STUDIES ON THE PHILIPPINE BUTTERFLIES CHIEFLY COLLECTED
BY THE CO-OPERATIVE SURVEY BY THE OSAKA MUSEUM OF
NATURAL HISTORY AND THE NATIONAL MUSEUM OF THE
PHILIPPINES, 1969. Part 1 : Papilionidae *

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The Philippines, which are consisted of 7,107 islands, scatter triangularly in the
eastern border of the Asian continental shelf. In tropical or subtropical climate,
geographical situation of the islands yields abundant endemic fauna which presents
interesting problems to biologists in the field of historical biogeography. It is gene-
really said that about 620 species of butterflies recorded from the Archipelago. Since
the publication of Semper’s monograph in 1886, numerous data have been added to the
butterfly fauna of this country. However, the most of them were so fragmental that
wide scope of view of faunal composition had been highly expected.

At the end of 1969, forty days trip for butterfly collecting was undertaken as
one of the main projects of "Natural history survey of the Philippines by the Osaka
Museum of Natural History in co-operation with the National Museum of the Phi-
ippines". During these short days trip, more than 2,500 samples of butterflies were
collected by us and Mr. Yorio Miyatake, all who were the members of the project.
Present materials can be classified into about 200 species by a short account of inves-
tigation. It is supposed that this number of species represent only one fifth of
the whole of the butterflies which are actually living in the Philippine Islands.

The main purpose of this series of reports is to describe the morphological and
biogeographical features of the butterflies captured during the present survey. Al-
though the collections were not extensive and not rich in number of species and speci-
mens, we believe that thorough investigation of the present materials will contribute
something new to the biogeography of the Philippine fauna. We have also a little
expectation that study on the present materials will throw some lights upon a question
from where the butterfly immigrants come into Japan.

Itinerary and brief descriptions of the collecting sites were already printed in the

* Contributions from the Osaka Museum of Natural History, No. 152.
Philippine Natural History Papers, No. 2.
first report of the serial publications entitled "Philippine Natural History Papers." Before entering the subject, we wish to express our cordial gratitude to all who favoured our field survey, whose name were also introduced in the first report. Hearty thanks are also due to the members of the survey, especially to Mr. Y. MIYATAKE, curator of entomology of the Osaka Museum of Natural History, who supported us to obtain many valuable samples.

In compiling this paper we tender our warmest thanks to Prof. Takashi SHIRÔZU and his stuff of Biological Laboratory, Kyushu University, for their kind advices and supports in various ways. Prof. TAMOTSU ISHIHARA and Dr. Sadanari HISAMATSU, Ehime University and Mr. Taizô HONDA of Kansei-Gakuin University allowed us to use some specimens for study to whom we are sincerely grateful.

Short series of Philippine butterflies in the collection of the Osaka Museum of Natural History will be included in this report for convenience. They are shown by the registoral number in the bracket such as (OMNH. EI-10063).

I. PAPILIONIDAE

As far as the butterfly is concerned, Papilionidae is the most gorgeous insect. Special attention of lepidopterists have been paid to taxonomy of the family so numerous local races or geographical subspecies were known to science. In the Oriental region especially in "WALLACEA" such as the Philippines, major islands or island group for the most part, have their own endemic representatives of wide spread swallowtail. It is very difficult problem to solve whether the endemic race differentiate to the specific level or not as compared with those of neighbouring islands. In the Philippines, 44 species of Papilionidae have been recorded. Among of them, 12 are endemic to the Philippine proper, 4 are confined to Palawan, 4 are restricted to the Philippine proper and Palawan, and 21 are the species common with Borneo and other Malaysian Archipelago judging from the present level of knowledge of Papilionidae classification.

We think, further investigation must be done to recognize the true meaning of higher degree of endemism in the Philippine proper than that of Palawan based on the standpoint view of historical biogeography. As the first step to approach the problem, comparative study of male genital structures of the Philippine Papilionidae with those of neighbouring lands was done as far as we could. In the case that the gap between endemic Philippine race and other races is larger than that among Malaysian or Oriental races, we treated the Philippine race as endemic "species".

As a consequence, some changes of taxonomy of Philippine swallowtails are needed.
1. *Trogonoptera trojana* (Honrath, 1886) (Pl. 1, fig. 1, text-fig. 1 & 9)

*Ornithoptera trojana*: Semper 1886–92 Reis, Arch. Phil., 2 (5): 263–4

*Ornithoptera trojana* (*O. brookiana* var. ?): Staudinger 1889 Iris, 2: 4–6.

*Trogonoptera trojana*: Rippon 1898 Icones Ornithopterorum, p. 5–6, pl. 27,
figs. 1–3, pl. 28, figs. 1–4.

*Papilio trojana*: Jordan 1908–9 Seitz Macrolep. World, 9: 18, pl. 5b "trojanus".

text-fig. 39 male valva.


Male genitalia: -- Superuncus of 8th abdominal tergite short, represented by a triangular horn-like process. 9th abdominal segment thin, saccus small. Valva short and

Text-fig. 1. Male genitalia of *Trogonoptera trojana* and *T. brookiana*.

d: dorsal aspect of genital segments, d’: the same, valva omitted, g: lateral aspect of genital segments, h: lower margin of harpe in the depressed condition, j: juxta, caudal view, m: lateral aspect of aedeagus and juxta, v: valva inner side, v’: valva dorsal aspect, y: apex of aedeagus, ventral aspect, z: horn of juxta, ventral aspect, h’, y’ and z’: specimen from Kinabalu, Sabah, h”’, y”’ and z”’: specimen from “G. Biara, E. Atjeh”, Sumatra,
broad, without apical process, having a prominent horn at the base of dorsal margin. Harpe broad and saucer-shaped, having the denticulation at ventro-distal and dorso-basal margin. Aedeagus stout and short, curved dorsally. Juxta having a pair of horn-like, well sclerotized process dorso-distally, outer margin of the horn with delicate denticulation. 10th abdominal segment represented by a pair of rugby-ball-shaped scaphium.

It is still in question whether trojana is a distinct "species" or only a geographical subspecies of T. brookiana. Although general features of male genitalia are common to both forms, a little but constant difference can be seen in shape of aedeagus and juxta. we could examine 1 North Bornean, 1 Sumatran and 2 Malayan specimens of T. brookiana. They have uniform structure in detail of genitalia having more widened apex of aedeagus and more coarse dentation of juxta as compared with those of trojana. So we tentatively treat trojana is a distinct species.

Genus Trogonoptera seems to be a relict in the lower altitude of Sundaland where the tropical rain forest are well reseeded. We could see no individuals during our stay in Palawan.

2a. Troides rhadamantus rhadamantus (Lucas, 1835)

(Pl. 1, figs. 2a-1~2a-6, text-fig. 2 & 9)

Pompeoptera rhadamantus: Rippon 1898 Icon. Ornithopt., 57-58, pl. 55, figs. 1-5.
Papilio rhadamantus rhadamantus: Jordan 1908-9 Seitz Macrolep. World, 9: 25-26, pl. 12c "rhadamantus".


25 & 97 male genitalia and schematic cross section of the anal area of hind wing.

(Specimens examined) Luzon: 1 ♂, Mt. Makiiiall (Makilin ?), 1913-xi-8 (OMNH, EI-10164).

Text-fig. 2. Male genitalia of Troides magellanus and T. rhadamantus.

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Male genitalia: -- General structure strongly allied to T. aeacus. Superuncus well-developed, beak-shaped. 9th abdominal segment normal, saccus large. Valva long, with a short apical process. Harpe about equal length as valva excepting sacculus, the "head" equipped with a line of teeth is turned upwards, basal hook of the harpe short and wide, without denticulation. Aedeagus short, almost straight, dorsal surface narrowly membranous, left side having two ridges running twistingly. Juxta rectangular without horn.

Rather common insect throughout the Philippines, although catching is not so easy.

2b. Troides rhadamantus plateni (Staudinger, 1888) (pl. 1, fig. 2b; text-fig. 9)
Ornthoptera plateni: Staudinger 1889 Iris, 2: 3-4.
Papilio rhadamantus plateni: Jordan 1908-9 Seitz Macrolep. World, 9: 26, pl. 10, c "plateni".
Troides rhadamantus plateni: Zeuner 1943 Trans. Zool. Soc. Lond., 25 (3): 118-130, text-fig. 26 male genitalia,

(Specimen examined) PALAWAN: 1 ♀, Quezon, 1969-xii-10 Y. Miyatake leg.

This birdwing has been regarded as a Palawanese race of T. rhadamantus by recent lepidopterists. We doubt this is not a subspecies but actual species endemic to Palawan. We regret that we could not obtain the male specimen, tentatively followed conventional treatment of authorities such as Jordan and Zeuner.

3. Troides magellanus (C. & R. Felder, 1862) (pl 1, fig. 3; text-fig. 2 & 9)
Pompeoptera magellanus: Riffon 1898 Icon. Ornithopt., 75-76, pl. 67, figs. 1-5

Troides magellanus: Shirôzu 1960 Butterfl. Formosa, 13, pl. 2, figs. 3♂, 4♀, text-figs. 8,9 & 10E distribution map and male genitalia,

(Specimen examined) LUZON: 8, Luzon, 1957-iv-20 (OMNH, EI-10163, ex Jacoulet Coll.).

Male genitalia: -- Fundamental structures are same to those of the preceding species, but superuncus is larger; harpe is broader, the "head" of which is not turned upwards, equipped with numerous large tooth; aedeagus bent more prominently, twisted ridge not developed.
Seems to be rarer than the preceding species.

4. *Atrophaneura semperi aphthonia* Rothschild, 1908 (pl. 1, figs. 4-1-4-2; text-fig. 9)


Text-fig. 3. Male genitalia of *Pachliopta aristolochiae*, *P. kotzebuea*, *P. phegeus*, *P. polyphontes* and *P. polydorus*.

- c: valva inner side, d: dorsal aspect of genitalia, g: latetal aspect of genitalia, j: juxta, m and n: right side scaphium in the depressed condition (upper) and superuncus (lower), o: same of *P. polyphontes*, p: same of *P. polydorus*, t: lateral aspect of 8th tergite. Numeral show the locality of sample, m1: Assam, m2: Cambodia, m3: Formosa, m4: Malay, m5: Java, m6: Sabah, m7-m9: Palawan, n1: San Pablo, Luzon, n2: Baguio, Luzon, n3: Negros.
(Specimens examined) Mindanao: 1♀, Upper Catigan, alt. 800m, 1969-xi-22 H. Gutierrez leg.
1♀, Upper Sibulan-Todaya, alt. 450m, 1969-xii-7~14 H. Gutierrez & E. Reynoso leg.
5. Pachliopta aristolochiae antiphus Fabricius, 1775
(pl. 2, figs. 5-1~5-4; text-fig. 3, 4 & 9)
Papilio antiphus var. acuta and ab. brevicauda: Staudinger 1889 Iris, 2: 10~11.
Papilio aristolochiae antiphus including ab, atamus, ab. acuta and ab. periphus: Jordan 1908-9 Seitz Macrolep. World, 9: 38~39.
(Specimens examined) Palawan: 6♀ 2♂, Tagburos, alt. 5 m, 1969-xii-12 I., Hiura, R. Alagar and Y, Miyatake leg. All specimens are short-tailed form, f. periphus (=brevicauda).

Pachliopta is superficially allied to subgenera Byasa and Losaria of the genus Atrophaneura, but sharply distinguished from them by the peculiar structures of male genitalia which had been already pointed out by Shirózu (1960) and Munroe (1961) respectively. Dorsum of 9th abdominal segment widely membranous, lateral remnants of tergum hypertrophied, saccus well developed, about equal length with valva including sacculus. Valva aborted, sharply pointed apically. Aedeagus long and straight, sharply pointed apically. 10th abdominal segment (scaphium) well developed, about equal size as valva excepting sacculus, apices rounded, covered with numerous short spines. A pair of membranous lobes with short spines hanging at the base of inner side of scaphium.

In P. aristolochiae, superuncus of 8th abdominal segment is wide in the stem, having two or more branches apically, scaphium constricted at apical 1/5.

6. Pachliopta kotzebuea Eschscloltz, 1821
(pl. 2, figs. 6-1~6-4; text-figs. 3, 4 & 9)
Papilio aristolochiae kotzebuea: Jordan 1908-9 Seitz Macrolep. World, 9: 39, pl. 16a Kotzebuea".
(Specimens examined) Luzon: 3♀ (2 normal and 1 aberrant form), Asin, near Baguio, 1969-v-7 S. Hisamatsu leg. (Ehime Univ. Coll.), 1♂, San Pablo, 1957-v-5 (OMNH, EI-10136, ex Jaccoulet Coll.), Negros: 1♀, 1♂, 1955-x. (OMNH, EI-374, 375, ex
Closely allied to *P. aristolochiae* and has long been treated as its subspecies by modern taxonomists. On the under side of hind wing *kotzebuea* has a well marked red stripe extending from the apex of the cell to the anal margin. According to Jordan (1908–9), specimens of the rainy season are dark, those of the dry season are lighter. One male from Asin near Baguio is a extreme individual of lighter tendency. It looks like as *P. schadenbergi* at a glance.

In the male genitalia, stem of superuncus is narrower than that of *P. aristolochiae* and scaphium not constricted apically. These characters are so delicate but enough for separating the species, because genus *Pachliopta* is a closely knit group and genitalic structures of *P. aristolochiae, P. polydorus, P. polyphontes* and *P. hector* are equally characterized. Swollen tibia of male hind leg of the present species is slenderer than that of *P. aristolochiae*.

7. *Pachliopta phegeus* Hopffer, 1866 (pl. 1, figs. 7–1~7–3; text–figs. 3, 4 & 9)

*Papilio (Menelaides) phegeus* : Semper 1886–92 Reis, Arch. Phil., 2 (5) : 270, pl.46, fig.4

*Papilio phegeus* : Jordan 1908–9 Seitz Macrolep. World, 9 : 39, pl. 15c "phegeus"

(Specimens examined) MINDANAO : 2♂, Shisinon~Palan, alt. 800–1000m, 1969–xi–26 Y, Miyatake leg. 1♀, Upper Baroren, alt. 1300m, 1969–xi–29 Y, Miyatake leg.

Male genitalian structure is conspicuously different from the rest member of the genus. 8th abdominal segment without superuncus, tegumen is represented by a narrow sclerotized band connecting both side of the ring. Valva has a blunt apex.

8. *Lamproptera megas decius* C. & R. Felder, 1862 (pl.3, figs. 8–1~8–5 ; text–fig. 9)


*Leptocircus megas decius* : Staudinger 1889 Iris, 2 : 17–18.


(Specimens examined) LUZON : 1♂, Los Banos, 1955–viii–23 (OMNH, E1–10856, ex Jacoulet Coll.).


No differences can be found between Palawan specimens and those from the other Philippine islands. They are, however, distinguished from Bornean specimens by the narrower green stripe of upper surface and smaller grey basal area of under surface.

9. *Graphium sarpedon sarpedon* Linnaeus, 1758

(pl. 2, figs. 9–9–2 ; text–fig. 9)

*Papilio sarpedon* : Staudinger 1889 Iris, 2 : 15.

*Papilio sarpedon sarpedon* : Jordan 1908–9 Seitz Macrolep. World, 9 : 94–96, pl. 44d "sarpedon".

*Graphium sarpedon* : Shirōzu 1960 Butterfl, Formosa, text–fig. 20 distribution map.

(Specimens examined) LUZON : 2♂, Mt. Maquiling, alt. 100m~Mud Spring, 1969–xii–17 & 19 I, Hiura and Y. Miyatake leg. CEBU : 1♂, Cebu City, 1957–x (OMNH. EI–353, ex Tomita Co.).

1♂ from Luzon and 1♂ from Cebu have narrower green discal band.

10. Graphium agamemnon agamemnon Linnaeus, 1758 (p1. 2, figs. 10~11~10~5; text-fig. 9)

Papilio agamemnon: Staudinger 1889 Iris, 2: 16~17.

Papilio agamemnon: Jordan 1908~9 Seitz Macrolep. World, 9: 101~102, pl. 45d "agamemnon".

Graphium agamemnon agamemnon: Shirōzu 1960 Butterfl. Formosa, 25, pl. 1, fig. 23♂, 24♀, text-figs. 25 & 26 male genitalia and distribution map.

(Specimens examined) LUZON: 2♂ 1♀, Manila, 1955~ix~26, x~15, viii~30, C. Hoare leg. (OMNH, EI~10850~10852, ex Jacoulet Coll.). CEBU: 1♂ 1♀, Cebu City, 1967~ix (OMNH, EI~361 & 362, ex Tomita Co.). MINDANAO: 1♂, Todaya, alt. 700m, 1969~ix~28 I, Hiura leg. 1♀, Capatagan, alt. 1100m, 1969-xii~1 native woman leg. PALAWAN: 2♂ 2♀ (one pair copulated), Quezon, 1969~xii~12 & 13 I, Hiura and Y. Miyatake leg.

11. Papilio (Menelaides) alphenor ledebouria Eschscloltz, 1821

(p1. 4, figs. 11~1~11~12; text-figs. 5 & 10)


Papilio alphenor var. ledebouria and var. elyros: Staudinger 1889 Iris, 2: 11.

Papilio polytes ledebouria including ♀f. horsfieldi, ♀f. praxilla and ♀f. elyros: Jordan 1908~9 Seitz Macrolep. World, 9: 60~63.

(Specimens examined) LUZON: 7♂ 3♀ (2♀ f. horsfieldi, 1♀ f. elyros), Manila, 1955~viii~18~30,

Text-fig. 5. Harpe of Papilio polytes (left) and P. alphenor ledebouria (right), in the depressed condition.

e: Amami-Oshima, Ryukyu, f: Assam, g and h: Kinabalu, Sahah, i: Atimonan, Luzon, j: Upper Sibulan, Mindanao, k, l and m: Tagbulos, Palawan.
ix-9, C. Hoare leg. (OMNH, EI-10759-10768). 1♂ 1♀, Manila, no data (OMNH, EI-622 & 623, ex Tomita Co. This female specimen allied to f. praxilla, but differs from it by the smaller central white marking and larger orange spots of the hind wing.). 1♂ 1♀ (f. praxilla), Mt. Maquiling, alt. 100m, 1969-xii-19 & 21 I, Hiura leg. 2♀ (tattered), Quezon National Forest Park, Atimonan, alt. 300m, 1969-xii-20 I, Hiura leg. NEGROS: 1♂, 1955-x (OMNH, EI-376, ex Tomita Co.). MINDANAO: 3♀, Upper Sibulan-Todaya, alt. 450m, 1969-xii-7-14 H, Gutierrez and E. Reynoso leg. PALAWAN: 15♂ 3♀ (2♀ f. horsfieldi, 1♀ f. elyros), Quezon, 1969-xii-8-12 I, Hiura, R. Alagar and Y. Miyatake leg. 10♂ 1♀ (f. elyros), Tagbubos, alt. 5m, 1969-xii-15 I, Hiura, R. Alagar and Y. Miyatake leg.

JORDAN (1908-9) divided *Papilio polytes* into two supra-subspecific groups. First one distributes throughout Continental Asia, Formosa, Ryukyu and Malaysia having blue scales outside a white band on under surface of hind wing, while the second distributes in Philippine and Moluccas, without such blue scales. Specimens collected at Palawan and other Philippine islands have uniformly narrower and longer harpe of

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Text-fig. 6 Male genitalia of *Papilio helenus* and *P. hystaspes*,

d: dorsal aspect of 8th tergite, h: harpe of *P. hystaspes* in the depressed condition, j: juxta, p: lateral aspect of aedeagus, t: lateral aspect of 8th tergite, v: valva, inner side, w: harpe of *P. helenus* in depressed condition, x: dorsum, lateral aspect. Numeral shows locality. w1: Ceylon, w2: Hamasaaka, Hyogo Pref., Japan, w3: Malay, w4: Cambodia, w5: Java, w6: Hongkong, w7: Formosa, w8: Sabah, w9: Palawan.
the male genitalia as compared with specimens from various localities belonging to JORDAN's first group. They are all tailless and blue scales cannot be recognized between orange anal spot and white spot of discal band in space 1b. We consider them (JORDAN'S second group) a distinct species separable from true P. polytes.

In the specimens we collected from Palawan all white spots of the band are separated by black veins, whilst in the specimens from Luzon and Mindanao white spots touch one another. August specimen from Manila have a tendency to approach to the Palawanese specimens.

12. Papilio (Charus) helenus palawanicus Staudinger, 1888

(P1, 3, figs. 12-1~12-2; text-figs. 6 & 10)

Papilio helenus var. palawanicus: Staudinger 1889 Iris, 2 : 12.


Papilio helenus: SHIRÔZU 1960 Butterfly, Formosa, text-fig. 44 distribution map.

(Specimens examined) PALAWAN: 3♀, Quezon, 1969-xii-11 & 12 R. Alagar and Y. Miyatake leg.

13. Papilio (Charus) hystaspes C. & R. Felder, 1862 (pl.3, figs.13-1~13-3; text-figs. 6 & 10)


(Specimens examined) MINDANAO: 2♂ 1♀, Upper Baroeng, alt. 1300m, 1969-xi-29-30 I, Hiura and Y. Miyatake leg. 1♀, Upper Sibulan~Todaya, alt. 450m, 1969-xii-7~14 H. Gutierrez and E. Reynoso leg.

This has also been treated as a subspecies of P. helenus by modern taxonomists. In P. helenus, white marking of hind wing always limited in space 5, 6 and 7 throughout its wide geographical range whereas hystaspes has a prominent markings in space 4, 5, 6 and 7 as like as P. iswara. In male genitalia, no apparent difference can be found between P. helenus and hystaspes. However, harpe of hystaspes is wider and concaved more strongly at dorso-apical margin than that of P. helenus. So we consider hystaspes differentiated at the specific level in the Philippine Archipelago excluding Palawan.

14. Papilio (Iliades) lowi Druce, 1873 (pl. 3, figs. 14-1~14-5; text-figs. 7 & 10)


Papilio lowi: STAUDINGER 1889 Iris, 2 : 12-13

Papilio lowi including ♀f. zephyria and ♀f. suffusus: JORDAN 1908-9 Seitz Macrolep, World, 9 : 71, pl. 25b "lowi".

(Specimens examined) PALAWAN: 8♀ 1♂ (f. zephyria), Quezon, 1969-xii-8~13 I, Hiura, R. Alagar and Y. Miyatake leg.

Male genitalia is similar to that of P. memnon especially in the shape of scaphium and harpe. When we failed to catch the female of lowi, she quickly flying into dense bush of Crassoccephalum-like herb and did not fly high up. This habit seemed to be different from P. memnon.
Text-fig. 7. Male genitalia of *Papilio lowi* and *P. rumanzovia*.


Text-fig. 8. Male genitalia of *Papilio palinurus* and *P. daedalus*.

15. *Papilio (Iliades) rumanzovia* EschsCHOLTZ, 1821

(pl. 4, figs. 15-1-15-3; text-figs. 7 & 10)

*Papilio rumanzovia* including ♀f. *semperi*, ♀f. *rumanzovia* and ♀f. *eubalia*; JORDAN 1908-9 Seitz

Macrolep. World, 9: 74-75, pls. 26c, 27a and 48c.

*Papilio rumanzovia*; SHIRÔZU 1960 Butterfl. Formosa, 46, pl. 13, fig. 59♀, 60♀, text-fig. 52 distribution map.


Male genitalia:—Superuncus longer than 8th tergum, curved downward (equal as 8th tergum and almost straight in *lovi*) ; harpe semi-circular (trapezoid in *lovi*) scaphium duck-billed-shaped (sharply pointed in *lovi*). In subgenus *Iliades*, *P. rumanzovia* stands nearest to *P. deiphobus* from Halmahera where as *P. lovi* allied to *P. memnon* from Malaysia and Asian Continent and *P. polymnestor* from Ceylon and South India. Celebean *P. ascalaphus* is common to *memnon-group* in the structure of scaphium but on the other hand, resembles *rumanzovia-group* in the shape of harpe.


(pl. 1, fig.16; text-fig. 8 & 10)

*Papilio (Harimala) daedalus*; SEMPER 1886-92 Reis, Arch. Phil., 2 (5): 278.

*Papilio palinurus daedalus*; JORDAN 1908-9 Seitz Macrolep. World, 9: 81, pl. 35c "daedalus".

(Specimen examined) MINDANAO: 1♂ (tattered), Upper Sibulan~Todaya, alt. ca, 450m, 1969-xii-7~14 H, Gutierrez and E. Reynoso leg.

This species has long been considered to be a Philippine race of *P. palinurus*. However, present research of genitalian structure revealed that it is a distinct species. Valva pentagonal, having a prominent protuberance at the ventral margin; harpe semi-circular in the depressed condition; juxta wide and not V-shaped; apex of scaphium pointed dorsally, whereas *P. palinurus* has a valva elliptical and the margin is entire, harpe triangular, juxta V-shaped, and scaphium pointed caudal. These differences show that *daedalus* is no doubt a different species from *P. palinurus*. Shape of scaphium and valva of the present species resembles some extent Celebean *P. blumei*.

As a consequence of present research, we recognize 44 species in total of Papilionidae in the Philippines. They are classified into 12 types according to their distribution patterns (table 1).
Text-fig. 9. Distribution map of Philippine Papilionidae and its related taxa. Capitals show the species and small letters show the subspecies of the Philippine species.
Text-fig. 10. Distribution map of Philippine Papilionidae and its related taxa,
Table 1. Distribution pattern of Philippine Papilionidae.

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<td>Graphium sarpedon</td>
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<td>Malayan Subregion extending to Palawan</td>
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<td>Graphium empedovana</td>
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<td>Papuan Subregion extending to Celebes and Philippine</td>
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<td>4</td>
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<td>Wallacea including Palawan and Philippine proper</td>
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<td>Papilio alphenor</td>
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*Papilio carolinensis* and *P. osmana* are tentatively included this species.
Explanation of Plate 1.

2a–1~2a–6: *Troides rhadamantus rhadamantus*,
   2a–2: ♀, NEGROS, 1955–xii, (OMNH, EI-347)
   2a–3: ♀, Sibulan Beach, Sirawan, Davao del Sul, MINDANAO, 1969–xi–25,
   2a–4: ♀, NEGROS, 1955–xii (OMNH, EI-348).
   2a–5: ♀, Upper Sibulan~Todaya, Davao del Sul, MINDANNAO, 1969–xii–7–14,
4–1~4–2: *Atrophaneura semperi aphthonia*,
   4–1: ♀, Upper Sibulan~Todaya, MINDANAO, 1969–xii–7–14,
7–1~7–3: *Pachliopta phegeus*,
16: *Papilio* (Achillides) *daedalus daedalus*,

Explanation of Plate 2.

5–1~5–4: *Pachliopta aristolechiae antiphus f. periphus*,
6–1~6–4: *Pachliopta kotzebuea*,
   6–2: ♀, aberrant form of rainy season form, Asin, LUZON, 1969–v–7 (Col, Ehime Univ.)
9–1~9–2: *Graphium sarpedon sarpedon*,
   9–1: ♀ with narrow discal band, Mt, Maquiling, Los Banos, LUZON, 1969–xii–17,
   9–2: ♀, with normal wide band, Mt, Maquiling, LUZON, 1969–xii–19.
10–1~10–5: *Graphium agamemnon agamemnon*,
   10–3: ♀, Capatagan, Davao del Sul, MINDANAO, 1969–xii–1,
Explanation of Plate 3.

8-1~8-5: Lamproptera meges decius,
  8-1: ♂, Mt. Maquiling, Los Banos, LUZON, 1969-xii-19,
  8-4~8-5: ♂, Quezon, west coast of Palawan, 1969-xii-9 & 10.

12-1~12-2: Papilio (Charus) helenus palawanicus,
  12-1: ♂, Quezon, PALAWAN, 1969-xii-12.
  12-2: ♀, Quezon, PALAWAN, 1969-xii-11.

13-1~13-3: Papilio (Charus) hystaspes,

14-1~14-5: Papilio (Iliades) lowi,
  14-1~3: ♂, Quezon, PALAWAN, 1969-xii-12.
Explanation of Plate 4.

11-1～11-12: *Papilio (Menelaides) alphenor ledebouria.*

11-1: ♂, Quezon, west coast of PALAWAN, 1969-xii-8.
11-5: ♂, Tagbulos, PALAWAN, 1969-xii-15. Unusual tiny specimen with white band developed like as specimens from Philippine proper.

15-1～15-3: *Papilio (Iliades) rumanzovia.*
