DISTANT, W. L. 1906. *Fauna of British India, Rhynchota, III*, Taylar and Francis Ltd., London.

DISTANT, W. L. 1906. *Fauna of British India, Rhynchota, V*, Taylar and Francis Ltd., London.

FRASER, F. C. 1933. *Fauna of British India, Odonata. I*, Taylar and Francis Ltd., London.

FRASER, F. C. 1933. *Fauna of British India, Odonata. II*, Taylar and Francis Ltd., London.

HAFIZ, H. A. AND PRADHAN, K. S. 1947. Notes on a collection of aquatic Rhynchota from Patna State with descriptions of two new species. *Rec. Ind. Mus. XLV*, pp. 347-376.

MACAN, T. T. 1963. *Fresh Water Ecology*, Longmans Green and Co. Ltd, Grosvener Street, London.

SUBRAMANYAM, K. 1962. *A systematic account of Common Indian aquatic Angiosperms*. S. N. Guha ray at Sree Sarswaty Press Ltd., Calcutta-9.

Rec. zool. Surv. India, 81 : 355-368, 1983

ON COLLECTIONS OF PAPILIONIDAE FROM ORISSA, INDIA

By

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(With 1 Table and 1 Map)

INTRODUCTION

An attempt is made to present a faunistic account of enlisted species and forms of Papilionidae from the less explored state of Orissa located at latitudes 17°49′-22°33′ N and longitudes 81°27′-87°57′ E in the eastern Peninsula of India. The material, most of which are new records for the state, were collected during 1971-1973 by different parties of Zoological Survey of India. These comprise ten species and infra-specific forms in three genera and tribes of Papilioninae. Besides, two known species and three subspecies, not available at hand, are just cited in the list to give a rather comprehensive idea of the state-fauna concerned. The classification is basically followed *sensu* Munroe (1961), but with the adoption of infra-specific nomenclature used by Talbot (1939). A table of global distribution and state-map with district-wise plotting of the elements accompanied by a general review of their earlier investigation, biogeography and miscellaneous notes are also incorporated. All the material examined are in the National Collections at Z. S. I.

EARLIER INVESTIGATION

The pioneering faunistic work on butterflies including the Papilionids from Orissa dates back to Taylor & de Nicéville (1888) who prepared a list of material from Khurda in the Puri district. Later, Crawford (1921) noted butterflies from Sambalpur, while Annandale & Dover (1921) published an account of the fauna from the Barkuda Island at Ganjam. Thus, except in these few districts out of a total of thirteen in the state, no further exploration could hitherto be made. Incidentally, Wynter-Blyth (1957) restored the lacuna of Talbot's (1939) non-citation of the Orissa-locality for *Papilio chaon* Westwood which was already recorded from Sambalpur by Crawford (*loc. cit.*).

BIOGEOGRAPHY

As discussed by Annandale & Dover (1921), the lower end of the Chilka Lake at Ganjam of southern Orissa forms the overlapping zone

through which the wide-ranging and adaptable species of the Papilionids and other butterflies infiltrate into the northern and southern areas of the concerned Peninsula. The general pattern of faunal distribution is nonetheless selectively influenced by the important climatological factors, such as topography, climate, vegetations and animals including predators. All these factors play a significant role on the survival of elements also in other districts surveyed, namely, Puri in the south, Cuttack in the east, Dhenkanol, Mayurbhanj, Keonjhar, Sundargarh and Sambalpur in the north with varied inclinations and Bolangir in the west of the state. These have a bearing on the abundance and scarcity of the members, some of which may be common resident forms like *Pachliopta hector* (Linnaeus) feeding on *Canavalia ensiformis*, while others may be rare immigrants like *P. a. aristolochiae* (Fabricius) feeding on *Aristolochia* spp. not known to grow in a given locality like Barkuda. No Papilionid sample could, however, be ever explored at the remaining four districts of the state including Koraput, Balasore, Baudhkondmals and Kalahandi. The district of Mayurbhanj represents the richest faunistic abode in Orissa where all but one species amidst the present lots occur (*vide* Map).

Pachliopta hector (Linnaeus) is the only species which is so far known exclusively from the southern districts of Ganjam and Puri, while *Graphium* (*Pathysa*) *antiphates naira* (Moore), *Papilio c. clytia* Linnaeus and *P. p. polymnestor* Cramer constitute new locality records for the entire state and the remaining six for the parts thereof. The evidence of wide occurrence of the species under study is further based on the fact that Talbot (1939) and Wynter-Blyth (1957) compiled the distributional range from the Himalayan, through the peninsular, to the insular areas of India, as relevant to the material. Out of an estimate of about 25% of the Papilionid species from the entire Indian Peninsula, a little over half the number occurs at Orissa. Of these, a few are endemic in the peninsular area and some are distributed almost throughout India. The material, mostly oriental in origin, show affinities more with the Sino-Malayan than with the Palaearctic fauna. These are, however, poorly represented in the Central Himalayas and also in the Ethiopian and Australo-Papuan regions of the globe (*vide* Table).

Miscellaneous Notes

Apart from the sexual, seasonal or individual variation, as mentioned under the relevant forms in the text, the female of *Papilio polytes romulus* Cramer exhibits the phenomenon of balanced polyphenism, in

which the different forms are supposed to occur at a more or less static condition in a particular area. Interestingly enough, such a maintenance of forms is not strictly observed in certain habitats of the concerned state. For instance, the female form *stichius* (Hübner) is not apparently found in association with any other form of that sex in the subspecies at least in northern Orissa.

As expected, the males and females of butterflies would occur in nearly equal number, but it is certainly not the invariable rule. For example, in the present collections made during all the seasons and represented by as many as 180 specimens in eleven lots from different districts of the state, all the forms except *Pachliopta hector* (Linnaeus) show an overall predominance of males over females, while *P. hector* is solely represented by females. Such a disparity in distribution of sexes is more apparent than real, since the seemingly rarer sex may be equally abundant but less frequently collected due to its different habits and habitats.

Finally, certain specimens of *Papilio polytes romulus* Cramer, *P. p. polymnestor* Cramer and *P. d. demoleus* Linnaeus exhibit the phenomenon of dwarfism, possibly due to their impoverished nutrition.

List of Papilionid Species and Forms From Orissa

Family Papilionidae

Subfamily Papilioninae

Tribe I. Leptocircini

1. *Graphium* (*Graphium*) *doson eleius* (Fruhstorfer)

*1(a). *Graphium* (*Graphium*) *doson axion* (Felder & Felder)

2. *Graphium* (*Pathysa*) *antiphates naira* (Moore)

3. *Graphium* (*Pathysa*) *nomius nomius* (Esper)

Tribe II. Papilionini

4. *Papilio clytia clytia* (Linnaeus)

   (i) *f. clytia* Linnaeus

   (ii) *f. dissimilis* Linnaeus

5. *Papilio polytes romulus* Cramer

   f. ♀ *stichius* (Hübner)

6. *Papilio polymnestor polymnestor* Cramer

7. *Papilio chaon chaon* Westwood

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* Not dealt with in the Systematic Account (for distribution, *vide* Table).

TABLE I. TABLE SHOWING THE GEOGRAPHICAL DISTRIBUTION OF PAPILIONIDAE FROM ORISSA

No. † of Spp./ Sspp.	PALAEARCTIC	ETHIOPIAN	ORIENTAL																AUSTRALIAN
			Chinese	Himalayan					Indian Peninsula								Malayan	PAPUAN	
				N. Western	Central	N. Eastern	Western	Northern	Western	Eastern ORISSA North-eastern		Southern	Elsewhere	Southern	Southern	S. Eastern			
I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX	XX
Sp. 1	+		+	+		+	+			+		+	+	+	+		+		
Ssp.										N′		+	+	+					
*Ssp. 1 (a)			+	+		+				+							+		
Sp. 2			+			+	+	+		N			+	+	+	+	+		
Ssp.							+			N				+					
Sp. 3			+			+	+	+		N′		+	+	+	+		+		
Ssp.						+	+	+		N′		+	+	+	+				
Sp. 4			+	+		+	+	+		N				+	+	+	+		
Ssp.				+		+	+	+		N				+					
Sp. 5	+		+	+		+	+	+	N′	N′		+	+	+	+	+	+		
Ssp.			+	+		+			N′	N′		+	+	+	+		+		

8. *Papilio demoleus demoleus* Linnaeus

f. *demoleinus* Oberthür

*8(a). *Papilio paris decorosa* Fruhstorfer

Tribe III. Troidini

9. *Pachliopta hector* (Linnaeus)

10. *Pachliopta aristolochiae aristolochiae* (Fabricius)

*10(a). *Troides helena cerberus* (Felder & Felder).

Systematic Account

Family Papilionidae

Subfamily Papilioninae

Tribe I. Leptocircini

1. Graphium (Graphium) doson eleius (Fruhstorfer)

Material examined : 2 ♂♂, 1 ♀, Jeuabil Forest, Mayurbhanj, 20. iii. 1973, *S. K. Gupta* leg.

*Wing expanse***: ♂♂ 76, ♀ 78 mm.

Distribution : India : West Bengal; Orissa (Mayurbhanj; Ganjam) southern Peninsula.

Remarks : This is one of the two known Indian subspecies of *G.* (*G.*) *doson* (Felder & Felder) which occurs from South Japan to South China, Sri Lanka and the Sundaland, extending westwards to India. It differs from ssp. *axion* (Felder & Felder) of the Sino-Indo-Malayan belts by the fore wings with yellowish green apical spots, broad discal band, prominently green subbasal line and hind wings with pale median vein. These subspecies are already known from southern and northern Orissa respectively. The present specimens, which are new record for northern Orissa, fit well in ssp. *eleius* in well accordance with its known distribution, being common but endemic in the Indian Peninsula. It is quite interesting to note that the occurrence of both the subspecies in the same area indicates further adaptability of the concerned species towards sympatric evolution.

2. Graphium (Pathysa) antiphates naira (Moore)

Material examined : 3 ♂♂, Astia, Baripada, Mayurbhanj, 20-21.iii.1973, *S. K. Gupta* leg.

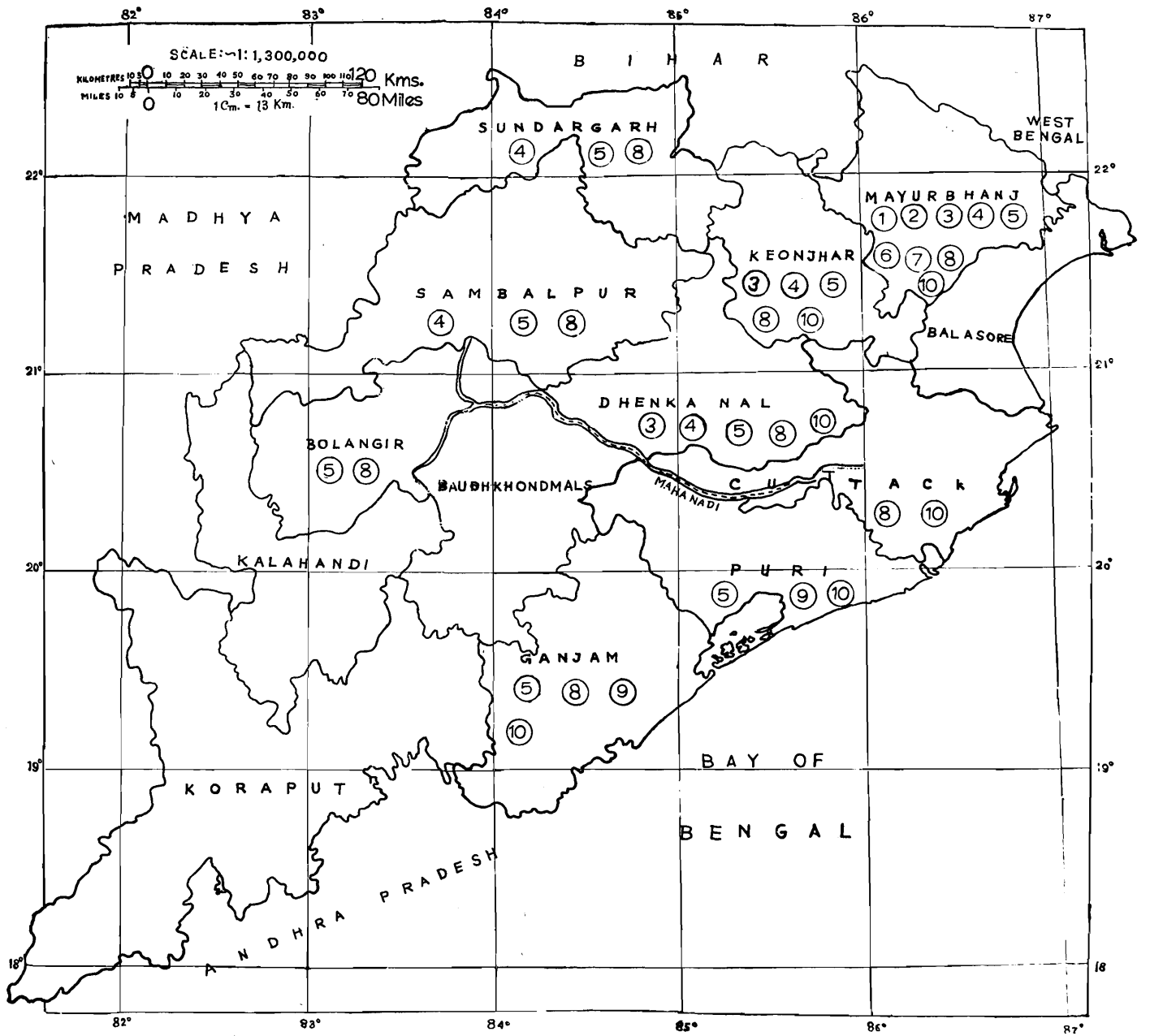
Wing expanse : 70-76 mm.

** tip-to-tip measurement of the bilaterally spread fore wings across mesothorax of pinned specimens.

TABLE I. (*Concluded*)

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX	XX
Sp. 6.						+	+	+		N			+	+	+				
Ssp.						+	+	+		N			+	+					
Sp. 7			+		+	+				+				+			+		
Ssp.					+	+				+									
Sp. 8	+	+	+	+		+	+	+	N′	N′	N′	+	+	+	+		+	+	+
Ssp.	+			+		+	+	+	N′	N′	N′	+	+	+	+				
*Sp. 8 (a)	+		+	+		+	+			+				+			+		
*Ssp.				+		+	+			+				+			+		
Sp. 9							+					+	+	+	+	+			
Sp. 10			+	+		+	+			N′	N′	+	+	+	+	+	+		
Ssp.				+		+	+	+		N′	N′	+	+	+	+		+		
*Sp. 10 (a)			+			+	+			+			+	+		+	+	+	
Ssp.			+			+				+			+	+			+		

N. B. : †, as marked in the list ; ↓ not dealt with in the systematic account ; N, exclusively & N′, partially new records for the state ; +, known distribution.



DISTRIBUTION OF THE PAPILIONIDAE IN

ORISSA

(Encircled number of species marked as in order of the text)

Distribution : INDIA : Maharashtra (Western Ghat) ; Orissa (Mayurbhanj) ; Karnataka (Coorg ; Karwar) ; Kerala (Malabar).

Remarks : This is one of the three known Indian subspecies of *G.* (*P.*) *antiphates* (Cramer) which occurs from China to Lesser Sunda Islands through India. It differs from ssp. *pompilius* (Fabricius) of the Sino-Indo-Malayan belts and ssp. *epaminondas* (Oberthür) of the Andaman Islands by the fore wings with terminal and subterminal bands united at Cu_{1a} before reaching dorsum. The specimens, which are recorded new for Orissa, are referred to ssp. *naira*. They are of the dry season form, being distinguished from the wet season form by the fore wings with narrower and shorter black bars and hind wings paler, with both the subterminal and terminal black markings obsolete. Endemic in the Indian Peninsula, this subspecies is rare, though the females are known to be fairly common during the wet season in the areas other than Orissa.

3. **Graphium (Pathysa) nomius nomius** (Esper)

Material examined : One ♂, Baripada, 26. iv. 1972, *A. R. Bhowmik* leg., 1 ♂, Bangriposhighat, MAYURBHANJ, 25. iii., 2 ♀ ♀, Ghatgaon, 1 ♀, Atci Reserve Forest, KEONJHAR, 28-29. iii., 1 ♂, Laboneji, Angul, DHENKANOL, 11. iv. 1973, *S. K. Gupta* leg.

Wing expanse : ♂ ♂ 76-78, ♀ ♀ 74-82 mm.

Distribution : INDIA : Sikkim ; Assam ; Gujarat ; Uttar Pradesh (Lucknow) ; Madhya Pradesh ; southern Bihar ; West Bengal ; Orissa (Mayurbhanj ; Keonjhar ; Dhenkanol ; Ganjam) ; Karnataka ; Tamil Nadu (Shevaroys ; southern Nilgiris, *c* 925-2140 m) ; Kerala. SRI LANKA.

Remarks : This is one of a couple of the known Indian subspecies of *G.* (*P.*) *nomius* (Esper) which occurs in the Oriental region. It differs from ssp. *swinhoei* (Moore) of the Sino-Indo-Malayan belts by the fore wings dorsally with the fifth black band extending up to the posterior angle of cell and ventrally with the fourth band below the cell also black, hind wings dorsally with the terminal band traversed by a series of white lunules and ventrally with the precostal spur not edged black. The specimens from northern Orissa, from where the species has not been previously recorded, are referred to ssp. *nomius* being locally common in the Indian subregion and already known from the south of the state.

Tribe II. Papilionini

4. **Papilio clytia clytia** Linnaeus

Material examined : One ♂, Trensa House Garden, Barsuan, SUNDARGARH, 14. ix, *S. Khera* leg. ; 1 ♀, Badrama, SAMBALPUR,

23. xii. 1972, 1 ♀, Upardhia, 3. iii., 1 ♀, Ghatgaon, 2 ♀ ♀, Atci Reserve Forest, KEONJHAR, 29. iii., 1 ♂, Hamilton Garden, Baripada, 1 ♂, Deopata, Bisoi, MAYURBHANJ, 17, 28. iii., 1 ♀, Laboneji, Angul, DHENKANOL, 11. iv. 1973, *S. K. Gupta* leg.

Wing expanse : ♂ ♂ 98-106, ♀ ♀ 86-116 mm.

Distribution : INDIA : Himachal Pradesh (Kangra) ; Sikkim ; Assam (*c* 2290 m) ; Maharashtra (Bombay) ; Madhya Pradesh ; Orissa (Sundargarh ; Sambalpur ; Keonjhar ; Mayurbhanj ; Dhenkanol) ; Karnataka (Karwar) ; Tamil Nadu (southern Nilgiris, *c* 925 m). BURMA.

Ramarks : This is one of the two known Indian subspecies of *P. clytia* Linnaeus which occurs from South China to Timor through India. It differs from spp. *flavolimbatus* (Oberthür) of the Andaman Islands by the fore wings dorsally with subterminal white spots irregular, spot in M_3 inwardly shifted and hind wings ventrally with a prominent series of terminal yellow spots. The specimens from Orissa, from where the species has not been previously recorded, are referred to the nominate subspecies being locally common to very rare in the Indian subregion. They are of the following first two out of six principal morphs, viz., f. *clytia* Linnaeus, f. *dissimilis* Linnaeus, f. *dissimillima* (Evans), f. *casyapa* Moore, f. *panope* Linnaeus and f. *commixtus* Rothschild, the last being very rare in Sikkim and Assam.

(i) f. **clytia** Linnaeus : This is recognised by the fore wings with a subapical spot, hind wings with cell neither white nor touched by the discal white sagittate streaks and both wings with ground colour dark velvetty black. A good mimic of *Euploea core* (Cramer), it is as widely distributed as the subspecies, but not recorded so far from Dhenkanol. It is known to be common at Karwar during the monsoon, at the southern Nilgiris during the spring and in the North-western Himalayas during the summer and winter. Also from the above data, it appears to be not rare at Orissa. It shows larger wing expanse at least in the female, varying between 106-116 mm., as compared to the next form.

(ii) f. **dissimilis** Linnaeus : This is recognised by the fore wings with creamy white cell-streaks united at base, spotted discal area, postdiscal series of streaks, hind wings with white cell touched by discal streaks and both wings not velvetty black. It mimicks a different Danaid species, *Danaus limniace* (Cramer) and occurs from the North-west Himalayan to the peninsular sectors of India where it is known to be locally common. It is represented by a couple of females from Dhenkanol and Keonjhar, having a smaller wing expanse, varying between 86-93 mm, as compared to the preceding form.

5. Papilio polytes romulus Cramer

Material examined : 3♂♂, H. S. L. Rest House and Valley, Barsuan, 13. i., 1♂, Govt. Seed Farm, Jharsuguda, 19. i., 1♀, Kalimandir Road, SUNDARGARH, 22. ix., 2♀♀, 1♂, Badrama, 7. xi., 21, 23. xii., 1♂, Pump House, 27. xi., 2♂♂, along the bank of R. Mahanadi, SAMBALPUR, 28. xi., 1♂, Chhatamakhna, 1♂, Sarishagura Village, 1♂, Rly. colony, Titilagarh, BOLANGIR, 1, 4-5. x., *S. Khera, J. M. Julka, A. K. Mandal* & *K. Rai* leg. ; 1♂, Karatpeta, Angul, 29. ix., 1♂, Amlapara, 1♂, Shankarpur, DHENKANOL, 5, 7. x., 1♂, Dayarsani Temple, Bisoi, 15. viii., 1♂, Aasna, Bangriposhi, 15. x. 1972, 1♂, Palbani, Baripada, 2♂♂, Jeuabil Forest, MAYURBHANJ, 18, 20. iii. 1973, *S. K. Gupta* & *S. K. Mitra* leg. ; 1♀, Badand, 4. ix., 1♂, Bhatsai, 20. ix. 1972, *K. Rai* leg., 1♂, Ananapur, KEONJHAR, 4. iv. 1973, *S. K. Gupta* & *S. K. Mitra* leg. ; 1♂, Banpada, Konark, PURI, 9. xi., 1♂, 1♀, near backwater, Gopalpur, GANJAM, 1, 5. x. 1972, *S. Khera* leg.

Wing expanse : ♂♂ 78-102, ♀♀ 92-108 mm.

Distribution : VIETNAM : Tonkin. INDIA : North-western Himalayas (*c* 925 m) ; North-eastern Himalayas (*c* 1530 m) ; southern Bihar ; West Bengal ; Orissa (Sundargarh ; Sambalpur ; Bolangir ; Dhenkanol ; Mayurbhanj ; Keonjhar ; Puri ; Ganjam) ; southern Peninsula. BURMA. SRI LANKA. MALAY PENINSULA. BORNEO. SULAWESI.

Remarks : This is one of the three known Indian subspecies of *P. polytes* Linnaeus which occurs from West China and India to the Moluccus, Timor and adjoining islands except Tenimber. The male of this subspecies, which occurs in a single form, differs from that of ssp. *stichioides* Evans of the Andaman Islands and of ssp. *nikobarus* Felder of the Nicobar Islands by the fore wings with prominent terminal white spots, hind wings dorsally with discal white band of even width and ventrally with red subterminal lunules. The specimens, which are already known only from southern Orissa, are referred to ssp. *romulus* being common in the Indian mainland including the state concerned. The female, on the other hand, is represented by three principal polyphenic forms, viz., f. ♀ *stichius* (Hübner), f. ♀ *cyrus* Fabricius and f. ♀ *romulus* Cramer, of which the first is concerned with the present specimens and, dealt with hereunder.

f. ♀ **stichius** (Hübner) : This is recognised by the fore wings basally and terminally dark with distinct intra-cellular streaks and hind wings velvetty black, with anal area distally red and sprinkled with blue scales, subterminal and terminal series of red markings. It is a good mimic of *Pachliopta aristolochiae* (Fabricius). The occurrence of the f. ♀ *stichius* not in association with its other allies in northern Orissa

seemingly goes against the phenomenon of balanced polyphenism. As compared to the females, certain males in the present collections are appreciably smaller in relation to the normal wing expanse starting from 90 mm. in both sexes.

6. **Papilio polymnestor polymnestor** Cramer

Material examined : One ♂, Hamilton Garden, Baripada, 17. iii., 3 ♂ ♂, Meghasoni, MAYURBHANJ, 19.iii.1973, *S. K. Gupta* leg.

Wing expanse : 110-124 mm.

Distribution : INDIA : Sikkim ; Maharashtra (Bombay ; Western Ghat) ; Madhya Pradesh ; southern Bihar ; West Bengal (Calcutta) ; Orissa (Mayurbhanj) ; Tamil Nadu (Nilgiris, *c* 620-2140 m).

Remarks : This is the only Indian subspecies of *P. polymnestor* Cramer which occurs in the south of the Indian subregion, being only a straggler at Sikkim in the north *sensu* Wynter-Blyth (1957). It is recognised by the fore wings with blue band and hind wings with blue area dorsally narrow in male. The female, which is not presently available, is known to have pale internervular streaks extending into the cell of fore wings, the band of which is ventrally also narrow. The specimens from Orissa, from where the species was not earlier recorded, are referred to the nominate subspecies occurring in the wet niches. They alight on flowers and repose with wings held in a roof-like manner as the moths do, being locally common up to an altitude of *c* 2140 m at Nilgiris during the dry season, but rare in the plains. Only one of the specimens under study is quite smaller with an expanse of 110 mm as compared to the normal scale starting from 120 mm.

7. **Papilio chaon chaon** Westwood

Material examined : One ♂, Jeuabil Forest, 1 ♂, Deopata, Bisoi, MAYURBHANJ, 20.iii.1973, *S. K. Gupta* leg.

Wing expanse : 114-120 mm.

Distribution : NEPAL. INDIA : Assam ; Orissa (Mayurbhanj ; Sambalpur). NORTH BURMA.

Remarks : This is the only Indian subspecies of *P. chaon* Westwood which occurs exclusively in the Oriental region amidst the lowly wooded hills. It is recognised by the fore wings with intra-cellular streaks, yellowish brown scales and hind wings with four white discal spots. Also, it is known to exhibit sexual dimorphism in which the

male is brighter and with smaller markings than the female. The specimens, which were earlier known from Sambalpur and presently recorded from one more district, i.e., Mayurbhanj of northern Orissa, are referred to the nominate subspecies being common both in the Central and North-eastern Himalayas, but seemingly rare in Orissa.

8. **Papilio demoleus demoleus** Linnaeus

Material examined : One ♂, Teak Plantation, east of F. R. H., Panposh, 21.vi., 7 ♂♂, 3 ♀♀, in and around H. S. L., Barsuan, Dhutura Village, 2 ♂♂, 1 ♀, Trensa Colony, 13-15, 18.ix., 1 ♂, near Raj Badi, SUNDARGARH, 23. x., 9 ♂♂, 9 ♀♀, *c* 4.5 kms. east, west, north and south of F. R. H., 2-4.vi., 1 ♂, Hirakud Dam, 1 ♂, near, Sambalpur Jail, 1 ♂, 1 ♀, Pump House, 2 ♀♀, along the bank of R. Mahanadi, 2 ♂♂, 2 ♀♀, Brooke's Hills, 5 ♂♂, 2 ♀♀, Badrama Reserve Forest, SAMBALPUR, 25, 29. ix., 7. xi., 21-23.xi., 1 ♂, *c* 6 kms. south of F.R.H., Mahakand, 29. v., 1 ♀, Chhatamakhna, 1. x., 1 ♂, 2 ♀♀, near Rly. Colony, Titilagarh, BOLANGIR, 5. x., 10. xi., *D. P. Sanyal, A. K. Mandal*, S. *Khera* & *J. M. Julka* leg. ; 1 ♂, Barsasoni, 2 ♀♀, Puranogarh, 20, 27, 29.ix., 3 ♀♀, Puranokote, 30.ix., 2 ♂♂, 4 ♀♀, Jharpara, 1 ♂, Lingorajori, 1 ♂, Jubilee Town, 1 ♂, 1 ♀, Laboneji, Angul, 2-3, 6, 10.x.1972, 1 ♀, Horticulture Garden, 1 ♂, Progeny Orchard, DHENKANOL, 7-9, 11.iv.1973, *Y. Chaturvedi* & *S. K. Gupta* leg., 2 ♂♂, 1 ♀, Manoda, 1 ♀, Bhalupahari, 1 ♂, Gosanipal, 14-16.ix. 1972, 2 ♂♂, 1 ♀, Astia, Baripada, 1 ♀, Chandanpur, Bangriposhi, MAYURBHANJ, 16, 21, 25.iii.1973, *K. Rai* & *S. K. Gupta* leg., 1 ♂, 3 ♀♀, Badand, KEONJHAR, 20.ix., *K. Rai* leg., 2 ♂♂, Ansupa Lake, Athgarh, 29.viii. 1972, 2 ♀♀, C. R. R. I., CUTTACK, 13.iv.1973, *S. K. Mitra* & *S. K. Gupta* leg. ; 1 ♂ Forest Rest Shed, 23.ix., 2 ♂♂, 1 ♀, near back water, Gopalpur, GANJAM, 9, 11.x.1972, *Y. Chaturvedi* leg.

Wing expanse : ♂♂, ♀♀ 70-98 mm.

Distribution : EASTERN ARABIA. IRAN. PAKISTAN : Baluchistan. INDIA : North-western and North-eastern Himalayas (*c* 2140 m) ; peninsular areas including Orissa (Sundargarh ; Sambalpur ; Bolangir ; Dhenkanol ; Mayurbhanj ; Keonjhar ; Cuttack ; Ganjam). NORTH BURMA. SRI LANKA.

Remarks : This is the only known Indian subspecies of *P. demoleus* Linnaeus which has a wide range of distribution in the Old World except Europe. It is very common in the plains of India and recognised by the fore wings with basal half of cell sprinkled with yellow scales and a narrow discal band of yellowish spots. The specimens from northern, western and eastern Orissa, from where the species was not

earlier recorded, are referred to the nominate subspecies being already known from the southern districts of the state. Some of them are appreciably smaller with the wing expanse of 70 mm as against the scale starting from 80 mm. Only the females of the material examined are of a single morph known from the Indian subregion and dealt with hereunder.

f. **demoleinus** Oberthür : This is recognised by the hind wings with anal red spot anteriorly reduced and separated from the blue lunules by a black spot. Apparently, it is exclusively represented by the females, although there is no such earlier mention of the given sex for this form unlike in the ssp. *romulus*, as already mentioned.

Tribe III. Troidini

9. **Pachliopta hector** (Linnaeus)

Material examined : 3 ♀ ♀, along the Rly. track, Tikarpara, Banpada, Konark, PURI, 14, 19. ix. 1972, 2 ♀ ♀, *c* 8 kms. north-east of the camp near foot-hill, Rambha, Gopalpur, GANJAM, 9. xi.,-.x. 1971-1972, *D. P. Sanyal* & *Y. Chaturvedi* leg.

Wing expanse : 90-108 mm.

Distribution : INDIA : Maharashtra ; southern Bihar ; West Bengal ; Orissa (Puri ; Ganjam) ; Tamil Nadu (Nilgiris, *c* 320-2440 m) ; the Andaman Islands. SRI LANKA.

Remarks : Amongst the three other Indian species of *Pachliopta Reakirt*, viz., *P. jophon* (Gray), *P. pandiyana* (Moore) and *P. aristolochiae* (Fabricius), the present one is distinguished by the fore wings with prominent white central and apical bands and hind wings with discal and subterminal row of red spots. It is known to exhibit sexual dimorphism in which the females differ from the males by the fore wings with paler discal and subterminal markings and abdomen black up to the anal end. Also, it acts as a model of *Papilio polytes romulus*, ♀ f. *romulus* Cramer which is not, however, presently available but cited by Annandale and Dover (1921) from southern Orissa. It is very rare in West Bengal and the Andaman Islands but common elsewhere. Eaton (1880) observed the roosting of the species in a multitude at Maharashtra. The present specimens, which are referred to *P. hector*, confirm their earlier record for southern Orissa. Interestingly enough, these are not represented by male which is more or less preponderant for the remaining elements under study, nor known from Mayurbhanj, the faunistically richest district of all in Orissa, nor provided with sharp geographical variations so as to be assigned to subspecific status.

10. Pachliopta aristolochiae aristolochiae (Fabricius)

Material examined : 2 ♂♂, 1 ♀, Bagmunda, 1.i., *V. C. Agarwal* leg., 2 ♀♀, Jharpara, 20.ix., 1 ♂, Nisa, Angul, 1.x., 1 ♂, Amlapara, 1 ♂, Jubilee Town, 1 ♀, Shankarpur, 5-7.x.1972, *K. Rai* leg., 1 ♂, Progeny Orchard, DHENKANOL, 8. iv., 2 ♀♀, Ghatgaon, 1♂, Atci Reserve Forest, KEONJHAR, 28-29. iii. 1973, *S. K. Gupta* leg., 1♂, Manbhanj, Bangriposhi, 17. ix. 1972, *K Rai* leg., 2 ♂♂, Baripada, 5 ♀♀, Palbani, MAYURBHANJ, 16, 18. iii. 1973, *S. K. Gupta* leg., 1♀, Rajatgarh, 2 ♀♀, Anukulmandia Forest, CUTTACK, 29-30. viii., 1 ♀, Tikarpara, PURI, 14. ix., 2 ♀♀, Dhonard, Balugaon, GANJAM, 30. ix. 1972, *S. K. Mitra* & *Y. Chaturvedi* leg.

Wing expanse : ♂♂, ♀♀ : 82-104 mm.

Distribution : INDIA : North-western Himalayas (*c* 925 m) ; North-eastern Himalayas (*c* 1530 m) ; peninsular areas (*c* 2440 m) including Orissa (Dhenkanol ; Keonjhar ; Mayurbhanj ; Cuttack ; Puri ; Ganjam), SRI LANKA. JAVA. SULAWESI.

Remarks : This is one of the five known Indian subspecies of *P. aristolochiae* (Fabricius) which is known from the Oriental region. It is remarkable for emitting rosy odour and showing gregarious habit on flowers particularly during the spring and rainy season. It is distinguished from ssp. *goniopeltis* (Rothschild) of the Sino-Indo-Malayan belts, ssp. *sawi* (Evans) of Car Nicobar, ssp. *camorta* (Moore) of the Nicobar Islands and ssp. *kondulana* (Evans) of Great Nicobar by the fore wings basally black up to a little beyond the origin of Cu_{1b}, with long stripes in the area of dorsum and hind wings dorsally without cell-spot and ventrally with a red anal spot. It occurs commonly in almost identical niches of *Papilio polytes romulus*, f. ♀ *stichius* (Hübner) as well as the diurnal Zygaenid moth, *Histia flabellicornis* Fabricius amidst the Citrus plantations mainly in response to the model-mimic relation. The specimens from northern and eastern Orissa, from where the species was not earlier recorded, are referred to the nominate subspecies which is already known from south of the state.

About half the number of specimens examined are provided with the discal series of white spots between M_2 and Cu_{1b} proximally reduced and thus remote from the cell and the rest with those proximally produced and close to the cell of hind wings. These variations were already noted by Talbot (1939) under "f. *aristolochiae* (Fabr.)" and "f. *diphilus* (Esper)" respectively. Talbot (*loc. cit.*) also observed that both these "forms" are more or less common in their similar niches of flight. It is apparent from the present data that the concept of remote or close orientation of discal spots in relation to the hind wing cell