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A REVISION OF THE BUTTERFLY GENERA *THEOCHILA* AND  
*TATOCHILA* (LEPIDOPTERA : PIERIDAE)

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This is the second in a series of four papers treating the “*Tatocheilae-Phulia*” complex of genera. In this paper is offered a treatment of the 14 species included in the genera *Theochila* Field and *Tatochila* Butler. Because these genera have recently been defined by the junior author (Proc. U. S. Nat. Mus., vol. 108, No. 3396, pp. 103–131, 1958), they are not further described here.

Both genera are Neotropical in distribution, *Theochila* being found in the southern nontropical parts of Brazil, in Paraguay, and in eastern Argentina and *Tatochila* being distributed from Colombia and Bolivia south through Tierra del Fuego in the tundra, temperate forests, and scrub areas.

This study is based upon 620 specimens gathered from the collections of the U. S. National Museum; Museo Nacional de Historia Natural, Santiago, Chile; Instituto Pedagógico, Universidad de Chile, at Santiago; Museu Nacional, Rio de Janeiro, Brazil; Fundación Miguel Lillo, Tucumán, Argentina; Cornell University, Ithaca, N. Y.; American Museum of Natural History, New York City; Chicago Museum of Natural History; and British Museum (Natural History), London. Thanks for the loan of this material are due to the officials of all of these museums and most especially to Dr. Kenneth J. Hayward of the museum in Tucumán, Mr. D. S. Fletcher of the British

Museum, and Dr. Emilo Ureta-R. of the Museo Nacional de Historia Natural, Santiago, Chile.

All specific and subspecific descriptions were prepared to supplement the illustrations and should be studied with that in mind.

The descriptions of the following new subspecies were prepared by William D. Field and are credited solely to him: *Tatochila theodice staudingeri* and *T. microdice fueguensis*.

### Genus *Theochila* Field

*Theochila* Field, Proc. U. S. Nat. Mus., vol. 108, p. 106, 1958.

TYPE: *Pieris maenacte* Boisduval = *Theochila maenacte* (Boisduval), by original designation.

This genus with characters as given in the original description. Only one species is included and it is here rather provisionally considered to consist of two subspecies. Its position until the present time has always been a matter of much speculation and doubt. It has, in a single decade, been placed in four different genera by four different authors.

#### *Theochila maenacte maenacte* (Boisduval)

*Pieris maenacte* Boisduval, Histoire naturelle des insectes, Species général des Lépidoptères, vol. 1, p. 517, 1836.—Doubleday, in Doubleday and Westwood, The genera of diurnal Lepidoptera, vol. 1, p. 48, 1847.

*Pieris menacte* Boisduval, Blanchard *nec* Boisduval (a misspelling), in Gay, Historia física y política de Chile, Zoología, vol. 7, pp. 10, 11, 1852.—Butler, Proc. Zool. Soc. London (1872), p. 41, 1872.—Burmeister, Description physique de la République Argentine . . . , vol. 5, pt. 1, p. 87, 1878; Atlas, sec. 5, pt. 2, p. 13, pl. 4, fig. 10, 1879–1880.—Herrich-Schaffer, Corresp.-Blatt Zool. mineral. Ver. Regensburg, vol. 21, No. 10, p. 126, 1867.—Gosse, Entomologist, vol. 13, p. 195, September 1880.—Mabilde, Guia practica para os principantes colleccionadores de insectos, p. 56, 1896.—Röber, in Seitz, Gross-Schmetterlinge der Erde, vol. 5, p. 58, pl. 19, figs. b1, b2, Sept. 26, 1908.—Giacomelli, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 26, p. 403, Mar. 10, 1915.—Jørgensen, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 28, p. 473, Nov. 10, 1916.—Giacomelli, Physis, vol. 3, No. 15, p. 379, 1917.—Köhler, Zeitschr. Wiss. Insekt.-Biol., vol. 18, pt. 12, suppl., p. 15, Dec. 15, 1923.—Drosihn, Ent. Rundschau, vol. 50, suppl., p. 81, pl. 20, fig. m, 1933.—Breyer, Verhandlungen VII Internationalen Kongress für Entomologie, vol. 1 (for 1938), pp. 34, February 1939.—Ureta, Rev. Chilena Hist. Nat., vol. 43 (for 1939), pp. 227, 228, 1940.

*Pieris automata* Berg, Mabilde *nec* Berg (a misidentification), Guia practica para os principantes colleccionadores de insectos, p. 55, pl. 2, fig. 5, 1896.

*Tatochila menacte* (Boisduval), Bartlett-Calvert *nec* Boisduval (a misspelling), Rev. Chilena Hist. Nat., vol. 2, No. 7, p. 98, July 1898.—Klots, Ent. Americana, new ser., vol. 12, No. 4, p. 218, December 1931.

*Pieris italicayae* Foetterle, Jørgensen *nec* Foetterle (a misidentification and misspelling), Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 28, p. 473, Nov. 10, 1916.—Röber, in Seitz, Gross-Schmetterlinge der Erde, vol. 5, p. 1016, Jan. 21, 1924.

*Ascia (Ganyra) menacte* (Boisduval), Talbot *nec* Boisduval (a misspelling), in Strand, Lepidopterorum catalogus, pars 66, p. 635, 1935.

*Pieris phileta itaticayae* Foetterle, Breyer *nec* Foetterle (a misidentification and misspelling), Verhandlungen VII Internationalen Kongress für Entomologie, p. 34, February 1939.

*Synchloë maenacte* (Boisduval), D'Almeida, Arq. Zool. Estado de São Paulo, vol. 2, p. 300, Jan. 3, 1941.

*Ascia maenacte* (Boisduval), Talbot, in Strand, Lepidopterorum catalogus, pars 66, p. 211, 1935.—Hayward, Acta Zool. Lilloana Inst. "Miguel Lillo," vol. 9, p. 97, Oct. 25, 1951.

*Theochila maenacte* (Boisduval), Field, Proc. U. S. Nat. Mus., vol. 108, p. 106, figs. 1, 9, 17, 25, 34, 1958.

VENATION: As illustrated (fig. 55).

LEGS: With paronychium, claw, and pulvillus as illustrated (fig. 69).

MALE: Plate 1, figure 1. Head with an orange margin behind eyes and with outer face of palpus white to pale yellow. Wings white above, usually with apex of forewing, costal margin and distal portions of radial veins dark fuscous in color. Extreme bases of both wings above irrorated with dark fuscous scales, especially along base of cubitus in the hindwing. Hindwing and apex of forewing below white with a faint yellowish cast, remainder of forewing white. There is a faint orange spot in extreme base of hindwing below and many specimens have the veins on this surface faintly outlined with fuscous, especially along the base of cubitus.

Length of forewing, 23–28 mm. (average 25.5 mm.).

Male genitalia as illustrated (figs. 27, 41). No differences were found between the genitalia of typical *T. maenacte* and its subspecies *T. maenacte itaticayae*. The genitalia of four males were studied.

FEMALE: Plate 1, figure 1a. Head as in the male. Wings above white with veins heavily outlined with fuscous and with dark apical area of forewing more extensive than in the male. Wings below as in the male, with ground color more yellow and with fuscous along the veins more distinct.

Length of forewing, 23–28 mm. (average, 25.5 mm.).

Female genitalia as illustrated (fig. 83), with anterior lobe of inner genital plate large, subtriangular, and having its ventral margin triundulate. As in the male, no differences were observed between the two subspecies. The genitalia of six females were studied.

TYPE LOCALITY: "Paraguay, Republique Argentina"=Paraguay.

LOCATION OF TYPE: British Museum (Natural History).

ADDITIONAL TYPE DATA: Described from a number of male specimens (number not specifically stated) in the Boisduval collection. Of these, only a single specimen is in the British Museum (Natural History), and we consider this to be the holotype.

**METHOD OF IDENTIFICATION:** By means of characters mentioned in the original description that are quite adequate for the identification of this name.

**SYNONYMICAL NOTES:** As shown in the references above, a number of workers have misspelled the name by dropping the first "a."

**MISIDENTIFICATIONS:** Jörgensen (1916), Röber (1924), and Breyer (1939) have all confused some specimens of *T. maenacte* with *T. maenacte itatiayae* and, in addition, have misspelled the latter. Mabilde (1896) has mistakenly identified this species as *Pieris automata* Berg.

**DISTRIBUTION:** Province of Buenos Aires in Argentina north into Paraguay and northwest into the states of Santa Catarina and Paraná in Brazil.

**ARGENTINA:** Province of Buenos Aires, Buenos Aires. **PARAGUAY:** no specific record. **BRAZIL:** State of Santa Catarina, Joinville; State of Paraná, Castro.

**MATERIAL STUDIED:** 7 males, 12 females.

*Theochila maenacte itatiayae* (Foetterle)

*Pieris itatiayae* Foetterle, Rev. Mus. Paulista, vol. 5, pp. 624-627, pl. 16, fig. 5, 1902.—Jörgensen, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 28, p. 473, Nov. 10, 1916.—Giacomelli, Physis, vol. 3, No. 15, p. 379, 1917.—Zikán, Ent. Rundschau, vol. 45, p. 7, Jan. 15, 1928.

*Pieris itaticayae* Foetterle, Röber *nec* Foetterle (a misspelling), in Seitz, Gross-Schmetterlinge der Erde, vol. 5, p. 60, pl. 19, fig. d1, 1908; *ibid*, vol. 5, p. 1016, Jan. 21, 1924.

*Synchlōe maenacte itatiayae* (Foetterle), D'Almeida, Arq. Zool. Estado de São Paulo, vol. 2, p. 300, pl. 1, figs. 1, 5, Jan. 3, 1941.

*Leptophobia itaticayae* Foetterle, Talbot *nec* Foetterle (a misspelling), in Strand, Lepidopterorum catalogus, pars 66, p. 52, 1935.

**VENATION:** Not illustrated, not different from typical *maenacte*.

**LEGS:** With paronychium, claw, and pulvillus not illustrated, not different from the typical subspecies.

**MALE:** Plate 1, figure 2. This subspecies is quite similar to typical *T. maenacte*, differing chiefly in having the fuscous on apex of forewing covering a considerably larger area and usually with dark scaling along veins on hindwing below slightly more distinct.

Length of forewing, 22-28 mm. (average, 25 mm.).

Male genitalia not illustrated, not different from the genitalia of typical *T. maenacte*. The genitalia of four males were studied.

**FEMALE:** Plate 1, figure 2a. Palpi as in the male but all five females available for study lacked the orange scaling behind the eyes (in four of these the heads were in poor shape). Wings similar to females of *T. maenacte maenacte* with fuscous on apical area more extensive and forming a more solid band. Wings below not distinguishable from the typical subspecies.

Length of forewing, 23–27 mm. (average 25 mm.).

Female genitalia not illustrated and not different from the typical subspecies. The genitalia of three females were studied.

VARIATION: One male (of a series of four) and one female (of a series of seven) labeled "Castro, State of Paraná, Brazil" are like *T. maenacte itatiayae*, while the remaining specimens from this locality are clearly *T. maenacte maenacte*. If these two specimens are correctly labeled (which we have reason to doubt) we will have to accept the fact that either the two subspecies overlap in distribution or that they are found a very short distance from each other although perhaps under different ecological conditions. For the time being this pair is classified as *itatiayae*, but Castro is not included as a locality for that subspecies.

TYPE LOCALITY: "Itatiaya, a partir de 1700 metros para cima," Brazil. The Itatiaya Mountains in the Serra do Mar chain, located in the region where the three states of Minas Gerais, Rio de Janeiro, and São Paulo join.

LOCATION OF TYPES: In the collection of José G. Foetterle, which according to Horn and Kahle (*Ent. Beih. Berlin-Dahlem*, vol. 2, p. 78, 1935) is in the Natural History Museum in Vienna, Austria.

ADDITIONAL TYPE DATA: Described from four males and one female, of which Foetterle considered one male and one female as "types" (=cotypes).

METHOD OF IDENTIFICATION: Identified by comparison of topotypical material with the original description and with the excellent original figure (in color).

SYNONYMICAL NOTES: There are no synonyms; however both Röber and Talbot, as shown in the references, have misspelled the name by adding a "e" between the second "i" and the second "a."

DISTRIBUTION: Only known from in and around the Itatiaya Mountains in the Serra do Mar chain of eastern Brazil.

BRAZIL: *State of Minas Gerais*, Passa Quatro (1,600 m., March, April, November), Virginia (1,500 m., January), Caldas (July); *State of Rio de Janeiro*, Itatiaya (February–April, August, October).

MATERIAL STUDIED: 14 males, 6 females.

### Genus *Tatochila* Butler

*Tatochila* Butler, *Cist. Ent.*, vol. 1, pp. 38, 51–52, 56, Sept. 12, 1870; *Proc. Zool. Soc. London* (1872), p. 67, Jan. 16, 1872.—Reed, *Anal. Univ. Chile*, vol. 49, p. 665, September 1877; *Una Monografía de los Mariposas Chilenas*, p. 20, 1877.—Butler, *Trans. Ent. Soc. London* (1881), pp. 472–474, December 1881.—Bartlett-Calvert, *Anal. Univ. Chile*, vol. 69, p. 314, March 1886.—Schatz, in Staudinger and Schatz, *Exotische Schmetterlinge*, Theil 2, p. 61, 1892.—Berg, *Anal. Mus. Nac. Buenos Aires*, vol. 4, pp. 217–255, figs. 1–5, Nov. 18, 1895.—Bartlett-Calvert, *Rev. Chilena Hist. Nat.*, vol. 2, p. 98,



- 1898.—Elwes, Trans. Ent. Soc. London (1903), pp. 292-293, October 1903.—Röber, in Seitz, Die Gross-Schmetterlinge der Erde, vol. 5, pp. 55-57, pl. 18, 1908.—Dixey, Proc. Ent. Soc. London (1909), p. cxxxv, Mar. 30, 1910.—Giacomelli, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 26, pp. 403-415, Mar. 10, 1915; Rev. Chilena Hist. Nat., vol. 20, pp. 41-57, 3 pls., June 30, 1916.—Jørgensen, Anal. Mus. Nac. Hist. Buenos Aires, vol. 28, pp. 430, 433-470, figs. 3-7, Nov. 10, 1916.—Giacomelli, Physis, vol. 3, pp. 371-378, 1917.—Röber, in Seitz, Die Gross-Schmetterlinge der Erde, vol. 5, pp. 1015-1016, Jan. 21, 1924.—Klots, Ent. Americana, new ser., vol. 12, No. 3, pp. 154, 161, December 1931; No. 4, pp. 217-218, 230, pl. 12, fig. 87, March 1932.—Talbot, in Strand, Lepidopterorum catalogus, pars 53, pp. 57-59, Oct. 24, 1932; pars 66, p. 626, Aug. 30, 1935.—Ureta, Bol. Mus. Nac. Hist. Nat., vol. 16, p. 123, 1937; Rev. Chilena Hist. Nat., vol. 41, pp. 239-283, pls. 11, 13, figs. 33-39, 1938.—Breyer, Verhandlungen VII Internationalen Kongress für Entomologie, vol. 1 (for 1938), pp. 28-33, 1938.—Apolinar, Rev. Acad. Colombiana Cienc. Exact. Fis. Nat., vol. 4, p. 349, 1941.—D'Almeida, Pap. Avulsos Dep. Zool., Sec. Agr. Brazil, vol. 3, p. 103, June 4, 1943.—Bryk, Ark. f. Zool., vol. 36a, pp. 5-7, pl. 1, figs. 2, 9, Nov. 6, 1944.—Hayward, Acta Zool. Lilloana, vol. 9, pp. 91-94, Oct. 25, 1951.—Field, Proc. U. S. Nat. Mus., vol. 108, pp. 108-110, 1958.
- Tatocheila* Butler, Scudder *nec* Butler (a misspelling), Proc. Amer. Acad. Arts Sci., vol. 10, p. 276, 1875.—D'Almeida, Pap. Avulsos Dep. Zool., Sec. Agr. Brazil, vol. 3, p. 102, June 4, 1943.
- Synchloë* Hübner, D'Almeida *nec* Hübner (falsely states that *Synchloë* was originally monotypic and makes a pseudotype of *S. autodice* Hübner), Arq. Zool. Estado de São Paulo, vol. 2, p. 299, Jan. 3, 1941; Pap. Avulsos Dep. Zool., Sec. Agr. Brazil, vol. 3, p. 102, June 4, 1943.

TYPE: *Synchloë autodice* Hübner = *Tatochila autodice* (Hübner). Type by reason of original designation and also by being sole included species.

Since this genus has just recently been redefined (Field, Proc. U. S. Nat. Mus., vol. 108, pp. 108-110, 1958), there is no need for discussion of its characters here.

The 13 species included in this genus are divided into five species groups on the basis of the type of aedeagus and differences in the wing patterns. It was not found necessary to include genitalia characters in the key.

#### Key to the species and subspecies of *Tatochila*

1. Hindwing below with a distinct white spot covering the lower discocellular vein and a considerable area of white along both sides of this vein (Groups B and C) . . . . . 2
- Hindwing below lacking this white spot and with lower discocellular vein outlined with black; or if white spot is present, it is restricted to the vein only (Groups A, D, E) . . . . . 19
2. Hindwing below with interspace Sc + R<sub>1</sub> containing a small oval or irregularly shaped spot or streak in the middle (Group B) . . . . . 3
- Hindwing below with interspace Sc + R, lacking this spot (Group C) . . . 5



16. Hindwing above with dark scaling along veins restricted to the outer margin.  
**T. mercedes** (p. 497)  
 Hindwing above with dark scaling along entire length of veins.  
**T. microdice** (p. 488)
17. Dark scaling along either side of veins on hindwing not covering the veins.  
**T. vanvoixemi** (p. 495)  
 Dark scaling covering the veins . . . . . 18
18. Hindwing below with a distinct series of fuscous, submarginal, sagittate markings; with white striping on veins narrow, usually covering only the veins . . . . . **T. microdice macrodice** (p. 492)  
 Hindwing below with fuscous, sagittate markings obsolete, sometimes entirely replaced with faint red spots; with white striping on veins broader, usually covering slightly more than the veins.  
**T. microdice arctodice** (p. 494)
19. Ground color of hindwing white washed with yellow; submarginal sagittate markings on both pair of wings underneath extending to at least below vein  $Cu_2$  . . . . . **T. theodice** and its subspecies (p. 475)  
 Ground color of hindwing underneath distinctly yellow; submarginal sagittate markings usually absent from both pairs of wings underneath or, if present, very faint and not extending below vein  $Cu_2$  (Groups D, E) . . . . . 20
20. Palpi with outer surface orange . . . . . **T. orthodice** (p. 504)  
 Palpi with outer surface yellow or white . . . . . 21
21. Scales behind eyes orange . . . . . 22  
 Scales behind eyes white . . . . . 24
22. Outer edge of forewing entirely black with marginal wedge-shaped markings solidly colored; hindwing below with distinct orange streaks in base of wing below cell and on outer half of wing between veins . . . . . 25  
 Outer edge of forewing white except for the wedge-shaped markings, at least some of which are divided in the middle by white along the veins; hindwing below with orange restricted to coastal margin.  
**T. inversa** (p. 501)
23. Hindwing below with large orange streak covering upper half of cell; forewing above with a submarginal series of connected sagittate markings.  
**T. xanthodice** (p. 511)  
 Hindwing below with this area yellow; forewing above lacking sagittate markings . . . . . **T. homoeodice** (p. 503)
24. Hindwing and apex of forewing below with long orange streaks between the veins extending from near the cell to the outer margin; veins on hindwing narrowly covered with dull white . . . . . 25  
 Hindwing and apex of forewing below lacking these orange streaks; veins on hindwing broadly covered with silvery white . . . . . **T. distincta** (p. 513)
25. Outer margin of hindwing above and below bordered by a distinct but narrow black line . . . . . **T. sagittata** (p. 506)  
 Outer margin of hindwing below with this black line lacking or represented only by short indistinct bars at the ends of the veins.  
**T. stigmadice** (p. 507)

## GROUP A. THE THEODICE GROUP

In this group the distal end of the aedeagus is deeply incised on its ventral side only, forming a large triangular-shaped lobe on its right side.



Hindwings above with solid-colored wedge-shaped markings along the outer margins and usually with a submarginal series of sagittate markings. Hindwings below with white ground color; with a submarginal series of sagittate markings; with narrow orange streaks through the middle of the interspaces from the outer margin to the cell and lacking a white spot that in some other groups covers the lower discocellular vein.

A single species that divides into three subspecies comprises this group.

*Tatochila theodice theodice* (Boisduval)

*Pieris theodice* Boisduval, Voyage de découvertes de l'*Astrolabe*, pt. 1, Lépidoptères, p. 51, 1832; Histoire naturelle des insectes, Species général des Lépidoptères, vol. 1, pp. 540, 541, 1836.—Doubleday, in Doubleday and Westwood, The genera of diurnal Lepidoptera, vol. 1, p. 51, 1847.—Blanchard, in Gay, Historia Física y Política de Chile, Zoología, vol. 7, p. 12 (description of female *theodice* only, which actually is male *theodice*), 1852.—Lucas, Rev. Mag. Zool., ser. 2, vol. 4, p. 337, July 1852.—Herrieh-Schäffer, Corresp. Blatt Zool.-Min. Ver. Regensburg, vol. 21, No. 10, p. 125, 1867.—Kirby, A synonymic catalogue of diurnal Lepidoptera, p. 450, 1871.—Berg, Actas Acad. Nac. Cienc., Córdoba, Argentine Rep., vol. 1, p. 66, 1875.

*Pieris demodice* Blanchard, in Gay, Historia de física y política de Chile, Zoología, vol. 7, pp. 13-14, 1852.—Kirby, A synonymic catalogue of diurnal Lepidoptera, p. 451, 1871.—Berg, Bull. Soc. Imp. Nat. Moscou, 1875, No. 4, pp. 195, 196, 1876.—Burmester, Description physique de la République Argentine . . . vol. 5, pt. 1, p. 89, 1878.—Staudinger, in Staudinger and Schatz, Exotische Schmetterlinge, vol. 1, p. 31, vol. 2, pl. 18, fig. a1, 1888.

*Tatochila theodice* Boisduval, Butler, Proc. Zool. Soc. London, 1872, p. 67, Jan. 16, 1872.—Reed, Anal. Univ. Chile, vol. 51, pp. 668-669, 1877.—Dixey, Proc. Ent. Soc. London, 1909, p. cxxxiv, Mar. 30, 1910.—Klots, Ent. Americana, new ser., vol. 12, No. 4, p. 218, March 1932.—Ureta, Rev. Chilena Hist. Nat., vol. 38, p. 78, 1934.—Breyer, Verhandlungen VII Internationalen Kongress für Entomologie, p. 30, February 1939.—Hayward, Act. Zool. Lilloana Inst. "Miguel Lillo," vol. 9, p. 92, Oct. 25, 1951.

*Tatochila demodice* (Blanchard), Butler, Proc. Zool. Soc. London (1872), p. 67, Jan. 16, 1872.—Reed, Anal. Univ. Chile, vol. 51, pp. 666, 667, 1877.—Butler, Trans. Ent. Soc. London (1881), p. 473, December 1881.—Bartlett-Calvert, Anal. Univ. Chile, vol. 69, p. 314, 1886.—Berg, Anal. Mus. Nac. Buenos Aires, vol. 4, pp. 240-245, Nov. 18, 1895.—Bartlett-Calvert, Rev. Chilena Hist. Nat., vol. 2, p. 98, July 1898.—Porter, Rev. Chilena Hist. Nat., vol. 3, p. 36, April 1899.—Elwes, Trans. Ent. Soc. London, 1903, pt. 3, pp. 292-293, pl. 12, figs. 7, 8, October 1903.—Röber, in Seitz, Die Gross-Schmetterlinge der Erde, vol. 5, pp. 56, 57, May 25, 1908.—Paravicini, Mitteil. Schweiz. Ent. Ges., vol. 12, pt. 1, p. 22, May 1910.—Giacomelli, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 26, pp. 406, 408, 414, 415, Mar. 10, 1915; Rev. Chilena Hist. Nat., vol. 20, pp. 44, 46, 57, 51, June 30, 1916.—Jørgensen, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 28, pp. 443, 462-464, figs. 3, 4, Nov. 10, 1916.—Giacomelli, Physis, vol. 3, p. 376, 1917.—Röber, in Seitz, Die Gross-Schmetterlinge der Erde, vol. 5, p. 1015, pl. 194, figs. a2, a3, Jan. 21, 1924.—Talbot, in Strand, Lepidopterorum catalogus, pars 53, Pieridae I, p. 58, Oct. 24, 1932.—Breyer, Rev. Soc. Ent.

- Argentina, vol. 8, p. 63, 1936; Verhandlungen VII Internationalen Kongress für Entomologie, vol. 1 (1938), p. 30, February 1939.—Hayward, Act. Zool. Lilloana Inst. "Miguel Lillo," vol. 9, p. 93, Oct. 25, 1951.
- Pieris xanthodice* Lucas, Mabile *nec* Lucas (a misidentification, figure only), Mission scientifique du Cap Horn, vol. 6, Zoologie, Insectes, pl. 1, fig. 1, 1888.
- Tatochila theodice theodice* (Boisduval), Ureta, Rev. Chilena Hist. Nat., vol. 41 (1937), pp. 265–270, fig. 37, Nos. 1–7; pl. 11, figs. 9, 10, 1938; Bol. Mus. Nac. Hist. Nat., vol. 16, p. 123, 1938.
- Tatochila theodice flammivolans* Bryk, Ark. f. Zool., vol. 36A, pp. 6, 7, Nov. 6, 1944.
- Tatochila theodice flammivolans f. antiquincunx* Bryk, Ark. f. Zool., vol. 36A, p. 7, pl. 1, fig. 9, Nov. 6, 1944.
- Tatochila theodice autodice* (Boisduval), Forster *nec* Boisduval (in error for *T. theodice theodice*), Veröffentl. Zool. Staatss. München, vol. 3, p. 134, Dec. 1, 1955.

VENATION: As illustrated (fig. 56).

LEGS: With paronychium, claw, and pulvillus as illustrated (fig. 72).

MALE: Plate 1, figures 3, 4. Head with scales behind eyes and with outer faces of palpi white to pale yellowish white. Wings above white with dark markings as illustrated, having the dark scaling along veins more heavy on outer margin, forming inwardly directed wedge-shaped marks. Both wings with a submarginal series of sagittate markings. Forewing with a large discal spot. Wings below with apex of forewing and ground color of hindwing pale yellow to white. Veins white and outlined on both sides with fuscous. Both pair of wings with a submarginal and intervenal row of sagittate markings. Hindwing with a fuscous streak through cell, forked near end of cell, with costal margin orange-yellow, with a long orange-yellow streak below cell and with long narrow intervenal streaks of the same color on outer margin and directed inward through the sagittate markings, continuing toward the cell.

Length of forewing, 25–30 mm. (average 27.1 mm.).

Male genitalia as illustrated (figs. 29, 42), with characters as described for the group. No differences were observed between the three subspecies. The genitalia of seven males of typical *T. theodice* were studied.

FEMALE: Plate 1, figures 3a, 4a. Head as in the male. Wings above very similar to those of the male, differing in having ground color somewhat yellowish or cream colored and with all dark markings more distinct than in the male. Wings below with ground color as in the male with yellow streaks usually darker and more distinct.

Length of forewing, 25–29 mm. (average, 26.8 mm.).

Female genitalia as illustrated (fig. 86), with posterior lobe of inner genital plate uncinatate and with a small basal fingerlike process. Anterior lobe of inner genital plate subtriangular, with posterior and

anterior free angles greatly produced and with ventral margin undulate. Ductus bursae with ribbonlike plate large, fused to anterior subtriangular plate and with a pair or more of small irregularly shaped plates anterior to this. As in the male, no differences are displayed between the three subspecies. The genitalia of six females were studied.

**SEASONAL VARIATION:** In the spring and sometimes in the fall, this Chilean species produces a form that is smaller ( $\sigma$ , 19–25 mm., average 22.6 mm.;  $\rho$ , 22–24 mm., average 22.8 mm.) with all markings correspondingly reduced in size (pl. 1, figs. 4, 4a).

**TYPE LOCALITY:** Herewith restricted to central Chile. A mixup over the type locality is the reason for the restriction. Boisduval, in his original description, cited the type locality as "Bourou" (Buru, an island in Indonesia). Later, he (1836) corrected this to Payta, Peru. However, this locality is also in error as no species found in Peru fits either the original description or his subsequent description, while the species here discussed from central Chile and southward does agree with his descriptions.

**ADDITIONAL TYPE DATA AND LOCATION OF TYPES:** *T. theodice* was originally described from the female sex, the number of specimens not being given. The type should have gone to the British Museum from the Oberthür collection. Mr. D. S. Fletcher of that museum writes that the type is not in the collection there. He states further that there is a Boisduval specimen labeled "type" by some subsequent worker but that it is certainly not the type, "for even if Boisduval were to mistake his sexes" (the specimen in question is a male) he would never mistake pure white for "white, a little yellowish." Mr. Jean Bourgogne of the Paris Museum searched the collections there and reported that the type of *theodice* is not present. The type is apparently lost.

**METHOD OF IDENTIFICATION:** Based upon the original and subsequent descriptions of Boisduval which positively fix the name *theodice* to the species here described. A neotype designation is not needed.

**SYNONYMICAL NOTES:** The data for the names listed in the above synonymy are as follows:

*Pieris demodice* Blanchard, 1852. Type locality, "Provincias del Norte," Chile (this should be interpreted as the north-central provinces, south of Antofagasta). Described from an unspecified number of specimens of both sexes. There are one male and three females, cotypes, in the Paris Museum. A lectotype is not designated. The original description can apply only to *T. theodice*.

*Tatochila theodice flammivolans* Bryk, 1944. Type locality, "Peninsula Llao Llao" on Lago Nahuel Huapí, Territory of Río Negro, Argentina. Described from holotype male, allotype female, and 20 male and 5 female paratypes. Type in Naturhistoriska Riksmuseet, Stockholm. Specimens from Villa Angostura and Lago Nahuel Huapí, Province of Neuquen (near the type locality) have been

studied and found to agree with the original illustration and description of *flammivolans*. This material is typical *theodice*.

*Tatochila theodice flammivolans* form *antiquincunx* Bryk, 1944. Type locality as given under *flammivolans*. Described from a single male, the holotype. Type in Naturhistoriska Riksmuseet, Stockholm. This is merely an individual variant.

**MISIDENTIFICATIONS:** Mabille (1888) figures this species under the name *Pieris xanthodice* Lucas. Förster lists this species under the name *Tatochila theodice autodice* (Boisduval), an obvious mistake for *Tatochila theodice theodice*.

**DISTRIBUTION:** In Chile from the Province of Aconcagua south at least through the Province of Malleco. In Argentina in the western portions of the Province of Neuquen and the Territory of Río Negro.

**CHILE:** *Province of Aconcagua*, Los Andes (April); *Province of Valparaiso*, Valparaiso; *Province of Santiago*, Peñalolen (March), Cumbre, Santiago (January), El Manzano (December), Maquil (February), El Canelo (February, October), Lo Valdés Cordillera (March); *Province of Talca*, Los Nieves (November); *Province of Chillan*, El Roble (January); *Province of Malleco*, Victoria. **ARGENTINA:** *Province of Neuquen*, Parque Nacional de Lanin, Lago Hermosa (November), Villa Angostura (December), Pucará (December), Hua Hun (December); *Territory of Río Negro*, El Tronador (February).

**MATERIAL STUDIED:** 22 males, 10 females.

#### *Tatochila theodice gymnodice* Staudinger

*Pieris theodice* Boisduval, Mabille,  *nec* Boisduval, Mission Scientifique du Cap Horn, 1832-1833, vol. 6, Zoologie. Insectes, p. 7, pl. 1, fig. 1 (sic fig. 2), 1838.

*Tatochila theodice gymnodice* Staudinger, Lepidopteren, in *Ergebnisse der Hamburger Magalhaensische Sammelreise*, vol. 2, art. 6, p. 13, 1898.—Röber, in *Seitz, Die Gross-Schmetterlinge der Erde*, vol. 5, p. 56, May 25, 1908.—Giacomelli, *Anal. Mus. Nac. Hist. Nat. Buenos Aires*, vol. 26, pp. 406, 412, 413, Mar. 10, 1915; *Rev. Chilena Hist. Nat.*, vol. 20, p. 56, June 30, 1916.—Jørgensen, *Anal. Mus. Nac. Hist. Nat. Buenos Aires*, vol. 28, p. 456, Nov. 10, 1916.—Giacomelli, *Physis*, vol. 3, p. 375, 1917.—Talbot, in *Strand, Lepidopterorum catalogus, pars 53, Pieridae I*, p. 58, Oct. 24, 1932.—Ureta, *Rev. Chilena Hist. Nat.*, vol. 41 (for 1937), pp. 270-272, pl. 12, fig. 6, 1938, *Bol. Mus. Nac. Hist. Nat.*, vol. 16, p. 123, 1938.

*Tatochila demolice argyrolice* Staudinger, *Elwes nec* Staudinger (a misidentification), *Trans. Ent. Soc. London* (1903), pp. 292, 293, pl. 12, figs. 9, 10, October 1903.

*Tatochila theodice gymnodice* Staudinger, Giacomelli  *nec* Staudinger (a misspelling), *Rev. Chilena Hist. Nat.*, vol. 20, p. 44, June 30, 1916.

*Tatochila theodice f. gymnodice* Staudinger, Hayward, *Act. Zool. Lilloana Inst. "Miguel Lillo,"* vol. 9, p. 92, Oct. 25, 1951.

Veins and legs show no subspecific characters.

**MALE:** Plate 2, figure 5. Head as in typical *theodice*. Wings similar to typical *theodice*, smaller with black bar at end of cell on upperside of forewing considerably narrower and with orange-yellow markings below considerably paler.

Length of forewing, 23-24 mm. (average, 23.5 mm.).



Male genitalia not illustrated and not different from the typical subspecies. Five males dissected and studied.

FEMALE: Plate 2, figure 52a. Head as in the male. Wings smaller than in typical *theodice* with black bar at end of cell on upperside of forewing narrower and with ground color considerably more suffused with fuscous in basal half of both wings above. Orange-yellow markings below considerably paler than in the typical subspecies.

Length of forewing, 19–24 mm. (average, 22.5 mm.).

Female genitalia not illustrated and not different from the typical subspecies. Four females were dissected and studied.

TYPE LOCALITY: Near "Punta-Arenas"=Punta Arenas, Department of Punta Arenas, Province of Magallanes, Chile.

LOCATION OF TYPE: In the "Zoologisches Museum der Humboldt-Universität, Berlin."

METHOD OF IDENTIFICATION: By a study of the original description and comparison with toptotypical material. The name *gymnodice* is based upon a pair of rather rare individual variants lacking most of the yellow between the sagittate markings and veins of the hindwings below. In spite of this individual variation the population here described deserves recognition.

SYNONYMICAL NOTES: Giacomelli (1916) misspelled the name as *gymmodice*.

MISIDENTIFICATIONS: Mabille (1888) confuses this population with typical *theodice*. Elwes (1903) designates this population as *argyrodice*.

DISTRIBUTION: The extreme southern parts of Argentina and Chile north of the Magellan Straits and in the northern part of Tierra del Fuego.

CHILE: Territory of Magallanes, Department of Punta Arenas, Punta Arenas (January, February); Department of Última Esperanza, Puerto Prat (January, February), Puerto Bories (February), Gregory Bay, Dos Lagunas (February); Department of Tierra del Fuego, Porvenir (February). ARGENTINA: Territory of Santa Cruz, Río Túnel.

MATERIAL STUDIED: 11 males, 10 females.

#### *Tatochila theodice staudingeri* Field, new subspecies

*Tatochila theodice* Boisduval, Staudinger *nec* Boisduval (a misidentification), Lepidopteren, in Hamburger Magalhaensische Sammelreise, vol. 2, art. 6, pp. 10–14, 1898.

Veins and legs display no subspecific characters.

MALE: Plate 2, figure 6. Head with scales behind eyes and with outer faces of palpi white to pale yellow, rarely pale orange. Wings above similar to *T. theodice gymnodice*, having the black bar at end of cell on upperside of forewing narrower than in typical *theodice*.



Below it differs from both of these subspecies in the greater amount of dark scaling along the veins with the resulting stripes twice the width they are in the other subspecies.

Length of forewing, 21-26 mm. (average, 24.1 mm.).

Male genitalia not illustrated and not different from the other two subspecies. Two males were dissected and studied.

FEMALE: Plate 2, figure 6a. Head as in the male. Wings above as in *gymnodice* but even more heavily suffused with fuscous. Under-surfaces as in the male with a greater amount of dark scaling along the veins.

Length of forewing, 22-26 mm. (average, 23.4 mm.).

Female genitalia not illustrated and not different from the other subspecies. One female dissected and studied.

TYPE LOCALITY: Puerto Harberton, Territory of Tierra del Fuego, Argentina.

ADDITIONAL TYPE DATA: Described from the holotype, male (locality as given above, Dec. 1, 1948, Olog and Budin); allotype, female (same data, ♀ genitalia preparation, W. D. F.-J. H. No. 399). Paratypes: 4♀♀, same data; 1 ♂, same locality and collectors, Dec. 18, 1948; 2 ♂♂, same locality and collectors, Nov. 26, 1948; 1 ♀, Ushuaia, Territory of Tierra del Fuego, Argentina, Dec. 12, 1948, Olog and Bodin; and 1 ♂, Río Douglas, Isla Navarino, Department of Tierra del Fuego, Province of Magallanes, Chile, Dec. 28, 1948, Olog and Bodin.

LOCATION OF TYPES: Holotype, allotype, four male and five female paratypes in Fundación Miguel Lillo, Universidad Nacional de Tucumán, Tucumán, Argentina. One pair of paratypes in U. S. National Museum.

DISTRIBUTION: Extreme southern part of the island of Tierra del Fuego and on the island of Navarino. Specific records as given under additional type data above.

MATERIAL STUDIED: 6 males, 6 females.

#### GROUP B. THE AUTODICE GROUP

In this group the aedeagus is sinuous and is incised at the distal end on its left side, with an upwardly directed rounded lobe below the incision on this side and two distal teeth dorsad of this incision.

Hindwings above with marginal wedge-shaped markings absent or, if present, divided by the white veins and with submarginal series of sagittate markings present or absent. Hindwing below with ground color yellow or white suffused with yellow; with a submarginal series of sagittate markings; without orange streaks in middle of interspaces; possessing a white spot over the lower discocellular vein and adjacent area. This is the only group possessing an oval or irregularly shaped

fuscous spot or streak in middle of interspace Sc+R<sub>1</sub> on undersurface of hindwing.

This group contains two species, one of which is divided into two subspecies.

*Tatochila autodice* (Hübner)

*Synchloë autodice* Hübner, *Zuträge sur Sammlung exotischer Schmetterlinge*, vol. 1, p. 26, 1818; *Sammlung exotischer Schmetterlinge*, vol. 2, pl. [227], 4 figs., [between Jan. 1, 1825, and Aug. 26, 1825].—D'Almeida, *Arq. Zool. Estado de São-Paulo*, vol. 2, p. 299, pl. 1, figs. 2, 4, Jan. 3, 1941.—Breyer, *Rev. Soc. Ent. Argentina*, vol. 12, p. 310, February 1945.—Zischka, *Folia Universitaria, Cochabamba, Bolivia*, vol. 1, p. 28, December 1947.

*Pieris autodice* (Hübner), Boisduval, *Histoire naturelle des insectes, species général des Lépidoptères*, vol. 1, pp. 539, 540, 1836.—Doubleday, *List of the specimens of lepidopterous insects in the collection of the British Museum*, pt. 1, p. 33, 1844; *in* Doubleday and Westwood, *The genera of diurnal Lepidoptera*, vol. 1, p. 51, 1847.—Herrich-Schäffer, *Corresp.-Blatt Zool.-min. Ver. Regensburg*, vol. 21, p. 125, 1867.—Kirby, *A synonymic catalogue of diurnal Lepidoptera*, p. 450, 1871.—Capronnier, *Ann. Soc. Ent. Belgique*, vol. 17, fasc. 1, p. 11, 1874.—Berg, *Act. Acad. Nac. Cienc. Córdoba, Argentine Rep.*, vol. 1, p. 65, 66, 1875; *Bull. Soc. Imp. Moscou* (1875), pp. 193-195, 1876.—Burmeister, *Description physique de la République Argentine . . .*, vol. 5, pt. 1, p. 88, 1878.—Gosse, *Entomologist*, vol. 13, p. 195, September 1880.—Weymer and Maassen, *W. Reiss und A. Stübel Reisen in Süd-Amerika, Lepidopteren . . .*, p. 93, 1890.

*Tatochila autodyce* (Hübner), *Butler nec Hübner* (a misspelling), *Cist. Ent.*, vol. 1, p. 51, Sept. 12, 1870.

*Pontia mercedis* Eschscholtz, *Kirby nec Eschscholtz* (in synonymy of *T. autodice* Hübner), *A synonymic catalogue of diurnal Lepidoptera*, p. 450, 1871.—Butler, *Trans. Ent. Soc. London* (1881), p. 473, December 1881.—Weymer and Maassen, *W. Reiss und A. Stübel Reisen in Süd-Amerika, Lepidopteren . . .*, p. 93, 1890.—Berg, *Anal. Mus. Nac. Buenos Aires*, vol. 4, p. 222, Nov. 18, 1895.

*Tatochila autodice* (Hübner), *Butler*, *Proc. Zool. Soc. London* (1872), p. 67, Jan. 16, 1872; *Trans. Ent. Soc. London* (1881), p. 473, December 1881.—Berg, *Anal. Mus. Nac. Buenos Aires*, vol. 4, pp. 219, 222-226, Nov. 18, 1895.—Bartlett-Calvert, *Rev. Chilena Hist. Nat.*, vol. 2, p. 98, July 1898.—Porter, *Rev. Chilena Hist. Nat.*, vol. 3, p. 36, April 1899.—Röber, *in* Seitz, *Die Gross-Schmetterlinge der Erde*, vol. 5, p. 56, pl. 18, figs. b1-b3, May 25, 1908.—Dixey, *Proc. Ent. Soc. London* (1909), p. cxxxiv, Mar. 30, 1910.—Paravicini, *Mitteil. Schweiz. Ent. Ges.*, vol. 12, heft 1, p. 21, May 1910.—Giacomelli, *Anal. Soc. Cient. Argentina*, vol. 78, p. 174, August 1914; *Anal. Mus. Nac. Hist. Nat. Buenos Aires*, vol. 26, pp. 406-408, 410, 412, 413, Mar. 10, 1915; *Rev. Chilena Hist. Nat.*, vol. 20, pp. 44, 45, 46-49, 53, pl. 1, figs. 1, 2, June 30, 1916.—Jørgensen, *Anal. Mus. Nac. Hist. Nat. Buenos Aires*, vol. 28, p. 430, 443, 444-446, Nov. 10, 1916.—Giacomelli, *Physis*, vol. 3, p. 373, 1917.—Köhler, *Zeitschr. Wiss. Insektenbiol.*, vol. 18, Sonderbeilage, p. 14, Dec. 15, 1923.—Klots, *Ent. Americana*, new ser., vol. 12, No. 4, p. 218, pl. 12, fig. 87, March 1932.—Talbot, *in* Strand, *Lepidopterorum catalogus*, pars 53, *Pieridae I*, p. 57, Oct. 24, 1932; *in* Strand, *Lepidopterorum catalogus*, pars 66, *Pieridae III*, p. 626, Aug. 30, 1935.—Ureta, *Rev. Chilena Hist. Nat.*, vol. 41 (for 1937), pp. 254-259, fig. 35; pl. 11, figs. 5, 6, 1938; *Bol.*

Mus. Nac. Hist. Nat., vol. 16, p. 123, 1938.—Breyer, Verhandlungen VII Internationalen Kongress für Entomologie, vol. 1 (for 1938), pp. 30–31, February 1939.—Hayward, Act. Zool. Lilloana Inst. "Miguel Lillo," vol. 9, p. 91, Oct. 25, 1951.—Zischka, Fol. Univ., Univ. Cochabamba, Bolivia, vol. 5, p. 18, October 1951.—Forster, Veröffentl. Zool. Staatss. München, vol. 3, p. 134, Dec. 1, 1955.

*Pieris mercedis* (Eschscholtz), Berg *nec* Eschscholtz (in synonymy of *T. autodice* (Hübner)), Bull. Soc. Imp. Nat. Moscou (1875), p. 193, 1876.—Burmeister, Description physique de la République Argentine . . . , vol. 5, pt. 1, p. 88, 1878.

*Pieris polydice* Blanchard, Butler *nec* Blanchard (in synonymy of *T. autodice* (Hübner)), Trans. Ent. Soc. London (1881), p. 473, December 1881.

*Hesperocharis marchalii* Guérin, Mabilde *nec* Guérin (a misidentification), Guia practica para os principantes colleccionadores de insectos, p. 52, pl. 2, figs. 1a–c, 1896.

*Tatochila autodice* f. *flava* Hayward, Act. Zool. Lilloana Inst. "Miguel Lillo," vol. 7, pp. 135, 136, 1949.

*Tatochila autodice* ab. *flava* Hayward, Act. Zool. Lilloana Inst. "Miguel Lillo," vol. 9, p. 91, Oct. 25, 1951.

VENATION: As illustrated (fig. 57).

LEGS: With paronychium, claw, and pulvillus as illustrated (fig. 71).

MALE: Plate 2, figures 7, 7b. Head with palpi white on the sides; scales behind eyes orange, darker above than below. Wings with markings dark brown to black in color. Ground color on upper surfaces and on disc and base of forewing below white. Below on hindwing and apex of forewing very pale yellow or white washed with yellow. Hindwing below with costal margin and extreme base orange and with a white spot over the lower discocellular vein and adjacent area. *T. autodice* differs from *blanchardii* chiefly by having the hindwing above entirely without markings or, if marked, with very faint spots at the ends of veins only and by usually having the black bar at end of cell, isolated from the costal margin.

Length of forewing, 20–30 mm. (average, 26.1 mm.).

Male genitalia as illustrated (figs. 28, 43). Very close to *blanchardii*, differing chiefly in having the aedeagus slightly less sinuate. The genitalia of seven males were studied.

FEMALE: Plate 2, figure 7a. Head as in the male. Wings with markings dark brown to black. Ground color on upper surfaces white, sometimes pale yellowish on hindwing. Wings below colored as in the male. This sex differs from the male chiefly in having all dark markings on upper surfaces larger and more distinct. From females of *blanchardii* it differs in having wedge-shaped marks on apex of forewing above extending inward only to the submarginal black spots and also in having the ground color of this surface of the hindwing white, sometimes with a faint yellowish tinge but not distinctly yellow as in that species.

Length of forewing, 21–30 mm. (average, 26.1 mm.).

Female genitalia as illustrated (fig. 84), with anterior lobe of inner genital plate gradually produced ventrally. Ductus bursae with a narrow ribbon-like plate on ventral surface opposite opening of ductus seminalis and with a small triangular plate just anterior to this. The genitalia of eight females were studied.

TYPE LOCALITY: "Aus Paraguan, vom Platastrome her." Probably near Buenos Aires, Argentina. In the latter part of the 18th century the region including the Río de la Plata was known for a time as Paraguay and this included Buenos Aires.

ADDITIONAL TYPE DATA: Originally described from the male sex, the number of specimens not stated, sent to Hübner by a Mr. Berg.

LOCATION OF TYPE: Believed to be in the Hübner collection in the Naturhistorisches Museum, Vienna, Austria.

METHOD OF IDENTIFICATION: By means of the very excellent original colored figure.

SYNONYMICAL NOTES:

*Tatochila autodice* f. *flava* Hayward, 1949. Type locality, "La Rioja." Described from a single female specimen, the holotype, deposited in the Museo Argentino de Ciencias Naturales de Buenos Aires. This name is listed as a synonym since it represents an individual variant.

Butler (1870) has misspelled this specific name as *autodyce*.

MISIDENTIFICATIONS: Kirby (1871) and others confused *mercedis* Eschscholtz with *autodice*. Butler (1881) has confused *polydice* Blanchard with *autodice*. Mabilde (1896) illustrates this species under the name *Hesperocharis marchalii* Guérin.

DISTRIBUTION: Bolivia and southern Brazil south into the territory of Río Negro, Argentina.

BOLIVIA: *Department of Cochabamba*, Cochabamba (March, August). BRAZIL: *State of Minas Gerais*, Punta Grossa (this record seems doubtful); *State of Rio Grande do Sul*, Pelotas (December). PARAGUAY: No specific locality. URUGUAY: *Department of Montevideo*, Montevideo. ARGENTINA: *Province of Jujuy*, Jujuy (May); *Province of Salta*, Cafayate (March), Salta (March, July); *Province of Tucumán*, Tucumán (January, April, June, October), San Genero (April, May), Valle Tafi (April), Quebrada Lulas (February); *Province of La Rioja*, La Rioja, Valle Ana (April); *Province of Córdoba*, Córdoba (February), Sauce (March), Capilla del Monte (February); *Province of Santa Fé*, Hovencia (July), Albarellos, Santa Felicia; *Province of Entre Ríos*, Nuñez; *Province of Buenos Aires*, Buenos Aires (March, December); Bahia Blanca (November), Diadema (October); *Neuquén Territory*, Neuquén (November); *Río Negro Territory*, Río Negro (April), Río Colorado.

FOOD PLANTS: *Brassica oleracea* L., *Alysson maritimum* L., *Medicago sativa* L., *Cestrum parqui* L'Her., *Lepidium ruderales* L., *Cestrum pseudoquina* Mar.

MATERIAL STUDIED: 51 males, 55 females.



*Tatochila blanchardii blanchardii* Butler

- Pieris autodice* (Hübner), Blanchard *nec* Hübner (a misidentification), in Gay, Historia física y política de Chile, Zoología, vol. 7, p. 11, 1852.
- Pieris theodice* Boisduval, Blanchard *nec* Boisduval (a misidentification), in Gay, Historia física y política de Chile, Zoología, vol. 7, atlas, plate 1, figs. 2a, 2b (male), 1852.—Berg, Anal. Mus. Nac. Buenos Aires, vol. 4, pp. 227–231, fig. 1, Nov. 18, 1895.
- Tatochila blanchardii* Butler, Trans. Ent. Soc. London (1881), pp. 472, 473, 483, pl. 21, fig. 15, December 1881.—Bartlett-Calvert, Anal. Univ. Chile, sec. 1, Mem. Cient. Lit., vol. 69, p. 314, 1886.—Berg, Anal. Mus. Nac. Buenos Aires, vol. 4, p. 227, Nov. 18, 1895.—Bartlett-Calvert, Rev. Chilena Hist. Nat., vol. 2, p. 98, July 1898.—Porter, Rev. Chilena Hist. Nat., vol. 3, p. 36, April 1899.—Ureta, Rev. Chilena Hist. Nat., vol. 41 (for 1937), p. 181, 1938, Rev. Chilena Hist. Nat., vol. 41 (for 1937), pp. 259–265, fig. 36, pl. 11, figs. 7, 8, 1938; Bol. Mus. Nac. Hist. Nat., vol. 16, p. 123, 1938; Rev. Chilena Hist. Nat., vol. 42 (for 1938), p. 297, 1939.—Breyer, Verhandlungen VII Internationalen Kongress für Entomologie, vol. 1 (for 1938), p. 31, February 1939.—Ureta, Rev. Chilena Hist. Nat., vol. 43 (for 1939), pp. 254, 255, 1940.—Hayward, Act. Zool. Lilloana Inst. "Miguel Lillo," vol. 9, p. 92, Oct. 25, 1951.
- Tatochila theodice* (Boisduval), Elwes *nec* Boisduval (a misidentification), Trans. Ent. Soc. London (1903), p. 293, October 1903.—Röber, in Seitz, Die Gross-Schmetterlinge der Erde, vol. 5, p. 56, pl. 18, figs. c1–c3, May 25, 1908.—Giacomelli, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 26, pp. 406, 407, 412, 413, Mar. 10, 1915; Rev. Chilena Hist. Nat., vol. 20, pp. 43, 44, 45, 49–51, 56, pl. 1, figs. 3, 4, June 30, 1916.—Jørgensen, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 28, pp. 443, 454–456, Nov. 10, 1916.—Giacomelli, Physis, vol. 3, p. 375, 1917.—Talbot, in Strand, Lepidopterorum catalogus, pars 53, Pieridae I, p. 57, Oct. 24, 1932.
- Tatochila blanchardii* ab. *izquierdoi* Ureta, Rev. Chilena Hist. Nat., vol. 41 (for 1937), pp. 263–265, fig. 36, No. 8, 1938; Bol. Mus. Nac. Hist. Nat., vol. 16, p. 123, 1938.
- Tatochila blanchardii blanchardii* Butler, Herrera, Rev. Chilena Ent., vol. 3 (for 1953), p. 144, 1954.

VENATION: As illustrated (fig. 58).

LEGS: With paronychium, claw, and pulvillus as illustrated (fig. 70).

MALE: Plate 3, figure 9. Head with palpi white to pale yellow on the sides. Scales behind eyes yellow to white above, orange below. Wings with dark markings black to dark brown. Ground color on upper surfaces and on disc and base of forewing below white. Pale greenish yellow on hindwing and apex of forewing below. Hindwing below with costal margin and extreme base somewhat darker yellow or pale orange and with a white spot over the lower discocellular vein and adjacent area. *T. blanchardii* differs from *autodice* in having marginal wedge-shaped spots and a submarginal series of black spots on the hindwings above, thus greatly resembling females of *autodice*. It also frequently differs from *autodice* by having the black bar at end of cell on forewing above extending to the costal margin.

Length of forewing, 22–29 mm. (average, 26.8 mm.).



Male genitalia as illustrated (figs. 30, 44).

Close to *autodice*, having a slightly more sinuous aedeagus. No differences were observed between the two subspecies of *blanchardii*. The genitalia of six males were studied.

FEMALE: Plate 2, figure 8; plate 3, figure 9a. Head as in the male. Wings with dark markings black to dark brown. Ground color of forewing above pale yellow to white, usually paler in base of wing. Ground color of hindwing above yellow, sometimes cream colored. Wings below colored as in the male. The female differs from the male by the yellowish ground color of the hindwing above and in having all dark markings larger and more distinct, in having the wedge-shaped markings of forewing above extending inward to the cell and in having these markings on this surface of the hindwing extending inward to the base along both sides of the veins. From females of *autodice* it differs in having the wedge-shaped markings on forewing above longer (extending inward to the cell) and in having the ground color of hindwing above yellow or cream colored, not white or white with a faint yellowish tinge.

Length of forewing, 24–30 mm. (average, 27 mm.).

Female genitalia as illustrated (fig. 85). With anterior lobe of inner genital plate subtriangular and having its posterior margin slightly undulate and its ventral margin broadly produced near the middle. Ductus bursae with narrow ribbon-like plate opposite opening of ductus seminalis divided into two elements and with a single large subtriangular plate and two small plates anterior to this. The genitalia of six females were studied.

TYPE LOCALITY: "Valparaiso," Province of Valparaiso, Chile.

ADDITIONAL TYPE DATA: Originally described from two specimens, one of each sex (locality as given above; collected by Thomas Edmonds, 1882). The male specimen is hereby designated the lectotype.

LOCATION OF TYPE: Lectotype in the collection of the British Museum (Natural History).

METHOD OF IDENTIFICATION: Photographs of a topotypical male were compared with the lectotype of *blanchardii* by Mr. D. S. Fletcher of the staff of the British Museum and were found by him to represent that species. These photographs are reproduced here as figure 17 on plate 3. Fletcher writes that the dark bar at the end of the cell on the lectotype does not extend to the costal margin. However the size of this bar is somewhat variable.

#### SYNONYMICAL NOTES:

*Tatochila blanchardii* ab. *izquierdoi* Ureta, 1937. Type locality, "Chile" (exact data unknown). This was described from a female specimen in the collection of Vicente Izquierdo Phillips. It is an aberrant specimen having a great amount of black suffusion particularly on the upper side of forewing, where from the apex of the cell to the submarginal sagittate markings this wing is almost entirely black.

MISIDENTIFICATIONS: Blanchard (1852) confused this species with *T. autodice* (Hübner) and with *T. theodice* (Boisduval). Elwes (1903) and others have identified this species with *T. theodice*.

DISTRIBUTION: Chile from the Province of Antofagasta south through the Province of Cautin.

CHILE: *Province of Antofagasta*, Antofagasta; *Province of Coquimbo*, El Tofo; *Province of Valparaiso*, Valparaiso; *Province of Santiago*, Pudahuel (October), Maquil (March), Peñalolen (October, November), Lo Ovalle (January), Canelo (October); *Province of Talca*, Los Nieves (November), San Cristóbal (January, March); *Province of Cautin*, Temuco (February).

FOOD PLANT: *Tropaeolum*.

MATERIAL STUDIED: 12 males, 13 females.

*Tatochila blanchardii ernestae* Herrera

*Pieris theodice* Boisduval, Hopffer *nec* Boisduval (a misidentification), Stettiner Ent. Zeit., vol. 40, p. 83, March 1879.

*Tatochila theodice* (Boisduval), Dyar *nec* Boisduval (a misidentification), Proc. U. S. Nat. Mus., vol. 45, p. 628, July 22, 1913.

*Tatochila blanchardii ernestae* Herrera, Rev. Chilena Ent., vol. 3 (for 1953), pp. 140-144, figs. 1-4, figs. A, B, 1954.—Forster, Veröffentl. Zool. Staatss. München, vol. 3, p. 134, Dec. 1, 1955.

Veins and legs show no subspecific characters and are not illustrated.

MALE: Plate 3, figure 10. Head very similar to *T. blanchardii blanchardii* with orange behind eyes slightly more extensive than in that subspecies. Wings above with dark markings slightly more distinct than in typical *blanchardii*. Differing chiefly from that subspecies in having the ground color of hindwing and of apex of forewing on the underside darker yellow with the costal margin and base of hindwing distinctly orange. Differing also in having veins on hindwing below pale purplish gray edged in gray instead of the usual white to gray edged in black that is true of typical *blanchardii*.

Length of forewing, 25-29 mm. (average, 27 mm.).

Male genitalia not illustrated, not different from typical *blanchardii*. The genitalia of five males were studied.

FEMALE: Plate 3, fig. 10a. Head as in the male. Wings above usually with dark markings slightly more distinct than in typical *blanchardii*, otherwise very similar to *blanchardii* on this surface. Wings below with yellow ground color even darker than in the male, tending toward orange, and with veins distinctly purplish gray instead of the usual gray of typical *blanchardii*.

Length of forewing, 26-28 mm. (average, 27 mm.).

Female genitalia not illustrated, not different from typical *blanchardii*. The genitalia of five females were studied.

TYPE LOCALITY: "Miñi-Miñi, 1,650 meters, Province Tarapacá," Chile.

**ADDITIONAL TYPE DATA:** Described from the holotype, male (locality as given above, Feb. 16, 1948, J. Herrera collection, genitalia No. 750); the allotype, female (locality as given above, Feb. 14, 1948, J. Herrera collection, genitalia No. 743); and from the following paratypes: 40 ♂♂ and 19 ♀♀ from various localities in the Province of Tarapacá (Miñi-Miñi, Iquique, Poroma, Codpa and Putre); 4 ♂♂ and 1 ♀ from various localities in Peru (Department of Lima, Supe; Department of Puno, Puno; Department of Arequipa, Arequipa and Cantas; Department of Tacna, Tarata).

**LOCATION OF TYPE:** Holotype and allotype in the collection of the Instituto Pedagógico, Universidad de Chile. Paratypes in the same collection and in the collections of the U. S. National Museum, Washington, D. C.; American Museum of Natural History, New York City; and the Museo Nacional de Historia Natural Javier Prado, Lima, Peru.

**METHOD OF IDENTIFICATION:** Through study of the holotype, allotype, and paratype series.

**DISTRIBUTION:** From the Department of Lima in Peru, south through the Province of Tarapacá in Chile, and east into the Department of Potosí in Bolivia.

**PERU:** *Department of Lima*, Supe (September, October), Matucana; *Department of Arequipa*, Arequipa, Cantas (2,000 ft., November), Cotahuasi (9,000 ft., October), Chuquibamba (10,000 ft., October), Coropuna (14,500 ft., October); *Department of Puno*, Puno (February, October); *Department of Tacna*, Tarata (February). **BOLIVIA:** *Department of Potosí*, Potosí (4,100 m., January). **CHILE:** *Province of Tarapacá*, Miñi-Miñi (1,650 m., February), Iquique (January, February), Poroma (3,000 m., March), Codpa (1,960 m., March), Putre (3,650 m., February).

**MATERIAL STUDIED:** 61 males, 37 females.

#### GROUP C. THE MICRODICE GROUP

In these species the aedeagus is gradually arched with the distal end hoodlike, this appearance caused by a very broad incision; there is a distinct subapical tooth at either side of this hood which is somewhat flattened either dorsoventrally or sometimes laterally.

Hindwings above as in Groups B and D. Hindwing below with white or yellow ground color; with or without a submarginal series of sagittate markings; without orange streaks through middle of interspaces; with a white spot on lower discocellular vein (the chief difference between this group and Groups C and D) or as mentioned above with nearly the entire wing white.

Three species, one of which includes four subspecies, comprise this group.

*Tatochila microdice* (Blanchard)

For references, see below under *T. microdice microdice*.

This species is divided into four subspecies. The most northern of these is found in Ecuador and southern Colombia and the most southern and probably most distinct is found only on the southern coast of the Island of Tierra del Fuego.

VENATION: As illustrated (fig. 59). There is no difference displayed between the various subspecies.

LEGS: With paronychium, claw, and pulvillus as illustrated (fig. 74). These structures exhibit no subspecific characters.

MALE GENITALIA: As illustrated (figs. 31–31h, 45). Certain figures of *T. microdice microdice* (figs. 31–31b), *T. microdice arctodice* (figs. 31c, 31h), and *T. microdice macrodice* (fig. 31g) are included to show individual variation in the aedeagus. Even though they belong sometimes to different subspecies, the differences displayed are not subspecific. Figure 31 shows perhaps the average for the whole species. In figure 31a the base of the aedeagus is deeply indented ventrally, a character occurring in 3 out of 11 specimens of *T. microdice microdice*, in 5 out of 13 specimens of *T. m. macrodice*, and in 3 out of 8 specimens of *T. m. arctodice*. Figure 31b shows an aedeagus with the base nearly flat, while figures 31, 31d–f illustrate variation in the harpes. Again, these are only individual variations and all types usually are found in all four subspecies. The genitalia of 38 males were studied.

FEMALE GENITALIA: As illustrated (fig. 87), with the anterior lobe of the inner genital plate subtriangular, having its posterior margin strongly toothed and gradually rounded to the ventral margin. Ductus bursae with one or sometimes two very narrow ribbonlike plates opposite opening of ductus seminalis, with the plate anterior to this large and subtriangular or sometimes completely ringing the ductus bursae and fused dorsally; usually with two irregular narrow plates anterior to this. No subspecific characters were found in the female genitalia. The genitalia of 22 females were studied.

*Tatochila microdice microdice* (Blanchard)

*Pieris microdice* Blanchard, in Gay, Historia física y política de Chile, Zoología, vol. 7, p. 14, 1852.—Kirby, A synonymic catalogue of diurnal Lepidoptera, p. 451, 1871.—Berg, Bull. Soc. Imp. Nat. Moscou (for 1875), p. 196, 1876.—Burmeister, Description physique de la République Argentine . . . , vol. 5, pt. 1, pp. 89, 90, 1878.—Berg, Act. Acad. Nac. Cienc. Córdoba, Argentine Rep., vol. 1, pp. 66, 67, 1875.

*Tatochila microdice* (Blanchard), Butler, Proc. Zool. Soc. London (1872), p. 67, Jan. 16, 1872.—Reed, Anal. Univ. Chile, vol. 51, p. 669, September 1877.—Bartlett-Calvert, Rev. Chilena Hist. Nat., vol. 2, p. 98, July 1898.—Röber, in Seitz, Die Gross-Schmetterlinge der Erde, vol. 5, p. 56, May 25, 1908.—Giacomelli, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 26, pp. 406, 412, 413, Mar. 10, 1915, Rev. Chilena Hist. Nat., vol. 20, pp. 44, 45, 53–54, 57,



June 30, 1916.—Jørgensen, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 28, pp. 443, 451–452, Nov. 10, 1916.—Talbot, *in* Strand, Lepidopterorum catalogus, pars. 53, Pieridae I, p. 58, Oct. 24, 1932.—Breyer, Verhandlungen VII Internationalen Kongress für Entomologie, vol. 1 (for 1938), p. 29, February 1939.—Hayward, Act. Zool. Lilloana Inst. "Miguel Lillo," vol. 9, p. 93, Oct. 25, 1951.

*Pieris theodice* Boisduval, Mabille *nec* Boisduval (a misidentification, figure only), Mission Scientifique du Cap Horn, 1882–1883, vol. 6, Zoologie, Insectes, pl. 1, fig. 2, 1888.

*Tatochila microdice sterodice* Staudinger, Lepidopteren, *in* Hamburger Magalhaensische Sammelreise, vol. 2, art. 6, pp. 18, 19, 1898.—Röber, *in* Seitz, Die Grossschmetterlinge der Erde, vol. 5, p. 56, May 25, 1908.—Giacomelli, Rev. Chilena Hist. Nat., vol. 20, p. 57, June 30, 1916.—Jørgensen, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 28, p. 452, Nov. 10, 1916.—Talbot, *in* Strand, Lepidopterorum catalogus, pars 53, Pieridae I, p. 58, Oct. 24, 1932.

*Tatochila sterodice* Staudinger, Giacomelli, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 26, pp. 406, 412, 413, Mar. 10, 1915.

*Tatochila microdice* f. *sterodice* Staudinger, Giacomelli, Physis, vol. 3, p. 374, 1917.—Breyer, Verhandlungen VII Internationalen Kongress für Entomologie, vol. 1 (for 1938), p. 29, February 1939.—Hayward, Act. Zool. Lilloana Inst. "Miguel Lillo," vol. 9, p. 93, Oct. 25, 1951.

*Tatochila microdice microdice* (Blanchard), Ureta, Rev. Chilena Hist. Nat., vol. 41 (for 1937), pp. 272–276, figure 38, Nos. 1–4; pl. 12, figs. 1, 2, 1938; Bol. Mus. Nac. Hist. Nat., vol. 16, p. 123, 1938.

*Tatochila microdice allodice* Bryk, Ark. f. Zool., vol. 36A, pp. 5–6, pl., fig. 2, Nov. 6, 1944.

**MALE:** Plate 3, figures 11, 11b. Head with scales behind eyes and outer face of palpus white, very rarely pale yellowish. Wings above quite similar to *T. microdice fueguensis*, new subspecies, with dark markings usually larger, more distinct. Below similar to *T. m. fueguensis* with gray stripes along veins usually slightly broader and with white spot over lower discocellular vein larger and with larger wing expanse than in that subspecies.

Length of forewing, 21–27 mm. (average, 24.1 mm.).

**FEMALE:** Plate 3, figures 11a, 11c. Head with scales behind eyes and outer face of palpus white, very rarely pale yellowish. Wings above with ground color usually white, sometimes pale yellowish white, particularly on the hindwing. Dark markings much more extensive than in the male. Veins, especially on the hindwing, are white entirely outlined along both sides with dark brown or black. Wings above similar to the male, ground color slightly darker yellow. Differing from *T. microdice fueguensis* particularly in the paler yellow ground color of wings above and on base and disc of forewing below and in the large white spot on the lower discocellular vein on underside of hindwing. Differing from all the subspecies in having veins on the upper-surfaces white.

Length of forewing, 22–25 mm. (average, 23.5 mm.).



TYPE LOCALITY: "Estrecho de Magallanes al havre Pulket"=Harbor of Pecket, Province of Magallanes, Chile.

ADDITIONAL TYPE DATA AND LOCATION OF TYPE: Described from specimens of both sexes (number of specimens not stated) said to be in the Boisduval collection. Not in that collection in the British Museum and not located in the Paris Museum.

METHOD OF IDENTIFICATION: By reference to the original description, which is adequate to distinguish this species from the only other species of the genus known to occur in the province of Magallanes (i. e., *T. theodice gymnodice* Staudinger).

SYNONYMICAL NOTES: The data for the names listed in the above synonymy are as follows:

*Tatochila microdice sterodice* Staudinger, 1899. Type locality, "Rio Grande," Territory of Tierra del Fuego, Argentina. Described from one pair (locality as given above) and one female ("Punta Arenas," Province of Magallanes, Chile). According to Dr. E. M. Hering of the Zoologisches Museum der Humboldt-Universität, Berlin, these cotypes were returned to the Hamburg Museum and were destroyed during World War II. This name, based upon scantily marked specimens, is clearly a synonym of *microdice*.

*Tatochila microdice allodice* Bryk, 1944. Type locality, "Peninsula Llau Llau, N. of Puerto Nuevo" (near Nahuel Huapi, Territory of Río Negro, Argentina). Described from a single female in the collection of the Naturhistoriska Riksmuseet, Stockholm. The holotype, illustrated by Bryk, matches perfectly specimens of typical *microdice* studied from the Province of Magallanes, Chile.

MISIDENTIFICATIONS: Mabille (1888) figures this species under the name *Pieris theodice* Boisduval.

DISTRIBUTION: Southern Argentina (Territory of Santa Cruz) and southern Chile (Province of Magallanes) into the island of Tierra del Fuego.

ARGENTINA: *Territory of Santa Cruz*, Glen Kross, San Julian. CHILE: *Province of Magallanes*, *Department of Punta Arenas*, Punta Arenas (January); *Department of Ultima Esperanza*, Puerto Prat (January-March), Natales (March), Puerto Consuelo (March), Puerto Bories (January), Dos Lagunas (February); *Department of Tierra del Fuego*, Porvenir (February).

MATERIAL STUDIED: 16 males, 7 females.

***Tatochila microdice fueguensis* Field, new subspecies**

*Tatochila microdice* (Blanchard), Staudinger nec Blanchard (a misidentification), Lepidopteren, in *Ergebnisse der Hamburger Magalhaensische Sammelreise*, vol. 2, art. 6, pp. 17-23, 1898.

MALE: Plate 4, figure 12. Head with scales behind eyes and with outer face of palpus white. Wings white above with markings dark brown to black in color. Similar to *T. m. microdice* but with these markings usually more restricted. Below with ground color of hindwing and of apex of forewing pale yellow; with costal margin of hindwing pale orange and with base and disc of forewing white.

Veins on hindwing dirty white outlined on both sides by gray with a white spot over the lower discocellular vein and adjacent area. Differing chiefly from *T. m. microdice* in having these gray stripes along the veins usually more narrow and with the white spot over lower discocellular vein smaller and in the smaller wing expanse.

Length of forewing, 20–30 mm. (average, 22.2 mm.).

FEMALE: Plate 4, figure 12a. Head with scales behind eyes and with outer face of palpus pale yellow. Wings quite different from those of the male, having the ground color above dark yellow and with dark brown stripes along veins. Other dark markings dark brown in color and more extensive than in the male. Ground color of wings below darker yellow than in the male with base and disc of forewing on this surface yellowish white rather than pure white and with a series of large but faint submarginal sagittate markings on this wing extending to below vein  $Cu_2$ . White spot on lower discocellular vein of hindwing small (as in the male) and with orange along costal margin of hindwing below more distinct than in the male. In addition there is a faint streak of orange below cell and another below vein  $Cu_2$ . *T. m. fueguensis* differs from the other subspecies, in the female sex particularly, in the ground color of the wings above and on the base and disc of the forewing below. In addition it differs from *T. m. macrodice* and *T. m. aretodice* in the color of the scales behind the eyes and of outer face of palpus. As is true of the males, the females have the smallest wing expanse of any of the other subspecies.

Length of forewing, 20–22 mm. (average 21.3 mm.).

TYPE LOCALITY: Puerto Harberton, Territory of Tierra del Fuego, Argentina.

ADDITIONAL TYPE DATA: Described from the holotype, male (locality as given above; Nov. 26, 1948, Olrog and Budin, ♂ genitalia preparation W. D. F.-J. H. 3919); allotype, female (Ushuaia, Territory of Tierra del Fuego, Argentina; Dec. 15, 1948, Olrog and Budin; ♀ genitalia preparation W. D. F.-J. H. 3929); and paratypes as follows: 2 ♂♂ and 2 ♀♀, same locality as holotype, Nov. 26 and Dec. 1, 1948, Olrog and Budin (♂ genitalia preparations W. D. F.-J. H. 3920 and 3922; ♀ genitalia preparations W. D. F.-J. H. 3923 and 3925); 2 ♂♂, same locality as the allotype, Dec. 11, 1948, Olrog and Budin (genitalia preparations W. D. F.-J. H. 3918 and 3921).

LOCATION OF TYPES: Holotype, allotype, and two male paratypes in the collection of the Fundación Miguel Lillo, Universidad Nacional de Tucumán, Tucumán, Argentina. One pair of paratypes in the U. S. National Museum and one pair of paratypes in the collection of Alberto Breyer, Buenos Aires, Argentina.

**MISIDENTIFICATION:** Staudinger (1899) describes this subspecies from material collected at Ushuaia, Tierra del Fuego, mistakenly calling it *microdice*.

**DISTRIBUTION:** As indicated above, this subspecies is known only from the extreme southern part of the island of Tierra del Fuego.

**MATERIAL STUDIED:** 5 males, 3 females.

*Tatochila microdice macrodice* Staudinger

- Pieris xanthodice* Lucas, Hopffer *nec* Lucas (a misidentification), Stettiner Ent. Zeit., vol. 4, p. 83, March 1879.—Weymer and Maassen *nec* Lucas (misidentification), W. Reiss und A. Stübel Reisen in Süd-Amerika, Lepidopteren . . ., pp. 36, 43, 48, 71, 1890.—Staudinger, Ent. Zeitschr. "Iris," Dresden, vol. 5, pt. 2, p. 273, December 1892.
- Pieris microdice* Blanchard, Weymer and Maassen *nec* Blanchard (a misidentification), W. Reiss und A. Stübel Reisen in Süd-Amerika, Lepidopteren . . ., p. 97, 1890.—Staudinger, Ent. Zeitschr. "Iris," Dresden, vol. 7, pp. 61, 62, July 14, 1894.
- Tatochila microdice macrodice* Staudinger, Lepidopteren, in Hamburger Magalhaensische Sammelreise, vol. 2, art. 6, pp. 21–23, 1898.—Röber, in Seitz, Die Gross-Schmetterlinge der Erde, vol. 5, p. 56, pl. 18, figs. C5, C6, D1, May 25, 1908.—Paravicini, Mitt. Schweizerschen Ent. Ges., vol. 12, p. 22, May 1910.—Talbot, in Strand, Lepidopterorum catalogus, pars 53, Pieridae I, p. 58, Oct. 24, 1932.—Ureta, Bol. Mus. Nac. Hist. Nat., vol. 23, pp. 52, 54, pl. 1, fig. 3, 1947.—Hayward, Act. Zool. Lilloana Inst. "Miguel Lillo," vol. 9, p. 93, Oct. 25, 1951.—Zischka, Fol. Univ., Univ. Cochabamba, Bolivia, vol. 5, p. 18, October 1951.
- Tatochila macrodice* Staudinger, Dyar, Proc. U. S. Nat. Mus., vol. 45, p. 628, July 22, 1913.—Giacomelli, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 26, pp. 406, 408, 409, 412, 413, Mar. 10, 1915; Rev. Chilena Hist. Nat., vol. 20, pp. 53, 54, 57, pl. 2, figs. 3, 4, June 30, 1916.—Jørgensen, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 28, pp. 443, 449–451, Nov. 10, 1916.—Giacomelli, Physis, vol. 3, pp. 373–374, 1917.—Röber, in Seitz, Die Gross-Schmetterlinge der Erde, vol. 5, p. 1015, Jan. 21, 1924.—Breyer, Verhandlungen VII Internationalen Kongress für Entomologie, vol. 1 (for 1938), p. 29, February 1939.—Förster, Veröffentl. Zool. Staatss. München, vol. 3, p. 134, Dec. 1, 1955.
- Tatochila microdice* Blanchard, Köhler *nec* Blanchard (a misidentification) Zeitschr. Wiss. Insektenbiol., vol. 18, Sonderbeilage, p. 14, Dec. 15, 1923.—Förster, Veröffentl. Zool. Staatss. München, vol. 3, p. 134, Dec. 1, 1955.
- Synchlōe macrodice* (Staudinger), Zischka, Fol. Univ., Univ. Cochabamba, Bolivia, vol. 1, p. 28, December 1947.

Length of forewing, 21–27 mm. (average, 25 mm.).

**TYPE LOCALITY AND ADDITIONAL TYPE DATA:** Described from about 50 males and 20 females (presumably all cotypes) from "Huallatani," Department of Cochabamba, from near "La Paz," and from "Illimani," Department of La Paz, Bolivia. Two male cotypes from near "La Paz" were sent to us for study. Of these, the one from Achacachi, La Paz, Bolivia, collected on Sept. 18, 1893, by Garlepp, is hereby designated the lectotype.

MALE: Plate 4, figure 13. Head with scales behind eyes and with outer face of palpus yellow to orange. Wings above somewhat as in typical *microdice* but with all dark markings much larger and with a series of dark wedge-shaped markings at end of veins. Usually with a series of submarginal intervenal dark markings on the hindwing. Wings below with ground color of hindwing and of apex of forewing darker yellow than in *T. microdice fueguensis* or *T. microdice microdice* and with the costal margin of hindwing darker orange than in those subspecies. Hindwing below with a distinct submarginal series of sagittate intervenal markings, and, as is true of *T. m. microdice*, there is a large white spot over the lower discocellular vein. This subspecies differs from *T. m. microdice* and from *T. m. fueguensis* also in having the series of dark submarginal sagittate markings on the underside of forewing very much larger and extending below vein Cu<sup>1</sup>.

Length of forewing, 22–28 mm. (average, 25.2 mm.).

FEMALE: Plate 4, figure 13a. Head with scales behind eyes orange and with outer face of palpus yellow to orange. Wings above similar to female *T. m. microdice* except that the dark markings are much more extensive and the veins on the hindwing are entirely dark brown or occasionally with small streaks of white but never white throughout their entire length. Wings below with ground color darker yellow than in the males and with orange along costal margin of hindwing darker. Similar to undersurface of female *T. m. microdice*, with veins on hindwings more of a silvery white with yellow ground color deeper and with dark markings of forewing larger, more distinct. Most similar to *T. m. arctodice* but with a distinct series of fuscous, submarginal sagittate markings and with white stripes on veins narrow, usually covering only the veins.

LOCATION OF TYPE: Lectotype in the Zoologisches Museum der Humboldt-Universität, Berlin.

METHOD OF IDENTIFICATION: By study of the lectotype, designated above, and by comparison with the carefully prepared original description.

MISIDENTIFICATIONS: Hopffer (1879) and others identified this population as *Pieris xanthodice* Lucas.

Weymer and Maasen (1890) and others identified this subspecies as *Pieris microdice* Blanchard.

DISTRIBUTION: Southern Peru and extreme northern Chile east into Bolivia and south as far as the Province of Mendoza in Argentina.

PERU: *Department of Puno*, Oroya (May), Puno (3,800–4,200 m., January); *Department of Arequipa*, Arequipa, Chuquibamba (10,000 ft., October), Cotahuasi (9,000 ft., October). BOLIVIA: *Department of La Paz*, Guaqui (3,820 m., February), Obrajes (January), Sicasica (October); *Department of Potosí*, Potosí (4,000–5,000 m., January). CHILE: *Province of Tarapacá*, Parinacota (4,500 m., Feb-



ruary), Putre (3,650 m. and 2,800 m., February), Lorancahua, two (2,800 m. February). ARGENTINA: *Province of Catamarca*, El Candado (March); *Province of Mendoza*, Punes (January).

MATERIAL STUDIED: 18 males, 7 females.

*Tatochila microdice arctodice* Staudinger

*Tatochila microdice arctodice* Staudinger, Lepidopteren, in Hamburger Magalhaensische Sammelreise, vol. 2, art. 6, pp. 19-21, 1898.—Röber, in Seitz, Die Gross-Schmetterlinge der Erde, vol. 5, p. 56, May 25, 1908.—Giacomelli, Rev. Chilena Hist. Nat., vol. 20, p. 57, June 30, 1916.—Jørgensen, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 28, pp. 452-453, Nov. 10, 1916.—Talbot, in Strand, Lepidopterorum catalogus, pars 53, Pieridae I, p. 58, Oct. 24, 1932.

*Tatochila xanthodice* Lucas, Röber nec Lucas (a misidentification of male), in Seitz, Die Gross-Schmetterlinge der Erde, vol. 5, p. 56, pl. 18, fig. d4, May 25, 1908.

*Tatochila arctodice* Staudinger, Giacomelli, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 26, pp. 406, 411, 414, 415, Mar. 10, 1915.—Campos-R., Rev. Col. Nac. Vicente Rocafuerte, vol. 9, p. 80, 1927.—Apolinar, Rev. Acad. Colombiana Cienc. Exact. Fis. Nat., vol. 4, p. 349, December 1941.—Brown, Colorado Coll. Pub., gen. ser., No. 233, p. 20, May 1942.

*Tatochila microdice* f. *arctodice* Staudinger, Giacomelli, Physis, vol. 3, p. 374, 1917.

MALE: Plate 4, figure 14. Head as in *T. microdice macrodice*. Wings above and below very similar to that subspecies, differing only in lacking the submarginal series of dark sagittate markings between veins on both surfaces of hindwings and in having the wedge-shaped marks at end of veins on upper surface of hindwing greatly reduced. These markings are sometimes represented only by faint linear bars.

Length of forewing, 22-28 mm. (average, 25.8 mm.).

FEMALE: Plate 4, figure 14a. Head with scales behind eyes orange and with outer face of palpus yellow to orange. Wings above quite unlike the male, most like female of *T. m. macrodice*, usually with dark color even more extensive, sometimes almost obliterating the ground color. A few females occur with this dark coloring almost absent on the hindwing except around the outer margin. Wings below quite similar to *T. m. macrodice* but with fuscous submarginal sagittate markings obsolescent, the fuscous sometimes replaced with faint red and with white stripes along veins broader, usually covering slightly more than the veins.

Length of forewing, 22-29 mm. (average, 25.4 mm.).

TYPE LOCALITY AND ADDITIONAL TYPE DATA: Described from two males and one female from the Cauca Valley, Colombia; from one female, Río Dagua, Department of Valle, Colombia; from one male and one female, Macachi, Province of Pichinchá, Ecuador (3,000 m.); and from one male, Loja, Province of Loja, Ecuador. There is no lectotype.



LOCATION OF TYPES: Cotypes in Zoologisches Museum der Humboldt-Universität, Berlin.

METHOD OF IDENTIFICATION: By reference to the original description, which is quite adequate, and by study of a male cotype from Ecuador.

MISIDENTIFICATION: Röber (1908) illustrates a male of this species as *T. xanthodice* (Lucas).

DISTRIBUTION: From the Andes in Colombia south into the Department of Junín in Peru.

COLOMBIA: See above under "Type locality." ECUADOR: *Province of Imbabura*, Ibarra (7,000 ft.); *Province of Tungurahua*, Banós (6,400 ft., January, February); *Province of Cañar*, Azogues, Biblián; *Province of Azuay*, Tarqui; *Province of Loja*, Loja. PERU: *Department of Cajamarca*, Calendín (2,625, m.); *Department of Junín*, Manchará (as Manchara, 7,000 ft., September).

MATERIAL STUDIED: 15 males, 15 females.

#### *Tatochila vanvolxemii* (Capronnier)

*Pieris van volxemii* Capronnier, Ann. Soc. Ent. Belgique, vol. 17, p. 11, pl. 1, fig. 1, 1874.—Kirby, A synonymic catalogue of diurnal Lepidoptera, suppl., p. 793, 1877.—Burmeister, Description physique de la République Argentine . . . , vol. 5, pt. 1, p. 86, 1878.

*Pieris achamantis* Berg, Act. Acad. Cienc. Córdoba, Argentine Rep., vol. 1, pp. 67–68, 1875; Bull. Soc. Imp. Nat. Moscou, 1875, pp. 196–198, 1876.—Kirby, A synonymic catalogue of diurnal Lepidoptera, suppl., p. 792, 1877.—Berg, Anal. Soc. Cient. Argentina, vol. 4, pp. 87, 88, July 1877.—Burmeister, Description physique de la République Argentine, vol. 5, pt. 1, pp. 86, 87, 1878.—Harold, Stettiner Ent. Zeit., vol. 40, p. 237, June 1879.—Berg, Anal. Mus. Nac. Buenos Aires, vol. 4, p. 236, Nov. 18, 1895.

*Pieris volxemi* Capronnier, Harold *nec* Capronnier (an improper emendation), Stettiner Ent. Zeit., vol. 40, p. 237, June 1879.

*Tatochila volxemi* (Capronnier), Berg *nec* Capronnier, Anal. Mus. Nac. Buenos Aires, vol. 4, pp. 236–240, fig. 2, Nov. 18, 1895.—Röber, *in* Seitz, Die Gross-Schmetterlinge der Erde, vol. 5, p. 55, pl. 18, figs. a5, a6, May 25, 1908.—Giacomelli, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 26, pp. 406, 407, 412, 413, Mar. 10, 1915; Rev. Chilena Hist. Nat., vol. 29, pp. 44, 45, 46, 51, 52, 56, pl. 2, figs. 1, 2, June 30, 1916.—Jørgensen, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 28, p. 443, 447, 448, Nov. 10, 1916.—Giacomelli, Physis, vol. 3, p. 373, 1917.—Köhler, Zeitschr. Wiss. Insektenbiol., vol. 18, Sonderbeilage, p. 14, Dec. 15, 1923.—Klots, Ent. Americana, new ser., vol. 12, No. 4, p. 218, March 1932.—Talbot, *in* Strand, Lepidopterorum catalogus, pars 53, Pieridae I, p. 57, Oct. 24, 1932.—Breyer, Rev. Soc. Ent. Argentina, vol. 8, p. 63, 1936; Verhandlungen VII Internationalen Kongress für Entomologie, vol. 1 (for 1938), pp. 28, 29, February 1939.—Ureta, Bol. Mus. Nac. Hist. Nat., vol. 26, pp. 161, 162, Mar. 14, 1956.

*Tatochila volxemi* ♀ var. *fulva* Köhler, Zeitschr. Wiss. Insektenbiol., vol. 18, Sonderbeilage, p. 14, pl. 1, fig. 1, Dec. 15, 1923.—Breyer, Verhandlungen VII Internationalen Kongress für Entomologie, vol. 1 (for 1938), p. 29, February 1939.—Hayward, Act. Zool. Lilloana Inst. "Miguel Lillo," vol. 9, p. 92, Oct. 25, 1951.

*Tatochila volxemi* ♀ forma *obsura* Köhler, Zeitschr. Wiss. Insektenbiol., vol. 18, Sonderbeilage, p. 14, Dec. 15, 1923.

*Tatochila vanvolxemii* (Capronnier), Hayward, Act. Zool. Lilloana Inst. "Miguel Lillo," vol. 9, p. 92, Oct. 25, 1951.

VENATION: As illustrated (fig. 60).

LEGS: With paronychium, claw, and pulvillus as illustrated (fig. 76).

MALE: Plate 4, figures 15, 15a; plate 5, figure 16. Head with outer surfaces of palpi white. Scales behind eyes orange. Forewing above white with dark brown markings as illustrated, usually having a large black discocellular bar. Variable in having a few dark scales along either side of the ends of the veins in the apex of forewing (the usual form) to having a heavy black sagittate, submarginal and subapical band with the markings along the veins extending inward through this band (this form more rare). Hindwings above entirely white. Wings below white with a pale yellow suffusion over hindwing especially in the base and around outer margin of this wing and in apex of forewing. Costal margin of hindwing orange. Veins on hindwing and in apex of forewing white outlined on both sides with faint black lines along outer margin and frequently for considerable distance inward.

Length of forewing, 26.5–32 mm. (average, 29.9 mm.).

Male genitalia as illustrated (figs. 32, 46). Not different from *T. microdice* and illustrated here to show how closely related it is to that species. The genitalia of 15 males were studied.

FEMALE: Plate 5, figures 16a, 16b. Head as in the male with outer surfaces of palpi white and with scales behind eyes orange. Wings above with ground color pure white to dirty white or very pale tan. Rarely pale yellow over much of hindwing and around outer third of forewing. Dark brown to black markings as illustrated, differing greatly from the male, with discocellular bar on forewing usually much larger both above and below and with submarginal row of sagittate markings large, confluent and strongly indicated even on the hindwing. Marginal sagittate markings and the black or brown scaling along veins extending inward to the cell along some veins in forewing and extending almost to the base along some veins in many specimens on the hindwings. Wings below with ground color of hindwing and apex of forewing yellow and with veins in these areas white completely outlined along either side with dark brown. Hindwing with costal margin orange, with a brown bar through middle of cell that is divided by a thin line of white or yellow and with a large white spot over lower discocellular vein. This latter larger than in *mercedis*. Submarginal row of confluent sagittate markings strongly indicated on forewing and also present on hindwing although more weakly indicated.

Length of forewing, 28–32 mm. (average, 29.6 mm.).

Female genitalia not illustrated, not distinguishable from *T. microdice*. The genitalia of six females were studied.

TYPE LOCALITY: "Buenos Aires," Argentina.

ADDITIONAL TYPE DATA: Described from a single male specimen, the holotype (locality as given above, December).

LOCATION OF TYPE: Presumably in the collection of M. C. Van Volxem, the whereabouts of which is unknown.

METHOD OF IDENTIFICATION: By comparison with the original colored figure and description.

SYNONYMICAL NOTES:

*Pieris achamantis* Berg, 1875. Type locality, "Cerro de Caballada," Territory of Río Negro, Argentina. Described from two specimens collected by Francisco P. Moreno and presumably now in the collections of the Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina. This name is clearly a synonym of *T. vanvolxemi*.

*Tatochila volxemi* var. *fulva* Köhler, 1923. Described from a single female specimen collected in Tucumán and now in the collection of Alberto Breyer. It represents a slightly melanic individual form in which the submarginal spots on forewing above are confluent and connected to the discocellular spot.

*Tatochila volxemi* forma *obscura* Köhler, 1923. Described from a female specimen collected in Tucumán and in the collection of Alberto Breyer. It is an individual form similar to *fulva* that has a deeper reddish yellow color (presumably, although not stated, on the undersurface of the hindwing).

MISSPELLINGS: Harold (1879) and others improperly emended the spelling of *P.* or *T. van volxemi* to *P.* or *T. volxemi*. Capronnier very clearly named this species after M. C. Van Volxem. Hayward (1951) was the first to give the proper form of this name.

DISTRIBUTION: Argentina from the Provinces of Tucumán and Buenos Aires south into the Territory of Río Negro.

ARGENTINA: *Province of Tucumán*, Tucumán; *Province of La Rioja*, La Rioja; *Province of Córdoba*, Córdoba; *Province of Mendoza*, Uspallata Mountains (1,850 m., October), Potrerillos (1,500 m., October), Mendoza (May, July); *Province of Buenos Aires*, Médanos (November), Bolívar (December); *Territory of Río Negro*, Río Colorado (October, November), Gómez (December, January), "Chdele" (November). We have seen specimens labeled without specific locality data as coming from both Uruguay and Paraguay. We doubt the authenticity of these labels.

MATERIAL STUDIED: 27 males, 19 females.

*Tatochila mercedis* (Eschscholtz)

*Pontia mercedis* Eschscholtz, in Kotzebue, Entdeckungs-Reise in die Sud-See und nach der Berings-Strasse, vol. 3, p. 215, pl. 9, figs. 22a, 22b, 1821.—Berg, Anal. Mus. Nac. Buenos Aires, vol. 4, p. 231, Nov. 18, 1895.—Staudinger, Lepidopteren, in Hamburger Magalhaensische Sammelreise, vol. 2, art. 6, p. 11, 1898.

- Pieris polydice* Blanchard, in Gay, Historia física y política de Chile, Zoología, vol. 7, p. 12, 1852.—Kirby, A synonymic catalogue of diurnal Lepidoptera, p. 451, 1871.—Reed, Anal. Univ. Chile, vol. 51, p. 665, September 1877.
- Tatochila mercedis* (Eschscholtz), Butler, Proc. Zool. Soc. London (1872), p. 67, Jan. 16, 1872.—Reed, Anal. Univ. Chile, vol. 51, pp. 665, 666, September 1877.—Bartlett-Calvert, Anal. Univ. Chile, vol. 69, p. 314, 1886.—Röber, in Seitz, Die Gross-Schmetterlinge der Erde, vol. 5, p. 56, pl. 18, figs. b4-b6, May 25, 1908.—Paravicini, Mitteil. Schweizerschen Ent. Ges., vol. 12, pp. 21, 22, May 1910.—Giacomelli, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 26, pp. 405, 406, 408, 412, 413, Mar. 10, 1915; Rev. Chilena Hist. Nat., vol. 20, pp. 44, 45, 51, 55, 56, pl. 1, figs. 5, 6, June 30, 1916.—Jørgensen, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 28, pp. 443, 453, 454, Nov. 10, 1916.—Talbot, in Strand, Lepidopterorum catalogus, pars. 53, Pieridae I, p. 57, Oct. 24, 1932.—Ureta, Rev. Chilena Hist. Nat., vol. 38, p. 78, 1934; vol. 41, pp. 246-254, figs. 33, 34, pl. 11, figs. 3, 4, 1938; Bol. Mus. Nac. Hist. Nat., vol. 16, p. 123, 1938; Rev. Chilena Hist. Nat., vol. 42, p. 297, 1939.—Breyer, Verhandlungen VII Internationalen Kongrees für Entomologie, vol. 1 (for 1938), p. 29, February 1939.—Ureta, Rev. Chilena Hist. Nat., vol. 44, p. 245, 1941.—Förster, Veröffentl. Zool. Staatss. München, vol. 3, p. 134, Dec. 1, 1955.
- Tatochila polydice* (Blanchard), Bartlett-Calvert, Anal. Univ. Chile, sec. 1, Mem. Cient. Lit., vol. 69, p. 314, 1886.—Berg, Anal. Mus. Nac. Buenos Aires, vol. 4, pp. 231-236, Nov. 18, 1895.
- Tatochila autodice* (Hübner), Bartlett-Calvert *nec* Hübner (a misidentification), Anal. Univ. Chile, sec. 1, Mem. Cient. Lit., vol. 69, p. 314, 1886.—Elwes, Trans. Ent. Soc. London (1903), p. 292, pl. 12, figs. 1, 3, 4, October 1903.
- Tatochila autodice* var.? *microdice* (Blanchard), Elwes *nec* Blanchard (a misidentification, in part.), Trans. Ent. Soc. London (1903), p. 292, pl. 12, fig. 6, October 1903.
- Tatochila mercedis* ab. *lilae* Ureta, Rev. Chilena Hist. Nat., vol. 41 (for 1937), pp. 250, 251, fig. 33, No. 7, pl. 12, fig. 8, 1938; Bol. Mus. Nac. Hist. Nat., vol. 16, p. 123, 1938; Rev. Chilena Hist. Nat., vol. 42 (for 1938), p. 297, 1939.
- Tatochila mercedis* ab. *porteri* Ureta, Rev. Chilena Hist. Nat., vol. 41 (for 1937), p. 251, pl. 12, fig. 7, 1938; Bol. Mus. Nac. Hist. Nat., vol. 16, p. 123, 1938; Rev. Chilena Hist. Nat., vol. 42 (for 1938), p. 297, 1939.
- Tatochila mercedis* ab. *clwesi* Ureta, Rev. Chilena Hist. Nat., vol. 41 (1937), pp. 251, 252, fig. 33, No. 8, 1938; Bol. Mus. Nac. Hist. Nat., vol. 16, p. 123, 1938; Rev. Chilena Hist. Nat., vol. 42 (for 1938), p. 297, 1939.
- Synchloë mercedis* (Eschscholtz), D'Almeida, Arq. Zool. Estado de São Paulo, vol. 2, p. 299, pl. 1, figs. 3, 6, Jan. 3, 1941.

VENATION: As illustrated (fig. 61).

LEGS: With paronychium, claw, and pulvillus as illustrated (fig. 76).

MALE: Plate 5, figures 17-17c. Head with outer surfaces of palpi white. Scales behind eyes white. Forewings above white with dark brown or black markings as illustrated, having a distinct discocellular bar (this bar also present on the undersurface), a submarginal row of separate sagittate markings and usually a marginal row of double streaks parallel to and lying on either side of the veins, thus differing from *vanvolcemii*. These streaks extend inward to not more than one-half the distance to the submarginal markings. Hind-



wings above almost always entirely white. In a very few specimens there is some black scaling along the veins at the outer margin and a submarginal series of small sagittate markings. Wings below with hindwing and apex of forewing yellow. Costal margin of hindwing and interspace below cell at base of wing darker yellow to pale orange. Hindwing with cell divided in the middle by a bar of dark brown that is itself divided by a thin line of yellow and with a distinct white spot on lower discocellular vein. Veins on hindwing white entirely outlined on both sides with dark brown, gray, or black. Veins in apex of forewing white to yellow outlined on both sides with this same dark color for a short distance inward but not reaching the submarginal row of sagittate markings. These sagittate markings are almost always present on forewing and hindwing, but on the latter they occasionally may be only weakly indicated.

Length of forewing, 20–29 mm. (average, 26.1 mm.).

Male genitalia as illustrated (figs. 33, 47). Differing from *T. microdice* and *T. vanvolxemii* in having the distal end of the aedeagus compressed entirely laterally instead of approximately dorsoventrally. Thus a lateral view of the aedeagus of *mercedis* has the nearly exact appearance of a ventral view of the other two species. The genitalia of 11 males were studied.

FEMALE: Plate 5, figures 18–18b. Head as in the male with outer surfaces of palpi white and scales behind eyes white. Wings above with ground color white, sometimes suffused with pale yellow, especially on the hindwing. Dark brown to black markings as illustrated, much more extensive than in the male and similar to female *vanvolxemii*. However, on the forewing the discocellular bar is much more narrow, the submarginal sagittate markings on both wings are smaller, separate and not nearly so confluent, and more sharply sagittate along the outer edges than in *vanvolxemii*. Wings below with ground color of hindwing and of apex of forewing more distinctly yellow than in *vanvolxemii*. Hindwing with cell divided in the middle by a bar of dark brown that is itself divided by a thin line of yellow, and with costal margin and sometimes interspace below cell at the base darker yellow to pale orange. Hindwing with a distinct white spot on lower discocellular vein and with veins white outlined along either side by dark brown or black clear to the base. Veins along outer margin of forewing white bordered by dark brown or black about one-half the distance toward the submarginal sagittate markings and thus differing from *vanvolxemii* where these markings extend clear through the submarginal band at least along some of the veins. Discocellular dark brown bar on forewing much narrower than in *vanvolxemii* and submarginal sagittate markings on both wings entirely separate and much smaller than in that species

Length of forewing, 22–30 mm. (average, 25.3 mm.).

Female genitalia as illustrated (fig. 88), with anterior lobe of inner genital plate having posterior margin smooth with its posterior free angle produced and finger-like and with ventral margin broadly produced near middle. Plate opposite opening of ductus seminalis very large and broad with the plate just anterior to this large and completely ringing the ductus bursae. The genitalia of eight females were studied.

TYPE LOCALITY: "Talcaguano" = Talcahuano, Province of Concepción, Chile.

ADDITIONAL TYPE DATA: The sex and the number of specimens are not given in the original description; however, the illustrations and description apply only to the female.

LOCATION OF TYPE: According to Horn and Kahle (Ent. Beih. Berlin-Dahlem, vol. 2, p. 69, 1935) the material described from Kotzebue's journey was shared in part by the "Museum Dorpat" (Eesti Rahva Museum, Tartu, Esthonia), and in part by C. G. Mannerheim (material now in the Zoological Museum of Helsingfors).

METHOD OF IDENTIFICATION: By comparison with the excellent, colored, original figures of both surfaces of the female and the original description.

#### SYNONYMICAL NOTES:

*Pieris polydice* Blanchard, 1852, described from both sexes (number of specimens not indicated) taken in the vicinity of Concepción, Chile, is clearly a synonym of *T. mercedis*. This type material, in the Museum National D'Historie Naturelle, Paris, consists of one male (cotype) in bad condition, presented by Gay in 1843, and two males and one female (cotypes) in good condition, purchased from Madame Lorquin in 1851.

*Tatochila mercedis* ab. *lilae* Ureta, 1937. This was described from a single female taken at Vicuna, Province of Coquimbo, Chile, in which the ground color is yellowish with violet reflections. It is clearly an individual variant and is therefore listed as a synonym. The type is in the collection of Dr. Emilio Ureta-R.

*Tatochila mercedis* ab. *porteri* Ureta, 1937. This was described from a single male taken at Santiago, Chile. It is an individual variant of the male sex in which the maculation of the wings above to some extent resembles that of *T. vanvolxemii* and in which nearly all black scaling along the veins underneath is absent. Being an individual variant, it is here listed as a synonym. The holotype is in the collection of Dr. Emilio Ureta-R.

*Tatochila mercedis* ab. *elwesi* Ureta, 1937, described from two females taken at El Pangué, Department of Elqui, Province of Coquimbo, Chile, is an individual variant of the female sex in which the ground color is bright yellow with a somewhat greenish tinge and in which nearly all black scaling along the veins below is absent. The type is in the collection of Dr. Emilio Ureta-R.

MISIDENTIFICATIONS: Bartlett-Calvert (1886) refers to this species under the name *T. autodice* (Hübner). Elwes (1903) illustrates a female of this species as *P. microdice* Blanchard.

**DISTRIBUTION:** Chile from the Province of Atacama south into the Province of Llanquihue and east into the extreme western part of the Territory of Río Negro in Argentina.

**CHILE:** *Province of Atacama*, Copiapó; *Province of Coquimbo*, Vicuña (February); *Province of Valparaiso*, La Campana (March), Quillota (March), Valparaiso (March), Papudo (January); *Province of Santiago*, La Florida (April), San Cristóbal (March), Peñalolen (February, March), Criadas (October), Maucul (February–April), Lo Ovalle (November), Romeral (December), Canelo (October), Santiago (February), El Volcán; *Province of Concepción*, Talcahuano; *Province of Malleco*, Angel (March), Victoria; *Province of Cautín*, Temuco (February); *Province of Llanquihue*, Frutillar (February). **ARGENTINA:** *Territory of Río Negro*, Bariloche (November).

**FOOD PLANTS:** *Brassica campestris* L. and *Raphanus sativus* L.

**MATERIAL STUDIED:** 29 males, 21 females.

#### GROUP D. THE ORTHODICE GROUP

In this group the aedeagus (in lateral view) is gradually arched and usually much narrower just before the middle than at the distal end. The distal end of the aedeagus is entirely excised on its right side and deeply incised on its left side. There is a small tooth above this incision and frequently one below it.

Hindwings above with marginal wedge-shaped markings absent, although the veins are sometimes black along the outer margin; without a submarginal row of sagittate markings, or if present, greatly reduced. Hindwing below with ground color yellow and with submarginal series of sagittate markings usually absent or, if present, very faintly represented. The orange streaks through middle of the interspaces are either present or absent. Usually the white spot on lower discocellular vein is absent, if present the white is confined to the vein.

This group contains five species.

#### *Tatochila inversa* Hayward

*Tatochila inversa* Hayward, Act. Zool. Lilloana Inst. "Miguel Lillo," vol. 7, pp. 136, 137, 1949; vol. 9, p. 94, Oct. 25, 1951.

**VENATION:** As illustrated (fig. 62).

**LEGS:** With paronychium, claw, and pulvillus as illustrated (fig. 73).

**MALE:** Plate 6, figure 19. Head with outer surfaces of palpi white. Scales behind eyes orange. Wings with dark markings dark brown to black, ground color on uppersurfaces and on disc and base of forewing below white, ground color of hindwing below and of apex of forewing below yellow with costal margin and extreme base of hindwing orange and with veins silvery white outlined heavily with gray. Lower discocellular vein white. This species is similar to *homoeodice* and *orthodice* in lacking the black scaling on veins of upper surface

of hindwing and differs from these species in having a very strong discocellular black bar on upperside of forewing. Like *homoeodice* it differs from *orthodice* in having lateral surface of palpi white to pale yellow not orange. It is easily separated from *homoeodice* in its lack of orange between the veins and below the cell on the undersurfaces of hindwing and from *orthodice* in lacking orange in upper half of cell on this wing.

Length of forewing, 27-28 mm.

Male genitalia as illustrated (figs. 34, 48), with aedeagus in lateral view having central part relatively more slender than in the other species of Group D and with dorsal and ventral margins of this central portion more nearly parallel than in the other species of this group except *orthodice*. From *orthodice* it differs, in addition to the slenderness, in having a narrower and shorter distal incision on the left side. The genitalia of both of the known males were studied.

FEMALE: Plate 6, figure 19a. Head with outer surfaces of palpi pale yellow. Scales behind eyes orange. Forewing above white with dark brown markings on forewing as illustrated, being very extensive with an especially large discocellular bar and large submarginal dark band. Hindwing above differing from all other species in Group D in having a clear yellow ground color. Veins white with dark brown scaling as illustrated. Wings below not differing from the male except with dark brown scaling along veins stronger, with discocellular bar of forewing more distinct and with the submarginal series of sagittate markings on this wing clearly indicated.

Length of forewing, 27.5 mm.

Female genitalia as illustrated (fig. 90), with anterior lobe of inner genital plate nearly subcircular, having a small lobelet at either end of ventral margin. The ribbon-like plate on ventral surface of ductus bursae is situated opposite and posterior to the opening of the ductus seminalis. Ductus bursae with two large plates, one ventral and one dorsal and anterior to the opening of ductus seminalis. Only a single specimen, the holotype, was available for dissection and study.

TYPE LOCALITY: "Quebrada Carapunco, Department de Tafi, Provincia de Tucumán," Argentina.

ADDITIONAL TYPE DATA: Described from a single female, the holotype (2,500 m., November 1932).

LOCATION OF TYPE: In the collection of the Instituto Miguel Lillo, Tucumán, Argentina.

METHOD OF IDENTIFICATION: By a study of the holotype.

ADDITIONAL REMARKS: The two known males, although from quite a distant locality, Cuzco, Peru, are here associated with the female holotype because of their great similarity in color and pattern. One of these males has the forewing with outer margin more straight and



an even larger discocellular bar than in the one illustrated (fig. 19) and with a row of large submarginal dark spots present. Otherwise it is quite similar to the one illustrated and has identical genitalia. It is possible that *inversa* may be a synonym of *homoeodice*; however, scarcity of material prevents that conclusion at this time.

DISTRIBUTION: This species is too rare for any general statement on distribution.

PERU: Department of Cuzco, Ollantaitambo (9,200 ft., March), Callanga (1,500 m.). ARGENTINA: Province of Tucumán, Quebrada Carapunco (2,500 m., November).

MATERIAL STUDIED: 2 males, 1 female.

#### *Tatochila homoeodice* Paravicini

*Tatochila homoeodice* Paravicini, Mitteil. Schweizerschen Ges., vol. 12, Heft 1, p. 23, May 1910.—Talbot, in Strand, Lepidopterorum catalogus, pars 53, Pieridae I, p. 59, Oct. 24, 1932.

VENATION: As illustrated (fig. 63).

LEGS: With paronychium, claw, and pulvillus as illustrated (fig. 77).

MALE: Plate 6, figure 21. Head with outer surfaces of palpi yellowish white. Scales behind eyes orange. Wings with dark markings dark brown, ground color of upper surfaces and on disc and base of apex of forewing underneath yellow. Hindwing with costal margin and intervenal area below cell orange and with faint orange streaks between veins along outer half of this wing. Veins on this surface white broadly outlined by dark gray. Similar to *T. orthodice*, differing chiefly in having the ground color below a much darker yellow and in having all markings much stronger. This is true of these markings on apex of forewing above also. From *sagittata* and *stigmadice* it is easily distinguished by lacking all the black markings on the uppersurface of the hindwing.

Length of forewing, 25 mm.

Male genitalia as illustrated (figs. 35, 49), with aedeagus more swollen before distal end than in *inversa* and *orthodice* and differing from *sagittata* chiefly in having a small but distinct, ventrally placed subapical tooth in addition to the dorsally placed subapical tooth. The genitalia of only a single male was available for study.

FEMALE: Unknown.

TYPE LOCALITY: "Huancabamba," Department of Piura, "Peru."

ADDITIONAL TYPE DATA: Described from three males, one labeled type (= holotype, locality as given above and without further data) and one labeled paratype (data as in the holotype, ♂ genitalia preparation W. D. F. No. 5338) by Paravicini. The whereabouts of the second paratype is unknown.

LOCATION OF TYPE: In the collection of the British Museum (Natural History).

METHOD OF IDENTIFICATION: Through a study of the paratype which was compared with the holotype by Mr. D. S. Fletcher.

DISTRIBUTION: Known only from the type locality.

MATERIAL STUDIED: 1 male.

*Tatochila orthodice* (Weymer)

*Pieris orthodice* Weymer, in Weymer and Maassen, W. Reiss und A. Stübel Reisen in Süd-Amerika, Lepidopteren . . ., pp. 99, 124, pl. 3, fig. 20, 1890.—Standing, Ent. Zeitschr. "Iris," Dresden, vol. 7, p. 62, July 14, 1894.

*Tatochila xanthodice* (Lucas), Berg nec Lucas (a misidentification of male), Anal. Mus. Nac. Buenos Aires, vol. 4, pp. 249–252, fig. 4, Nov. 18, 1895

*Tatochila orthodice* Weymer, Berg, Anal. Mus. Nac. Buenos Aires, vol. 4, pp. 253, 254, Nov. 18, 1895.—Rebel, Weymer, and Stichel, Berliner Ent. Zeitschr., vol. 46, p. 291, September 1901.—Röber, in Seitz, Die Gross-Schmetterlinge der Erde, vol. 5, p. 57, pl. 18, figs. e4, e5, May 25, 1908.—Paravicini, Mitteil. Schweizerischen Ges., vol. 12, p. 23, May 1910.—Giacomelli, Anal. Mus. Nac. Buenos Aires, vol. 26, pp. 406, 407, 409, 411, 414, 415, Mar. 10, 1915; Rev. Chilena Hist. Nat., vol. 20, pp. 43, 44, 46, 53, 55, 56, 57, pl. 3, fig. 6, June 30, 1916.—Jørgensen, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 28, pp. 430, 443, 456–459, fig. 5, Nov. 10, 1916.—Giacomelli, Physis, vol. 3, pp. 375, 376, 1917.—Röber, in Seitz, Die Gross-Schmetterlinge der Erde, vol. 5, p. 1015, Jan. 21, 1924.—Talbot, in Strand, Lepidopterorum catalogus, pars 53, Pieridae I, p. 59, Oct. 24, 1932.—Breyer, Verhandlungen VII Internationalen Kongress für Entomologie, vol. 1 (for 1938), p. 32, February 1939.—Hayward, Act. Zool. Lilloana Inst. "Miguel Lillo," p. 93, Oct. 25, 1951.—Förster, Veröffentl. Zool. Staatss. München, vol. 3, p. 136, Dec. 1, 1955.—Zischka, Fol. Univ., Univ. Cochabamba, Bolivia, vol. 5, pp. 18, 19, October 1951.

*Tatochila orthodice* ab. *breyeri* Breyer (Giacomelli MS.), Verhandlungen VII Internationalen Kongress für Entomologie, vol. 1 (for 1938), pp. 32, 33, February 1939.—Hayward, Act. Zool. Lilloana Inst. "Miguel Lillo," vol. 9, p. 94, Oct. 25, 1951.

*Tatochila orthodice* f. *inpunctata* Breyer, Verhandlungen VII Internationalen Kongress für Entomologie, vol. 1 (for 1938), p. 32, February 1939.

*Synchlœ orthodice* (Weymer), Breyer, Rev. Soc. Ent. vol. 12, p. 310, February 1945.—Zischka, Fol. Univ., Univ. Cochabamba, Bolivia, vol. 1, p. 28, December 1947.

*Tatochila orthodice* f. *inpunctata* Breyer, Hayward (a correction for *inpunctata*), Act. Zool. Lilloana Inst. "Miguel Lillo," vol. 9, p. 94, Oct. 25, 1951.

VENATION: As illustrated (fig. 64).

LEGS: With paronychium, claw, and pulvillus as illustrated (fig. 78).

MALE: Plate 6, figure 20. Head with outer surfaces of palpi orange and thus differing from all other members of Group D. Scales behind eyes orange. Wings above white with dark brown markings on forewing as illustrated, being more reduced than in *inversa* or

*homoeodice*, the discocellular bar being represented by a narrow line. As in *inversa* and *homoeodice*, this species differs from *sagittata* and *stigmadice* in lacking all black markings on hindwing. Wings below very similar to *homoeodice* and *inversa* with yellow of ground color and black bordering along veins even paler than in those two species and differing from both in having the upper half of hindwing cell orange.

Length of forewing, 22–29 mm. (average, 25.4 mm.).

Male genitalia as illustrated (figs. 36, 49). Aedeagus in lateral view similar to *inversa*, being thicker throughout and differing also in having a broader and deeper distal incision on its left side. The genitalia of six males were studied.

FEMALE: Plate 6, figure 20a. Head as in the male with outer surfaces of palpi orange and thus differing from all other females in Group D. Scales behind eyes orange. Forewing above white, sometimes slightly creamy, with dark brown markings on forewings, as illustrated, being much more extensive than in the male but much less so than in the female of *inversa*, the discocellular bar and submarginal row of spots being greatly reduced. Hindwing above with ground color white, sometimes slightly cream colored with veins white and bordered by pale brown. Wings below quite like the male, differing from *inversa* in having yellow of ground color paler, and like *stigmadice* in having upper half of cell orange. It differs from *stigmadice* in lacking the distinct dark brown stripes along the veins especially on the base and disc of forewing and in lacking the clearly defined orange lines between the veins on the hindwing and on apex of forewing.

Length of forewing, 21.5–26 mm. (average, 24.3 mm.).

Female genitalia as illustrated (fig. 89), with anterior lobe of inner genital plate subtriangular and with both the posterior and the ventral margin of this plate serrate. Ductus bursae with the ribbon-like plate on ventral surface opposite the opening of ductus seminalis divided and with a semicrescentic plate just anterior to this. The genitalia of four females were studied.

TYPE LOCALITY: "Cotana," Department of La Paz, Bolivia.

ADDITIONAL TYPE DATA: Described from five males, cotypes (locality as given above, 1,200–2,200 m., December).

LOCATION OF TYPES: In the Zoologisches Museum der Humboldt-Universität, Berlin. According to Dr. E. M. Hering of that institution, there are only two males remaining in the collection. A third male was destroyed during World War II. Two males are unaccounted for. A lectotype is not designated.

METHOD OF IDENTIFICATION: By a study of one of the two remaining cotypes and by comparison with the excellent original colored figure and description.

## SYNONYMICAL NOTES:

*Tatochila orthodice* ab. *breyeri* Breyer, 1939. This was described from a single melanistic female taken at Rfo Ochuna, Province of Tucumán, Argentina. The type is in the collection of Alberto Breyer, Buenos Aires, Argentina.

*Tatochila orthodice* f. *impunctata* Breyer, 1939 (corrected to *impunctata* by Hayward, 1951). This was described from a single specimen (sex not indicated) taken at Rfo Cochuna, Province of Tucumán, in which the discocellular bar on uppersurface of forewing is absent. The type is in the collection of Alberto Breyer, Buenos Aires, Argentina.

**MISIDENTIFICATIONS:** Berg (1895) refers to a male of this species as *Tatochila xanthodice* (Lucas).

**DISTRIBUTION:** From the Cordillera near La Paz in Bolivia south into the Province of Catamarca in Argentina.

**BOLIVIA:** *Department of La Paz*, Province of Nor Yungas, Yanacachi (January); *Department of Santa Cruz*, Province of Balle Grande, Semaipata (1,500–2,500 m., March). **ARGENTINA:** *Province of Jujuy*, Laguinillas (October); *Province of Salta*, Salta (December), San Lorenzo (April); *Province of Tucumán*, Quebrada Carapunco (November), Quebrada de Lules (January), El Nogalar (September), Rfo Ochuna, Villa Nougues (January); *Province of Catamarca*, Esquina Grande (November), El Candado (December).

**MATERIAL STUDIED:** 37 males, 12 females.

*Tatochila sagittata* Röber

*Tatochila demodice sagittata* Röber, in Seitz, Die Gross-Schmetterlinge der Erde, vol. 5, p. 57, pl. 18, fig. e1, May 25, 1908.—Giacomelli, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 26, pp. 406, 408, 414, 415, Mar. 10, 1915; Rev. Chilena Hist. Nat., vol. 20, p. 55, pl. 3, fig. 1, June 30, 1916.—Talbot, in Strand, Lepidopterorum catalogus, pars 53, Pieridae I, p. 58, Oct. 24, 1932.

*Tatochila stigmadice sagittata* Röber, Paravicini, Mitteil. Schweizerschen Ent. Ges., vol. 12, p. 22, May 1910.

*Tatochila sagittata* Röber, Jörgensen, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 23, pp. 443, 464, 465, Nov. 10, 1916.—Giacomelli, Physis, vol. 3, p. 377, 1917.—Röber, in Seitz, Die Gross-Schmetterlinge der Erde, vol. 5, p. 1015, Jan. 21, 1924.—Förster, Veröffentl. Zool. Staatss. München, vol. 3, p. 135, Dec. 1, 1955.

*Tatochila jorgenseni* Röber, in Seitz, Die Gross-Schmetterlinge der Erde, vol. 5, pp. 1015, 1016, pl. 194, fig. a4, Jan. 11, 1924.—Talbot, in Strand, Lepidopterorum catalogus, pars 53, Pieridae I, p. 59, Oct. 24, 1932.

**VENATION:** As illustrated (fig. 65).

**LEGS:** With paronychium, claw, and pulvillus as illustrated (fig. 79).

**MALE:** Plate 6, figures 22–22b. Head with outer surfaces of palpi white. Scales behind eyes white. Wings with dark markings dark brown to black. Ground color on uppersurfaces and on disc and base of forewing below white. Hindwing and apex of forewing below yellow with costal margin and extreme base of hindwing orange and with



intervenal orange streaks. Veins on undersurface of hindwing gray, heavily outlined by dark brown. Similar to *orthodice* and *stigmadice*, differing chiefly in having the margins of hindwing above and below bordered by a distinct but narrow black line and in usually having a submarginal series of dark brown or black sagittate markings on both wings (on both surfaces) and, in addition, differing from *orthodice* in having outer surface of palpi white not orange.

Length of forewing, 24–28 mm. (average, 27 mm.).

Male genitalia as illustrated (figs. 37, 51). Distal portion of aedeagus more swollen than in *orthodice*, with incision on left side deeper and placed distinctly above the middle and differing from *homoeodice* in lacking the distal and subapical ventral tooth found in that species. From *inversa* it differs in not being constricted in front of the dorso-lateral tooth (ventral view). The genitalia of 10 males were studied.

FEMALE: UNKNOWN.

TYPE LOCALITY: "Huancabamba," Department of Piura, "Peru."

ADDITIONAL TYPE DATA: Described from male specimens (number not stated) taken at 3,000 m. According to Dr. E. M. Hering of the Zoologisches Museum, Humboldt-Universität, Berlin, there is in the Röber collection a single male. We consider this to be the holotype.

LOCATION OF TYPE: In the Röber collection, formerly in Dresden and now in the Berlin Museum, as stated above.

METHOD OF IDENTIFICATION: By comparison with the excellent original figure.

SYNONYMICAL NOTES:

*Tatochila joergenseni* Röber, 1924. Type locality, "Ecuador." Described from a single male, the holotype, in the Röber collection. This name falls to *sagittata* Röber as a synonym since it is only an individual variant. It differs from typical *sagittata* only in lacking the submarginal sagittate markings on upper side of hindwing.

DISTRIBUTION: The Andes from southern Colombia south to central Peru.

COLOMBIA: Province of Cauca, Popayán. PERU: Department of Piura (6,000–10,000 ft.); Department of Cajamarca, Celendin (2,625 m.); Department of Junín, Huancayo (3,500 m.).

MATERIAL STUDIED: 11 males.

#### *Tatochila stigmadice* (Staudinger)

*Pieris stigmadice* Staudinger, Ent. Zeitschr. "Iris," Dresden, vol. 7, pp. 62, 63, July 14, 1894.

*Tatochila xanthodice* (Lucas), Berg nec Lucas (a misidentification of female), Anal. Mus. Nac. Buenos Aires, vol. 4, pp. 249–252, fig. 5, Nov. 18, 1895.

*Tatochila stigmadice* (Staudinger), Berg, Anal. Mus. Nac. Buenos Aires, vol. 4, pp. 254, 255, Nov. 18, 1895.—Röber, in Seitz, Die Gross-Schmetterlinge der Erde, vol. 5, p. 57, May 25, 1908.—Dixey, Proc. Ent. Soc. London, (1909)

- p. cxxxiv, Mar. 30, 1910.—Paravicini, *Mittel.* Schweizerschen Ent. Ges., vol. 12, p. 22, May 1910.—Giacomelli, *Anal. Mus. Nac. Hist. Nat. Buenos Aires*, vol. 26, pp. 406, 407, 409, 414, 415, Mar. 10, 1915; *Rev. Chilena Hist. Nat.*, vol. 20, pp. 44, 55, 56, 57, pl. 3, fig. 4, June 30, 1916.—Jørgensen, *Anal. Mus. Nac. Hist. Nat. Buenos Aires*, vol. 28, pp. 430, 443, 467, Nov. 10, 1916.—Giacomelli, *Physis*, vol. 3, pp. 377, 378, 1917.—Röber, *in* Seitz, *Die Gross-Schmetterlinge der Erde*, vol. 5, p. 1016, pl. 194, fig. a6, Jan. 21, 1924.—Talbot, *in* Strand, *Lepidopterorum catalogus*, pars 53, Pieridae I, p. 58, Oct. 24, 1932.—Hayward, *Act. Zool. Lilloana Inst. "Miguel Lillo,"* vol. 9, p. 94, Oct. 25, 1951.—Förster, *Veröffentl. Zool. Staatss. München*, vol. 3, p. 135, Dec. 1, 1955.—Zischka, *Fol. Univ., Univ. Cochabamba, Bolivia*, vol. 5, p. 18, October 1951.
- Tatochila stigmadice* f. *immaculata* Röber, *in* Seitz, *Die Gross-Schmetterlinge der Erde*, vol. 5, p. 57, pl. 18, figs. e2, e3, May 25, 1908.—Giacomelli, *Anal. Mus. Nac. Hist. Nat. Buenos Aires*, vol. 26, pp. 406, 407, 409, 410, 414, 415, Mar. 10, 1915; *Rev. Chilena Hist. Nat.*, vol. 20, p. 55, pl. 3, fig. 3, June 30, 1916.—Jørgensen, *Anal. Mus. Nac. Hist. Nat. Buenos Aires*, vol. 28, pp. 430, 469, Nov. 10, 1916.—Röber, *in* Seitz, *Die Gross-Schmetterlinge der Erde*, vol. 5, p. 1016, Jan. 21, 1924.—Talbot, *in* Strand, *Lepidopterorum catalogus*, pars 53, Pieridae I, p. 59, Oct. 24, 1932.—Breyer, *Verhandlungen VII Internationalen Kongress für Entomologie*, vol. 1 (for 1938), p. 31, February 1939.—Hayward, *Act. Zool. Lilloana Inst. "Miguel Lillo,"* vol. 9, p. 94, Oct. 25, 1951.—Zischka, *Fol. Univ., Univ. Cochabamba, Bolivia*, vol. 5, p. 18, October 1951.
- Tatochila stigmadice* f. *immaculata* Röber, *Giacomelli nec Röber* (a misspelling), *Rev. Chilena Hist. Nat.*, vol. 20, pp. 46, 57, June 30, 1916.
- Tatochila stiginadice* (Staudinger), *Giacomelli nec Staudinger* (a misspelling), *Rev. Chilena Hist. Nat.*, vol. 20, p. 55, June 30, 1916.
- Tatochila stigmadice* f. *punctata* Jørgensen, *Anal. Mus. Nac. Hist. Nat. Buenos Aires*, vol. 28, pp. 430, 467, 468, Nov. 10, 1916.—Röber, *in* Seitz, *Die Gross-Schmetterlinge der Erde*, vol. 5, p. 1016, Jan. 21, 1924.—Talbot, *in* Strand, *Lepidopterorum catalogus*, pars 53, Pieridae I, p. 59, Oct. 24, 1932.—Breyer, *Verhandlungen VII Kongress für Entomologie*, vol. 1 (for 1938), p. 31, February 1939.
- Tatochila stigmadice* ab. *nigra* Breyer (*Giacomelli MS*), *Verhandlungen VII Internationalen Kongress für Entomologie*, vol. 1 (for 1938), pp. 31, 32, February 1939.—Hayward, *Act. Zool. Lilloana Inst. "Miguel Lillo,"* vol. 9, p. 94, Oct. 25, 1951.
- Synchlōe stigmadice* (Staudinger), *Zischka nec Staudinger* (a misspelling), *Fol. Univ., Univ. Cochabamba, Bolivia*, vol. 1, p. 28, December 1947.
- Tatochila stigmadice* ab. *punctata* Jørgensen, Hayward, *Act. Zool. Lilloana Inst. "Miguel Lillo,"* vol. 9, p. 94, Oct. 25, 1951.
- Tatochila stigmadice immaculata* Röber, *Zischka, Fol. Univ., Univ. Cochabamba, Bolivia*, vol. 5, p. 18, October 1951.

VENATION: As illustrated (fig. 66).

LEGS: With paronychium, claw, and pulvillus as illustrated (fig. 80).

MALE: Plate 6, figure 23; plate 7, figure 24. Head with outer surfaces of palpi white. Scales behind eyes white, thus differing from *inversa*, *orthodice*, and *homoeodice*. Wings above with dark brown markings as illustrated, having dark scaling more extensive than in *orthodice*, especially on the hindwing where the outer parts of the veins

are covered with dark brown. Wings below with ground color of hindwing and apex of forewing pale yellow as in *orthodice*. Similar to *orthodice*, *homoeodice*, and *inversa* in having veins on these areas more narrowly covered with white and more narrowly bordered with dark brown and unlike these species in having clearly defined orange lines between the veins on these areas. Like *orthodice* and differing from *inversa* and *homoeodice* in having orange on upper half of cell of hindwing below.

Length of forewing, 23–27 mm. (average, 25.1 mm.).

Male genitalia as illustrated (figs. 38, 52). Distal end of aedeagus more slender than in any of the other species and with ventral lobe formed by the lateral incision smaller and less produced, thus somewhat similar to the *autodice* group from which it differs otherwise in being gradually arched, not sinuous. The genitalia of 12 males were studied.

FEMALE: Plate 7, figures 24a–24c. Head with outer surfaces of palpi white. Scales behind eyes white, thus differing from females of *inversa* and *orthodice*. Wings above white, sometimes slightly creamy with dark brown markings as illustrated, being very much more extensive than in the male of this species and in other females of this group, having the veins on both wings entirely and extensively covered with dark brown clear to their bases and with the submarginal row of sagittate markings very distinct even on the hindwing. Wings below quite like the male, except with veins on base and disc of forewing very distinctly outlined by dark brown, differing from *inversa* and *orthodice* females in this character as well as in having clearly defined orange lines between all of the veins on the hindwing and on apex of forewing. The upper half of cell on hindwing is orange, thus differing from *inversa*.

Length of forewing, 22–26 mm. (average, 23.6 mm.).

Female genitalia as illustrated (fig. 91), having anterior lobe of inner genital plate with anterior margin serrate and with ventral margin triundulate. Ductus bursae almost entirely sclerotized. The genitalia of five females were studied.

TYPE LOCALITY: "Cocapata," Department of Cochabamba, Bolivia.

ADDITIONAL TYPE DATA AND LOCATION OF TYPE: Described from seven males, cotypes (locality as given above); of these, five now remain in the Zoologisches Museum der Humboldt-Universität, Berlin. One of these was sent to us for study and it is hereby designated as the lectotype.

METHOD OF IDENTIFICATION: By a study of the lectotype.

SYNONYMICAL NOTES:

*Tatochila stigmadice* f. *immaculata* Röber, 1908. This was described from the male sex from Province of Tucumán, Argentina. The type is in the Röber collection of the Zoologisches Museum, Humboldt-Universität, Berlin. The

original description and colored figure show that it is an unnecessary name, representing an individual variant in which the submarginal spots are absent on both surfaces of both wings.

*Tatochila stigmadice* f. ♂ *punctata* Jorgensen, 1916. This was described from a number of specimens from various localities in the Provinces of Salta, Tucumán, and Catamarca, Argentina. Type in the collection of the Museo Argentino de Ciencias Naturales of Buenos Aires. A study of a paratype in the collection of the U. S. National Museum and of the carefully prepared original description show this name to apply (indeed as described) to a fairly common individual variant of the male sex in which there is a submarginal series of small spots on the upper surfaces of the hindwings. The name is neither desirable nor necessary and falls to *stigmadice*.

*Tatochila stigmadice* ab. *nigra* Breyer, 1939. This was described from a single specimen (sex not stated) taken in Tucumán, Argentina. It is a large and dark individual variant and does not need a name. The type is in the collection of Alberto Breyer, Buenos Aires, Argentina.

The name *stigmadice* has been misspelled as *stiginadice* by Giacomelli (1916) and as *stigamdice* by Zischka (1947).

MISIDENTIFICATIONS: Berg (1895) refers to a female of this species as *Tatochila xanthodice* (Lucas).

DISTRIBUTION: Bolivia, from Department of Cochabamba and the southern part of Department of La Paz, south into the Province of Córdoba, Argentina.

BOLIVIA: *Department of Cochabamba*, Cochabamba (2,600 m., March); *Department of La Paz*, Sicasica (October). ARGENTINA: *Province of Jujuy*, Jujuy; *Province of Salta*, Salta (December); *Province of Catamarca*, Las Faldas, Esquina Grande (April, November, December), El Suncho (May), El Candado (February); *Province of Tucumán*, Siambón (March, May, October), Villa Nougues (November), Tafi (February), Tucumán; *Province of La Rioja*, La Rioja; *Province of Córdoba*, Rearte (April).

MATERIAL STUDIED: 29 males, 17 females.

#### GROUP E. THE XANTHODICE GROUP

In this group the aedeagus is gradually arched and deeply incised at the distal end both dorsally and ventrally, forming large lateral lobes, at least one of which forms a point at the apex. The aedeagus here is thus similar to the aedeagi found in the genera *Hypsochila*, *Phulia*, and *Piercolias*.

Wings above like Groups C and D. Hindwing below with a yellow ground color; without a series of sagittate markings and sometimes with irregular orange spots replacing this series. The white spot sometimes found on the lower discocellular vein is lacking in this group.

This group contains two species.



*Tatochila xanthodice* (Lucas)

*Pieris xanthodice* Lucas, Rev. Mag. Zool., ser. 2, vol. 4, pp. 337, 338, July 1852.—Kirby, A synonymic catalogue of diurnal Lepidoptera, p. 450, 1871.—Herich-Schaffer, Corresp.-Blatt Zool.-Min. Ver. Regensburg, vol. 21, p. 125, 1867.—Whymper, Travels amongst the Great Andes of the Equator, supplementary appendix, p. xi, 1891.—Godman and Salvin, in Whymper, *ibid.*, p. 106, 1891.—Campos-R., Rev. Col. Nac. Vicente Rocafuerte, No. 4, p. 42, 1921.

*Tatochila xanthodice* (Lucas), Butler, Proc. Zool. Soc. London (1872), p. 67, Jan. 16, 1872.—Rebel, Weymer, and Stichel, Berliner Ent. Zeitschr., vol. 46, pp. 290, 291, pl. 4, figs. 1, 2, September 1901.—Elwes, Trans. Ent. Soc. London (1903), p. 293, October 1903.—Röber, in Seitz, Die Gross-Schmetterlinge der Erde, vol. 5, p. 56, pl. 18, figs. d5, d6, May 25, 1908.—Dixey, Proc. Ent. Soc. London (1909), p. cxxxiv, Mar. 30, 1910.—Paravicini, Mitteil. Schweizerischen Ent. Ges., vol. 12, p. 23, May 1910.—Giacomelli, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 26, pp. 406, 408, 411, 415, Mar. 10, 1915; Rev. Chilena Hist. Nat., vol. 20, pp. 44, 46, 54, 57, pl. 2, figs. 5, 6, June 30, 1916.—Jørgensen, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 28, pp. 443, 460–462, Nov. 10, 1916.—Giacomelli, Physis, vol. 3, p. 376, 1917.—Campos-R., Rev. Col. Nac. Vicente Rocafuerte, vol. 9, pp. 80, 81, 1927.—Klots, Ent. Americana, new ser., vol. 12, No. 4, p. 218, March 1932.—Talbot, in Strand, Lepidopterorum catalogus, pars 53, Pieridae I, p. 58, Oct. 24, 1932.—Apolinar, Rev. Acad. Colombiana Cienc. Exact. Fís. Nat., vol. 4, p. 349, December 1941.

*Pieris* (*Tatochila*) *xanthodice* Lucas, Therese von Bayern, Berliner Ent. Zeitschr., vol. 46, p. 242, September 1901.

*Tatochila pyrhomna* Röber, in Seitz, Die Gross-Schmetterlinge der Erde, vol. 5, p. 56, pl. 18, figs. d2, d3, May 25, 1908.—Paravicini, Mitteil. Schweizerischen Ent. Ges., vol. 12, p. 23, May 1910.—Giacomelli, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 26, pp. 406, 408–413, Mar. 10, 1915; Rev. Chilena Hist. Nat., vol. 20, pp. 44, 52–55, 57, pl. 3, fig. 2, June 30, 1916.—Jørgensen, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 28, pp. 443, 460, Nov. 10, 1916.—Giacomelli, Physis, vol. 3, p. 376, 1917.—Talbot, in Strand, Lepidopterorum catalogus, pars 53, Pieridae I, p. 58, Oct. 24, 1932.

VENATION: As illustrated (fig. 67).

LEGS: With paronychium, claw, and pulvillus as illustrated (fig. 81).

MALE: Plate 7, figures 25, 25a. Head with outer surfaces of palpi white to pale yellow. Scales behind eyes orange. Wings above white, sometimes yellowish with dark brown markings on forewing as illustrated, having the marginal black sagittate markings broad and entirely obscuring the veins and thus differing from *distincta*. Wings below with base and disc of forewing white and with ground color of hindwing and apex of forewing pale yellow, nearly white along outer margins. Veins white outlined with black in these areas. Hindwing with costal margin, upper half of cell and interspace below cell orange.

Differing from *distincta* in having upper half of cell and interspaces below cell orange and in having a submarginal series of orange spots on the hindwing.

Length of forewing, 24–28 mm. (average, 26.6 mm.).

Male genitalia as illustrated (figs. 39, 53). Aedeagus with dorsal and ventral incisions much deeper than in *distincta* and forming two lateral lobes that are not equal in size or shape. Five genitalia preparations were studied.

FEMALE: Plate 7, figure 25b. Head as in the male with outer surfaces of palpi pale yellow and scales behind eyes orange. Wings above as illustrated with ground color yellow and nearly obliterated by the dark brown markings along the veins. Submarginal spots large and confluent with the vein markings. Wings below as in the male.

Length of forewing, 26–28 mm. (average 27 mm.).

Female genitalia as illustrated (fig. 92). The anterior lobe of the inner genital plate is subtriangular, having the posterior margin serrulate and the ventral margin deeply undulate, forming five separate lobelets. Ductus bursae lacks all sclerotization. Two genitalia preparations were studied.

TYPE LOCALITY: The original description specifies Venezuela and Peru. According to Mr. Jean Bourgogne, of the Paris Museum, the two original males are from Colombia and were purchased from a Mr. Parzudaki. A lectotype is not designated.

ADDITIONAL TYPE DATA: Described from two males, cotypes (Colombia, Mr. Parzudaki), and one female, presumed to be a cotype (Peru, from Mr. Becker).

LOCATION OF TYPES: In the Museum National D'Historie Naturelle, Paris.

METHOD OF IDENTIFICATION: Identified by reference to the original description, which fits no other species. *Tatochila microdice arctodice* Staudinger and *T. microdice macrodice* Staudinger, the only other species with which *xanthodice* could logically be confused, lack entirely the submarginal streaks of orange between the veins on hindwings below and never have black marginal lines on the hindwings above. The present species is quite in agreement with the original description, does have these orange streaks, and frequently has this black marginal line.

#### SYNONYMICAL NOTES:

*Tatochila pyrromma* Röber, 1908. Described from the male sex (number of specimens not stated) from "Huancabamba," Department of Piura, Peru (3,000 m.). Type presumably in the Röber collection. The original description and colored figure accompanying this name show clearly that it is a synonym of *xanthodice*.

**DISTRIBUTION:** The Andes of Colombia south through Ecuador into northern Peru.

**COLOMBIA:** *Department of Santander*, Río Suarez (900–1,000 m., August); *Department of Boyacá*, Arcabuco (2,200–3,000 m., September) Samacá; *Department of Cundinamarca*, San Miguel (3,000 m., August), La Calera (2,800 m., February), Choachi (December), Aguadita (June); *Department of Cauca*, Páramo Malvoza (3,400 m., July). **ECUADOR:** *Province of Tungurahua*, Río Pastaza. **PERU:** *Department of Cajamarca*, Cajamarca; *Department of Piura*, Huancabamba (3,000 m.).

**MATERIAL STUDIED:** 12 males, 2 females.

### *Tatochila distincta* Jörgensen

*Tatochila distincta* Jörgensen, Anal. Mus. Nac. Hist. Nat. Buenos Aires, vol. 28, pp. 443, 465–467, figs. 6, 7, Nov. 10, 1916.—Giacomelli, Physis, vol. 3, p. 377, 1917.—Röber, in Seitz, Die Gross-Schmetterlinge der Erde, vol. 5, p. 1016, pl. 194, fig. a5, Jan. 21, 1924.—Talbot, in Strand, Lepidopterorum catalogus, pars 53, Pieridae I, p. 59, Oct. 24, 1932.—Breyer, Verhandlungen VII Internationalen Kongress für Entomologie, vol. 1 (for 1938), p. 30, February 1939.—Hayward, Act. Zool. Lilloana Inst. "Miguel Lillo," vol. 9, p. 94, Oct. 25, 1951.

**VENATION:** As illustrated (fig. 68).

**LEGS:** With paronychium, claw, and pulvillus as illustrated (fig. 82).

**MALE:** Plate 7, figure 26. Head with outer surfaces of palpi and scales behind eyes white. Forewings above white with dark markings as illustrated, having black marginal sagittate markings much narrower than in *xanthodice* and not covering the white veins along the margin. Submarginal sagittate markings prominent and usually confluent in forewing, absent or sometimes only faintly indicated on hindwing. Hindwing above white sometimes with prominent black scaling along both sides of the veins. Wings below with base and disc of forewing white and with ground color of hindwing and apex of forewing yellow, with veins silvery white outlined with gray in these areas. Orange absent except in base, cell, and along costal margin of hindwing, thus differing from *xanthodice*.

Length of forewing, 22–24 mm. (average, 23 mm.).

Male genitalia as illustrated (figs. 40, 54), with dorsal and ventral incisions much more shallow than in *xanthodice* and forming two lateral lobes that are nearly equal in size and shape. The genitalia of five males were studied.

**FEMALE:** Plate 7, figure 26a. Head as in the male with outer surfaces of palpi and scales behind eyes white. Wings above as illustrated, with ground color of forewing white and of hindwing white with a yellowish tinge. Dark markings more extensive than in the male, especially on the hindwing where the veins are white completely outlined on both sides by dark brown or black. All dark

markings much smaller and more narrow than in females of *xanthodice*, with submarginal sagittate markings of hindwing very indistinct. Wings below as in the male.

Length of forewing, 23–24 mm. (average, 23.5 mm.).

Female genitalia as illustrated (fig. 93), with anterior lobe of inner genital plate subtriangular and with posterior and ventral margins of this lobe slightly irregular and undulate. Ductus bursae with sclerotized ring around area at opening of ductus seminalis. Only one of the two available females was dissected for study.

TYPE LOCALITY: "Cerros de Aconquija," Province of Catamarca, Argentina.

ADDITIONAL TYPE DATA: Described from males and females, cotypes (number not specified), from Cerro Negro (3,500 m.), La Ollada (3,100 m.), and Cerro de la Ensenada (3,200 m.), all in the Sierra de Aconquija, Province of Catamarca, Argentina (on the wing in February and March).

LOCATION OF TYPES: In the collection of the Museo Argentino de Ciencias Naturales, Buenos Aires. One male cotype (Cerro Negro) and one female cotype (La Ollada) in the collection of the U. S. National Museum. One male cotype (Cerro Negro) in the collection of the British Museum (Natural History).

METHOD OF IDENTIFICATION: By a study of the three cotypes available to us for study and of the well-prepared original description and illustrations.

DISTRIBUTION: Known only from Argentina.

ARGENTINA: Province of Tucumán, Casa de Piedra (3,150 m., February), La Ollada (3,100 m.).

[A single specimen in the collection of Cornell University is labeled "Puno Peru, 17.XII.38, Leg. Loukuf." This record is very doubtful and should be further verified before acceptance.]

MATERIAL STUDIED: 6 males, 2 females.