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# Records of the Zoological Survey of India

## ON THE LEPIDOPTEROUS FAUNA OF ANDAMAN AND NICOBAR GROUP OF ISLANDS (INDIA) : FAMILY ARCTIIDAE

by

G. S. ARORA

Issued by the Director
Zoological Survey of India, Calcutta

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## I. Introduction

The Zoological Survey of India has undertaken a series of surveys of the Andaman & Nicobar group of Islands. Those ones that contained the material of Arctiidae, were led by Dr. B. S. Lamba (South Andamans, 1963-64) ; Drs. A. Daniel & H.K. Bhowmik (Great Nicobar, 1966 : in collaboration with Geological Survey of India) ; Dr. B. K. Tikader (Andaman group of Islands, 1970 and Car Nicobar, 1971) ; Shri K. S. Pradhan, Dr. G. S. Arora & Shri D. N. Nandi (Andaman & Car Nicobar Is., 1972-73) ; Dr. G. K. Srivastava (South Andamans, 1975) ; and Dr. P. K. Maiti, S/Shri D. K. Mandal and D. N. Nandi (South Andamans and Great Nicobar Islands, 1975-76).

Very little consolidated account is available on the Arctiidae of Andaman and Nicobar group of Islands. As far as the Indian fauna, in general, is concerned, Cotes and Swinhoe (1887-89) catalogued the collections of Indian Moths, including Arctiidae and 'Lithosiidae' (Pt. 2, 1887), then present in the Indian Museum (later transferred to the custody of Zoological Survey of India) and now referred to as "The National Zoological Collections" (*N. Z. C.*) at Zoological Survey of India. Hampson (1894) dealt with Arctiidae in a series "Fauna of British India" and later (1900, 1901) in a series entitled "Catalogue of the Lepidoptera Phalaenae", including those from these areas. Other workers who dealt with the Indian fauna, including Arctiidae, were mainly : Seitz (1910, 1913) ; Draudt (1914), Rothschild (1914) and Barlow (1982). Strand (1919-22) and Bryk (1937) catalogued the whole family and listed about 410 species distributed over 85 genera, including 22 species from these areas, but did not treat the genus *Utetheisa* Hübner with three known species from these areas, under Arctiidae. To these known 25 species of Andaman and Nicobar Islands, a species was added by Rothschild (1936) from Andamans, bringing the total to 26.

The present study on Arctiid-fauna of Andaman & Nicobar group of Islands, as well as the earlier brief report of the author (*vide* Arora and Singh, 1975), have added four species as new records to India ; two species as new to these areas (Andamans) ; confirmed the occurrence of three species in Andamans (omitted earlier by Hampson, 1900, 1901, Strand 1919-22 and Bryk, 1937) ; and described a species new to science from Great Nicobar Island.

The classification followed in this account is that of Seitz (1910), Rothschild (1914) and Daniel (1943-54). The keys to identification of genera as well as species, wherever given have been adapted from those

given by Hampson (*loc. cit.*), which form a valuable series of contribution on the Indian Fauna, Eecke (1926-27), Jordan (1939) and Roepke (1941-57).

The range of distribution of each species cited in the text, besides from the actually examined material, has been collected from various sources, including original publication (if available) and other works of Cotes and Swinhoe (1887), Hampson (1894, 1900, 1901, 1903, 1914), Strand (1919, 1922), Bryk (1937) and Daniel (1943, 1951, 1952, 1954). Thus, a large number of localities, if known earlier, have been cited only to show the range of distribution in areas other than those of Andaman & Nicobar group of Islands.

The present account deals in all with 36 species distributed over 15 genera in four subfamilies as follows : Nyctemerinae (1 genus, 6 species) ; Micrarctiinae (2 genera, 4 species) ; Spilosominae (1 genus, 1 species) ; and Lithosiinae (11 genera, 25 species).

## II. SYSTEMATIC ACCOUNT

### Family ARCTIIDAE

Antennae bipectinate, unipectinate, serrate or simple. Proboscis usually well developed, rarely aborted. Labial palpi short or long, porrect or upturned. Tibial spurs short or moderate to long ; rarely medial spurs absent. Fore- and hind wings without vein $Cu_2$ ; vein $M_2$ arising from the lower angle of cell, sometimes slightly above it or coincident with $M_3$ in fore- or hind wings or both wings. Hind wings with the vein $Sc+R_1$ not free at base but coincident with Rs nearly upto or beyond the middle of cell (*vide* Richards & Davies, 1977) ; frenulum spine present ; retinaculum bar shaped in male.

The family Arctiidae is further subdivided here into four subfamilies *viz.*, Nyctemerinae, Micrarctiinae, Spilosominae (after Seitz, 1910 ; Draudt, 1914 ; and Daniel, 1943-54).

### (A) Subfamily NYCTEMERINAE

Antennae strongly bipectinate in male, rami decreasing gradually towards the tip ; simple or with short and unequal rami in female. Proboscis strongly developed. Labial palpi porrect or ascending. Ocelli present. Fore wing with the vein $R_3$ arising from $R_2$ and anastomosed with $R_4$ to form an areole ; hind wing with veins $Rs-M_1$ stalked.

Only one genus, *Nyctemera* Hübner, is known to occur in Andaman & Nicobar Is., and is dealt with here.

## Genus **Nyctemera** Hübner

1816. *Nyctemera* Hübner [1820], *Verz. bek. Schmett.*, p. 178.

*Type species* : *Phalaena lacticinia* Cramer (1779)

*Remarks* : Bryk (1937) reported ten species from India, including four, viz., *selecta*, *latistriga*, *lacticinia* and *nicobarica* from Andaman & Nicobar Islands. The present study has added two more species viz., *coleta* and *baulus*, to the faunistic knowledge of these areas. While the former species is hitherto known from the Indian mainland, the record of the later species is the first from India. Out of six species, the material of four species was available for study and are described here.

### Key to identification of **Nyctemera** species

1. Male with a tuft of hair on fore tibia. Female antennae with very minute serrations on one side only. Fore wing with a white patch in basal half of discocellular cell ; hind wing with the marginal border sending spurs on inner side along veins. Abdomen with dorsal and lateral spots ... *coleta* (Cramer)

— Male without tufts of hair on fore tibia. Female antennae with rami better developed but unequal and longer on one side. Fore wing without patch in discocellular cell ; hind wing with marginal border not sending spurs. Abdomen with transverse segmental bands ... ... 2

2. Female antennae with rami long and unequal. Fore wing with a white patch below cell ; white streaks present in basal area ... *latistriga* Walker

— Female antennae with rami short and unequal. Fore wing without patch below the cell ... ... 3

3. Fore wing with the inner margin, at base, white ; without white patch between vein $M_2$-$M_3$ ... *lacticinia* (Cramer)

— Fore wing with long and narrow white streaks in basal half ; a patch between $M_2$-$M_3$ present and forming a part of medial band ... *baulus* Boisduval

### 1. **Nyctemera (Coleta) coleta** (Cramer)

(Plate I, figs. 1 & 2 ♀, 3 & 4 ♂ ; Fig. 1, A-C)

1781. *Phalaena coleta* Cramer, *Pap. Exot.*, **4** : 153, pl. 368, fig. 4.

*Material examined* : India : S. Andaman ; Cowriaghat, 1 ♀, 8. iv. 1964, Burma Nallah, 1 ♂, 15. iv. 1964 (*B. S. Lamba* coll.), Chiriatapu,

Maujari, 1 ♂, 8. i. 1976 (*D. N. Nandi* coll.). Central Nicobar Is.; Kamorta Chota, 1♂, 1 ♀, 4. x. 1973 (*P. T. Cherian* coll.). Great Nicobar Island ; Rajendra Nagar, 1 ♀, 30. xii. 1975 (*D. N. Nandi* coll.).

*Wing expanse* : Male, 53 mm. ; female, 56 mm.

*Distribution* : India (Assam ; southern India ; Andaman & Nicobar Is.) ; Sri Lanka ; Burma ; S. China ; Indonesia (Java ; Sumatra ; Nias ; Sulawesi ; Amboina and Molucca) ; Malaysia (Malaya) ; Philippines ; Australasia (New Guinea).

*Remarks* : While Hampson (1894) recorded the species only from Assam, in India, Bryk (1937) recorded it also from 'Hinterindien'. There seems to be no other record of the species from the Indian mainland, so that the present record of the species from Andaman and Nicobar Islands, is the first ever from these areas and is of zoogeographical interest in view of its reported wider distribution in Indo-Malayan and Indonesion regions.

Roepke (1949) erected a new subgenus *Coleta* to include *Nyctemera coleta*, on account of the presence of hair-brush on fore tibia in male ; nearly serrate antennae in female ; and the "peculiar male genitalic structure" (Roepke *loc. cit.*). The genitalic studies in this species have also been made (*vide* Fig. 1, A-C), which corroborate with the description as given by him and is quoted here : "The male genitalia have the uncus modified in a special manner. It consists of a basal and an apical part, the former being distinctly separated from the tegumen, triangularly shaped, whereas the distal part is beak-shaped, strongly directed downwards and attached to the basal part on its underside. It looks as if the basal part is much elongated, surpassing the virtual top considerably. I call it tectum. Dorsally the chitinization of the tegumen, in its centre, is weak and membranous. The aedeagus is rather long and straight, supported by a weak chitinization dorsally which I call junctus. The valva is longer than broad, its upper margin truncate at apex, its lower one elongated into a strong hook which is slightly bent downwards".

Besides, the species is characterised by the presence of white-streaked veins in basal part of fore wing ; part of the cell and the area below it with elongated white patches ; an elongate maculate band ; the terminal cilia dark throughout except at areas between $R_5$ and $M_2$ and below $Cu_{1b}$ at tornus ; hind wing white, with the terminal dark band sending spurs on inner side along veins, more prominently on $M_3$, $Cu_{1a}$ and $Cu_{1b}$ ; the cilia on the terminal margin white between $M_1$-$M_2$ and and below $Cu_{1b}$ ; and abdomen marked with a row of dorsal and lateral spots.

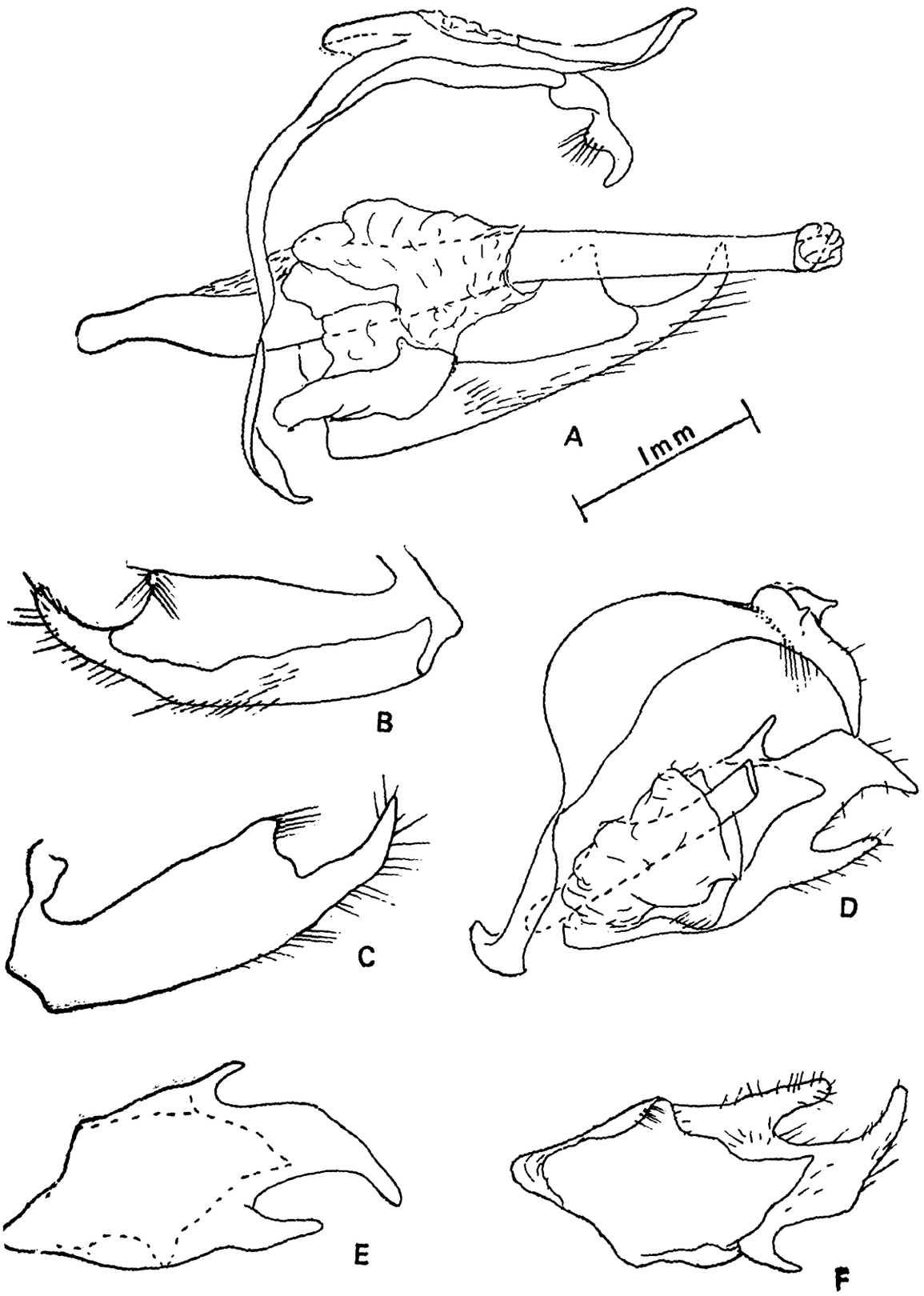


Figure 1. *Nyctemera (Coleta) coleta* : A, lateral view of male genitalia, without left valva ; B, inner view of left valva ; C, outer view of left valva. *Nyctemera latistriga* : D, lateral view of male genitalia, without left valva ; E, outer view of left valva ; F, inner view of left valva. (All figures of the same magnification).

## 2. **Nyctemera latistriga latistriga** Walker

(Plate I, figs. 5♂, 6♀; Fig. 1D-F)

1854. *Nyctemera latistriga* Walker, *List Lep. Het. Br. Mus.*, **2** : 397.

*Material examined* : India : Andaman Is., 1♂, 3 ♀♀ (no further data). Great Nicobar Is., 2 ♀♀ (no further data) [all in *National Zoological Collections* at Z. S. I.].

*Wing expanse* : Male, 36-44 mm ; female, 36-46 mm.

*Distribution* : India (Meghalaya, Cherrapunji ; Andaman & Nicobar Is.) ; Bangladesh ; Sri Lanka ; Burma ; Indonesia ; Philippines ; S. China (Formosa).

*Remarks* : Although the species has not been collected recently from these areas, the collections in *N. Z. C.* at Z. S. I. clearly suggest its occurrence in Andaman & Nicobar Is. The record of the species from Gt. Nicobar Is. is new for these areas and fills the gap of distribution between Andaman Is. on one side and Indonesia on the other extending into S. China, Burma, Indian mainland, Bangladesh and Sri Lanka.

Roepke (1949) has also dealt with the taxonomic problems associated with this species and described its genitalia without sketches which were unfortunately lost during world war (Roepke, 1949). Later, he figured *latistriga pallens* in 1957. His description of male genitalia on the basis of "one specimen from Medan Sumatra, and in one of Vollenhoven's paratypes of *nubecula* from Java", is reproduced here (Roepke, 1949) so as to co-relate his description with the genitalic figures drawn presently on the basis of male specimen from Andaman Is. (*vide* Fig. 1, D-F) : "They are rather typical, and show the uncus strongly developed, bent downwards, and at its base dorsally with two prominent hooks. The valva ends in a three pointed processes, the first of which is situated at its upper basal angle ; it is the smallest one ; its shape is rather dentiform. The second is the largest one, forming the virtual distal top of the valva ; it is slightly bent downwards. The third is smaller, straight, situated beneath the second. Second and third processes together have the shape of an asymmetrical forceps. The aedeagus is very short, only very slightly bent upwards ; it is surrounded by the same structure as in *herklotsii*, consisting of a junctus dorsally in combination with a juxta ventrally".

Besides, the species is characterised by the antennae being pectinate in both sexes ; absence of white patch in the cell area as well as on the terminal margin in fore wing ; absence of spurs along veins and white on terminal margin in hind wing ; and by the presence of transverse segmental bands on abdomen.

### 3. **Nyctemera lacticinia** (Cramer)

(Plate I, Figs. 7-8 ♀ )

1779. *Phalaena Geometra lacticinia* Cramer, *Pap. Exot.*, 2 : 40, pl. 128.

*Material examined* : India : S. Andaman Islands ; Port Blair, 2 ♀ ♀ (no further data : in *N. Z. C.*) ; Port Blair, Horticulture garden, 1 ♀ , 2.iii. 1964 (*B. S. Lamba* coll.).

*Wing expanse* : Female, 37-43 mm.

*Distribution* : India (W. B. ; Meghalaya ; Assam ; Tamil Nadu ; Karnataka (Canara) ; Andamans) ; Sri Lanka ; Malaysia (Malaya, Kuala Lumpur) ; Burma ; Tong King and Hong-Kong.

*Remarks* : Roepke (1957) opined that the record of the species from Java and Borneo is based on wrongly identified specimens, and the one from Java has already been proposed as *N. regularis crameri* Roepke (1949), so that the distribution is limited to the areas as mentioned above. The species is characterised by the cross band on fore wing being rather broad and interrupted by dark cross veins ; the inner margin at the base white ; and the hind wing with the terminal border very broad and projected into a tooth at vein $Cu_{1b}$. Abdomen white, with transverse segmental bands. Roepke (1957) described the male genitalia as follows : "The valva is strongly bifurcate, the aedeagus long and slender, slightly bent upwards, without special structures. By the shape of the valva the species ranks near *latistriga* Walk., *luctuosa* Voll., etc."

### 4. **Nyctemera baulus baulus** Boisduval

(Plate I, figs. 9-10, ♀ )

1832. *Nyctemera baulus* Boisduval, *Fauna Ent. Oc. Pacif.*, p. 200.

*Material examined* : India : Great Nicobar Island ; Campbell Bay, forest around Magur Nulla, 1 ♀ , 27.ii.1975 (*D. N Nandi* coll.).

*Wing expanse* : 54 mm.

*Distribution* : India (Gt. Nicobar Is.) ; Malaysia ; Indonesia (Lambo Is. ; Java ; Sumatra) ; Philippines ; N. Australia and Oceanic Is.

*Remarks* : Hitherto distributed from Malaya to the Philippines, N. Australia and the Oceanic Is. (Roepke, 1949), the species' record from the Gt. Nicobar Is., extends its distribution into the Indian region, and as such this constitutes the first report ever from India in general and Gt. Nicobar Is. in particular. Bryk (1937) reported as many as eleven subspecies, to which one was added by Roepke (1957) from Moluccas. The present subspecies, viz., *baulus baulus* is very close to *N. lacticinia*, particularly in the terminal band on hind wing being broader, with a

projection at vein $Cu_{1b}$ ; and by the presence of a broad oblique band on fore wing. However, it differs by having an additional patch in the band between veins $M_2$-$M_3$ and long white streaks in basal half of fore wing, unlike in *lacticinia* where both these above-mentioned characters are lacking. Besides, the antennae in female are nearly unipectinate, with rami of inner side extremely small as compared to those of outer side. Roepke (1949) has described and figured the male genitalia and gave the following characters : "The uncus is dilated and rather loosely attached to the tegumen. The valva is broad and ends in two sharpe processes, strongly bent towards each other, like a pair of forceps. The aedeagus is long and curved".

### 5. **Nyctemera nicobarica** Reich

1932. *Nyctemera nicobarica* Reich, *Int. ent. Zeitschr.*, **26** : 236, no. 3.

*Distribution* : India : Nicobar Is.

*Remarks* : No material of this species was available for study.

### 6. **Nyctemera selecta** Walker

(Plate III, fig. 1)

1854. *Nyctemera selecta* Walker, *List Lep. Het. Br. Mus.*, **2** : 399.

*Distribution* : India (Andamans) ; Indonesia (Borneo, Buru, Ambonia, Ceram) ; Philippines ; and Australia.

*Remarks* : No material of this species was available from these Islands for study. However, the colour transparency-slide received from the British Museum (N. H.), with the locality label reading as 'Luzon', has helped considerably to identify certain salient features to differentiate this species from the hitherto known other species of this genus. The species is characterised by the presence of dorsal and sublateral black spots, a character present only in *N. coleta* here but difers considerably in the fore & hindwing markings. The fore wing with small basal patches ; an elongated patch below the cell nearly upto its middle ; median band of white patches interrupted at cubito-median and $Cu_{1b}$ ; a patch present on subapical area as well as in the terminal area below $M_3$. Hind wing with the terminal band very broad, with a patch on apical area as well as below $M_3$ area, the inner margin wavy but not sending spurs along the veins. Antennae appear to be shortly pectinate (Plate III, fig. 1)

The labels of the species read as follows :

"Mt Arajat, Luzon, Aug., 1903 (Browne)
"Rothschild Bequest, B. M. 1939-1"

## (B) Subfamily MICRARCTIINAE

Seitz (1910) separated certain genera, including *Argina* Hübner and *Utetheisa* Hübner, from amongst the Indian genera under a new subfamily Micrarctiinae. He characterised it mainly on the following features :-

Moths partially of diurnal nature and very often abundant at their flight-places, sometimes forming swarms. The body of male slender ; the fore wings elongate, with short distal margin, with light, white, ivory or brown ground colour and marked with small dashes or dots ; hind wings very broad, with long outer margin.

Presently, the study deals with only two genera, viz., *Argina* and *Utetheisa* from Andaman & Nicobar Is.

### Genus **Argina** Hübner

1816. *Argina* Hübner [1819], *Verz. bek. Schmett.*, p. 167.

*Type species* : *Phalaena cribraria* Clerck (1764) (=*Phalaena astrea* Drury).

*Remarks* : The genus is distinguishable by the labial palpi being short and porrect ; proboscis thin ; abdomen golden yellow or reddish, marked with dorsal and lateral rows of dots.

Rothschild (1914) placed this genus independently between Arctiinae and Callimorphinae but was also of the opinion that it showed an alliance to the latter subfamily. Probably because of this reason, Bryk (1937) treated the genus under Callimorphinae and referred to three species from India. Later, Daniel (1943) treated it under subfamily Micrarctiinae, following Seitz (1910).

Only one species is hitherto known to occur in these areas and is recorded hereunder.

#### 7. **Argina astrea** (Drury)

(Plate II, fig. 1♂, 2♀)

1773. *Phalaena astrea* Drury, *Illust. nat. Hist. exot. Insects*, 2 : index 11, pl. 6, fig. 3.

*Material examined* : India : S. Andaman ; Port Blair, Horticulture Garden, Haddo, 2 ♀ ♀ , 2. iii.1964 (*B. S. Lamba* coll.)

*Wing expanse* : 44-46 mm.

*Distribution* : Throughout India (including Andaman & Nicobar Is.) ; China ; Sri Lanka ; Burma ; New Guinea ; Samoan Is. (Pacific Ocean) ; Mauritius (Indian Ocean) ; Philippines.

*Remarks* : Although the species has been earlier recorded from Port Blair (S. And.) and Kamorta (Car Nico.) by Moore (1877), Hampson (1894) and Bryk (1937) do not mention about these records in species' distributional range. The present report of the species confirms its occurrence in these areas and the species seems to be well distributed on the mainland right upto Arunachal Pradesh in north-eastern India (*vide* Arora & Chaudhury, 1982). The species is characterised by the head, thorax, wings and abdomen being yellowish and the forewing spots being quite large with light edges.

*Phalaena cribraria* Clerck (1764) is a junior primary homonym of *Phalaena cribraria* Linn. (1758) and "there is no objective replacement name but *Phalaena astrea* Drury is the oldest of the junior subjective synonyms and is therefore available for use as a subjective replacement name" (*vide* Watson, 1980).

## Genus **Utetheisa** Hübner

1816. *Utetheisa* Hübner [1819], *Verz. bek. Schmett.*, p. 168.

*Type species* : *Phalaena ornatrix* Linn. (1758).

*Diagnosis* : Antennae ciliate in both sexes or shortly pectinate in male ; proboscis well developed ; labial palpi upturned but not reaching vertex of head. Hind tibiae with two pairs of spurs. Fore wing long and narrow ; vein $R_1$ arising free from the cell ; $R_2$-$R_3$ stalked, the latter anastomosing with $R_4$ to form an areole ; $R_5$ from the end of areole, or, if areole absent, $R_2$-$R_5$ usually stalked ; $M_1$ arising well below the upper angle of cell ; $M_2$ from well above the lower angle of cell ; $M_3$ from angle ; $Cu_{1a}$-$Cu_{1b}$ from before the angle. Hind wing with vein $Sc+R_1$ from middle of cell ; Rs from just before the upper angle of cell ; $M_1$ from angle ; other feature as in fore wing.

*Remarks* : Hampson (1894) included only two species under the genus *Deiopeia* Stephens from India, treating *lotrix* (Cramer) and *antennata* Swinhoe as synonyms of *pulchella* (Linn.). Later (1901), he synonymised the genus *Deiopeia* to *Utetheisa* Hübner, and revalidated *antennata* but maintained the *status quo* for *lotrix*. Besides, he reported that the species *venusta* with its synonym *cruentata*, as recorded earlier (Hampson, 1894) from Sikkim, did not occur in Sikkim, so that there were again two species left, viz., *pulchella* and *antennata*. Later, a species each was added i. e. *pulchelloides* by Hampson, 1907, and *indica* by Roepke, 1941. Although, Jordan (1939) treated *pulchelloides* as an independent species, with nine subspecies, including a new subspecies, viz., *Utetheisa pulchelloides vaga*, occurring in Bombay and Nicobar Is. (in India) and Sri Lanka in its distribution range, and restricted the distribution of *pul-*

*chella* to Africa and southern Europe, Bhattacherjee & Gupta (1969) dealt with *pulchella* (*sensu lat.*) from India and were of the opinion that *pulchella* represented an heterogeneous assemblage of several species. They not only revalidated *thyter* Butler, which was treated as a synonym of *pulchella* (*vide* Hampson, 1894), but also erected three species out of the *pulchella* complex, viz., *shyama*, *shiba* and *menoni*, and differentiated these species, in key, on the basis of origin of vein $R_2$ in fore wing, either before, or after the origin of $R_5$. Further, on close scrutiny of the illustrations of fore wing (*vide* Bhattacherjee & Gupta, 1969), it was observed that none of the figures showed the presence of areole, whereas on examining the type material at I. A. R. I., New Delhi, it was discovered to be present in two out of 11 paratypes of *shyama*, in three out of four paratypes of *shiba* and in all the five paratypes and one allotype of *menoni*. Obviously, the external characters of wing-venation, pattern and the presence of sensory hair on hind wing do not seem to be reliable for separating the species. Because of these reasons, a broad diagnosis of the genus has been given, and the descriptions have been substituted by the genitalic features, wherever possible.

Jordan (1939) was of the view that "*U. pulchella* is the lowest in the Old World series and differs from other species in a slight modification of the male genitalia, every other distribution being shared with one or the other species, and *U. lotrix* is the highest being, different from every other species in the genitalia (♂, ♀), the tarsal claws (♂, ♀) and the hind leg (♂)". Thus, he considered only three species under the genus *Utetheisa* from the Indian region, i.e. *pulchelloides*, *lotrix* and *antennata*, which broadly cover the *pulchella* complex of Bhattacherjee & Gupta (*loc. cit.*), and treated all the species of *Utetheisa* under well defined four groups, *Pulchella*, *Pulchelloides*, *Lotrix* and *Semara*. Roepke (1941), however, treated *pulchelloides* as a synonym of *lotrix* and gave a new name for the species available in India, viz. *U. indica*.

The photo transparency colour-slide of the type of *Utetheisa lotrix* (Cramer), received from B. M. (N. H.), London, nearly sets the controversy if any at rest, in as far as the confusion that exists between what Jordan (1939) and Roepke (1941) have described as '*lotrix*'. The salient features, as far as possible to study from the colour slide, show that what Jordan (1939) had described was correct, and hence the work of Jordan (1939) has been followed here to avoid any further confusion whatsoever.

The material of only three species was available for study and these have been separated by the following key based on external as well as genitalic features.

## Key to identification of **Utetheisa** species

1. Antennae simple in both sexes. Fore wing without basal dash ; all the black spots nearly separate from each other and not conjoined. Hind wing without sensory hair. Hind tibiae dilated and with patch of specialised scales on inner side. In the male genitalia, the uncus broad & blunt apically, with a curved subapical process above ... *lotrix* (Cramer)

— Antennae fasciculate or minutely bipectinate in male. Fore wing with or without basal dash ; the black spots particularly in costal area conjoined with the one below the cell as well as in postmedian area. Hind wing with sensory hair in anal fold. Hind tibiae slightly dilated, or normal, but without specialised scales. In the male genitalia, the uncus narrow and pointed, without subapical process ... ... 2

2. Antennae fasciculate. Fore wing with basal dash ; the postmedial series of black spots smoothly curved ; subterminal area with a a series of black spots and interrupted pale-scarlet narrow patches ... *pulchelloides* Hampson

— Antennae minutely bipectinate. Fore wing without basal dash ; the postmedial series of black spots strongly curved outwards at $M_2$ and inwards at $M_3$ ; the subterminal area occupied by broad pale-scarlet blotches ... *antennata* (Swinhoe)

### 8. **Utetheisa lotrix** (Cramer)

(Plate II, fig. 3♂, III, fig. 2 ; Fig. 2 A-D)

1779. *Phalaena lotrix* Cramer, *Pap. Exot.*, **2** : 20.

*Material examined* : India : S. Andamans ; Port Blair, Haddo, Horticulture Garden, 2♂♂, 2♀♀, 2. iii. 1964 (*B. S. Lamba* coll.).

*Wing expanse* : 36-38 mm.

*Distribution* : S. Eastern Asia, including India, Sri Lanka, Pakistan, Java, Amboina and Queensland.

*Remarks* : As mentioned earlier in the remarks under the genus, Jordan (1939) has been followed here. The most important characteristic features being the absence of sensory hairs in the inner area of hind wing ; the last two marginal spots on fore wings being elongate (Plate III, fig. 2) ; presence of a patch of specialised scales on dilated hind tibiae in males ; and in the tarsal claws being asymmetrical

particularly in male. In the male genitalia (fig. 2 A-D), the most prominent features being the presence of a subapical process dorsally just before the broad and blunt end of uncus ; the valvae broad, the dorso-distal end short and blunt than the ventro-distal which is narrow, uptur-

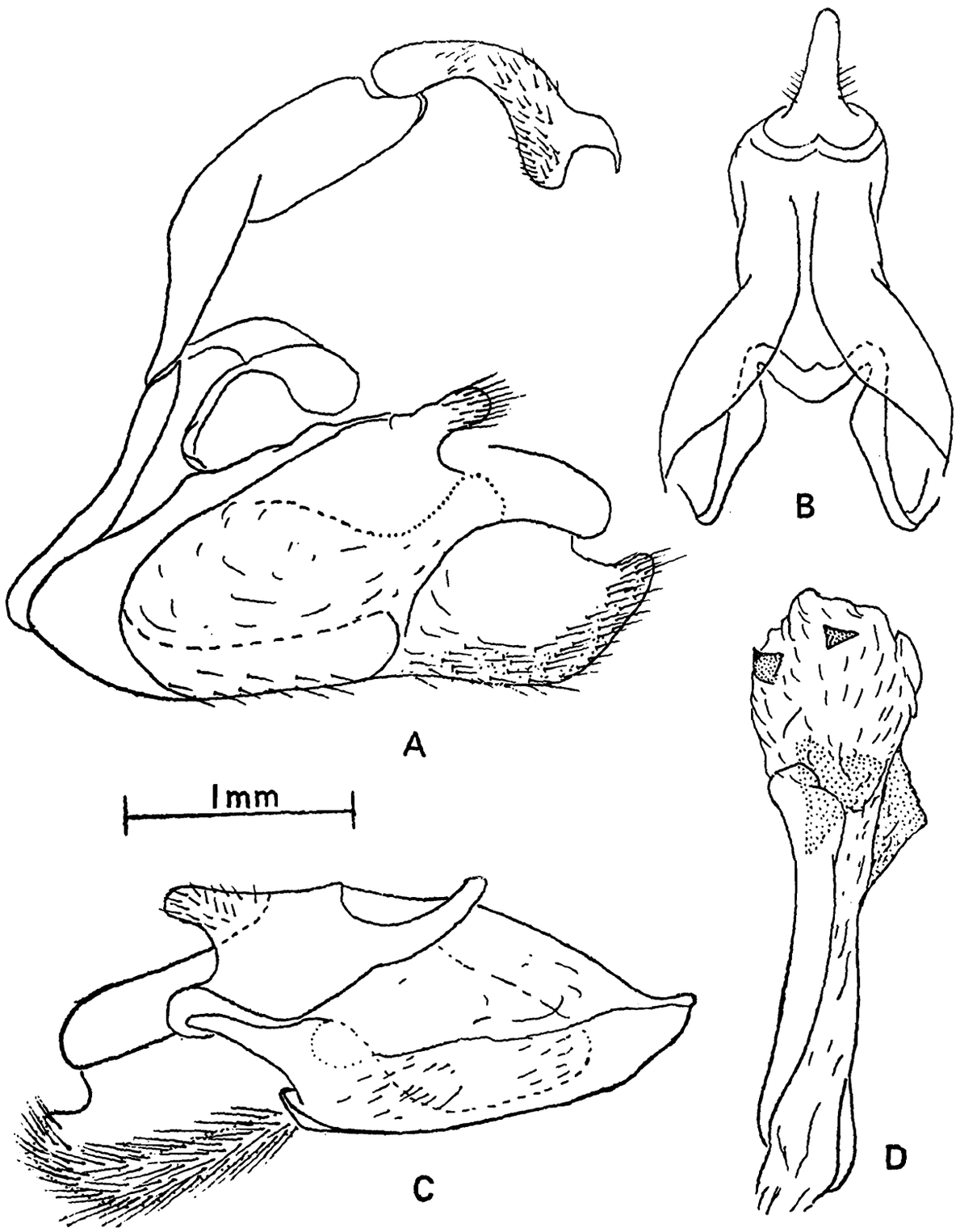


Figure 2. *Utetheisa lotrix* : A, lateral view of male genitalia ; B, anterior view of 'A' ; C. inner view of right valva ; D, aedeagus, with vesica fully extended showing two large cornutal spines. (All figures of same magnification).

ned and extending slightly beyond the upper part ; the aedeagus with prominent corunti.

For differences from other species see *U. pulchelloides* Hampson.

### 9. **Utetheisa pulchelloides** Hampson

(Plate II, fig. 4 ♀ , 5 ♂ ; Fig. 3 A-D)

1907. *Utetheisa pulchelloides* Hampson, *Ann. Mag. nat. Hist.*, (7) **19** : 239.

*Material examined* : India : S. Andamans ; Ferrarganj, 4 ♂ ♂, 16.iii.1975 (*G. K. Srivastava* coll.). Middle Andamans ; Mayabunder, Kishori Nagar, 1 ♂, 3.v.1971, Mayabunder, Tugapur, 3 ♂ ♂, 8.v.1971, 1 ♂, 9.v.1971, 1 ♂, 2 ♀ ♀, 10.v.1971 (*B. K. Tikader* coll) ; Rangat, 2 ♂ ♂, 4.iii.1975, 4 ♂ ♂, 2 ♀ ♀, 6.iii.1975, 2 ♂ ♂, 9.iii.1975 (*G. K. Srivastava* coll). North Andamans ; Diglipur near Luxmipur, 1 ♀, 24.iv.1971, S. of Aerial bay, 1 ♂, 26.iv.1971, 1 ♂, 2 ♀ ♀, 30.iv.1971 (*B. K. Tikader* coll). Car Nicobar : Malacca village, Circuit House, 2 ♂ ♂, 3.iii.1970 (*B. K. Tikader* coll.).

*Wing expanse* : Male, 31-36 mm. ; female, 30-37 mm.

*Distribution* : India (Tamil Nadu ; Kerala ; Orissa ; Rajasthan ; Sikkim ; Assam ; and Andaman & Nicobar Is.) ; Pakistan ; Sri Lanka ; Japan ; Malaysia extending to Indonesia ; New Guinea, Australia and New Zealand.

*Remarks* : The species is characterised, externally, by the presence of sensory hairs in the inner area of hind wing ; the last two marginal spots being rounded and the absence of patch of specialised scales on, otherwise, a normal male hind tibia. Besides, the genitalic features characteristically separate this species from *lotrix* particularly the uncus which is gradually narrowing apically into down-curved tip and without subapical dorsal process ; the valvae with the dorso-distal margin extending beyond the ventro-distal end and pointed downwards ; and the aedeagus with two groups of coruntal spines (fig. 3, A-D).

An authentically identified male specimen (Plate II, figs. 5 ♂) (Locality : Mahe, Seychelles), of *Utetheisa pulchelloides* Hampson, received from B. M. (N. H.), London, has been compared with the collections presently available from these areas. The collections have been found to agree with this specimen in their external characters and the wing-markings.

Following Jordan (1939) the material avilable for study is referable to the subspecies *pulchelloides vaga* Jordan.

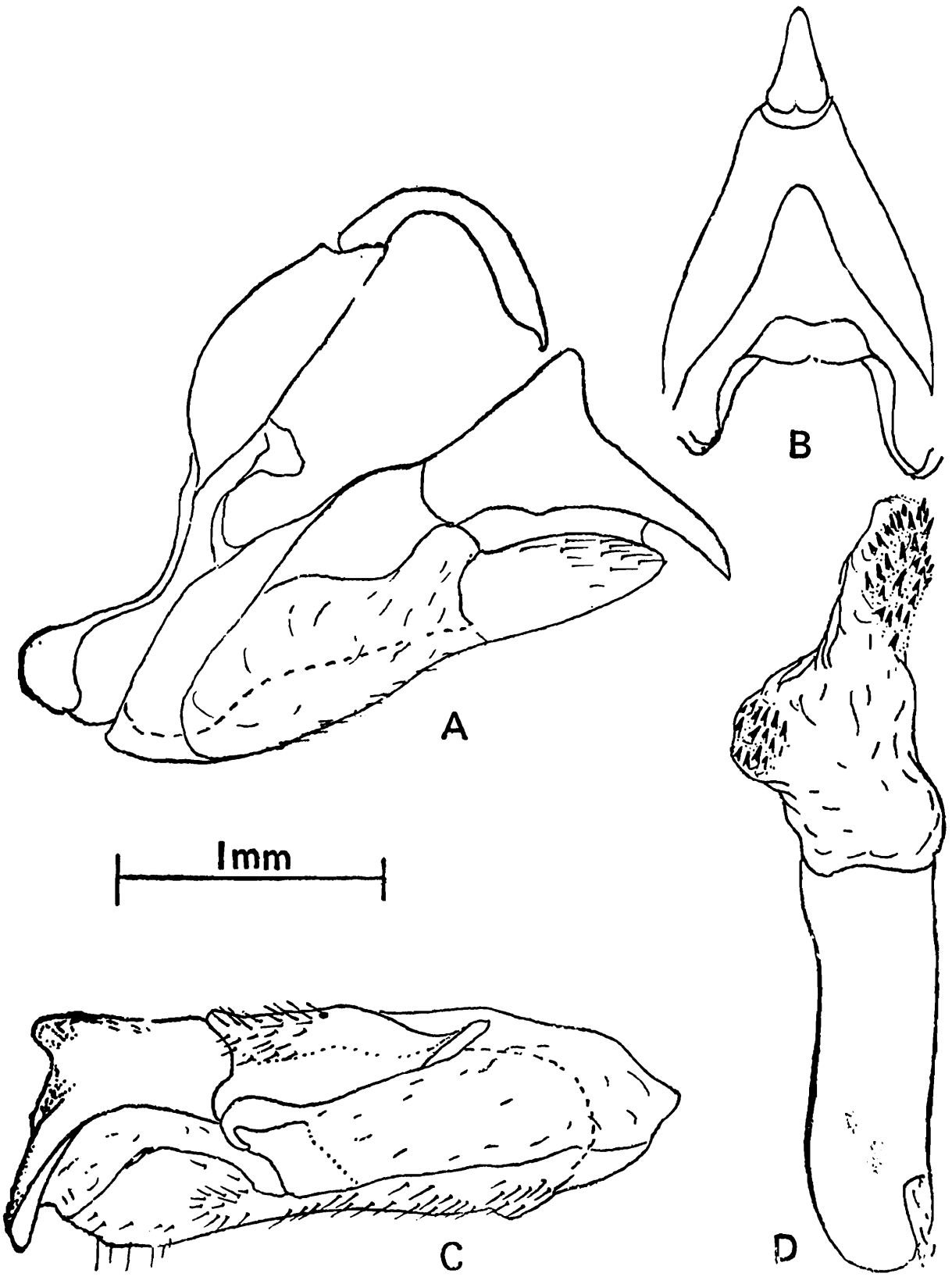


Figure 3. *Utetheisa pulchelloides* : A, lateral view of male genitalia ; B, anterior view of 'A' ; C, inner view of right valva ; D. aedeagus, with vesica fully extended showing two groups of spines (all figures of same magnification).

### 10. **Utetheisa antennata** (Swinhoe)

(Fig. 4 A-D)

1893. *Deiopeia antennata* Swinhoe, *Ann. Mag. nat. Hist.*, (6) **12** : 215.

*Material examined* : India : Car Nicobar; Malacca village, Circuit House, 1 ♂, 3. iii. 1970 (*B. K. Tikader* coll.)

*Wing expanse* : 30 mm.

*Distribution* : India : Nicobars.

*Remarks* : By the external features, the species is characterised by antennae in male being minutely bipectinate (*vide* Hampson, 1901) ; fore wing without basal dash and the subterminal area, in fore wing, with broad pale-scarlet blotches. The latter feature is characteristic of this species. In the male genitalia, it comes closer to *U. pulchelloides*, particularly in the shape of uncus and valva, but the aedeagus is only with one group of cornutal spines unlike in *pulchelloides* where there are two.

The species is smaller as compared to recorded expanse of 36 mm. (*vide* Hampson, 1901).

## (C) Subfamily SPILOSOMINAE

Seitz (1910) introduced the division of Arctiinae (*sensu lat.*) into Micrarctiinae, Spilosominae and Arctiinae (*sensu str.*) for the sake of "lucidity of arrangement". Later, Daniel (1943), however, recognised this division. Keeping in view the utility of the purpose for which this division was proposed by Seitz (1910), this system of classification was followed by Arora & Chaudhury (1982) for the faunistic account of the arctiids of Arunachal Pradesh and adjoining areas of Assam in north-eastern India. Accordingly, the only species viz., *flavens* (Moore), hitherto known from these areas, is assigned to the genus *Spilarctia* Butler.

Seitz (1910) characterised the subfamily as follows :—

Moths of nocturnal habits. Head broad, with antennae sometimes quite short ; thorax broad and woolly, almost often without markings ; abdomen very slender in male ; legs short and strong ; fore wings often long, with sparse markings often reduced to dots. Besides, proboscis more or less aborted ; antennae variable in male ; fore wing with the vein $R_2$ arising free or stalked.

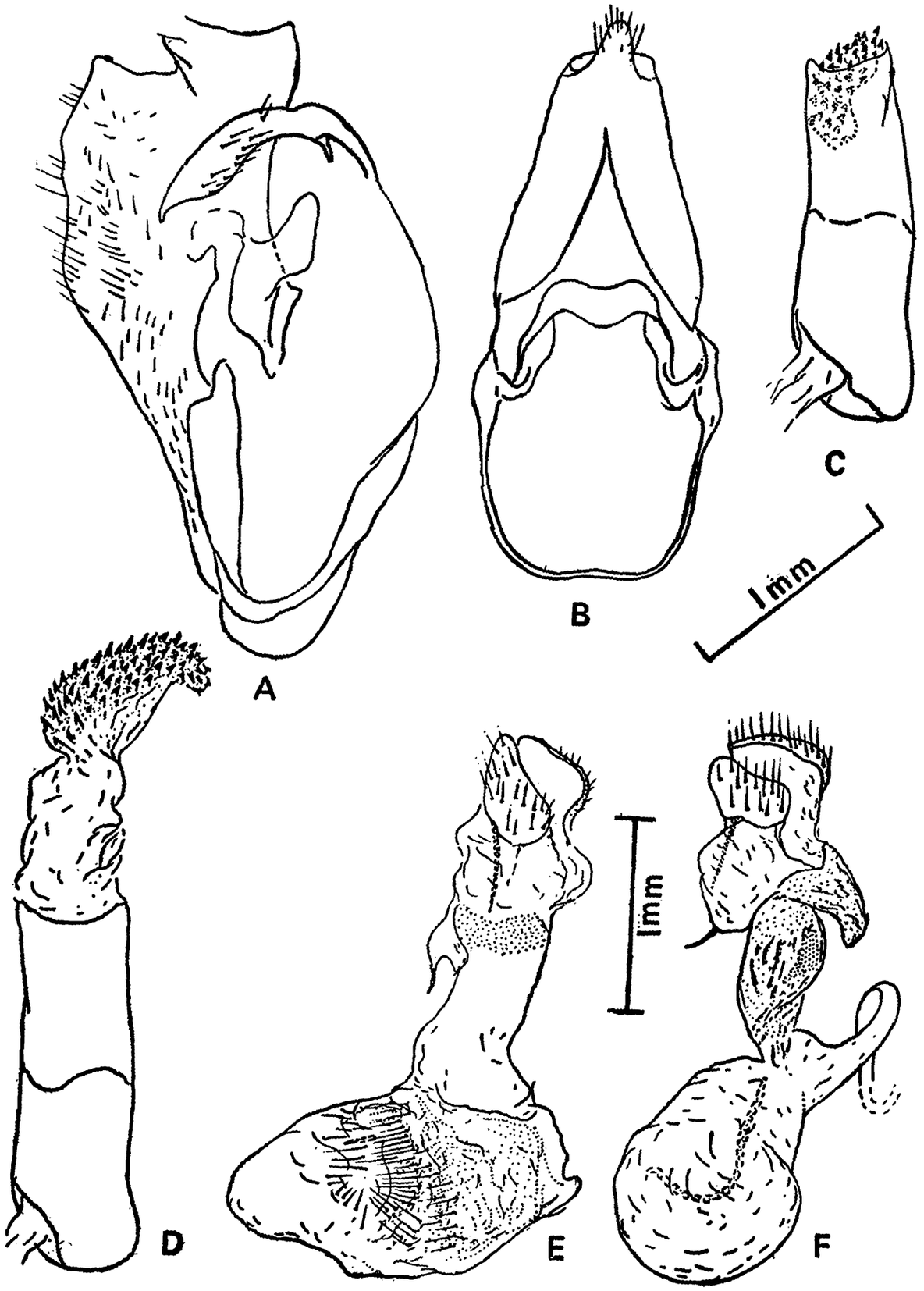


Figure 4. *Utetheisa antennata* : A, latero-mesal view of male genitalia, without right valva ; B, anterior view of 'A' ; C, aedeagus, without extended vesica ; D, aedeagus with vesica fully extended with a group of spines (All figures of same magnification). *Garudinia simulana* : E, female genitalia. *Eugoa vagigutta* : F, female genitalia.

## Genus **Spilarctia** Butler

1875. *Spilarctia* Butler, *Cistula ent.*, 2 : 39.

*Type species* : *Phalaena lutea* Hufnagel (1766)

*Remarks* : Seitz (1910) while introducing the division of Arctiinae (*sensu lat.*) into Spilosominae, Micrarctiinae and Arctiinae (*sensu str.*) placed some of the Old World species, hitherto under *Diacrisia* Hübner (*vide* Hampson, 1901), under *Spilarctia* Butler, and treated *Diacrisia* under Arctiinae (*sensu str.*).

The genus *Spilarctia* Butler is broadly characterised by the antennae in the male being bipectinate and about half the length of costa ; proboscis extremely short and not exceeding the width of head. Head, thorax and abdomen covered with large woolly hair. Hind tibiae with two pairs of tibial spurs ; fore tibiae without the curved apical claw.

Only one species is hitherto known and is dealt with hereunder.

### 11. **Spilarctia flavens** (Moore)

1879. *Alpenus flavens* Moore, *Descr. Indian Lep. Atk.*, p. 39.

*Wing expanse* : 40 mm.

*Distribution* : India (Assam, Andaman) ; Japan.

*Remarks* : The material of this species was not available for study. However, it may be mentioned that while Hampson (1901) treated *flavens* (Moore) from Assam as a species separate from *biseriata* (Moore) from Andamans, Daniel (1943) synonymised latter to *flavens* with the comment that he found no difference between the two species. Besides, he also considered *moltrechi* Miyake, from Japan, as its synonym. The species is characterised (*vide* Hampson, 1901) by the abdomen being orange, with dorsal, lateral and sublateral series of black spots. Forewing with curved medial series, two discal spots ; the postmedial series excurved from costa to vein $Cu_{1a}$ and then incurved. Hind wing with a discal spot or dot ; some subterminal spots present towards tornus.

## (D) Subfamily LITHOSIINAE

The moths of the subfamily Lithosiinae, are generally of slender built, with the abdomen just reaching the anal margin of hind wing. Head broad, with the frons large and flat ; antennae either minutely pectinate in male, or simple in both sexes ; eyes bulging ; ocelli either absent completely, or weakly to well marked ; labial palpi generally present, slightly upturned or porrect ; proboscis usually strong. Legs strong, often with coxae very long ; hind tibiae with two pairs of spurs. Fore wings long and narrow ; hind wings usually large.

Hampson (1900) classified the whole of the Indian Arctiidae on the basis of presence or absence of ocelli into three subfamilies. Accordingly, the subfamilies Lithosiinae and Nolinae were believed to be without ocelli. However, Arora (1975), while studying the Arunachal Pradesh Arctiidae, discovered and brifly reported the presence of ocelli in certain Indian genera. Later, Arora & Chaudhury (1982) supplemented with photographs of the heads of several species showing presence of ocelli in certain Arunachal Pradesh fauna, particularly *Tigrioides*, *Chrysorabdia*, *Oeonistis*, *Agylla* and *Agrisius*. None of these genera is so far reported to occur in the areas of Andaman & Nicobar Is.

As many as eleven genera have been included here but none of the genera is having well marked ocelli. All these genera have been differentiated externally by the following key-characters which have been mainly adapted from Hampson (1900). It is hoped that the key will help to identify any further material from these areas.

## Key to identification of **Lithosiinae** of Nicobar Is.

| | | | |
|---|---|---|---|
| 1. | Fore wing with the vein $M_3$ absent in males... | ... | 2 |
| — | Fore wing with the vein $M_3$ present in males ... | ... | 5 |
| 2. | Hind wing with $M_3$ present ; fore wing with $R_5$ absent ... | ... | 3 |
| — | Hind wing with $M_3$ absent ; fore wing with $R_5$ present ... | .. | 4 |
| 3. | Fore wing with vein $M_1$ free, $R_4$-$R_5$ stalked, or $R_4$ absent ... | *Garudinia* Moore | |
| — | Fore wing with $M_1$ stalked with $R_4$-$R_5$ ... | *Padenia* Moore | |
| 4. | In male fore wing with or without secondary sexual characters ; hind wing without secondary sexual characters ... | *Eilema* Hübner | |
| — | In male fore- and hind wings with secondary sexual characters ... | *Prabhasa* Moore | |
| 5. | Hind wing with vein $M_3$ absent or coincident with $M_2$ ... | ... | 6 |
| — | Hind wing with vein $M_3$ present ... | ... | 8 |
| 6. | Fore wing with veins $R_1$ and $M_1$ free ; $R_2$-$R_5$ stalked. ... | *Pachycerosia* Hampson | |
| — | Fore wing with $R_1$ anastomosing with Sc ; $R_5$-$M_1$ stalked ... | ... | 7 |
| 7. | Fore wing with $R_2$-$R_4$ stalked ... | *Eugoa* Walker | |
| — | Fore wing with $R_3$-$R_4$ arising from cell ... | *Hemonia* Walker | |

| | | |
|---|---|---|
| 8. | Fore wing with $R_1$, $R_2$ free ; $R_3$-$R_4$, $R_5$-$M_1$ and $M_2$-$M_3$ stalked ... | *Trischalis* Hampson |
| — | Fore wing with $R_1$ free or anastomosing with Sc ; other features not as above ... | ... 9 |
| 9. | Fore wing, in male, with $R_3$-$R_4$ absent, $R_1$, $R_2$ and $M_1$ free ; in female $R_3$-$R_5$ stalked ... | *Cyana* Walker |
| — | Fore wing, in both sexes, with $R_3$-$R_5$ stalked .. | ... 10 |
| 10. | Fore wing with vein $R_1$ anastomosing with Sc : hind wing with veins Rs-$M_1$ stalked ... | *Asura* Walker |
| — | Fore wing with vein $R_1$ free, but curved and approximated to Sc ; hind wing with Rs-$M_1$ on a long stalk ... | *Miltochrista* Hübner |

## Genus **Garudinia** Moore

1882. *Garudinia* Moore, *Lep. Ceylon*, **2** : 59.

*Type species* : *Tospitis latana* Walker (1863).

*Remarks* : Strand (1922) recorded six species under this genus including *biguttata* Rothschild, to which one species each from Great Nicobar (*vide* Arora & Singh, 1975) and Arunachal Pradesh (*vide* Arora & Chaudhury, 1982), were added. The genus, in Indian region, is distributed from Bhutan through the north-eastern region of Indian mainland to Sri Lanka and the Gt. Nicobar Is, and is mainly characterised by the following features :—

The antennae ciliate in both sexes. Legs with the tibial spurs moderately long. Fore wing rather narrow, costa arched ; veins $R_1$, $R_2$ arising free from the cell ; $R_3$ absent ; $R_4$-$R_5$ stalked or $R_4$ absent ; $M_1$ arising from below the upper ; $M_2$ absent ; $M_3$ from angle ; $Cu_{1a}$ slightly before the angle ; $Cu_{1b}$ when curved/bent, touches the anal vein ; male with a fringe of hair on under side. Hind wing with or without androconia ; Rs-$M_1$ coincident ; $M_2$ present.

### 12. **Garudinia** sp. (A) : **simulana** (Walker) Group

(Plate II, fig. 6 ♀ , 7 ♀ ; Fig. 4 E ♀ )

1863. *Tospitis simulana* Walker, *List Lep. Het. Br. Mus.*, **28** : 429.

*Material examined* : India : Gt. Nicobar Is. ; Shiva Dutta Bay, 1 ♀ , 15. iv. 1966 (*Daniel & Bhowmik* coll.).

*Expanse* : 16 mm.

*Distribution* : India : Great Nicobar Is. Indonesia : Borneo, Java ; Eastern Malaysia : Sarawak.

*Remarks* : Arora & Singh (1975) briefly reported this species not only as new to Gt. Nicober Is., but also to India as well. The specimen, available for study, is comparatively smaller, being 16 mm in expanse, as compared to the earlier recorded 20 mm. (*vide* Hampson, 1900).

The species is characterised by the presence of a postmedian patch on fore wing as in *G. biplagiata* Hampson, but unlike in the latter, the patch extends upto the costal margin. The species having been recorded from India since 1975 and represented by a female specimen from Gt. Nicobar Is., was studied for its genitalia, the main features of which are as follows : ostuim bursae simple, with light chitinization ; ductus bursae short and broad, membranous leading into obliquely placed sac-like bursa copulatrix, the inner walls of which are slightly chitinized and beset with sclerotised setae of varying lengths ; on one side of the bursa arises the ductus ejaculatorius which opens at the distal end at ovipositor ; anterior and posterior apodemes very short (fig. 4 E).

The material available for study agrees in external colouration and wing pattern with an identified female specimen (Plate II, fig. 7) received from B. M. (N. H.). This specimen, which bears the locality label as "Singolangoe, Tengger, 5000' ; April, 1934, F. P. A. Kalis", is, however, larger in wing expanse, being about 18 mm., than the one from Great Nicobar Is.

*G. simulana* (Walker) is a part of species-complex involving *biguttata* Rothschild, *biplagiata* Hampson and *simulana* Walker, and possibly a few more undescribed species (Holloway, 1982).

## Genus **Padenia** Moore

1882-83. *Padenia* Moore, *Lep. Ceylon*, **2** : 58-59.

*Type species* : *Cyllene transversa* Walker (1854)

*Remarks* : Strand (1922) recorded eight species, including one from India, viz., *Padenia transversa* (Walker) which is dealt with here. Besides the characters as given in key to genera, it is distinguishable by the sexual dimorphism, i.e., in the male the hind wings are highly excised at the apex and with a fringe of long hair arising from costal area, the fore wings with a very broad costal fold on underside extending right up to the apex and $M_2$ coincident with $M_3$, unlike in female where the underside-costal-fold on fore wing and costal fringe on hind wings are normal and veins $M_2$-$M_3$ in fore wings are well developed and strongly stalked. Besides, the vein $R_5$ is absent, and $M_1$ is stalked with $R_4$-$R_5$, in both sexes. The ocelli are absent.

The species from Andamans is dealt with hereunder.

### 13. **Padenia transversa** (Walker)

1854. *Cyllene transversa* Walker, *List Lep. Het. Br. Mus.*, **2** : 544.

*Material examined* : India : S. Andamans, 6♂♂, 2 ♀♀ (no other data : In *Z. S. I.* Colln.).

*Expanse* : Male, 20-21 mm. ; female, 19-24 mm.

*Distribution* : India (Tamil Nadu ; Andamans) ; Sri Lanka and Indonesia.

*Remarks* : The species is characterised by the presence of two purplish-black bands on fore wings as in *duplicana* ; underside fore wing with the costal fold tinged with brown and hind wing costal fringe brown, as in *duplicana*. However, the latter species is pure white with the bands cupreous-fuscous and the antemedial band expands at costal margin.

## Genus **Eilema** Hübner

1816. *Eilema* Hübner [1819], *Verz. bek. Schmett.*, p. 165.

*Type species* : *Bombyx caniola* Hübner (1808)

*Remarks* : Strand (1922) recorded 252 species under the genus *Eilema*, including 37 species from the Indian region. Out of these, he recorded five species from the regions of Andaman & Nicobar Islands. Later, Daniel (1954) revived one of the synonymic genera, i. e. *Prabhasa* Moore which includes one of the Andamanese species, so that the present studies include only four species under *Eilema*. A lot of nomenclatoral controversy exists with regard to this genus and has been discussed in detail by Arora & Chaudhury (1982) to which reference may be made. Following the latter, the genus has been retained here as well to include the Andaman & Nicobar fauna.

The genus *Eilema* Hübner is characterised by the following features (*vide* Arora & Chaudhury, 1982) : Antennae simple ; labial palpi porrect, reaching frons, the 2nd joint fringed with hair below ; frons rounded ; ocelli weakly developed or absent ; legs slender, tibiae with the spurs rather short. Wings with or without secondary sexual characters ; vein $M_2$ absent in both wings. Fore wings vein $R_1$ arising free, or anastomosing with Sc ; $R_2$ arising from cell, or $R_3$ from $R_2$ and anastomosing with $R_4$ to form an areole ; $R_5$ stalked with $R_2$-$R_4$, rarely free in male ; $M_1$ from well below upper angle of cell and stalked with radial veins ; $M_3$-$Cu_{1a}$ either connate, or from cell, or on a long stalk ; $Cu_{1b}$ from middle of cell, curved towards base. Hind wings with vein Sc from middle of cell ; Rs-$M_1$ stalked or coincident ; $M_3$-$Cu_{1a}$ on a

long stalk ; $Cu_{1b}$ from before angle of cell. In the male genitalia scaphium absent ; uncus short or long ; valvae simple or sclerotised. Aedeagus with or without cornutal spines.

## 14. **Eilema atrifrons** (Hampson)

1907. *Ilema atrifrons* Hampson, *Ann. Mag. nat. Hist.*, (7) **19** : 231.

*Expanse* : 26 mm.

*Distribution* : India : Nicobar Is.

*Remarks* : No material of this species was available for study. Hampson (1914) placed the species close to *Eilema decreta* (Butler) from Indonesian and Australian regions. The species is characterised by the head, tegulae, patagia and the legs being fulvous yellow ; palpi, frons and fore legs in front fuscous ; thorax and abdomen at base, dorsally, greyish white, the rest of abdomen being yellow, with white suffusion. Hind wing pale-yellow (*vide* Hampson, 1914).

## 15. **Eilema brevipennis** (Walker)

1854. *Lithosia brevipennis* Walker, *List Lep. Het. Br. Mus.*, 2 : 509.

*Material examined* : India : S. Andamans, 1 ♀ (no other data).

*Expanse* : 24 mm.

*Distribution* : India (Tamil Nadu ; Andamans) ; Sri Lanka. Indonesia and Africa.

*Remarks* : Although Hampson (1894) recorded *E. intermixta* (Walker) from Andamans, Nilgiris and Sri Lanka, Hampson (1900) synonymised *intermixta* to *brevipennis* but omitted 'Andamans' in the distribution range of species. Strand (1922) followed Hampson (1900) in retaining the name *brevipennis*, including its synonym *intermixta*, but at the same time recorded the latter from Andaman and South India. Presently, only one female, from Andamans, was available from the old collections of Z. S. I. and is nearly close to expanse of 22 mm. of '*intermixta*' (*vide* Hampson, 1894) but comparatively smaller being 24 mm., as compared to 30 mm. by Hampson (1900), so that the range of expanse can now be given as 22-30 mm. for female.

The species is characterised by absence of ocelli ; veins $R_3$ stalked with $R_4$-$R_5$ but close to cell angle ; areole absent ; $M_1$ stalked with radial veins in male and free in female ; cell closed in both wings.

### 16. **Eilema cucullata** (Moore)

1878. *Katha cucullata* Moore, *Proc. zool. Soc. Lond.*, p. 10.

*Expanse* : 30-32 mm.

*Distribution* : India : Assam ; Khasis ; Andamans.

*Remarks* : No material of this species was available for study. Hampson (1900) has characterised the species as follows : Head and thorax black ; legs mostly black ; abdomen dull orange, with the base fuscous grey. Fore wing whitish-grey ; costal area somewhat paler, with some diffused fuscous on termen, the costal area towards apex and the cilia yellowish. Hind wing yellowish-white. In forewing venation, the vein $R_1$ anastomoses with Sc ; $R_3$ arises from $R_2$ and anastomoses with $R_4$ to form an areole, or $R_2$ free ; $M_1$ from areole or cell.

### 17. **Eilema vicaria** (Walker)

1854. *Lithosia vicaria* Walker, *List Lep. Het. Br. Mus.*, **2** : 505.

*Material examined* : India : S. Andamans, 2 ♀ ♀ (no other data) (in N.Z.C. at Z.S.I.).

*Expanse* : 27—28 mm.

*Distribution* : India (Sikkim ; Assam ; Arunachal Pradesh ; West Bengal, Calcutta ; Maharashtra, Bombay ; Andamans) ; Bhutan ; Sri Lanka ; Indonesia (Java and Borneo) ; Malaysia (Sarawak) ; W. Africa ; and China (Formosa, Kuangtung and Ussurigebiet.)

*Remarks* : Arora & Chaudhury ( 1982 ), while dealing with Arunachal Pradesh Arctiidae, dealt with the species and described its genitalia, and differentiated it as well from its closely allied E. Indian species, *E. fumidisca* (Hampson), to which the reference may be made. The species, as in *brevipennis*, is characterised by the stalked $R_3$-$R_5$, but unlike in the latter, the vein $R_3$ arises from beyond the origin of $R_5$ and not close to cell angle ; cell closed in hind wings, but the discocellulars are weak in fore wings.

## Genus **Prabhasa** Moore

1878. *Prabhasa* Moore, *Proc. zool. Soc. Lond.*, p. 25.

*Type species* : *Prabhasa venosa* Moore

*Remarks* : Moore (1878) erected this genus to include three of his new species, viz., *venosa*, *flavicosta* and *costalis*, from Darjeeling (W. B.), Cherrapunji (Meghalaya) and North China, respectively. For a very long time, the genus remained as a synonym either of *Lithosia* Fabricius or *Ilema* Hübner (vide Hampson 1894, 1900 respectively). Later, Strand (1922) treated *Prabhasa* as well as *Ilema* as synonyms of *Eilema* Hübner.

However, Daniel (1954) revalidated this genus while dealing with the Chinese Arctiidae and was subsequently followed for arctiids of Arunachal Pradesh and adjoining areas, by Arora & Chaudhury (1982).

The genus *Prabhasa* is characterised by the following main features : Antennae simple in both sexes, with fine bristles on each segment ; labial palpi slender, long and slightly reaching beyond frons ; ocelli very weakly marked. Wings long ; fore wings narrow ; cell very long, about a little over half the length of wing, folded in male and covered with overlapping recumbent tufts of scales up to half the length of cell, costa slightly arched before apex ; vein $R_1$ anastomosing with Sc ; $R_2$ arising free, or $R_3$ arising from $R_2$ and anastomosing with $R_4$ to from a short areole ; $M_1$ either arising free from below the angle of cell or from areole if present ; $M_3$-$Cu_{1a}$ stalked ; $Cu_{1b}$ slightly depressed near base. Hind wing produced at apex ; cell a little over half the length of wing ; Rs-$M_1$ and $M_3$-$Cu_{1a}$ stalked.

Daniel (1954) while dealing with Chinese arctiids, referred to *P. venosa* Moore, a species of Indian origin and described its genitalia as : Uncus long and narrow ; valvae membranous, long and narrow ; aedeagus long and narrow.

The present account deals with only one species as hereunder.

### 18. **Prabhasa costalis** Moore

1878. *Prabhasa costalis* Moore, *Proc. zool. Soc. Lond.*, p. 26. (*Type loc.*—N. China).

*Expanse* : Male, 30 mm ; female, 32 mm.

*Distribution* : India (Assam ; Andamans) ; Burma ; N. China.

*Remarks* : The material of this species was neither collected by survey parties of Z. S. I., nor the species is represented in the collections of Z. S. I., so that the species was not available for study. The species has been characterised (*vide* Hampson, 1900) by the presence of secondary sexual characters on fore wing ; head, thorax and fore wing being fuscous, the latter with an ochreous fascia below costa ; vertex of head orange-yellow. Hind wing ochreous, suffused with fuscous, except on inner area. The female differs from male, in being much paler, with the hind wing yellow. The venation is quite variable.

## Genus **Pachycerosia** Hampson

1900. *Pachycerosia* Hampson, *Cat. Lep. Phal.*, **2** : 270.

*Type species* : *P. bipuncta* Hampson (1900)

*Remarks* : Only one species, viz. *P. bipuncta* is hitherto known from Indian region, particularly the Andamans. The genus *Pachycerosia*

Hampson differs from all the preceding genera due to presence of vein $M_2$ in fore wing and due to this character itself all the following genera form one group distinct from the preceding one of four genera. However, it is more closer to *Eugoa* and *Hemonia* due to absence of vein $M_2$ in hind wing, than the remaining four genera viz., *Cyana*, *Asura*, *Miltochrista* and *Trischalis* where $M_2$ in hind wing is present.

Besides, the genus *Pachycerosia* has been characterised by the antennae being laminate and serrate ; proboscis well developed ; labial palpi upturned, reaching vertex of head ; tibial spurs long. Fore wing with the veins $R_1$, $R_2$ arising free ; $R_3$-$R_5$ stalked, $R_5$ closer to apex than to the cell angle. Hind wing with Rs-$M_1$ and $M_3$-$Cu_{1a}$ stalked (*vide* Hampson, 1900).

Only one species has been recorded from Andaman as hereunder.

### 19. **Pachycerosia bipuncta** Hampson

1900. *Pachycerosia bipuncta* Hampson, *Cat. Lep. Phal.*, **2** : 270 (*Type loc.*— Andamans)

*Expanse* : 18 mm.

*Distribution* : India : Andamans.

*Remarks* : No material of this species was available for study.

## Genus **Eugoa** Walker

1857. *Eugoa* Walker, *List Lep. Het. Br. Mus.*, **12** : 768.

*Type species* : *Eugoa aequalis* Walker (1857)

*Remarks* : Strand (1922) recorded 35 species under the genus from the world, with only three from the Indian mainland, particularly Sikkim, Assam and Nilgiris. Recently another species, *E. vagigutta* (Walker), was recorded from India, Gt. Nicobar Island, for the first time (*vide* Arora & Singh, 1975), thus bringing the total to four from Indian region. The reported occurrence of the genus from Gt. Nicobar Is., is of zoo-geographical interest because of its hitherto report from Borneo and Sarawak.

The genus differs from the preceding one by the tibial spurs being moderate ; vein $R_1$ anastomosing with Sc ; $R_3$-$R_4$ and $R_5$-$M_1$ stalked ; $M_2$-$M_3$ stalked.

Only one species is dealt with as hereunder.

### 20. **Eugoa vagigutta** (Walker)

(Fig. 4F)

1862. *Lyclene vagigutta* Walker, *J. Linn. Soc. Zool.*, **6** : 116. (*Type loc.*—Sarawak)

*Material examined* : India : Gt. Nicobar Is. ; Galathea Bay, 1 ♀, 28.iii.1966, Casuarina Bay, 1 ♀, 18.iv.1966 (*Daniel & Bhowmik* coll.).

*Expanse* : 19 mm.

*Distribution* : India (Gt. Nicobar Is.) ; Indonesia (Borneo) and Malaysia (Sarawak).

*Remarks* : Arora & Singh (1975) while reporting the species from India, particularly the Gt. Nicobar Is., described for the first time the salient features of female specimen, thus differentiating it from that of male. The female is, thus, differentiated by the fore wing being without black on the costal edge towards base and the subbasal spots on costa and in cell being absent ; the antemedial series of four spot continuing below the cell as a weak striation upto the inner margin. Hind wing brownish ochreous ; frenulum comprised of three spines. Besides, the female genitalia was also studied (Fig. 4F) and, like *Garudinia simulana*, is quite short. However, it differs in having the ostium bursae simple but chitinized ; ductus bursae lightly sclerotised ; corpus bursae short and baloon-shaped, with a long and narrow curved ribbon-like structure inside unlike in *simulana* where the walls on inner side are beset with sclerotised setae ; the corpus bursae just near the point of its junction with ductus bursae, is produced on one side and the duct enters as ductus spermathecus to open at the distal ovopore ; both the pairs of apodemes are extremely short, as in *simulana*.

## Genus **Hemonia** Walker

1863. *Hemonia* Walker, *List Lep. Het. Br. Mus.*, **28** : 425.

*Type species* : *Hemonia orbiferana* Walker (1863)

*Remarks* : The genus is represented by ten species, out of which only one, viz., *H. orbiferana* Walker, is reported to occur in India, particularly Sikkim, so that the present record of the genus from Andaman Islands is of zoogeographic interest in view of its distribution in Indonesian region.

One species, being recorded from Andaman Is., is dealt with hereunder.

### 21. **Hemonia** sp. (A) : **orbiferana** Walker group

(Plate II, fig. 8 ♀)

1863. *Hemonia orbiferana* Walker, *List Lep. Het. Br. Mus.*, **28** : 426 (*Type loc.*— Ceylon).

*Material examined.*—India : S. Andamans ; Humphrygunj, 1 ♀, 4. iii. 1964, (*B. S. Lamba* coll.).

*Expanse* : Female, 21 mm.

*Distribution* : India (Sikkim ; Andamans) ; Bhutan ; Sri Lanka ; Indo-China ; Indonesia (Borneo, Java and Sulawesi) and E. Malaysia (Sarawak).

*Remarks* : Hitherto known from Sikkim on the Indian mainland, the species is being recorded from these areas for the first time, and is of zoogeographical interest in view of its distribution in Indonesian and adjoining areas.

Besides characters as given in key, the species is characterised by the head, thorax and fore wings being purplish-fuscous.

An identified female specimen of *Hemonia orbiferana* Walker, with the locality data as "Colombo, -12.07", received (Plate II, fig 8) from B. M. (N. H.), agrees externally with the female available for study. Dr. Watson, however, believes (personal communication) that this species too forms a part of the complex of taxa occurring throughout Indo-Australian tropics, and needs revision.

## Genus **Trischalis** Hampson

1894. *Trischalis* Hampson, *Fauna Br. India*, Moths, **2** : 101.

*Type-species* : *Tospitis absconditana* Walker (1863)

*Remarks* : Strand (1922) recorded five species under this genus, including *absconditana* and *subaurana* occurring in India. The latter species is already known to occur in Andaman Is., and is also being recorded presently.

The genus *Trischalis* Hampson differs from all the preceding genera due to the presence of vein $M_2$, in both wings, and is stalked with $M_3$ ; and veins $R_3$-$R_4$, $R_5$-$M_1$ stalked in fore wings. Hampson (1900) has differentiated both the Indian species externally, i. e. by the whorl-shaped mark in fore wing being present in *subaurana* (Walker) and absent in *absconditana* (Walker).

The species from Andaman is dealt with hereunder.

### 22. **Trischalis subaurana** (Walker)

1863. *Tospitis subaurana* Walker, *List Lep. Het. Br. Mus.*, **28** : 432. (*Type loc.*— Sarawak).

*Material examined* : India : S. Andamans : Humphrygunj, 1 ♂, 1 ♀, 6, 18. iii. 1964 (*B. S. Lamba* coll.).

*Expanse* : Male, 21 mm. ; female, 19 mm.

*Distribution* : India (Andamans) ; Indonesia (Borneo) ; E. Malaysia (Sarawak) ; New Britain.

*Remarks* : The species is hitherto known by female only (*vide* Hampson, 1900), but presently is represented by an example each of male and female. The male agrees externally to female, except that the abdomen extends beyond the anal margin of hind wing and, in length, is as long as the hind wing, unlike in female where it is shorter than hind wing and hardly extends beyond its margin ; the whorl-shaped mark on fore wing is diffused and poorly marked in male than in female where it is well marked ; and the frenulum spine is single unlike two in female.

## Genus **Cyana** Walker

1854. *Cyana* Walker, *List Lep. Het. Br. Mus.*, 2 : 528.

*Type species* : *Cyana detrita* Walker (1854)

*Remarks* : Several generic names, with their respective types, have been cited by Hampson (1900) as synonyms, including the genus *Cyana* Walker, under *Chionaema* Herrich-Schäffer. Roepke (1944), following Neave (1939), believes that the correct year of publication of *Chionaema* Herr.-Sch. is 1855, and not 1850, whereas that of the genus *Cyana* being 1854, so that the latter genus has a priority over *Chionaema*, and has been followed in recent publication (Roeseler and Küppers, 1976).

About 150 species are hitherto known including 30 in India (*vide* Strand, 1922 and Daniel, 1952). Strand recorded four species from the areas of Andaman & Nicobar Is., viz., *amabilis* (Moore), *coccinea* (Moore), *guttifera* (Walker) and *selangorica* Hampson, thus omitting the areas of these islands, for *bianca* (Walker) and *subornata* Walker though the latter two species were recorded from these areas by Hampson (1894). The present study also reports the occurrence of *subornata* and *bianca*, thus confirming the earlier report (*vide* Hampson, 1894). Presently, one species has been added viz., *javanica sumatrensis* which is not only new to these areas but to India also.

Thus, the present study incorporates eight species from the areas of Andaman & Nicobar Is.

The genus *Cyana* is characterised by the antennae being simple in both sexes ; tibiae with spurs rather moderate ; abdomen covered with rough hair and not extending beyond hind wings. Fore wings long and narrow ; a fringe of hair from middle of costa on upperside and a lobe on underside in males, thus distorting the neuration ; veins $R_1$-$R_2$ arising from the cell ; $R_3$-$R_4$ usually absent in males ; $M_1$ either stalked with $R_5$, or from upper angle, or from below the upper angle of cell ; $M_2$-$M_3$ free or stalked. Hind wings with veins Rs-$M_1$ stalked ; $M_2$ obsolescent ; $M_3$-$Cu_{1a}$ on a long stalk, or rarely coincident.

The Andaman & Nicobar species are distinguishable by the following key characters adapted from Hampson (1900, 1914), Rothschild (1936) and Roepke (1944).

## Key to identification of **Cyana** species

1. Fore wing, in female, with veins $M_2$-$M_3$ stalked ; the male with the fringe on costa well developed, the lobe on underside large and single ; the spot at the end of cell red ... *amabilis* (Moore)

— Fore wing, in female, with veins $M_2$-$M_3$ not stalked ; the male fringe on costa either wanting or moderate to well developed, the lobe not single ... ... 2

2. Fore wing with the costal fringe moderate ; the underside lobe trifid ; the lines on fore- and hind wings yellow ... *guttifera* (Walker)

— Fore wing without or with well developed costal fringe ; the underside lobe single or bilobed ... ... 3

3. Fore wings with the underside lobe bifid, the inner part being large and elongate ; the costal fringe well developed ; the bands without black edges ... ... 4

— Fore wings with the underside lobe single ; the fringe of scales wanting ; the bands with or without black edges ... ... 5

4. Legs banded with orange. Abdomen orange, the ventral surface whitish ... *selangorica* (Hampson)

— Legs banded with black. Abdomen yellow, tinged with crimson towards extremity ... *javanica* (Butler)

| | | |
|---|---|---|
| 5. | Fore wings with the bands without black edges ; both sexes with three spots at the end of cell ; terminal band not dentate ... | *subornata* (Walker) |
| — | Fore wings with the antemedian and postmedian bands edged with black ; males with three and females with two or three spots at the end of cell ... ... | 6 |
| 6. | Fore wings whitish ; with the black edges at ante- and postmedian bands curved in both sexes ; male with the underside lobe large ; female with one or two spots at the end of cell ... | *bianca* (Walker) |
| — | Fore wings yellowish or whitish ; with the black edges of antemedian bands in both sexes and the postmedian in male curved, the postmedian black edges straight in female ... ... | 7 |
| 7. | Fore wings in male yellow, with scarlet bands ; female with two spots ... | *coccinea* (Moore) |
| — | Fore wings in male whitish, with scarlet bands ; female with three spots ... | *tripunctata* (Rothschild) |

## 23. **Cyana amabilis** (Moore)

(Plate II, figs. 9♂, 10♀ ; Fig. 5 A-E)

1877. *Bizone amabilis* Moore, *Proc. zool. Soc. Lond.* : 597, Plate 59, fig. 2♂ (*Type loc.*—S. Andamans, Port Blair).

*Material examined* : India : Great Nicobar Island ; Bank of Campbell Bay, 1♂, 3. iii. 1966, 1♂, 6. iii. 1966, 1♂, 16. iii. 1966 (all *Daniel & Bhowmik* coll.), Rest House, Campbell Bay, 1♂, 29. xii. 1975 (*D.N. Nandi* coll.). S. Andaman ; Port Blair, Haddo, Govt. Rest House, 1♂, 12. xii. 1972. Mid. Andaman ; Rangat Rest House, 1♂, 15. i. 1973 (all *K. S. Pradhan* and *G. S. Arora* coll.).

*Expanse* : Male, 19-23 mm ; female, 23 mm.

*Distribution* : India (Gt. Nicobar [new record] ; Car Nicobar ; Andamans) ; Thailand (Siam).

*Remarks* : Referable to the genus *Cyana*, the species hitherto had been known from the areas of Andamans and Car Nicobar only, till Arora and Singh (1975) reported briefly about it from Gt. Nicobar Islands, thus extending its distribution, which is of some zoo-geographical interest, for filling-up the gap between Andaman & C. Nicobar on one hand and Gt. Nicobar Is. on the other.

The species can be easily distinguished by the characters as given in the key, particularly by the veins $M_2$-$M_3$ being stalked in fore wing

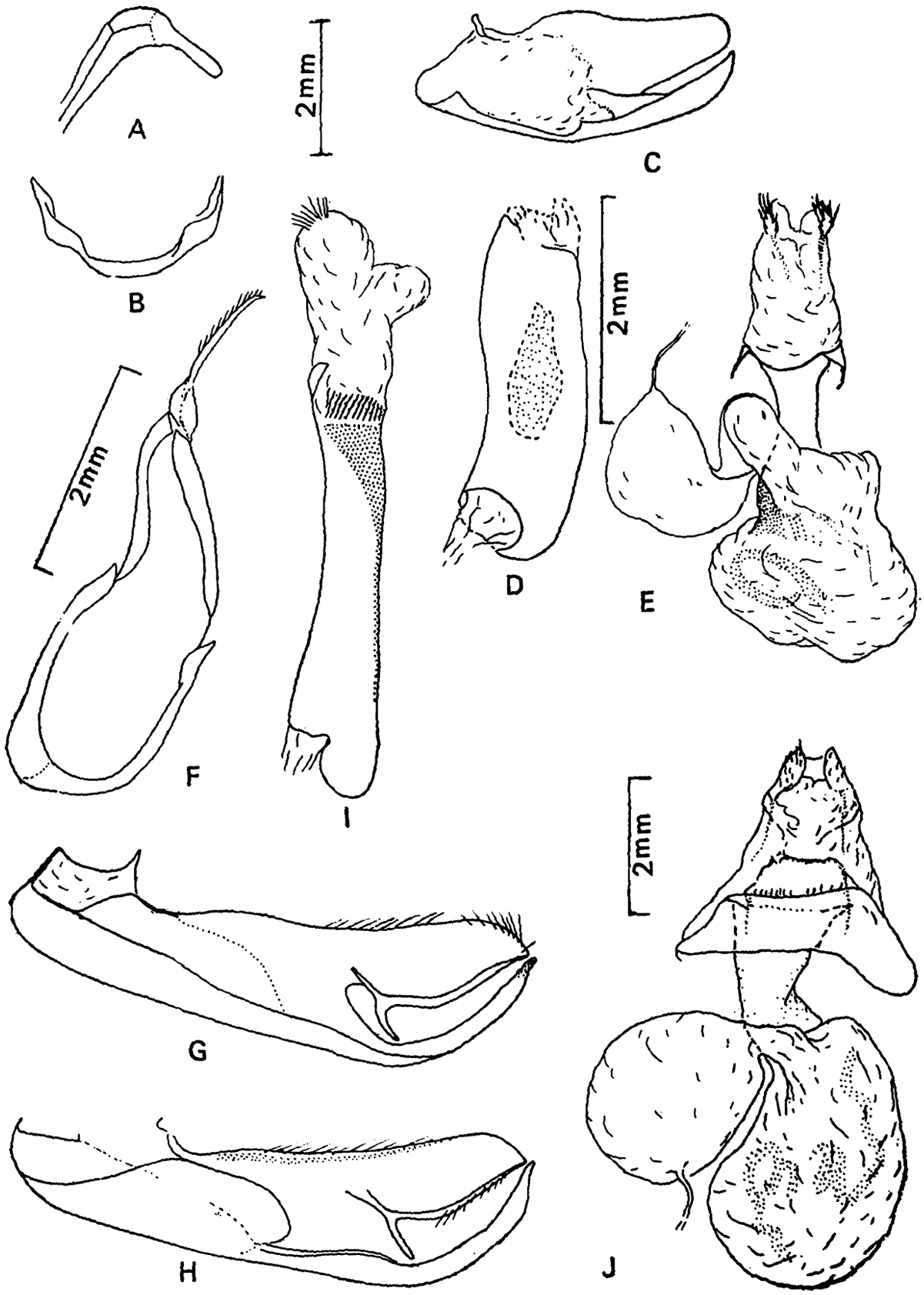


Figure 5 *Cyana amabilis*: A, uncus and part of tegumen; B, vinculum; C, inner view of right valva; D, aedeagus (All figures of same magnification); E, female genitalia. *Cyana javanica sumatrensis*: F, lateral view of male genitalia, without valvae; G, outer view of left valva; H, inner view of right valva; I, aedeagus with fully extended vesica (All figures of same magnification); J, female genitalia.

unlike in all the following species where these are free. Besides, the underside lobe is large and single, the bands on fore wings are scarlet and the subbasal bands are not reaching the inner margin. The male and female genitalic structures are rather simple and are figured here (*vide* Fig. 5A-E).

### 24. **Cyana guttifera** (Walker)

1856. *Bizone guttifera* Walker, *List Lep. Het. Br. Mus.*, **7** : 1779 (*Type loc.*—Landoor, N. E. Himalayas).

*Material examined* : India : S. Andamans, 2 ♀ ♀ (no other data : in old *N. Z. C.* at *Z. S. I.*).

*Expanse* : 32-34 mm.

*Distribution* : India : Sikkim ; Assam ; Himachal Pradesh, Kangra and Kulu ; Maharashtra, Bombay ; Kerala ; and S. Andamans.

*Remarks* : The species is differentiated from the preceding one by the veins $M_2$-$M_3$ in fore wing being free, this character being present in all the rest of the species (vide *supra*). However, it can be differentiated from all the following ones by the underside lobe being bifid. Besides, the lines on wings are yellowish unlike in all the other species dealt with here where these are either scarlet, orange-red or reddish.

### 25. **Cyana selangorica** (Hampson)

1903. *Chionaema selangorica* Hampson, *Ann. Mag. nat. Hist.*, (7) **11** : 346 (*Type loc.*—Selangor, Semangho, 2700′).

*Expanse* : 34 mm.

*Distribution* : India : Nicobar. Malaysia, Selangor.

*Remarks* : No material of this species was available for study. However, the species can be easily identified (*vide* Hampson, 1903, 1914), by the veins $M_2$-$M_3$ being free in fore wing ; the latter with the underside lobe bifid ; the bands orange and without black edges ; the legs banded with orange. Hind wing and underside of fore wings pale orange, tinged with pink.

Barlow's (1982) account on South East Asian Moths, does not include India in the distributional range of the species and places it close to *Cyana malayensis* Hampson. This species is having more ochreous markings than *malayensis*, with a tuft of pale ochreous hairs on each side of the third thoracic segment.

## 26. **Cyana javanica sumatrensis** (Druce)

(Plate, II, fig. 11♂; Fig. 5F-J)

1899. *Chionaema sumatrensis* Druce, *Ann. Mag. nat. Hist.*, **4** (7) : 200 (*Type loc.*— Pedang).

*Material examined* : India : Gt. Nicobar ; Campbell Bay, 1♂, 3.iii. 1966, 5♂♂, 9,11.iii.1966 ; Galathea Bay, 2♂♂, 1♀, 18,22.iii.1966 ; Phulbari, 1♂, 7.iv.1966 ; Alexander Riverbank, 1♂, 13.iv.1966 ; Appiah Bay, 1♂, 14.iv.1966 (all *Daniel & Bhowmik* coll.) ; Rest House camp, 5♂♂, 25, 27.xii.1975 (*D. N. Nandi* coll.). Car Nicobar ; Kamorta, 1♂, 28.iii.1970 (*B. K. Tikader* coll.).

*Expanse* : Male, 29-38 mm ; female, 36 mm.

*Distribution* : India (Great Nicobar) ; Burma ; Malaysia ; Indonesia.

*Remarks* : Arora and Singh (1975) briefly reported about its first record from India, particularly from Great Nicobar as "*Chionaema javanica sumatrensis* Eecke". It was in fact Eecke (1927) who for the first time erected *sumatrensis* as a new subspecies of *javanica*, at the same time synonymising "*Chionaema sumatrensis* Druce" with its subspecies. Roepke (1944) opines that "*sumatrensis* Eecke" is not only a homonym of "*sumatrensis* Druce" but a synonym of the latter, and has been supported by the genitalic studies. Presently, the material available for study has been examined for genitalic structures and the comparison with those given by Roepke (1944) leave no doubt that the material belongs to this species and thus constitutes a new distributional record from India (Gt. Nicobar).

Besides the genitalic structures (*vide* Fig. 5F-J), the subspecies is characterised by the complete absence of black edges to scarlet bands on fore wings ; the spots are also scarlet on fore wings, and are two in male and one in female.

## 27. **Cyana subornata** (Walker)

1854. *Bizone subornata* Walker, *List Lep. Het. Br. Mus.*, **2** : 550-551 (*Type loc.*— Ceylon).

*Material examined* : India : S. Andaman ; Wrafter's Creak, Baratang, 1♀, 16.iii.1964 (*B. S. Lamba coll.*).

*Expanse* : 29 mm.

*Distribution* : India (Maharashtra, Bombay ; Rajasthan, Khandala ; Karnataka, N. Canara ; Andaman Is.) ; Sri Lanka ; and Indonesia.

*Remarks* : Though the species has been reported from Andamans by Hampson (1894), there was no mention about it in the distribution

range of the species as given by Hampson (1900) and Strand (1922). The present report of a single female from S. Andamans confirms the earlier report of Hampson (1894).

The species is much smaller in expanse as compared to the recorded expanse of 36 mm. (*vide* Hampson, 1903) and is characterised by the presence of one spot on fore wings in both sexes.

### 28. **Cyana bianca** (Walker)

(Plate II, fig. 12 ♂)

1856. *Bizone bianca* Walker, *List Lep. Het. Br. Mus.*, **7** : 1684 (*Type loc.*— 'Hindostan').

*Material examined* : India : Middle Andaman ; Rangat Rest House, 1 ♂, 7.i.1973 (*K. S. Pradhan* and *G. S. Arora* coll.).

*Expanse* : Male, 28 mm. ; female, 44 mm.

*Distribution* : India (Sikkim ; Assam ; Andamans) ; Burma ; Malaysia.

*Remarks* : The distribution range of the species as recorded by Hampson (1900) and Strand (1922) shows that the areas of Andamans have been omitted inspite of the fact that Cotes and Swinhoe (1887) and Hampson (1894) reported from these areas. The present study, based on a single male confirms earlier records.

The species is characterised by the presence of sinuous black edges to ante- and postmedian bands on fore wings in both sexes, which clearly separate it from the following two species, viz. *coccinea* and *tripunctata* where the postmedian black edge is nearly straight ; and the scarlet bands expand below costa and below the middle at the inner area.

### 29. **Cyana coccinea** (Moore)

(Plate II, fig. 13 ♀)

1878. *Bizone coccinea* Moore, *Proc. zool. Soc. Lond.* : 28, Pl. III, fig. 14 (*Type loc.*— Sikkim).

*Material examined* : India : S. Andamans ; Bamboo flat, Hope Town 1 ♀, 18.xii.1972 (*K. S. Pradhan* and *G. S. Arora* coll.).

*Expanse* : Male, 36 mm ; female, 34-40 mm.

*Distribution* : India (Sikkim ; Andamans) ; Burma.

*Remarks* : The species can easily be distinguished (*vide* Hampson, 1900) by the nearly straight black edge to the postmedian band in fore

wings, in females, which are with two black spots ; fore wings in males, are yellowish unlike in its closely allied preceding species, *bianca*, where these are whitish.

### 30. **Cyana tripunctata** (Rothschild)

1936. *Chionaema tripunctata* Rothschild, *Ann. Mag. nat. Hist.*, (10) **17** : 487 (*Type loc.*—Andamans, Aberdeen).

*Material examined* : India : S. Andamans, 3 ♀ ♀ [no other data, in *N. Z. C.* at *Z. S. I.*]

*Expanse* : Female, 39-42 mm.

*Distribution* : India : S. Andaman, Aberdeen.

*Remarks* : The species has not been collected recently by the Z. S. I. survey parties. However, the old collections present in the Zoological Survey have three specimens of female, lying misidentified as "*Chionaema bianca* (Walker)". This material on the basis of external characters (*vide* Hampson, 1900 and Rothschild, 1936) does not belong to *bianca* but to *tripunctata*, particularly because of nearly straight black edges to postmedian band on fore wing, and the latter with three black spots, unlike two in *coccinea* and one to two in *bianca*.

## Genus **Asura** Walker

1854. *Asura* Walker, *List Lep. Het. Br. Mus.*, **2** : 484.

*Type species* : *Asura cervicalis* Walker (1854).

*Remarks* : Strand (1922) recorded as many as 195 species under this genus, to which one more new species from Western Asia was added by Daniel (1952). However, only 42 species are hitherto known from India, including three species only from the areas of Andaman Is., i.e. *andamana* (Moore), *phantasma* Hampson and *toxodes* Hampson.

The genus is characterised mainly by the following features : Antennae bipectinate with rami long in male and short in female or short in male and ciliate in female or simple and ciliate in both sexes ; labial palpi slender and porrect, not reaching beyond the hairy frons. Legs with the tibial spurs short. Fore wings usually yellowish-white, orange-red or greyish-brown ; the vein $R_1$ anastomosing with Sc ; $R_2$ arising free ; $R_3$, $R_4$, $R_5$ stalked ; $M_1$ from below the upper angle of cell ; $M_2$ from above the lower angle ; $M_3$ from angle ; $Cu_{1a}$ from from before the angle ; $Cu_{1b}$ from the middle of cell. Hind wings pale ochreous or yellowish ; with veins Rs-$M_1$ stalked ; $M_2$ from above the lower angle, from angle or stalked with $M_3$ ; $Cu_{1a}$-$Cu_{1b}$ as in fore wing.

All the three species from Andamans fall under the category (*vide* Hampson 1900, 1914) of species with antennae simple and ciliate in both sexes, and are distinguishable by the following key.

## Key to identification of **Asura** species

1. Fore wing with postmedian line, the line not strongly curved beyond the cell and confluent with median line at costa and inner margin. Hind wing semi-hyaline ochreous ... *toxodes* Hampson

— Fore wing with postmedian series of spots or streaks and separated from medial line ... ... 2

2. The postmedian series of spots strongly bent outwards below costa and incurved below $Cu_1a$, those on veins $M_1$ and $M_3$ extending more towards termen ; a terminal series of spots conjoined into a line and extending to costa before apex ... *andamana* (Moore)

— The postmedian series of spots often obsolete, those on veins $M_1$ and $M_3$ close to termen ; the terminal areas with one or two spots on termen ... *phantasma* Hampson

### 31. **Asura toxodes** Hampson

1907. *Asura toxodes*. Hampson, *Ann. Mag. nat. Hist.*, (7) **19** : 233 (*Type loc.*— Andamans).

*Expanse* : 24 mm.

*Distribution* : India ; Andamans.

*Remarks* : No material of this species was available for study. However, it differs from the other two species, viz. *andamana* and *phantasma* by the presence of a curved postmedian line (*vs.* postmedian series of spots) (*vide* Hampson, 1907, 1914).

### 32. **Asura andamana** (Moore)

1877. *Sesapa andamana* Moore, *Proc. zool. Soc. Lond.* : 597 (*Type loc.*—Port Blair, Andamans).

*Material examined* : India : S. Andamans ; 3 ♂♂, 4 ♀♀ (no other data, in old colln. *Z. S. I.*).

*Expanse* : Male, 17-18 mm. ; female, 17-20 mm.

*Distribution* : India : Andaman Is.

*Remarks* : The species like the following *A. phantasma* is characterised by the presence of series of postmedian spots on fore wing (*vide*

Hampson, 1907, 1914) but is distinguishable by the labial palpi, antennae, spots on vertex of head, tegulae, patagia, thorax, fore tibiae and tarsi being blackish (*vs.* fuscous in *phantasma*).

### 33. **Asura phantasma** Hampson

1907. *Asura phantasma* Hampson, *Ann. Mag. nat. Hist.*, (7) **19** : 233 (*Type loc.*— Andamans).

*Expanse* : 18 mm.

*Distribution* : India ; Andamans.

*Remarks* : See *A. andamana* (Moore).

## Genus **Miltochrista** Hübner

1876. *Miltochrista* Hübner, *Verz. bek. Schmett.*, p. 166.

*Type species* : *Noctua rubicunda* Denis & Schiffermüller (1775) (=*Phalaena miniata* Forster, 1771).

*Remarks* : Strand (1922) recorded 90 species under this genus from the world. Later, Reich (1937) added three species. Daniel (1951, 1952) while dealing with East-Asian Arctiidae referred to 27 species under this genus, revived subgenus *Barsine* Walker and referred to only four Indian species, i.e., *gratiosa* (Guérin-Méneville), *delicia* (Swinhoe), *perpallida* Hampson and *spilosomoides* (Moore). Of these, only *gratiosa* is hitherto known to occur in Andamans. The genus is also represented from Andamans by *M. exclusa* (Butler). Besides, a new species from Great Nicobar Is., *Miltochrista danieli* is being described under this genus. The discovery of a new species in Great Nicobar Is. is of zoogeographical interest, as it is the first report of the genus from as far as Great Nicobar Is. and fills the gap of distribution between Andaman Is. and Indonesian countries.

The three species, including a new species, are differentiated by the following key.

### Key to identification of **Miltochrista** species

1. Fore wings with streaks in interspaces ; the cilia not black ; hind wing pale crimson, without any markings or bands on terminal area ... *gratiosa* (Guérin-Mén.)

   Fore wings without streaks ; cilia black ; hind wing pale yellowish, with or without terminal band ... ... 2

2. Fore wings pale crimson ; hind wings without terminal band ; abdomen fuscous, with the tip paler ... *exclusa* (Butler)

— Fore wings orange red ; hind wings with broad terminal band ; abdomen dark fuscous, with the tip orange or pale crimson ... *danieli*, sp. nov.

## 34. **Miltochrista gratiosa** (Guérin-Méneville)

1843. *Euchelia gratiosa* Guérin-Méneville, *In* : Deless., *Souv. Inde*, **2** : 90, pl. 26, fig. 1 (*Type loc.*—Nilgiris).

*Expanse* : 34-46 mm.

*Distribution* : India (Sikkim ; Assam, Cachar ; Tamil Nadu, Nilgiris ; N. W. Himalayas ; Himachal Pradesh, Dharamsala ; Andamans) ; Indonesia, Java ; Borneo ; Sri Lanka ; Burma ; Japan ; and China.

*Remarks* : The material of this species from Andamans was not available for study. However, the species can be distinguished by the characters as given in key, from the following two species.

## 35. **Miltochrista exclusa** (Butler)

1877. *Barsine exclusa* Butler, *Trans. ent. Soc. Lond.* : 240 (*Type loc.*—Sarawak).

*Material examined* : India : Andamans ; Mt. Harriet Range, Wright Myo, 3 ♀ ♀, 29.iii.1964, Mannerghat, 1 ♂, 31.iii.1964 (all *B. S. Lamba* coll.).

*Expanse* : Male, 23 mm ; female, 27 mm.

*Distribution* : India (Andamans) ; Indonesia (Java and Borneo) and E. Malaysia (Sarawak).

*Remarks* : The specimens are slightly smaller in expanse being 23 mm, in male, as compared to lowest recorded expanse of 26 mm (*vide* Hampson 1894). Bulter (1877) observed that the species was most nearly allied to "*Barsine trivittata* Moore (1877)", from Andamans, which has now been synonymised to *exclusa* (*vide* Strand, 1922).

## 36. **Miltochrista danieli**, sp. nov.*

(Plate II, fig. 14 ♀ ; Fig. 6A-H)

*Female* : Head with the frons, labial palpi, vertex and thorax orange red ; antennae dark brown throughout except a few basal segments which are orange red. Abdomen mainly fuscous, with the anal tuft

* Named after Dr A. Daniel, Joint Director, Zoological Survey of India, and senior-most among the collectors of this species from Great Nicobar Is.

orange red. Fore wings orange red ; costa black throughout, continued with the black outer margin and the cilia, upto termen ; traces of basal points may be present ; cross bands black and well developed ; the antemedial from costa excurved in cell and prominent in the upper half of wing, becoming obsolete and incurved below the cell and not reaching the inner margin ; medial line excurved from costa and cubito-median nervure, but incurved in cell and the inner area and ending obliquely on inner margin ; postmedial arising from a little beyond middle of costa, strongly excurved upto the vein $M_1$, then incurved and ending at the inner margin, the area beyond the post-medial line occupied by a large patch, the outer border of which being irregular and projecting outwards, the one on vein $R_{3+4}$ reaching the preapical area of costa and another on vein $M_3$ reaching terminal margin, the third projection on vein $M_1$ does not reach the margin but ends half way in the subterminal area ; the terminal margin and the cilia black. Hind wings yellowish, with slight orange tinge throughout except from the subterminal area to terminal margin, which is fuscous. Underside fore wing as on upperside except for the absence of antemedial and medial bands ; the postmedial band broad and diffused, extending from beyond middle of costa to a little before apex, the projection at vein $M_3$ reaching the terminal margin. Legs mainly orange red.

*Male* : The male differs from the female in being paler in colouration ; the markings on wings being fainter ; and the abdomen being dark fuscous throughout and without orange-red anal tuft.

Head with the frons smooth ; labial palpi short and upturned, just reaching the frons. Antennae simple and ciliate in both sexes ; and about three-fourth, or slightly less than the forewing length ; the cilia prominent in male. Legs with a single pair of spurs in middle tibiae and two pairs in hind tibiae. Hind wing with a stout single frenulum spine in male, held by bar shaped recurved retinaculum.

*Venation* : Fore wing (Fig. 6A) : The vein $R_1$ arising from cell, curved and running close to the vein Sc near its middle but not anastomosing with it ; $R_2$ free from cell and arising from a place between the origin of $R_1$ and $R_3$-$R_5$ ; $R_3$, $R_4$, $R_5$ stalked, $R_5$ close to the apex of cell ; $M_1$ below the upper angle of cell ; $M_2$ from above the lower angle of cell ; $M_3$ from angle ; $Cu_{1a}$-$Cu_{1b}$ slightly behind the lower angle. Hind wing (Fig. 6B) with vein Sc arising from apical one-third of the cell ; Rs-$M_1$ stalked ; $M_2$-$M_3$ and $Cu_{1a}$-$Cu_{1b}$ as in fore wing.

*Genitalia* : *Male* (Fig. 6C-G) : Uncus long and narrow, gradually tapering apically, the tip pointed downwards ; tegumen broad specially

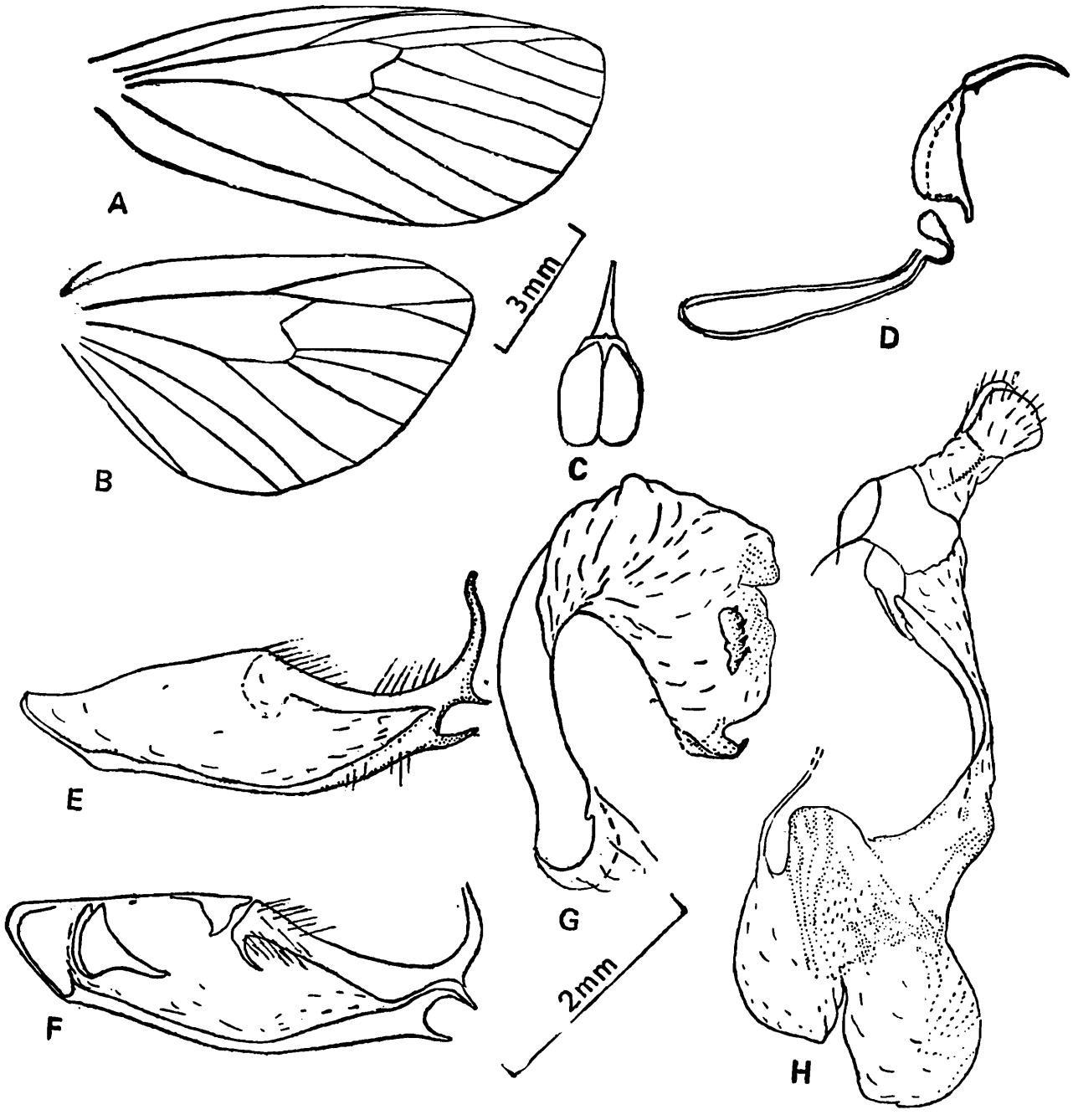


**Figure 6.** *Miltochrista danieli*, sp. nov. : A, fore wing venation ; B, hind wing venation (A-B of same magnification) ; C, anterior view of uncus and tegumen ; D, lateral view of male genitalia, without valvae ; E, outer view of left valva ; F, inner view of right valva ; G, aedeagus, with fully extended vesica (All genitalia figures of same magnification) ; H, female genitalia.

from beyond middle- downwards ; vinculum slightly broad at the beginning, but narrowed abruptly throughout into a long 'U' shape, without forming a distinct saccus. Valva broadest in the middle, about three times as long as its maximum width ; the dorsal margin produced into basal process turned distad and an apical process turned upwards and backwards ; the ventral margin also produced apically into two projections ; juxta simple, narrowing apically. Aedeagus short and broad,

with the apical part of vesica membranous and, when extracted out, shows two well formed sclerotised patches.

*Female* (Fig. 6H) : Ostium bursa unsclerotised ; ductus bursa partly sclerotised specially on the upper part, but completely sclerotised at its lower part which enters into the bursa copulatrix ; while upto some area the sclerotisation continued particularly in the upper part, the lower part of bursa copulatrix is more or less membranous ; ductus spermatheca arises from corpus bursae and enters into the genital tube ; papila anales broader and simple ; with the anterior and posterior apodemes short and slender.

*Holotype* : Female : INDIA ; Great Nicobar, Campbell Bay, 27.xii. 1975 (*D. N. Nandi* coll.). *Allotype.- Male* : INDIA ; Great Nicobar, Campbell Bay Rest House, 29.xii. 1975 (*D. N. Nandi* coll.). (Regd. Nos. 3344/$H_{10}$ and 3345/$H_{10}$).

*Paratypes* : 5♂♂, 3♀♀ as Follows : INDIA ; Gt. Nicobar, Campbell Bay, 1 ♀, 1. iii. 1966, Bank of Campbell Bay, 1♂, 3. iii. 1966, Dogma Riverbank, 1♂, 11. iv. 1966, Alexandar Riverbank, 1♂, 11. iv. 1966, Campbell Bay, 1♂, 13. iv. 1966, Casuarina Bay, 1♂, 18.iv. 1966 (all *Daniel* & *Bhowmik* coll.), Campbell Bay Rest House, 2♀♀, 26. xii. 1975 (*D. N. Nandi* coll.) (all collected at light). (Regd. Nos. 3346/$H_{10}$ to 3353/$H_{10}$. All deposited in *N. Z. C.* at *Z. S. I.*).

*Expanse* : Male, 19-25 mm ; female, 23-28 mm.

*Remarks* : *Miltochrista danieli*, sp. nov. comes very close to *Miltochrista lineata* (Walker) (from Philippines, Borneo and Sulawesi, type locality, Sumatra) in the hind wing being yellow with a terminal fuscous band, but differs due to the presence of a well marked patch conjoined to the postmedial line in fore wing. Hampson (1900) although separates *M. lineata*, in the key characters, from other three species, viz, *M. sanguintincta*, *M. punicea* and *M. plumbilineata* on the basis of absence of medial line in fore wing (*vs* present in above-mentioned three species), he mentions about its presence in the text, so that the medial line appears to be present in all these species. *Miltochrista danieli*, sp. nov. also falls under the category with "medial line present". However, it differs from all other species in the general colour being predominently orange-red in fore wing (*vs* orange in other species).

The specimens available for study and described as a new species have been compared with the male and female (Type) colour transparency-slides of *M. lineata*, (Plate III, figs. 3, 4), received from B. M. (N. H.), and differ as mentioned above.

## III. SUMMARY

The paper deals with 36 species in 15 genera distributed over four subfamilies of Arctiidae.

Besides being the first exclusive report of Arctiidae from Andaman and Nicobar group of Islands, it brings to light some new distributional records from India as a whole and others as new from Andaman & Nicobar Is. in particular. Mention may be made of *Nyctemera (Coleta) coleta* (Cramer) from Andaman & Nicobar Islands ; *Nyctemera latistriga* Walker from Great Nicobar Island ; **Nyctemera baulus baulus* Boisduval from India (Great Nicobar Island) ; **Garudinia simuiana* (Walker) from India (Great Nicobar Is.) ; **Eugoa vagigutta* (Walker) from India (Great Nicobar Island) ; *Hemonia orbiferana* Walker from Andamans ; **Cyana amabilis* (Moore) from Great Nicobar Island ; and **Cyana javanica sumatrensis* (Druce) from India (Great Nicobar Island). It also confirms the occurrence of three species i. e. *Argina astrea* (Drury), *Cyana subornata* (Walker) and *Cyana bianca* (Walker) in Andamans.

A new species is also described under the genus *Miltochrista* Hübner.

The genitalic studies have been made in several species. Particular mention may be made of the species *Nyctemera latistriga latistriga* Walker whose genitalia had been studied by Roepke (1949) but without sketches which are reported by Roepke to have been lost. His description has been reproduced to corroborate with the genitalic features now being presented in sketches.

Important diagnostic features, particularly in the genus *Utetheisa*, have been brought to focus for identification, both in keys as well as in the text keeping in view the studies made by Jordan (1939) ; Roepke (1941, 1949) ; and Bhattacherjee and Gupta (1969). The type material of new species erected by the last two authors out of *pulchella* complex, have been also studied. Although these do not occur in the areas of Andaman & Nicobar group of Islands, the study was useful in view of their involvement with species presently studied.

The keys to identification of genera as well as species have been adapted from Hampson (1894, 1900, 1901) ; Jordan (1939) ; Roepke (1941, 1949), etc. Where necessary, the keys have been modified based on actual observations.

## IV. ACKNOWLEDGEMENTS

The author is greatly indebted to Dr. B. K. Tikader, Director, Zoological Survey of India for permission to workout the collections

* Briefly reported earlier by Arora & Singh (1975).

of Arctiidae of Andaman & Nicobar group of Islands, and providing all the necessary facilities. Thanks are also due to Dr. O. B. Chhotani, Superintending Zoologist, Entomology Division and Dr. S. K. Ghosh, Officer-in-Charge, Lepidoptera Section for putting the whole of unnamed and the old named collection at my disposal for study and comparison, whenever required. Thanks are also due to the Photography Section for taking various photographs and providing facilities, particularly to Dr. R. K. Kacker for helping me in taking some microphotographs ; and Shri B. P. Mandal for typing this manuscript.

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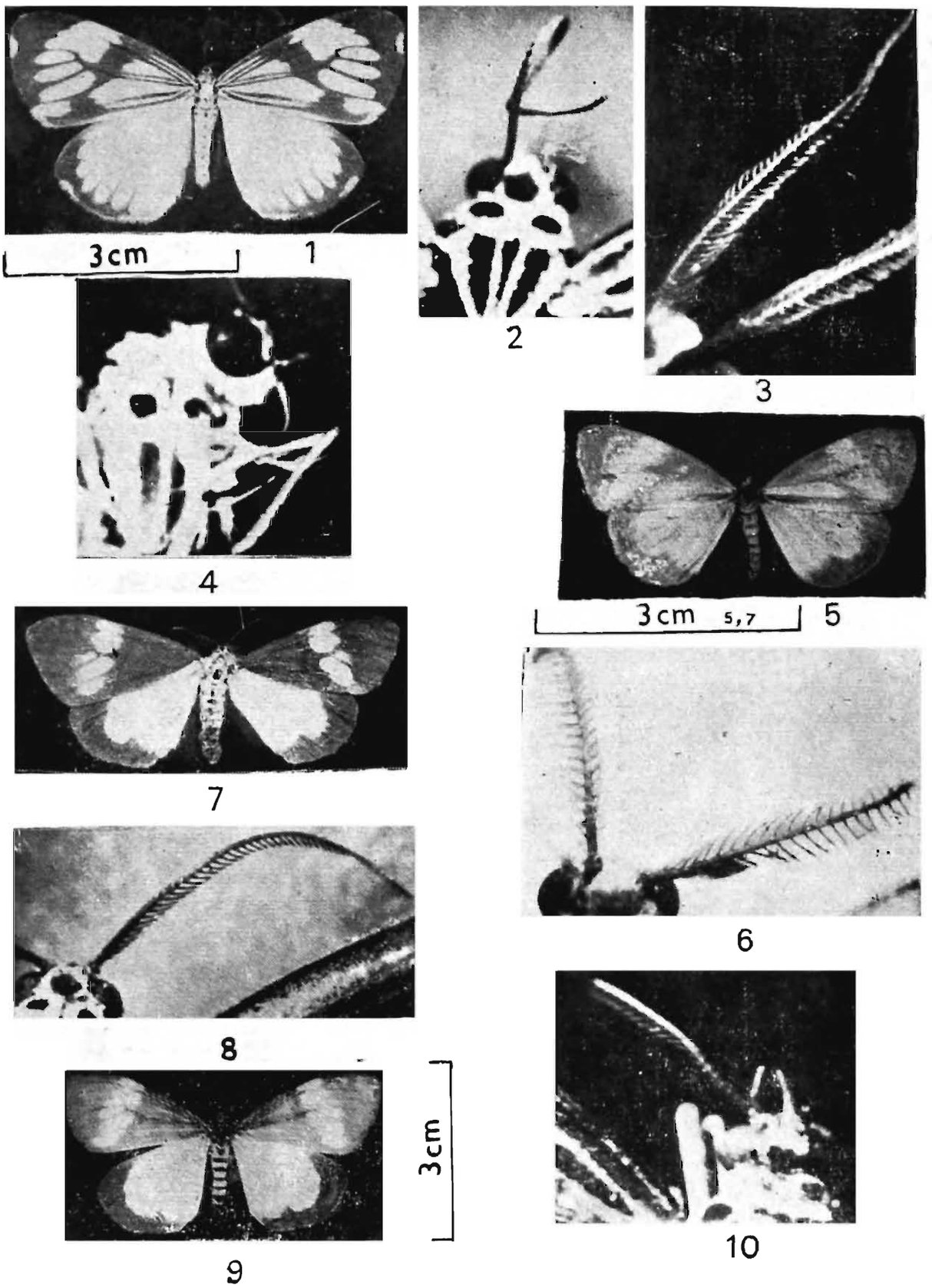
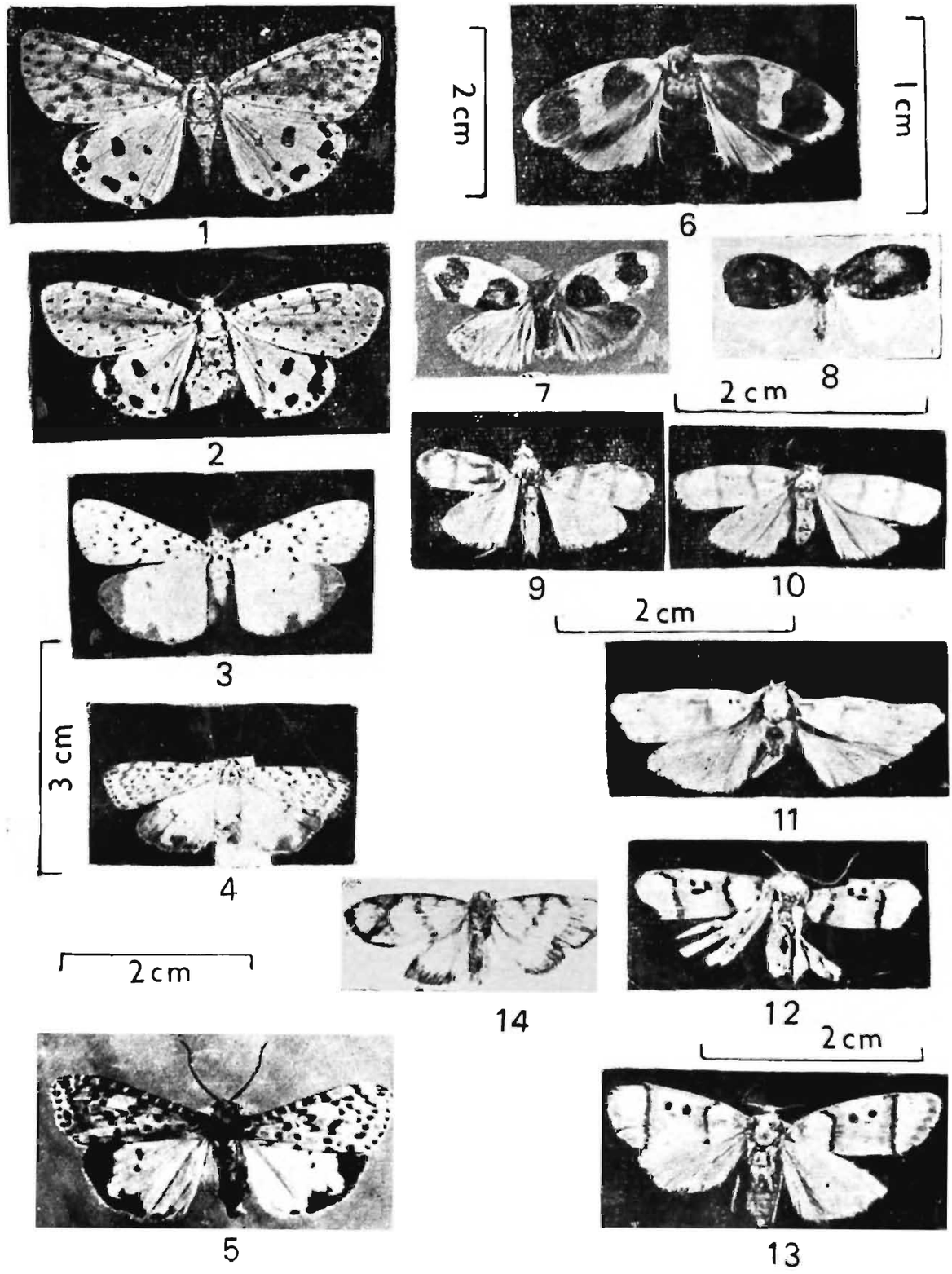
## VI. INDEX

[Valid names of species and genera are printed in italics ; names printed in roman type have been either synonymised, or have changed generic assignment. The page number indicated against each taxon lead to main reference and description].




1. *Nyctemera* (*Coleta*) *coleta* (Cramer) : Female. 2. *Nyctemera* (*Coleta*) *coleta* (Cramer) : A part of the enlarged head of female at No. 1 above showing antenna and thorax. 3. *Nyctemera* (*Coleta*) *coleta* (Cramer) : A part of the head of the male showing antennal pectination. 4. *Nyctemera* (*Coleta*) *coleta* (Cramer) : Latero-ventral view of male showing tuft of hair on fore tibia. 5. *Nyctemera latistriga* Walker : Male. 6. *Nyctemera latistriga* Walker : Head of the female showing antennal pectination. 7. *Nyctemera lacticinia* (Cramer) : Female. 8. *Nyctemera lacticinia* (Cramer) : A part of the head of female at No. 7 above showing antennal pectination. 9. *Nyctemera baulus baulus* (Boisduval) : Female. 10. *Nyctemera baulus baulus* (Boisduval) : A part of head of female at No. 9 above showing part antenna.




1. *Argina astrea* (Drury) : Male. 2. *A. astrea* (Drury) : Female. 3. *Utetheisa lotrix* (Cramer) : Male. 4. *U. pulchelloides* Hampson : Female. 5. *U. pulchelloides* Hampson : Male. (Received from B.M. (N.H.) London). 6. *Garudinia simulana* (Walker) : Female. 7. *G. simulana* (Walker) : Female. (Received from B.M. (N.H.) London). 8. *Hemonia orbiferana* Walker : Female. (Received from B.M. (N.H.), London). 9. *Cyana amabilis* (Moore) : Male. 10. *C. amabilis* (Moore) : Female. 11. *C. javanica sumatrensis* (Druce) : Male. 12. *C. bianca* (Walker) : Male. 13. *C. coccinea* (Moore) : Female. 14. *Miltochrista danieli* sp. nov. : Female.

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1. *Nyctemera selecta* Walker
2. *Utetheisa lotrix* (Cramer) : Male (Type)
3. *Miltochrista lineata* (Walker) : Male
4. *Miltochrista lineata* (Walker) : Female (Type)

*(Reproduced from colour transparency slides received from B.M. (N.H.), London : Courtesy Dr. A. Watson.)*