



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

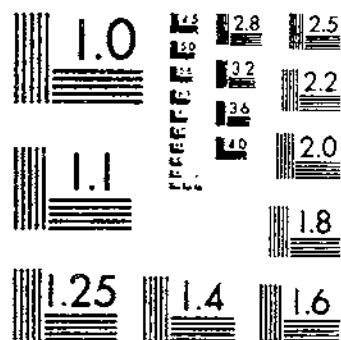
Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

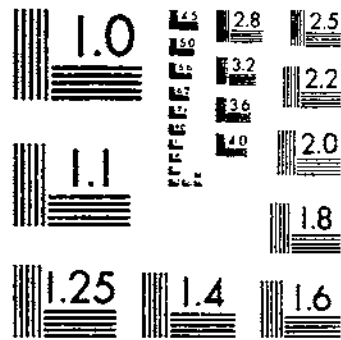
*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

TE 1489 (1974) USDA TECHNICAL BULLETINS UPDATA
THE ORIENTAL SPECIES OF THE TRIBE HAEMATOPOTINI (DIPTERA: TABANIDAE)
STONE, A. PHILIP, D. C. B. 1 OF 3

START



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

**The Oriental Species
of the Tribe Haematopotini
(Diptera, Tabanidae)**

By Alan Stone and Cornelius B. Philip

Technical Bulletin No. 1489

**Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE**

Washington, D.C.

Issued August 1974

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402 — Price \$2.05

Stock Number 0100-03205

Contents

	Page
Acknowledgments	2
Distributional list of Oriental Haematopotini	4
Explanation of characters	6
Key to Oriental species of Haematopotini	8
Tribe Haematopotini	27
Genus <i>Hippocentroides</i> Philip	28
Descriptions of <i>Hippocentroides</i> species	28
Genus <i>Haematopota</i> Meigen	30
Descriptions of <i>Haematopota</i> species	30
Nomina dubia	200
Nomina nuda	201
Literature cited	202
Index to names	207

The Oriental Species of the Tribe Haematopotini (Diptera, Tabanidae)

By ALAN STONE,¹ formerly Systematic Entomology Laboratory, Entomology Research Division, Agricultural Research Service, and CORNELIUS B. PHILIP, California Academy of Sciences

While on a visit to the British Museum in 1955, the senior author attempted to determine several Oriental *Haematopota* species with notable lack of success. Since then the junior author has described several species from the Malayan subregion and the Philippines. Still much of the undetermined material in the U.S. National Museum remained unnamed. What started out as a paper to describe these species burgeoned into a revision of the entire tribe Haematopotini for the Orient when large quantities of specimens were found in several collections available for study. The source of this material is given in the acknowledgments, which follow. As the junior author was well versed in the Tabanidae of the Orient and also had unnamed material, he was invited to participate in this project and this bulletin is the result.

The tribe Haematopotini in the Orient consists of two genera, *Hippocentrotodes* Philip and *Haematopota* Meigen. The former is confined to Nepal and northern India; the latter is a very large genus, particularly in the tropics of Africa and Asia. Apparently the only Australasian record is a stray individual of *Haematopota irrorata* from Papua. The genus is well represented in the Palaearctic Region and there are five North American species, ranging from Alaska to New Mexico and Florida, but most of the Nearctic species are rare in collections except *Haematopota americana* Osten Sacken. No species so far have been recognized as Holarctic. This paucity of Nearctic species suggests a relatively recent derivation from Eurasian ancestry. The Palaearctic species have been keyed by Leclercq (1966),² the Ethiopian by Oldroyd (1952), and

¹ Retired Dec. 31, 1971.

² The year in italic after the author's name indicates the reference in Literature Cited, p. 202.

the Oriental species by Ricardo (1911). There are more restricted Oriental keys by Schuurmans Stekhoven (1926) and Philip (1959, 1960b).

The region covered in this study comprises that included in the catalog of Oriental Diptera being prepared by D. E. Hardy and M. D. Delfinado in Hawaii. It extends from Pakistan across northern India and Nepal to the Provinces of Yunnan, southern Kweichow, and Hunan to Shanghai on the north. The southern boundary runs from Ceylon to Timor and the eastern boundary from Timor north through the Celebes, Philippines, Hainan, and Taiwan to the Ryukyus. The fauna in this region includes 2 species of *Hippocentroides* and 160 valid species of *Haematopota*, 81 of which are newly described here, 16 synonymous or probably synonymous names, 5 nomina dubia, 1 new name, and 2 nomina nuda. One or both of us have seen the type or syntype specimens of 65 of the previously described nominal taxa and the paratypes of several of the others.

We have not attempted to subdivide the genus into species groups as was done for the Ethiopian fauna by Oldroyd (1952). This might be possible, but finding characters that would clearly define such groups was difficult. For convenience, we have arranged the descriptions of the species alphabetically, but the figures (placed at the back of the bulletin) have been arranged more or less as they appear in the key so that similar species can be compared more readily.

In the Orient, *Haematopota* may be extremely abundant and annoying, particularly to livestock. Although there is no direct evidence of disease transmission by flies of this genus, where feeding is interrupted by the host's activities, mechanical transmission of surra, the trypanosome disease of cattle, horses, and other mammals, most probably would occur. Anthony (1962) published a chart of the Tabanidae reported as vectors of surra. Biological studies of this genus are greatly needed. Many Oriental species are still undescribed, and as further collecting is done, it is hoped this review will aid in their detection.

Acknowledgments

This study would have been impossible without the valuable assistance of many people.

In April 1971 the senior author visited the British Museum (Natural History), the Zoological Museum, Amsterdam University, and the State Museum of Natural History, Leiden, and was given excellent facilities for studying their important collections.

Brother Theowald at Amsterdam and P. J. van Helsdingen at Leiden made visits to these places both profitable and pleasant. Some notes on pertinent material at these institutions had been made previously by the junior author before this study was contemplated. Harold Oldroyd of the British Museum was extremely helpful throughout this study, providing both specimens and notes that permitted preparation of a well-developed key to the species before visiting these museums.

A. Kaltenbach (NMW),³ Pedro Wygodzinsky (AMNH), and Harold Oldroyd (BM) loaned type specimens or provided comparative notes on them.

Unusually large quantities of material were obtained from several sources. We are particularly grateful to J. J. S. Burton (CU) for loaning the *Haematopota* from his extensive collecting in Thailand in connection with his graduate work. The field trip to Thailand was financed by the National Geographic Society, Washington, D.C., and Geigy Agricultural Chemicals, Division of Geigy Chemical Corporation, Ardsley, N.Y. Other large collections were loaned by L. L. Pechuman (CU), J. L. Gressitt (BBM), Marcel Leclercq (LZG), Harold Oldroyd (BM), Saul Frommer (Univ. of Calif., Riverside), and H. J. Teskey (CNC). Less extensive but valuable collections came from F. Grenier (PIP), J. L. Laf-foon (Iowa Sta. Univ.), H. E. Evans (MCZ), H. V. Weems, Jr. (FSCA), P. I. Persson (SM), Josef Moucha (Narodni Muz., Prague), Hugo Andersson (ZIL), L. Tsacas (MNHP), and S. Somadikarta (MZB).

Laura Gupta, Systematic Entomology Laboratory, prepared a few of the drawings. Linda Heath, also of this Laboratory, drew most of the heads and prepared the plates.

Specimens for this study came from the following museums, institutions, and collections. The abbreviations used for these sources are as follows:

AM	Division of Entomology, Zoological Museum, Amsterdam University, Netherlands
AMNH	American Museum of Natural History, New York, U.S.A.
BBM	Bernice P. Bishop Museum, Honolulu, Hawaii, U.S.A.
BM	British Museum (Natural History), London, U.K.
CBP	Collection of Cornelius B. Philip, San Francisco, Calif., U.S.A.
CNC	Canadian National Collection, Ottawa, Canada
CU	Cornell University, Ithaca, N.Y., U.S.A.

³ For meaning of abbreviations, see following list.

FSCA	Florida State Collection of Arthropods, Gainesville, Fla., U.S.A.
HAMM	Hamburg Museum, Hamburg, Germany
IM	Zoological Survey of India, Indian Museum, Calcutta, India
LM	State Museum of Natural History, Leiden, Netherlands
LU	Location unknown
LZG	Laboratoire de Zoologie de la Faculte des Sciences Agronomique, Gembloux, Belgium
MCG	Museo Civica Genova, Genova, Italy
MCZ	Museum of Comparative Zoology, Cambridge, Mass., U.S.A.
MNHP	Museum National d'Histoire Naturelle, Paris, France
MZB	Museum Zoologicum Borogiense, Bogor, Indonesia
NE	Not in existence
NMW	Naturhistorisches Museum, Vienna, Austria
PIF	Pasteur Institute, Paris, France
SM	Naturhistoriska Riksmuseet, Stockholm, Sweden
SSI	Shanghai Science Institute, Shanghai, China
UCR	University of California, Riverside, Calif., U.S.A.
USNM	National Museum of Natural History, Washington, D.C., U.S.A.
ZCBS	Zoological Collection, Bavarian State Museum, Muenchen, Germany
ZIL	Zoological Institute, Lund, Sweden
ZMC	Zoologisk Museum, Copenhagen, Denmark

In addition to these collections, specimens when available will be sent to the following places: Applied Scientific Research Corporation, Kasetsart University, and Thailand Ministry of Agriculture in Bangkok, Thailand; Commonwealth Scientific and Industrial Research Organization in Canberra, Australia; Institute for Medical Research in Kuala Lumpur, Malaya; National Biological Institute in Bogor, Indonesia; Queensland Institute for Medical Research, Brisbane, Australia; and collection of L. L. Pechuman.

Distributional List of Oriental Haematopotini

All species listed here are *Haematopota* except those with an asterisk (*), which are *Hippocentrotodes*. Species doubtfully recorded are not included except *jellisoni* from the Burma-Assam border.

PAKISTAN, INDIA, BANGLADESH, NEPAL, and CEYLON

PAKISTAN: *fulvipes*, *kashmirensis*INDIA: **desmotes*, **striatipennis*, *adusta*, *albimedia*, *albofasciatipennis*, *alticola*, *alyta*, *amala*, *annandalei*, *assamensis*, *barri*, *bicolor*, *biguttata*, *biharensis*, *bilineata*, *biroi*, *brevis*, *cana*, *casca*, *chralui*, *cilipes*, *contracta*, *cordigera*, *crossi*, *demellonis*, *dissimilis*, *echma*, *equina*, *fasciata*, *flavicornis*, *flavipuncta*, *hardyi*, *hindostani*, *immaculata*, *inconspicua*, *indiana*, *javana*, *jellisoni*, *kashmirensis*, *lata*, *latifascia*, *limbata*, *litoralis*, *longipennis*, *malabarica*, *marceli*, *marginata*, *matherani*, *melloi*, *montana*, *mouchai*, *nathani*, *oporina*, *pallida*, *pattoni*, *philipi*, *pisinna*, *punctifera*, *roralis*, *schmidi*, *sikkimensis*, *singarensis*, *sparsa*, *striata*, *zophera*BANGLADESH: *marginata*, *mouchai*NEPAL: **desmotes*, *bicolor*, *crossi*, *jiri*, *mouchai*, *nepalensis*, *orba*, *pallida*, *philipi*CEYLON: *brevis*, *cingalensis*, *krombeini*, *litoralis*, *roralis*, *tesellata*, *unizonata*

SOUTHEAST ASIA (MAINLAND)

BURMA: *annandalei*, *brunnipes*, *burmanica*, *burtoni*, *cilipes*, *crassitibia*, *fletcheri*, *javana*, *jellisoni*, *kaulbacki*, *knekidis*, *lata*, *latifascia*, *personata*, *punctifera*, *rubida*, *taunggyiensis*, *tenasserimi*THAILAND: *abacis*, *abatrata*, *albihalter*, *areei*, *assamensis*, *biorbis*, *burtoni*, *cilipes*, *corrigata*, *demeilloni*, *fasciata*, *glenni*, *gracilicornis*, *helvirenter*, *howarthi*, *javana*, *lata*, *latifascia*, *libera*, *lineola*, *lunulata*, *pachycera*, *pallida*, *personata*, *picea*, *procyon*, *punctifera*, *scanloni*, *singularis*, *splendens*, *takensis*, *taunggyiensis*, *tenasserimi*, *thurmanorum*, *varifrons*, *whartoni*MALAYA (including Singapore): *achlys*, *albiocrea*, *areei*, *irregularis*, *irrorata*, *javana*, *lunulata*, *malayensis*, *pachycera*, *rubida*, *splendens*, *tenasserimi*, *tiomanensis*, *varifrons*LAOS: *abacis*, *albihalter*, *albimanica*, *burtoni*, *cilipes*, *glenni*, *helvirenter*, *howarthi*, *javana*, *kerri*, *lata*, *latifascia*, *lineola*, *pachycera*, *pechumani*, *personata*, *punctifera*, *singularis*, *tenasserimi*, *thurmanorum*, *tosta*, *u-nigrum*, *varifrons*CAMBODIA: *abacis*, *biorbis*, *cilipes*, *glenni*, *howarthi*, *pachycera*, *prolixa*, *punctifera*, *singularis*, *tenasserimi*, *varifrons*, *whartoni*VIETNAM: *abacis*, *abatrata*, *albimanica*, *ampla*, *assamensis*, *badia*, *biorbis*, *circina*, *glenni*, *helvirenter*, *howarthi*, *javana*, *limulata*, *pachycera*, *prolixa*, *singularis*, *spenceri*, *tenasserimi*, *tonkini-ana*, *varifrons*, *vassali*

SUNDA and PHILIPPINE ISLANDS

SUMATRA: *achlys*, *annulipes*, *atriventer*, *corrigata*, *cristata*, *equitibiata*, *intermedia*, *irregularis*, *irrorata*, *javana*, *lunulata*, *malayensis*, *nigricans*, *nigrita*, *paucipunctata*, *pungens*, *splendens*

JAVA: *cingulata*, *elegans*, *ensifer*, *fumigata*, *irrorata*, *jacobsoni*, *javana*, *lunulata*, *maculata*, *paucipunctata*, *punctifera*, *pungens*, *tuberculata*

BORNEO: *achlys*, *angustisegmentata*, *atomaria*, *bizonata*, *borneana*, *cingulata*, *clarkeana*, *grossitti*, *irregularis*, *irrorata*, *lunulata*, *malayensis*, *pendleburyi*, *pungens*, *splendens*

PHILIPPINES: *abbreviata*, *holtmanni*, *monticola*, *torrevillasi*, *volmeri*

SOUTH CHINA, HAINAN, and TAIWAN

SOUTH CHINA: *aquilina*, *atrata*, *chewiangensis*, *chinensis*, *famicis*, *formosana*, *fukienensis*, *gregoryi*, *lata*, *mokanshannensis*, *yunguni*, *yunnanensis*

HAINAN: *atrata*, *hainani*

TAIWAN: *formosana*

Explanation of Characters

We here present certain explanations helpful in interpreting the keys and descriptions, as well as a rather generalized description that will apply to a large proportion of the species.

Dimensions.—Length is lateral measurement from frontal callus to tip of abdomen excluding antenna; wing length is from base of basicosta to apex; antennal length is from base of scape to tip of flagellum in normal extended position, pointing forward.

Head.—Frontal ratio of female is based on width of frons at its narrowest part, near vertex, divided by height from line across top of head to lower margin of frontal callus as viewed directly from front. We selected this width at vertex because it is shortest distance between eyes in this genus and is therefore easier to measure than width below, which varies because eye margins curve outward. *Midfrontal spot* is small, dark, often present on frons a short distance below top of frons, which will vary in intensity or visibility depending on light angle. *Paired spots* are larger than midfrontal spot, usually well defined and velvety black, lying in lower corners of opaque part of frons above frontal callus. *Frontal callus* is denuded, usually crosses frons at base, and varies from strongly protuberant and smooth to relatively flat and slightly wrinkled; maximum width is compared to its height on midline. In male, callus is usually represented by small shiny area on lower part of frontal triangle. Subcallar area in

female may be entirely opaque with or without central dark pollinose *interantennal spot* and with or without median cleft; in other species there may be a shiny area below callus that may consist of pair of triangles to either side of median cleft. This shiny area is usually differentiated from callus itself by slender transverse suture or at least by distinct color difference, but it is sometimes continuous with callus. Face below antenna is slightly protuberant in female, depressed in male. On either side are *parafacials*, and color pattern of upper part lying between antennal base and eye is of great descriptive value. This may be solidly black or broken into smaller spots; in more northern species spots may be of rather uniform size and separated; in others there is some fusion of spots along lower margin of area. This pattern varies slightly depending on light angle, but where it is described as solidly dark, then it is unbroken in any light. Sometimes what is a broken pattern in female will be solidly black in male. Antenna is composed of *scape*, *pedicel*, and *flagellum*; last is composed of larger more or less compressed *first flagellomere* (equivalent of plate in *Tabanus*) and *style* composed of three flagellomeres. In giving dimensions, relative lengths or relation of thickness to length is measured as viewed laterally.

Thorax.—*Notum* includes complete dorsal surface of thorax from anterior margin to end of scutellum. *Scutum* ends at *scuto-scutellar suture* and includes pair of prothoracic *humeral calli*, pair of lateral lobes, *antealares*, partial *transverse suture* between antealares, and very narrow *prescutellar sclerite*. Elements of scutal pattern consist of pale humerus, three more or less distinct pale stripes at least on anterior part and with sublateral pair often more or less expanded behind transverse suture; some pale transverse marking on hind margin, sometimes involving *prescutellar sclerite*. *Scutellum* may be pale basally, discally, or along hind margin, or entirely dark. *Pleuron* often has dark area on lower *anepisternum*. This pattern is modified in various ways and sometimes drastically so.

Wing.—Terminology of wing cells is slightly mixed. For marginal cell we use R_1 , and for two submarginal cells we use R_2 and R_3 , but we call cells R_1 to M_1 the first to fifth posterior cells. First and second basal cells are cell R and cell M , respectively. *Furcation* is where veins R_1 and R_2 part, with spur vein present from base of R_1 . Usual pattern consists of gray or brown ground with paler spots, usually following characteristic arrangement in *Haematopota*. This consists of a more or less developed band or row of spots near apex (*subapical band*); a series of spots in circular pattern around apex of second basal cell, apex of discal cell, and

furcation (*rosettes*); transverse marks across outer portion of posterior cells; spots, usually triangular on wing margin in some or all posterior cells but frequently absent; and zigzag marks across anal area. Here again pattern may be greatly modified with many of elements missing or conversely confluent.

Halter.—Stem is nearly always pale, but knob may be pale, darkened laterally, or entirely dark.

Legs.—Usual pattern if any is present, consisting of pale base of fore coxa; single pale band at or near base of fore tibia; two, or less frequently one, pale bands on midtibia; one or two pale bands on hind tibia, second sometimes confined to outer aspect; pale base on basitarsus of midleg and hind leg. In one group of species hind femur bears unusually long hairs forming tuft, and hind tibia is somewhat swollen with heavy fringe of hairs.

Abdomen.—Usually dark with pale incisures along hind margin of terga and sterna; often pale middorsal spot; less often separated pale spots sublaterally on terga III–VI; venter often paler but with center darkened posteriorly. Males tend to have paler abdomen, especially basally.

Key to Oriental Species of *Haematopotini*

This key includes the species of the genera *Hippocentroides* and *Haematopota*. It is intended primarily for keying females and will not serve for males in most instances. Also, unfortunately, it requires specimens in reasonably good condition, as many of the characters depend on color patterns and characters of the antenna and legs. If specimens are badly discolored by greasing of the body or if antennae or legs are missing, determination is difficult. Seven species known only as males have been included. They are *Hippocentroides striatipennis* and *Haematopota abatrata*, *albihalter*, *casca*, *famicis*, *scanloni*, and *tosta*. Species insufficiently known in either sex to place in the key are *Haematopota aquilina*, *borncanu*, *flavicornis*, *intermedia*, *matherani*, *nigrita*, and *yunnanensis*. Specimens of the last species were damaged before they could be properly keyed, but comparative notes are given after the description. To make allowance for variation, 19 species are keyed out in 2 places and 1 in 3 places.

- | | |
|---|---|
| 1 Wing infuscated with six more or less complete transverse pale bands and no rosettes; eye bands straight (<i>Hippocentroides</i> Philip) ----- | 2 |
| Wing pattern not so, but either with irregular spotting forming rosettes or circles or with one or two diagonal or longitudinal bands; eye bands sinuous (<i>Haematopota</i> Meigen) ----- | 3 |

- 2 (1) Transverse pale bands of wing at least half as broad as intervening dark areas, reaching hind margin of wing (fig. 122) (India, Nepal) ----- *dësmotes* Philip
 Transverse pale bands narrower, most of them not reaching hind margin (India) ----- *striatipennis* (Brunetti)
- 3 (1) Notum in clean specimens with strong middorsal grayish stripe from anterior margin to end of scutellum which gradually widens posteriorly and is always wider than sublateral pale stripes ----- 4
 Notum not so patterned; if with complete dorsal stripe, this slender on anterior two-thirds and sublateral stripes wider than middorsal stripe ----- 10
- 4 (3) Fore tibia at least two-thirds white ----- 5
 Fore tibia not more than one-third white basally (Hainan I., South China) ----- *atrata* Szilady
- 5 (4) Hind margin of wing distad of axillary cell without pale markings; wing with curved longitudinal stripes, no rosettes ----- 6
 Hind margin of wing with isolated pale spots in at least some posterior cells ----- 7
- 6 (5) Discal cell with base and apex dark (fig. 124) (Borneo, Java) ----- *cingulata* Wiedemann
 Discal cell dark along posterodistal margin, base pale (fig. 125) (Cambodia, Laos, Thailand, Vietnam) ----- *howarthi*, new species
- 7 (5) Distal half of wing with two joined, nearly complete pale rings; legs mostly yellow or pale brownish, banding on midtibia and hind tibia faint or lacking ----- 8
 Distal half of wing with usual interrupted rosettes and streaks, not with two nearly unbroken rings; legs mostly darker, banding on midtibia and hind tibia distinct ----- 9
- 8 (7) Vertex with large subshiny black area; anal and axillary cells dark with pale blotches not forming narrow stripes (Vietnam) ----- *circina* Philip
 Vertex not shiny black although mass of dark hair may be present; anal and axillary cells crossed by two, mostly slender, pale stripes (fig. 5) (Cambodia, Thailand, Vietnam) ----- *biorbis*, new species
- 9 (7) Paired frontal spots fused; no interantennal black spot (Vietnam) ----- *lineata* Philip
 Paired frontal spots discrete and clearly separated by gray pollinose area; small black interantennal spot present (fig. 6) (Hainan I.) ----- *hainani*, new species
- 10 (3) Hind femur with long hairs above, at least apically, forming dense tuft, and fringe of long ventral hairs; hind tibia with fringe of long hairs and often swollen ----- 11
 Hind femur not with dense tuft of long hair dorsally and ventral hair fringe usually not strongly developed; hind tibia slender ----- 27

- 11 (10) Upper parafacial sometimes punctate but without solid velvety black spot ----- 12
 Upper parafacial with unbroken black spot to upper margin ----- 13
- 12 (11) Blackish species; scutellum broadly white with dark apex; terga II-VII with pale hind margins; first flagellomere long and slender (fig. 7) (Burma, Cambodia, India, Laos, Thailand) ----- *cilipes* Bigot
 Grayish-brown species; scutellum not pale basally; no incisural bands; first flagellomere short, strongly compressed (fig. 8) (Thailand) ----- *scanloni*, new species
- 13 (11) Wing hyaline with gray blotches without distinct rosettes of pale spots (fig. 130) (Sumatra, Thailand) -----
corrigata, new name (in part)
 Wing with dark pattern of pale spots forming rosettes or with strong oblique white band ----- 14
- 14 (13) Wing with oblique pale band tapered posteriorly from cell R_1 to axillary area; other pale markings of wing not forming rosettes (figs. 131-132); pale stripes of scutum not reaching posterior margin ----- 15
 Wing without oblique band but with usual rosettes somewhat developed; if oblique band appears to be present, pale stripes of scutum reach hind margin ----- 17
- 15 (14) Reddish-brown species; fore tibia with distinct pale ring; scape stout, yellow, apex not darkened dorsally (Burma) ----- *rubida* Ricardo
 Black species; fore tibia entirely dark; scape less stout, entirely black or apex darkened dorsally ----- 16
- 16 (15) Scape mostly yellowish, only blackened at apex above; flagellum slightly longer than scape (fig. 9); scutellum mostly pale; halter knob dark (Cambodia, Laos, Thailand, Vietnam) ----- *singularis* Ricardo
 Scape shiny black; flagellum shorter than scape (fig. 10); scutellum black; halter white (Laos, Thailand) -----
albihalter, new species
- 17 (14) Central anterior part of scutum yellowish white, remainder mostly deep black; scutellum entirely white (Laos) -----
u-nigrum, new species
 Scutal pattern different; scutellum not entirely white ----- 18
- 18 (17) Pair of prominent gray stripes on anterior scutum usually reaching to scutellum ----- 19
 Scutum with pair of distinct pale spots behind transverse suture, with anterior stripes less pronounced or also with middorsal stripe ----- 20
- 19 (18) Fore tibia with strong white basal band; midtibia with broad central band (Cambodia, Laos, Thailand, Vietnam) ----- *glenni* Philip
 Fore tibia with at most very indistinct yellowish basal band; midtibia with two indistinct yellowish bands (Thailand) ----- *procyon*, new species
- 20 (18) Tibiae distinctly banded or largely pale ----- 21
 Tibiae almost entirely dark (Thailand, Vietnam) - *abatrata* Philip

21 (20)	Scape dull pollinose	22
	Scape shiny	24
22 (21)	Scutellum distinctly bicolored, base pale, posterior margin darker; subapical band of wing double (fig. 140); frontal callus yellow (India to Vietnam, Java, Sumatra) <i>javana</i> Wiedemann (in part)	
	Not with this combination of characters	23
23 (22)	Subapical band of wing broad, double (fig. 137); frontal callus attenuated laterally, yellow brown (fig. 16); abdomen extensively gray sublaterally (North India) <i>crossi</i> , new species (in part)	
	Subapical band of wing slender, only rarely faintly doubled, (fig. 138); frontal callus truncate laterally, usually black (fig. 17); abdomen with at most small gray spots sublaterally on posterior terga (East India, Thailand, Vietnam) <i>assamensis</i> Ricardo (in part)	
24 (21)	Wing heavily patterned with pale markings; apex of cell R with pale spot (figs. 140-141); scape yellowish at least ventrally	25
	Wing less heavily patterned; apex of cell R dark (fig. 139); scape entirely black (Burma, Laos, Thailand) <i>personata</i> Philip	
25 (24)	Notum with broad pale band covering scutoscuteellar suture (see couplet 22) <i>javana</i> Wiedemann (in part)	
	No such band over scutoscuteellar suture	26
26 (25)	Subapical band of wing double, outer arm nearly filling apex of wing (fig. 141); abdomen mostly black dorsally (East India) <i>casca</i> , new species	
	Subapical band single, wing apex widely darkened (fig. 142); abdomen extensively orange brown basally (Laos) <i>tosta</i> , new species	
27 (10)	Scape swollen and as long or longer than flagellum (figs. 20-25, 99)	28
	Scape slender, or if swollen, not as long as flagellum (figs. 26-39, etc.)	35
28 (27)	Upper parafacial with broad unbroken black area (figs. 20-22)	29
	Black of upper parafacial, if present, broken by yellowish or gray, at least in some light angles (figs. 23-25, 99) ..	32
29 (28)	Notum with broad pale band covering scutoscuteellar suture	30
	No such band over scutoscuteellar suture	31
30 (29)	Tibiae entirely dark (South China) <i>famieis</i> , new species	
	Tibiae banded with white (Burma, East India, Laos, Thailand) <i>latifascia</i> Ricardo (in part)	
31 (29)	Subapical band of wing consisting of two slender broken bands, outer one reaching hind margin in cell R ₄ (fig. 145) (Ceylon, India) <i>litoralis</i> Ricardo	
	Subapical band of wing single, broken, widely separated from margin in cell R ₄ (fig. 146) (Burma, East India) <i>annandalei</i> Ricardo	

- 32 (28) Scape shiny dark brown to black; first flagellomere not strongly compressed nor higher than length of style (figs. 24, 25, 99) ----- 33
- Scape usually paler, less shiny; first flagellomere strongly compressed, higher than length of style (fig. 23) (Malaya to Vietnam) ----- *pachycera* Bigot
- 33 (32) Scutum with pair of prominent white spots just behind transverse suture; basal half of hind margin of axillary cell broadly white (fig. 148) (South India) ----- *nathani*, new species
- No strong white spots just behind transverse suture; basal half of hind margin of axillary cell entirely dark (figs. 149-150) ----- 34
- 34 (33) Subapical band of wing strong, crossing wing (fig. 149); hind tarsus all dark; pleuron gray above (Thailand) ----- *picea*, new species
- Subapical band composed of small spots (fig. 150); hind basitarsus pale basally; pleuron all dark brown (South India) ----- *bilineata* Ricardo (in part)
- 35 (27) Frontal callus separated from eye by about width of one paired spot or callus sharply attenuated laterally, scarcely touching eyes (figs. 16, 26, 27) ----- 36
- Frontal callus touching eyes broadly or if not, separation narrow and callus not sharply attenuated laterally --- 39
- 36 (35) Eye with protuberance near dorsal margin; middle of scutellum and tergum I broadly pale yellowish (Java) ----- *tuberculata* Meijere
- Eye without dorsal protuberance; scutellum and tergum I without pale spot ----- 37
- 37 (36) Small, wing less than 7 mm long; frontal callus small, black (fig. 26); abdomen with rather broad bands but no middorsal stripe or sublateral spots (Cambodia, Thailand) ----- *whartoni*, new species
- Medium sized, wing more than 7 mm long; frontal callus nearly reaching eyes, yellow brown; abdomen with mid-dorsal stripe and sublateral spots ----- 38
- 38 (37) Paired spots of frons strong, black, round; upper parafacial with small solid black spot (fig. 16); femora pale (see couplet 23) ----- *rossi*, new species (in part)
- Paired spots of frons weak, brownish, irregular in shape; upper parafacial finely punctate (fig. 27); femora dark brown (Burma) ----- *fletcheri*, new species (in part)
- 39 (35) First flagellomere compressed, greatest height exceeding length of style (figs. 15, 17, 28-33) ----- 40
- Height of first flagellomere not greater than length of style (presumed for *kerri* and *nigricans*) ----- 52
- 40 (39) Upper parafacial with solid black area, having at most a small break at lower lateral border ----- 41
- Darkened area on upper parafacial, if present, composed of punctations, evanescent in different lights or of two or more brownish spots ----- 46

- 41 (40) Wing hyaline with gray blotches but without distinct rosettes of pale spots (fig. 130) (see couplet 13) *corrigata*, new name (in part)
Wing with distinct rosettes composed of separate spots ---- 42
- 42 (41) Hind margin of scutum with transverse pair of strong gray crescentic marks ----- 43
Hind margin of scutum without these marks ----- 45
- 43 (42) Scutellum rather distinctly bicolored, base pale ----- 44
Scutellum unicolorous or distal part paler than basal part (see couplet 23) ----- *assamensis* Ricardo (in part)
- 44 (43) Fore tibia slightly swollen, hind tibia robust; fore coxa usually brown distally; subapical band of wing usually doubled (fig. 140); darker species, but frontal callus yellow (see couplet 22) ----- *javana* Wiedemann (in part)
Fore and hind tibiae slender; fore coxa entirely pale; subapical band of wing rarely doubled (fig. 153); more yellowish species but frontal callus usually darker (Thailand) ----- *takensis*, new species
- 45 (42) Small, length 6.5-7.5 mm; midfrontal spot usually not perceptible; frontal callus a slender transverse black stripe with middorsal projection (fig. 28); small pale band in lower margin of dark spot on upper parafacial (Burma, Cambodia, India, Java, Laos, Thailand) *punctifera* Bigot
Larger, length 7.5-10 mm; callus higher, orange brown to dark reddish brown; midfrontal spot present (fig. 29); dark area of upper parafacial not broken (Bangladesh, East India, Nepal) ----- *mouchai*, new species
- 46 (40) Scape nearly as long as flagellum, stout, cylindrical (fig. 30); strong gray band on scutoscuteellar suture (Burma, China, India, Laos, Thailand) -- *lata* Ricardo (in part)
Scape short, stout, slightly expanded distally; no strong pale band on scutoscuteellar suture ----- 47
- 47 (46) Frontal callus shiny black; paired frontal spots large, touching eyes and only narrowly separated from frontal callus ----- 48
Frontal callus yellow to reddish brown; frontal spots smaller ----- 49
- 48 (47) Wing pattern very heavy (fig. 157); darker species; scutum with five heavy gray stripes; pale bands of hind tibia broad, distinct (Thailand) -- *demeilloni*, new species
Wing pattern much less developed, spots slender, disconnected; paler species; stripes on scutum slender; bands of hind tibia narrow, lower one indistinct (South India) ----- *demeillonis* Senior-White
- 49 (47) Scape less than twice as long as distal height, distinctly expanded distally ----- 50
Scape longer in relation to distal height, cylindrical ----- 51

- 50 (49) Width of frons at vertex 0.7 of height; upper parafacial with distinct broken darkened area; wing pattern pale but with posterior marginal spots (Burma)
kuekidis, new species
 Width of frons at vertex about 0.58 of height; parafacial with no darkening above; wing pattern stronger but no spots on hind margin (Vietnam) ---- *vassali*, new species
- 51 (49) First flagellomere nearly twice as long as high and longer than scape (fig. 32); no interantennal dark spot; scutum distinctly striped; scutellum gray on disk, brown marginally (Cambodia, Vietnam) - *prolixa*, new species
 First flagellomere about 1.5 times as long as high and shorter than scape (fig. 33); small triangular interantennal dark spot present; scutal lines indistinct; scutellum unicolorous (South India) - *malabarica*, new species
- 52 (39) Wing with usual pattern of spots in circles or rosettes -- 53
 Wing not with pattern of this sort ----- 179
- 53 (52) Legs almost uniform in color, without bands on any tibiae - 54
 At least fore tibia with distinct pale band at or near base, and midtibia and hind tibia usually with one or two bands ----- 61
- 54 (53) Upper parafacial with unbroken velvety black spot (East India) ----- *limbata* Bigot
 Upper parafacial entirely pale or with irregular dark markings but not unbroken black spot ----- 55
- 55 (54) Hind margin of wing with pale marks in some or all posterior cells ----- 56
 Wing without marginal spots in posterior cells ----- 57
- 56 (55) Subapical band of wing strong, complete; hind margin of wing with continuous pale stripe (Burma)
brunnipes, new species
 Subapical band slender, incomplete; spots of hind margin small, usually separated (fig. 161) (India) ---- *biroi* Szilady
- 57 (55) Small species, wing length 7 mm or less ----- 58
 Larger species, wing length 8 mm or more ----- 59
- 58 (57) Abdomen dark centrally, broadly gray laterally (India)
cana Walker
 Abdomen with slender middorsal gray stripe and sublateral spots (Thailand) ----- *libera*, new species (in part)
- 59 (57) Abdomen with gray middorsal stripe and sublateral spots; frontal callus yellow; upper parafacial at most finely punctate ----- 60
 Abdomen with rather broad, yellowish middorsal stripe but no sublateral spots; frontal callus chestnut brown; upper parafacial distinctly blotched with irregular spots (India) ----- *equina*, new species

- 60 (59) Frons with heavy brown marking on either side of pale stripe at vertex (fig. 38); cell M and first posterior cell to furcation mostly dark (fig. 163) (Ceylon, India) ----- *rovalis*, Fabricius
 Frons not darkened at vertex (fig. 39); cells R, M, and R₁ and first posterior to furcation and discal cell almost entirely pale (Pakistan) ----- *fulvipes*, new species
- 61 (53) Upper parafacial with unbroken velvety black or brown spot often extending beneath antenna (*chinensis* with central brownish tinge when viewed from front) ---- 62
 Upper parafacial entirely pale or with irregular dark markings but not an unbroken black spot ----- 74
- 62 (61) Abdomen with strong middorsal gray or yellowish stripe at least to end of tergum VI ----- 63
 Abdomen with at most narrow pale triangles on few terga 67
- 63 (62) Abdomen with middorsal stripe slender but with strong sublateral spots on terga ----- 64
 Middorsal stripe usually broader and no sublateral spots on terga ----- 65
- 64 (63) Scape rather distinctly swollen, slightly concave near middle (East India) ----- *barri*, new species
 Scape slender, not concave near middle (fig. 40) (Burma) ----- *burmanica* Senior-White (in part)
- 65 (63) Wing with several pale spots on posterior margin ----- 66
 Wing without pale marginal spots or these extremely faint (fig. 165) (East India, Nepal) ----- *bicolor*, new species
- 66 (65) Dark species; middorsal white stripe of abdomen strongly contrasting; wing pattern contrasting (fig. 166); scape long, shiny; frontal callus black (fig. 42) (Laos, Thailand) ----- *lineola* (Philip)
 Brownish species; middorsal pale stripe of abdomen more diffuse; wing pattern rather faint (fig. 167); scape shorter, pollinose (fig. 43); frontal callus yellow (India, Nepal, Thailand) ----- *pallida*, new species
- 67 (62) Scutellum usually gray anteriorly; if not compare with *tiomanensis* (see couplet 72) ----- 68
 Scutellum entirely dark ----- 70
- 68 (67) Midtibia and hind tibia with basal ring only; scape as long as flagellum (fig. 44) (? India, Thailand) - *arcei*, new species
 Midtibia with two distinct bands; hind tibia with at least trace of second band; scape distinctly shorter than flagellum (figs. 20, 40) ----- 69
- 69 (68) Spots of wing small and mostly separated; pale spots in base of discal cell and apex of cell M small or absent (fig. 169) (see couplet 64)
burmanica Senior-White (in part)
 Spots of wing larger, more confluent; spots in base of discal cell and apex of cell M large (fig. 144) (see couplet 30) ----- *latifascia* Ricardo (in part)

- 70 (67) Subapical wing band divided posteriorly to make two bands (fig. 224); whitish area at hind margin of scutum preceded by and joined to yellowish median spot (South India) ----- *flavipuncta*, new species (in part)
 Subapical wing band not divided; at most very narrow pale area on hind margin of scutum ----- 71
- 71 (70) Midtibia and hind tibia each with single broad white basal band; scape rather long, slender, brown (figs. 45, 46) ----- 72
 Midtibia and hind tibia each with two narrow bands or hind tibia with single rather narrow basal band sometimes with preapical white spot anteriorly; scape stouter, dark brown to black (figs. 47, 48) ----- 73
- 72 (71) Fore coxa and dorsum of abdomen entirely dark; subapical band of wing broken (fig. 249) (Malaysia, Tioman I.) ----- *tiomaneensis*, new species
 Fore coxa extensively gray basally; distinct gray triangle on tergum II; subapical band of wing complete, curved inward (Borneo, Java, Malaya, Sumatra, Thailand) ----- *lunulata* Macquart
- 73 (71) Frons broad, index slightly more than 1; scape nearly as long as flagellum, distinctly irregular dorsally (fig. 47); pale band of fore and hind tibiae narrow, well separated from base of each (China) ----- *chinensis* Ouchi
 Frons narrow, index about 0.6; scape much shorter than flagellum, not irregular dorsally (fig. 48); bands of fore and hind tibiae broad, basal (Borneo, Malaya, Sumatra, Thailand) ----- *splendens* Schuurmans Stekhoven
- 74 (61) Hind tibia unbanded or with single basal band of varying width, but if basal band is narrow, with at most small subapical spot anteriorly ----- 75
 Hind tibia with two usually equally distinct pale bands (presumed for *cordigera*) ----- 114
- 75 (74) Hind tibia at least three-fifths white, sharply bicolored -- 70
 Hind tibia unicolorous or not more than basal half paler, sometimes with incomplete subapical ring ----- 85
- 76 (75) Fore tibia not more than half white ----- 77
 Fore tibia at least three-fifths white ----- 82
- 77 (76) Dark interantennal spot present; pleuron uniformly dull gray if not discolored; hind basitarsus at most indistinctly paler basally ----- 78
 No black interantennal spot; pleuron grayish above, slightly shiny and brown below; hind basitarsus clear white on basal two-thirds (India-Burma border) -- *jellisoni* (Philip)
- 78 (77) Body and wing each at least 12 mm long; median spot on frons present or absent ----- 79
 Body and wing each not more than 10 mm long; median spot on frons present ----- 80
- 79 (78) No median spot on frons; midfemur dark (Sumatra) ----- *nigricans* Schuurmans Stekhoven
 Median spot on frons strong; midfemur white on basal half (Sumatra) ----- *atriventer* Schuurmans Stekhoven

- 80 (78) Subapical band of wing strongly sinuous, curving to vein *R*₁ before wing margin 81
 Subapical band nearly straight although sometimes interrupted, reaching wing margin in cell *R*₄ (fig. 173) (Cambodia, Laos, Thailand, Vietnam) *abacis* (Philip) (in part)
- 81 (80) Frontal callus nearly four times as wide as high with small middorsal projection; wing with two pale spots beyond subapical band (Nepal) *jiri* Chvala
 Frontal callus broadly angular above, width about twice height; no pale spots beyond subapical band (Sumatra) *equitibiata* Schuurmans Stekhoven
- 82 (76) Anepisternum in clean specimens with brown mark posteriorly or ventrally; scape orange, sparsely haired; palpus brownish 83
 Anepisternum without brown mark; scape slightly darker, heavily clothed with dark hair; palpus grayer (Laos, Vietnam) *albimanica*, new species
- 83 (82) Fore tibia about two-thirds white; scape long, slender, cylindrical, or slightly expanded distally; upper parafacial very weakly darkened if at all 84
 Fore tibia about four-fifths white; scape shorter, slightly thickened toward base (fig. 52); upper parafacial with distinct dark blotches (Malaya) - *albiocrea*, new species
- 84 (83) Frons distinctly narrowed above, about two-thirds as wide at vertex as high; paired spots large (China) *fukienensis*, new species
 Frons with parallel sides, about four-fifths as wide as high; paired spots small (Borneo) *angustisegmentata* Schuurmans Stekhoven
- 85 (75) Scape rather short and stout, usually shiny black or gray pollinose or if slender black with thin pollinosity ---- 86
 Scape slimmer, ground yellowish brown 89
- 86 (85) Scape gray, pollinose; abdomen with strong pattern of midlateral and sublateral spots (North India) *alticola* (Philip)
 Scape shiny or subshiny; abdomen with only incisures pale and no sublateral spots 87
- 87 (86) Frontal callus at least 3.5 times as wide as high, not very protuberant, without flattened middorsal extension; height and width of frons subequal; small species ---- 88
 Frontal callus protuberant, 2-2.5 times as wide as high with flattened middorsal extension; frons distinctly higher than wide (fig. 54); medium-sized species (Borneo, ? Malaya) *atomaria* Walker
- 88 (87) Scape slender, thinly pollinose (Nepal) *orba*, new species
 Scape stouter, shiny (India) *pishuna*, new species
- 89 (85) Fore tibia at least two-thirds white; paired spots on frons usually obscured by connecting dark area (figs. 55, 56) 90
 Fore tibia half or less pale; paired spots of frons widely separated 92

- 90 (89) Hind tibia with distinct white band 91
 Hind tibia entirely dark (Borneo, Malaya, Sumatra)
achlys, new species
- 91 (90) Larger species, wing more than 10 mm long; hind femur
 dark brown; large pale spots at margin of wing in
 cell R_1 (fig. 181) (Laos) *kerri*, new species
 Smaller, wing not more than 9 mm long; hind femur yellow
 orange; cell R_1 with only small spot at wing margin,
 if any (fig. 182) (Borneo, Malaya, Sumatra)
malayensis Ricardo
- 92 (89) Cells, R and M, first posterior cell before furcation, and
 discal cell mostly white, producing contrasting longi-
 tudinal stripe (fig. 183) (South India)
albimedia, new species
 These cells crossed by dark bands so no central longitudinal
 stripe is evident 93
- 93 (92) Beneath frontal callus two triangular shiny projections
 separated by sharply margined cleft 94
 No bare shiny subcallar triangles; this area dull, usually
 with dark interantennal spot and often no cleft 99
- 94 (93) Sides of scutum and most of posterior margin rather
 broadly pale yellowish, separated from pleuron by nar-
 row dark stripe (Borneo, Malaya, Sumatra)
irregularis Schuurmans Stekhoven
 Scutum laterally and posteriorly not broadly yellowish .. 95
- 95 (94) Slender, delicate species with very slender scape slightly
 expanded near apex (fig. 59); subapical band of wing
 single and complete (fig. 186) (East India)
amala, new species
 If scape is slender, not small delicate species; subapical
 band of wing often broken or double 96
- 96 (95) Upper parafacial sometimes slightly darkened but with no
 strong contrasting spots or blotches (Borneo)
gressitti Philip
 Upper parafacial with distinct brown spots and blotches.. 97
- 97 (96) Hind margin of scutum with distinct gray band; tergum II
 with strong gray triangle (China, Taiwan)
formosana Shiraki
 Scutum and abdomen almost uniformly brown 98
- 98 (97) Flagellum very slender; frontal callus high with middorsal
 projection; pleuron with gray pattern; bands of fore
 and hind tibiae very narrow, subbasal; hind basitarsus
 with very little white (India) *dissimilis* Ricardo
 First flagellomere not very slender; frontal callus not high,
 dorsal margin straighter (fig. 62); pleuron uniformly
 brown; fore tibia with rather strong basal band; hind
 basitarsus extensively pale (South India)
oporina, new species
- 99 (93) All posterior cells of wing with pale marginal spots 100
 Some posterior cells without pale marginal spots 107

- 100 (99) Scape subequal to flagellum in length, thickened toward base with shallow constriction near middle; callus with rather strong middorsal projection (fig. 63); inter-antennal dark spot large (Ceylon) *krombeini*, new species (in part)
Not with this combination of characters 101
- 101 (100) Subapical band of wing double, divided at end of vein R_{2+3} (fig. 190) (Java) *jacobsoni* Schuurmans Stekhoven
Subapical band single 102
- 102 (101) Disk or posterior margin of scutellum gray sh; posterior terga with gray sublateral spots 103
Scutellum uniformly dark; no gray sublateral spots on posterior terga 105
- 103 (102) Frontal callus shiny dark reddish to black; scutellum brown with gray hind margin (South India) *singarensis*, new species
Frontal callus chestnut brown to yellow; scutellum variable 104
- 104 (103) Frons higher than wide; frontal callus rather evenly convex above; scutellum yellow brown with grayish center (Burma) *crassitibia*, new species
Frons not higher than wide; frontal callus a rather narrow band not evenly convex above (fig. 66); scutellum with hind margin grayish (Northeast India) *biharensis*, new species
- 105 (102) Mittitibia with two pale bands; abdomen with no middorsal stripe 106
Mittitibia with basal three-fourths pale with only very faint indication of division into two; abdomen with rather distinct middorsal gray stripe (East India) --- *indiana* Bigot
- 106 (105) Subapical band of wing curved inward; scape straight, shiny (India) *fasciata* Ricardo (in part)
Subapical band of wing curved outward (fig. 194); scape curved upward distally, less shiny (fig. 68) (India) *albofasciatipennis* Brunetti (in part)
- 107 (99) Some posterior cells with pale marginal markings 108
No pale marginal markings in posterior cells 111
- 108 (107) Pale spots of posterior margin of wing small, slender, running parallel to wing margin (fig. 195) (see couplet 100) *krombeini*, new species (in part)
Pale spots of hind margin of wing large, not running along margin 109
- 109 (108) Paired spots of frons distinctly white ringed; subapical band of wing broad, crossing wing 110
Paired spots of frons not surrounded by white; subapical band not crossing wing (Burma) --- *kaulbacki*, new species
- 110 (109) Scutum brown with rather strong pattern of paler brown stripes and pale prescutellar band; wing spots rather coarse and confluent (fig. 197) (Ceylon) - *unizonata* Ricardo
Scutum with very faint pattern; wing spots small, separated (Sumatra) *annulipes* Schuurmans Stekhoven

- 111 (107) Frontal callus less than twice as wide as high, strongly convex above ----- 112
- Frontal callus more than twice as wide as high, upper margin nearly straight centrally (fig. 70) (subapical band of wing reaching vein R₁ (fig. 198) (North India) ----- *sikkimensis*, new species
- 112 (111) Midtibia with about basal half pale but no second band; strong gray prescutellar band present (Borneo) ----- *pendleburgi*, new species
- Midtibia with two narrow pale bands; no distinct pale area in front of scutellum ----- 113
- 113 (112) Subapical band of wing evanescent, separated from wing margin and anterior end not reaching vein R₁ (fig. 200); wing about 8 mm long; no pale prescutellar band (Borneo, Java, Malaya, Sumatra) ----- *irrorata* Macquart (in part)
- Subapical band of wing often broken but usually reaching apex of vein R₁ (fig. 201); wing rarely less than 10 mm long; indistinct narrow pale prescutellar band usually present (Java, Sumatra) ----- *paucipunctata* Schuurmans Stekhoven (in part)
- 114 (74) Subapical band of wing broad, leaving narrow apical dark area; sometimes a much narrower irregular pale band based of broad band; hind margin of wing continuously pale (fig. 202); scape short, subshiny, basal half slightly swollen (fig. 73) (Bangladesh, India) ----- *marginata* Ricardo
- Not with this combination of characters ----- 115
- 115 (114) Wing pattern complex with many concentric circles; subapical band distinctly double (fig. 203); scape yellow pollinose, shorter than first flagellomere (fig. 74); frontal callus yellowish, convex above; hind margin of scutellum pale but rarely with more than narrow discal spot (Ceylon, India) ----- *brevis* Ricardo
- Not with this combination of characters ----- 116
- 116 (115) Scutum with three narrow yellowish lines anteriorly and broad middorsal white stripe starting behind transverse suture which widens, crosses scutellum, and continues to hind margin of tergum II; wing appearing yellowish gray with rather distinct darker spots (Java) ----- *ensifer* Schuurmans Stekhoven
- Scutum and abdomen not with this continuous prominent streak; wing pattern not appearing as darker spots on yellowish-gray ground ----- 117
- 117 (116) Pair of denuded triangles projecting from center of lower margin of frontal callus divided by cleft or these fused to make single bare prong from callus; black interantennal spot present or absent ----- 118
- Area below frontal callus entirely tomentose or at most with pair of shallow shiny curved or truncate lobes above tomentose area ----- 136
- 118 (117) Fore tibia distinctly more than half white ----- 119
- Fore tibia not more than half white ----- 121

- 119 (118) Frontal callus with rather large, slightly protuberant mid-dorsal lobe; scutum with pattern little developed; scutellum entirely dark; paired spots of frons triangular and often fused into solid black area (fig. 75) (Burma, Cambodia, Laos, Malaya, Thailand, Vietnam) ----- *tenasserimi* Szilady
- Frontal callus with dorsal extension, if present, a very small flat triangle; scutal pattern more developed and scutellum usually slightly paler mesally; spots of frons usually small or absent or if fused only narrowly so above ----- 120
- 120 (119) Abdominal bands very narrow, yellowish, not expanded on sides of tergum II; subapical band of wing curved, usually single, curved inward (fig. 205); no sublateral spots on terga III-V (Laos, Malaya) ----- *pechumani*, new species
- Abdominal bands broader, gray; subapical band straighter, usually doubled, partially fused (fig. 210); usually sublateral spots on terga III-V (Cambodia, Laos, Thailand, Vietnam) ----- *varifrons*, new species (in part)
- 121 (118) Frons with central part dark usually obscuring pair of spots 122
- Frons with two clearly separated spots ----- 126
- 122 (121) Wing with rather distinct dark spot at furcation (fig. 206); scape usually shorter than first flagellomere (fig. 77) (South India) ----- *longipennis*, new species
- No accentuated dark spot at furcation darker than pattern around it; scape usually longer than first flagellomere 123
- 123 (122) Scutum with median stripe, widened on posterior half; base of first posterior cell of wing mostly white; subapical band of wing straight (Vietnam) ----- *ampla*, new species
- Scutum without middorsal stripe; basal part of first posterior cell R₁ not mostly pale; subapical band of wing curved, irregular ----- 124
- 124 (123) Pale triangles on hind margin of wing in posterior cells and three pale spots around furcation and stem vein; distinct pale triangles on scutum at transverse suture (India) ----- *cordigera* Bigot
- Either pale marginal triangles lacking or furcation without three small spots above and to either side; no pale triangles on scutum at transverse suture ----- 125
- 125 (124) Cell R₁ before stigma, distal half of cell R, and base of cell R₂ mostly white; hind margin of wing with strong pale spots (fig. 207) (Philippines) ----- *monticola* (Philip)
- These cells not mostly white; no pale marginal spots in posterior cells (fig. 208) (Philippines) ----- *volueri* (Philip)
- 126 (121) Scutum anteriorly with rather broad yellowish-gray central stripe tapering posteriorly; wing spots rather coarse, center of discal cell with single large U-shaped pale spot (fig. 209); midfrontal spot very small (Vietnam) ----- *tonkiniana* Szilady
- Scutum usually with three stripes, central one slender; wing pattern of smaller spots not as shown in figure 209; midfrontal spot variable ----- 127

- 127 (126) Fore coxa unicolorous in clean specimens, gray pruinose or yellowish 128
 Fore coxa distinctly browner on distal half or more 131
- 128 (127) Scape slender, at least 4.5 times as long as thick (fig. 81); hind tibia moderately swollen basally with peculiar dorsal constriction at upper pale, white-haired ring, dense fringe of short black hairs on median and apical dark bands; face with pair of large black spots; (India) *biguttata*, new species
 Scape shorter, stouter, less than 2.5 times as long as thick; face without strong black spots; hind tibia not thus abnormal 129
- 129 (128) Basal pale band of midtibia divided, making three bands, basal one very narrow; abdomen usually with small sublateral pale spots (see couplet 120)
varifrons, new species (in part)
 Basal pale band of midtibia complete; no sublateral pale spots on abdomen 130
- 130 (129) Thorax and abdomen dark brown; scape subequal in length to first flagellomere, latter rather stout; frontal callus black; hind tibia with narrow pale basal band in addition to two others (Java) - *fumigata* Schuurmans Stekhoven
 Thorax and terga I-III reddish brown; scape two-thirds length of first flagellomere, latter more slender; frontal callus red brown; hind tibia white on basal half with subapical yellowish band (Java)
elegans Schuurmans Stekhoven
- 131 (127) Pair of strong pale stripes before transverse suture; scutellum sharply bicolored, basal third white, apical two-thirds black (see couplet 46) --- *lata* Ricardo (in part)
 If fore part of scutum is striped, there are three or more; scutellum uniformly dark 132
- 132 (131) Subcallar prolongation deeply cleft and cleft lined with dark pollinosity 133
 Subcallar prolongation uniformly shiny with no more than median crease 135
- 133 (132) Dorsum of abdomen with at most yellowish sublateral spots on terga V-VII; venter with rather broad grayish incisures 134
 Dorsum of abdomen usually with larger, grayer sublateral spots on most terga; venter dark in middle, pale laterally, incisural bands narrow (Philippines)
holtmanni, new species
- 134 (133) Frons when viewed obliquely from below with dark undivided central streak from vertex, tapering below and sometimes joined to paired spots (fig. 84); callus shiny black; antenna very slender (Thailand)
gracilicornis, new species
 Dark at vertex not slenderly prolonged below (fig. 85); callus reddish brown; antenna heavier (Borneo, Java, Sumatra) *pungens* Doleschall

- 135 (132) Distinct pale spot behind furcation (fig. 214); scape long and slender (fig. 86); rather slender, smaller species, 7-10.5 mm (Philippines) ----- *abbreviata* (Philip)
 No pale spot behind furcation or this very small (fig. 215); scape not so long and slender (fig. 87); larger, heavier species, 9-11 mm (Philippines) ---- *torrevillasi*, new species
- 136 (117) Scape with sharp dorsal notch near apex (fig. 88), or with basal half thicker than apical half with slight concavity beyond swollen part (figs. 89-93) ----- 137
 Scape of various shapes but without dorsal notch near apex; if swollen, this swelling uniform or expansion distal ----- 143
- 137 (136) Scape completely gray pollinose with distinct dorsal notch near apex (fig. 88) (North India, Pakistan)
kashmirensis, new species
 Scape not like this ----- 138
- 138 (137) Pale area in front of scutellum extending anteriorly as pair of sublateral triangles half way to transverse suture (South India) ----- *marceli*, new species
 Pale area in front of scutellum a rather narrow band, without extensions half way to transverse suture ---- 139
- 139 (138) Subapical band of wing double (fig. 218) (Ceylon)
tessellata Ricardo
 Subapical band of wing not double (figs. 219-221) ----- 140
- 140 (139) Scape entirely dark; bands of hind tibia subequal, subapical one ringing segment (South India)
contracta, new species
 Scape almost uniformly reddish orange; hind tibia with subapical spot confined to outer surface ----- 141
- 141 (140) Scape distinctly longer than width of frons at vertex (fig. 92); subapical band of wing complete, rather regular (fig. 220) (South India) ----- *montana* Ricardo
 Scape not longer than width of frons at vertex, usually shorter (fig. 93); subapical band of wing broken and irregular (fig. 221) (South India)
hindostani Ricardo (in part)
- 142 (136) Scape black to dark reddish brown, rarely paler, shiny or subshiny, rather short and stout, usually not expanded distally ----- 143
 Scape slender or expanded distally, yellow or yellowish gray, usually not distinctly shiny, or if darker, rather long ----- 151
- 143 (142) Hind margin of wing with pale spots in some or all posterior cells; spots of upper parafacial slightly fused below ----- 144
 Hind margin of wing without pale spots (fig. 222); spotting of upper parafacial uniform without fusion of spots (fig. 94) (South China) ----- *gregoryi*, new species
- 144 (143) Scutellum dark with strong gray discal spot that scarcely reaches hind margin; two strong U-shaped gray spots on hind margin of scutum and prominent gray spots behind transverse suture (South India) - *pattoni*, new species
 Thoracic pattern not entirely as this ----- 145

- 145 (144) Pale area on hind margin of scutum reaching half way to transverse suture medially and yellowish anteriorly (see couplet 70) ----- *flavipuncta*, new species (in part)
 Pale area on hind margin of scutum, if present, not prolonged forward ----- 146
- 146 (145) Hind margin of wing rather continuously pale; abdomen with middorsal and lateral gray stripes (South India) ----- *striata*, new species
 Spots of hind margin of wing discontinuous; abdomen with no more than faint median row of triangles and no lateral gray stripes ----- 147
- 147 (146) Scape entirely orange, shiny (Burma, Thailand) -----
taunggyiensis, new species
 Scape black, at least laterally ----- 148
- 148 (147) Hind margin of scutum with distinct gray area including prescutellar sclerite; scape often reddish on inner surface (South India) ----- *echma*, new species
 Hind margin of scutum entirely dark or at most with small crescentic spots not including prescutellar sclerite; scape uniformly dark (East India) ----- 149
- 149 (148) Abdomen with distinct middorsal row of triangles and large sublateral spots on terga III-VI (Nepal) -----
nepalensis, new species
 Abdomen with no pale middorsal triangles or sublateral spots ----- 150
- 150 (149) Subapical band of wing partially doubled, consisting of overlapping bands sometimes broken into spots (fig. 150); lower part of head with pronounced brown area; hind basitarsus not more than half white (see couplet 34) ----- *bilineata* Ricardo (in part)
 Subapical band coarse, sinuous, not doubled; all wing spots coarser (fig. 227); no pronounced brown area on lower part of head; hind basitarsus more than half pale (India) ----- *schmidi*, new species
- 151 (142) Paired frontal spots weak and indistinct, or irregularly shaped, slightly vertical streaks (figs. 27, 72) ----- 152
 Paired frontal spots black, sharply defined although sometimes small, transverse, spherical, or subquadrate ---- 154
- 152 (151) Scape short, distinctly expanded distally (fig. 27); abdomen with prominent pattern of median stripe and sublateral spots (see couplet 38) -----
fletcheri, new species (in part)
 Scape longer, not strongly expanded distally (fig. 72); abdomen not strongly patterned ----- 153
- 153 (152) Wing with several large pale triangles on posterior margin (fig. 228) (South India) ----- *chvalai*, new species
 Hind margin of wing with at most very small faint marginal spots (fig. 201) (see couplet 113) -----
paucipunctata Schuurmans Stekhoven (in part)

- 154 (151) Scutellum gray basally, posterior margin brown (see couplet 80) ----- *abacis* (Philip) (in part)
 Scutellum dark brown to yellow with median gray, if present, reaching apex ----- 155
- 155 (154) Subapical band of wing double, outer part sometimes very faint or broken ----- 156
 Subapical band of wing single ----- 158
- 156 (155) Wing pattern coarse with rather distinct transverse band basad of stigma (South China ----- *mokanshanensis* Ouchi
 Wing pattern composed of many fine spots without broad transverse band ----- 157
- 157 (156) Scape subequal to width of frons at vertex (fig. 101); abdomen with three distinct rows of linear spots, middle row forming nearly continuous stripe (Ceylon) ----- *cingalensis* Ricardo
 Scape distinctly shorter than width of frons at vertex (fig. 102); abdomen with only trace of spots (Borneo) ----- *clarkeana*, new species
- 158 (155) Subcallar area with cleft but no dark spot ----- 159
 Subcallar area with or without cleft but with distinct reddish-brown to black spot ----- 162
- 159 (158) Hind margin of wing with pale triangles in most cells; wing pattern rather coarse, distinct (fig. 231) (India) ----- *zophara*, new species
 Hind margin of wing without pale triangles; wing pattern fine, indistinct (figs. 233-235) ----- 160
- 160 (159) Abdomen with strong middorsal gray stripe and gray lateral border; frontal callus yellow; upper parafacial punctations extending along eye border (fig. 104) (East India) ----- *sparsa*, new species
 Abdomen without broad middorsal stripe; frontal callus dark; upper parafacial punctations extending from eye toward face ----- 161
- 161 (160) Rather stocky brownish species; usually no midfrontal spot; legs bright yellow (East India) ----- *immaculata* Ricardo
 Slender grayish species; distinct midfrontal spot; legs dark brownish (see couplet 58) ----- *libera*, new species (in part)
- 162 (158) Interantennal spot rusty brown; scape rather long, slender, slightly expanded distally (fig. 107); hind margin of wing without pale spots (fig. 200); hind margin of scutum without pale band (see couplet 113) ----- *irrorata* Macquart (in part)
 Interantennal spot if small, black; scape short or other characters differ ----- 163
- 163 (162) Scape distinctly expanded distally, usually rather short (figs. 108-112, 116) ----- 164
 Scape not expanded distally, variable in length ----- 170
- 164 (163) Scape yellow, scarcely or not at all shiny, distal expansion gradual (figs. 108, 109, 116) ----- 165
 Scape yellow to blackish, rather distinctly shiny, distal part slightly bulbous (figs. 110-112) ----- 168

- 165 (164) No distinct gray band on hind margin of scutum ----- 166
 Distinct gray band on hind margin of scutum ----- 167
- 166 (165) Scape less than twice as long as distal height; flagellum
 not particularly slender; frontal callus scarcely more
 than twice as wide as high (fig. 108) (Vietnam) *badia* Philip
 Scape usually more than twice as long as distal height;
 flagellum distinctly more slender; callus wider in rela-
 tion to height (fig. 109) (India) ----- *hardyi*, new species
- 167 (165) Small, rather stocky species; palpus noticeably swollen
 basally; scutellum gray discally (India) -- *melloi*, new species
 Larger, slender species; palpus not noticeably swollen
 basally; scutellum mostly dark brown (Laos, Thailand,
 Vietnam) ----- *helviverter*, new species (in part)
- 168 (164) Posterior margin of scutum with strong pale band includ-
 ing prescutellar sclerite; scape distinctly shorter than
 first flagellomere, blackish (fig. 110) (Sumatra) *cristata* Schuurmans Stekhoven
 Scutum scarcely paler posteriorly than scutellum; prescutel-
 lar sclerite dark; scape subequal to first flagellomere
 in length, yellow (figs. 111, 112) ----- 169
- 169 (168) Both bands of hind tibia narrow, yellowish, indistinct, first
 well separated from base; abdomen with distinct mid-
 dorsal row of rather broad yellowish triangles (East
 India, Nepal) ----- *philipi* Chvala
 Hind tibia with basal band broad, reaching base, subapical
 band narrow, scarcely complete; abdomen at most with
 grayish triangle on tergum II and slender gray stripe
 beyond (South China) ----- *chekiangensis* Ouchi
- 170 (163) Some posterior cells with marginal triangles; subapical
 band reaching hind margin although sometimes broken
 (figs. 221, 240-244) ----- 171
 Posterior cells with at most one or two very small flecks
 at margin; subapical band not reaching hind margin
 (figs. 245-246) ----- 178
- 171 (170) Clean specimens with sublateral spots on posterior terga - 172
 Abdomen with pale incisures with or without usually faint
 middorsal stripe but no sublateral spots ----- 174
- 172 (171) Subapical band of wing very irregular, spots usually
 disconnected (fig. 221); scape rather shiny, usually
 slightly swollen basally; frontal callus with upper
 margin straight except for small median projection
 (fig. 93) (see couplet 141) ---- *hindostani* Ricardo (in part)
 Subapical band of wing nearly straight, complete; scape
 cylindrical; frontal callus convex above (figs. 113, 114) 173
- 173 (172) Small, wing 7-8.5 mm; triangles on hind margin of wing
 small (fig. 240) (Laos, Thailand) -- *thurmanorum*, new species
 Larger, wing about 10.5 mm; triangles on hind margin of
 wing large (fig. 241) (South China) -- *yungani*, new species

- 174 (171) Small species with finely punctate wing and strong complete subapical band (fig. 194); paired frontal spots large and space between equal to one spot (fig. 68); abdomen with pale incisures only; hind margin of scutum not gray (see couplet 106)
albofasciatipennis Brunetti (in part)
 Not with this combination of characters ----- 175
- 175 (174) Small species, wing about 6 mm long; wing pattern coarse (fig. 242) (South India) ----- *inconspicua* Ricardo
 Larger, wing 8-11 mm long; wing pattern finer ----- 176
- 176 (175) All posterior cells with pale marginal spots; callus with straight margin above; strong midfrontal spot (see couplet 106) ----- *fasciata* Ricardo (in part)
 One or more posterior cells without marginal spot; callus convex above or midfrontal spot absent ----- 177
- 177 (176) Frontal callus with upper margin usually strongly convex, semicircular, weakly protuberant, finely roughened centrally (fig. 116); darkened area of upper parafacial distinctly broken when viewed from side (see couplet 167) ----- *helviventer*, new species (in part)
 Frontal callus with upper margin straighter often with small middorsal projection, shiny, more protuberant, median part irregular but not finely roughened (fig. 117); dark area of upper parafacial when viewed from side solidly brown (Vietnam) -- *spenceri*, new species
- 178 (170) Brownish; fore tibia with two distinct pale bands; fore coxa uniformly brownish (Southwest India)
adusta, new species
 Blackish; fore tibia with single white basal band; fore coxa gray with apex narrowly dark brown (Burma, Laos, Thailand) ----- *burtoni*, new species
- 179 (52) Wing almost entirely infuscated except for broad subapical band narrowest anteriorly and irregular blotch backward from end of subcosta not reaching hind margin (fig. 247) (Borneo) -- *bizonata* Schuurmans Stekhoven
 Wing pattern not like this ----- 180
- 180 (179) Wing pattern consisting of continuous pale streaks paralleling most veins; hind margin of wing entirely pale from middle of cell R_4 to base (fig. 248) (South India) ----- *alyta*, new species
 Wing with basal cells and basal half of first posterior cell mostly pale but without pale streaks bordering veins; hind margin of wing not entirely pale (Java)
maculata Meijere

Tribe Haematopotini

As in other members of the subfamily Tabaninae the hind tibial spurs are absent and as in most there are no ocelli. This tribe differs from the tribe Tabanini in having the female frons never more than twice as long as broad and often broader than long,

either largely shiny or more usually pollinose with two or three velvety dark spots sometimes fused; frontal callus usually transverse; wings nearly always patterned with irregular paler marks often forming rosettes or with transverse or oblique bands.

Genus *Hippocentroides* Philip

Hippocentroides Philip, 1961, p. 82. Type-species, *desmotes* Philip, by monotypy.

This genus is characterized in the female by having the eyes, when relaxed, greenish with lower border and three straight bands purple; frons with large dark callus and above this mostly dark, shiny, with only one or two pairs of pollinose spots; pair of shiny yellow triangles below callus but with no pollinose interantennal spot; antenna slender, scape only about four times length of pedicel and about two-thirds length of first flagellomere; palpus slightly thickened basally, pollinose; thorax and abdomen mostly rather dark, subshiny, pleuron with longitudinal grayish stripes and abdomen with rather wide grayish incisures; wing brown with pattern of six more or less complete bands but no rosettes of spots; basal section of vein R_1 distinctly longer than spur vein; midtibia, hind tibia, and tarsi pale yellowish. Male has gray frons nearly covered by bilobed yellow callus; upper facets of eye bright brown, lower facets dark green with single straight purplish stripe.

This description is based on the type-species, known only from the female, and the description of *striatipennis* (Brunetti), known only in the male. The most characteristic features are transversely banded wings, straight bands of eyes, short spur vein in relation to basal section of vein R_1 , and mostly yellowish midtibia, hind tibia, and tarsi.

Descriptions of *Hippocentroides* Species

Hippocentroides desmotes Philip

(Figs. 1, 122)

Hippocentroides desmotes Philip, 1961, p. 82.

Type.—Kanchrapara, Bengal (AMNH).

Female.—Length 7–8 mm; wing 6–7 mm; antenna 1.8–2 mm. Frons mostly shiny with grayish pollinose area near eyes above callus; width at vertex about 0.83 of height, slightly widened below; callus dark reddish brown, slightly protuberant, broadly

angulate above, shallowly concave below, touching eyes, about 2.5 times as wide as high; pair of shiny triangles below; no inter-antennal dark spot; face and parafacials dark grayish brown without definite pattern. Scape yellow, slender, about three times as long as thick; pedicel stout without dorsal projection; flagellum long and slender, darkened beyond base. Palpus stout basally, dark brown with dark hair. Thorax dark brown; indications of pair of pale triangles behind transverse suture and pair of gray stripes on posterior part of scutum and gray stripe on upper pleuron. Wings brown with six nearly complete rather broad pale bands and partial band across end of first two posterior cells. Halter knob dark brown. Coxae and femora brown; fore tibia yellowish on basal half, brown beyond; fore tarsus brown; mid-tibia and hind tibia pale yellow; mid tarsus and hind tarsus mostly pale. Abdomen dark reddish brown.

Distribution.—India (Bengal), Nepal.

In addition to the type we have seen a female from Amlakghani, Nepal, 580 m, June 19, 1956, Shannon trap, E. I. Coher. This specimen is cleaner than the type, showing more gray striping on the thorax and broad gray incisures on the shiny abdomen; the shiny triangles below the callus are contrastingly yellow; the distal bands of the wing are slightly fused posteriorly, and the short band in the first two posterior cells is merged with the fusion. The wing of the type was figured originally; that shown here is from the Nepal specimen.

This species differs from *striatipennis* in having the pale bands of the wing much broader and all reaching the hind margin of the wing. It does not seem likely that so different a wing pattern is the result of sexual dimorphism.

***Hippocentroides striatipennis* (Brunetti), new combination**

Haematopota striatipennis Brunetti, 1912, p. 460 (as *Haematopotas triatipennis*, misplacement of letter); Senior-White, 1922a, p. 107; 1927, p. 16.

Type.—Dehra Dun, foot of Mussoorie Hills, Western Himalayas (BM).

Male.—Length 8 mm. Upper large facets of eye bright brown, lower small ones dark with narrow violet band; frontal triangle gray with bilobed yellow callus above antennae; face gray with dark hair; parafacials gray. Antenna yellow, darkened distally; scape half length of flagellum, cylindrical flagellum slender. Palpus pale yellowish brown with black hair. Thorax dark gray, apparently unstriped; sides of scutellum slightly yellowish. Wings gray

with six slender, irregular transverse pale bands including sub-apical band; two small streaks across first and second posterior cells; subapical band nearly reaching hind margin; band just beyond stigma reaching anterior margin but not posterior; all other bands reach neither margin. Halter dark. Coxae dark gray, fore coxa little paler; femora dark brown; tibiae brownish yellow, fore tibia with apical half dark; fore tarsus black; midtarsus and hind tarsus brownish yellow. Abdomen dark reddish brown with dark hair, basal half tinged with yellow laterally; venter also dark with less hair.

Distribution.—Northwest India.

This species is known only from the type locality. It very closely resembles *desmotes*, which may be the female of *striatipennis*, but the much broader more regular wing bands, all reaching the hind margin of *desmotes*, make the synonymy very doubtful.

Genus *Haematopota* Meigen

Chrysosoma Meigen, 1800, p. 23. Type-species, *Tabanus pluvialis* Linnaeus, by designation of Coquillett, 1910, p. 524. Suppressed by International Commission on Zoological Nomenclature, 1962.

Haematopota Meigen, 1803, p. 267. Type-species, *Tabanus pluvialis*, by monotypy.

Potisu Surcouf, 1909, p. 454. Type-species, *Haematopota pachycera* Bigot, by original designation.

This genus differs from *Hippocentroides* in the female by having the eyes when relaxed purple or coppery green with narrow sinuous green or brown bands; frons usually mostly pollinose with usually pair of velvety dark spots above frontal callus and often small midfrontal spot above these; wing usually rather dark with pattern of paler spots or irregular marks usually forming two or three distinct rosettes on disk of wing, or with oblique band with other scattered marks; midtibia, hind tibia, and tarsi partially or entirely dark.

Descriptions of *Haematopota* Species

Haematopota abacis (Philip)

(Figs. 50, 173, 174)

Chrysosoma abacis Philip, 1960a, p. 29.

Haematopota obscurata Philip, (preocc. by Bigot, 1891), 1963, p. 529; 1965, p. 378 (teratoid wing); 1969, p. 198 (synonymy).

Types.—*abacis*, Thailand (CBP); *obscurata*, 30 km northwest of Pleiku, 300 m, Vietnam (BBM).

Female.—Length 8–10 mm; wing 6–7.5 mm; antenna 1.7–2.2 mm. Frons gray, the height and width subequal, scarcely widened below; midfrontal spot small, sometimes scarcely visible, brownish to black; paired spots subquadrate, touching or narrowly separated from eyes, separate from callus; callus reddish brown to black, almost six times as wide as high, touching eyes; upper margin nearly straight with small middorsal point; lower margin broadly concave centrally; subcallar area with velvety brown or black pollinose interantennal spot, usually well developed; face and parafacials gray, sometimes with pair of dark spots on upper face; parafacials with irregular dark markings above. Scape yellow brown, subshiny, with black hair, cylindrical, usually slightly irregular in outline, 2.5 to 4.5 times as long as thick; pedicel yellowish to grayish with black hair and small dorsal projection; flagellum long and slender, yellowish brown, style dark; first flagellomere subequal in length to scape. Palpus grayish yellow brown with mixed dark and pale hair. Scutum dark brown with rather distinct graying anteriorly and laterally, with three indistinct gray stripes anteriorly not forming pair of spots behind transverse suture, and some graying anterior to scutellum; latter in clean specimens with distinct gray area anteriorly; pleuron gray. Wings yellow brown with pale markings in usual pattern; subapical band usually complete and rather broad, sometimes slender and broken; hind margin quite variable, often with most of posterior cells with gray triangles at margin, sometimes these absent or indistinct. Halter knob brown. Legs mostly grayish brown, midfemur and hind femur often paler; fore tibia white on basal third; midtibia with two pale bands; hind tibia with two pale bands or dark intervening band indistinct, leaving all but apex pale; hind basitarsus weakly paler basally. Abdomen dark brown with narrow pale incisures, usually elongate gray triangle on tergum II, and sometimes with indistinct median stripe or with indistinct sublateral spots on posterior terga.

Male.—(*obscurata* allotype).—"Eyes bare, upper facets not as enlarged as usual but occupying about the upper $\frac{2}{3}$. No visible occipital tubercle. Frontal triangle small, buff gray pollinose, taller interantennal spot than in holotype, antennal segments proportionately shorter and thicker, and apical band a little heavier. Though more worn, other characters agree with holotype. Length of body: 8.5 mm."

Distribution.—Cambodia, Laos, Thailand, Vietnam.

Other localities from which we have seen specimens are CAMBODIA: Kiri Rom, 700 m; LAOS: Vientiane and Sedone Provin-

ces; THAILAND: Chanthaburi; Mee Fack; Upper Pram R.; Loei Province, Dan Sai District; Saraburi Province, Muak Lok District; Nakhon Ratchasima Province, Pak Chang District, Klang Dong Canton; Chiang Mai Province, Huai Kaeo; VIETNAM: Bien Hoa; 20 km north of Pleiku, 650 m. All the dated specimens (66) were collected between March 20 and June 25.⁴

This is an extremely variable species and may prove to consist of more than one taxon, but we have been unable to clearly define such entities. Seven of our eight specimens collected at Chanthaburi, one out of nine topotypes of *obscurata*, and one of two from 20 km north of Pleiku had the hind tibia mostly white without a central dark band. Even more variable is the wing pattern. In typical *abacis* the hind margin of the wing has no pale spots, and in most of such specimens, although not the holotype, the subapical band of the wing is slender and broken. Much more commonly there is a rather continuous border of pale triangles in most or all the posterior cells and the subapical band is strong and complete. To this form Philip gave the name *obscurata*, but because of intermediate forms and our difficulty in distinguishing any but the extremes we are not proposing a new name for *obscurata* Philip. The typical form slightly resembles *immaculata* or *irrorata*, but the scutellum of *immaculata* is not bicolored and the paired frontal spots are very small, and *irrorata* has a proportionately much narrower frons and callus (fig. 107). *H. jiri* is close to *abacis*, and we have seen only one fragmentary specimen, but *jiri* appears to have a less transverse and not as dark frontal callus, stouter, shinier scape, more slender palpus, scutellum with hind, not fore margin gray, and base of abdomen both dorsally and ventrally more reddish brown.

Haematopota abatrata Philip

(Figs. 14, 136)

Haematopota atrata Philip, 1963, p. 521 (preocc. by Szilady, 1926).

Haematopota abatrata Philip, 1969, p. 198.

Type.—25 km southwest of Pleiku, Vietnam (BBM).

Male.—Length 10–11 mm; wing 9–9.5 mm; antenna 2 mm. Upper part of eye with large facets, rather sharply differentiated from small ventral facets; frons a slender brownish pollinose triangle above a small, shiny, bilobed subcallus and below this a velvety black spot; narrow brown pollinose triangle between eyes and

⁴Throughout this bulletin all information pertaining to material examined is given essentially as it appeared on the insect labels.

antenna; upper face and parafacials nearly to bottom of eye velvety black; lower face and parafacials gray; beard yellow. Scape swollen, shiny, black with black hair; pedicel and flagellum reddish; scape and flagellum subequal in length; first flagellomere compressed, about twice as long as high; style slightly shorter than height of first flagellomere. Palpus yellowish brown, slightly darkened ventrally. Thorax and abdomen almost uniformly black, posterior lateral corners of terga II-III grayish; hairs of body mostly dark. Wing dark, rosettes consisting of slender, separated spots; subapical band broad, complete; marginal triangles in posterior cells narrow, confluent. Halter brown. Legs black, femora and tibiae heavily clothed with long black hair; small, faint pale mark at base of fore tibia, midtibia and hind tibia with two very faint bands.

Distribution.—Thailand, Vietnam.

Three males of this species have been collected in Thailand, as follows: 17 km northwest of Loei, March 14, 1967, R. R. Pinger; 12-15 km northwest of Loei, April 14, 1969, J. J. S. Burton; Khlong Yai, Mu Si Canton, Pak Chong District, Nakhon Ratchasima Province, June 17, 1969, G. R. Ballmer.

We have been unable to discover any female that might belong to this species.

***Haematopota abbreviata* (Philip), new combination**

(Figs. 86, 214)

Chrysozona abbreviata Philip, 1959, p. 615.

Type.—♀. Manila suburbs, Luzon (CBP).

Female.—Length 8.5-10 mm; wing 7.5-10 mm; antenna 2.3-2.5 mm. Frons yellowish gray, about 0.7 times as wide as high, slightly widened below; midfrontal spot small but distinct; paired spots large, subquadrate, touching eyes and scarcely separated from callus; callus large, protuberant, shiny dark brown to black, about twice as wide as high, touching eyes, upper margin strongly convex, lower margin when visible shallowly concave, but ordinarily completely fused with shiny, triangular, subcallar area running down between bases of antennae, with no dark inter-antennal spot; face and parafacials grayish brown, upper parafaciali with, at most, very fine darker speckling; beard pale. Scape orange brown, long, slender, cylindrical; pedicel short with black hair, dorsal projection very short; flagellum long and slender, orange brown, darkened distally. Palpus grayish yellow with long dark hair and some pale hair ventrally. Notum dark brown with indistinct pattern; humerus paler; some indication of pair of pale

stripes forming small spots behind transverse suture, and pair of crescentic pale marks in front of scutellum; pleuron gray. Wings brown with pale spots in usual pattern; subapical band consisting of three irregular spots, sometimes appearing as partial double bands; distinct pale spot immediately posterior to furcation; pale triangles usually present in all posterior cells. Halter knob yellowish brown. Legs reddish brown; fore coxa pale on basal half; fore tibia with subbasal white band about one-third of segment; midtibia and hind tibia each with two subequal pale bands; hind basitarsus weakly paler basally. Abdomen dark brown; dorsum with distinct narrow, pale incisures; venter dark brown with very narrow pale incisures.

Male.—Similar to female except for usual sexual differences; general color paler; distinct interantennal black opaque spot and no shiny area on frontal triangle; large and small facets of eye sharply demarcated.

Distribution.—Philippines (Luzon).

The specimen referred to as *Chrysozona* sp., following the original description of *abbreviata*, from Irisan, Benguet Province, appears sufficiently close to be *abbreviata*. The species that Kroeber (1924, p. 11) called "Chrys. spec. aff. *irrorata* Macq.)" is also probably *abbreviata* as he refers to paired spots on the frons, which are distinctly confluent in other related Philippine species. In addition to the type series we have seen the Irisan specimen and others as follows: 1 ♀, Gatteran, VII.15.45, B. B. Sugerman; 1 ♀, Los Banos, VI-VII.17, F. X. Williams; 1 ♀, same, May 28, 1959, F. B. Colora; 1 ♂, same, Mar.-June 1925, Pemberton; 1 ♀, Subic Bay, VI.1907, J. C. Thompson.

This species is close to *monticola* and *volneri*, both of which, however, have gray area on scutellum and diffused and slightly confluent paired frontal spots; in addition, *volneri* lacks pale spots on hind margin of wing; it is also close to *holtmanni*, differing by characters mentioned after that species description.

Haematopota achlys, new species

(Figs. 55, 180)

Holotype, female, Forest Camp, 19 km north of Kalabakan, North Borneo (SE), 60 m, October 30, 1962, Y. Hirashima (BBM). Paratypes: NORTH BORNEO: 175 ♀, same locality as holotype, Y. Hirashima or K. J. Kuncheria, 1962: October 16, 17, 21, 22, 25-31, November 1, 4, 6, 7, 14, 18, 21; 1 ♀, Sandakan Residency, Gomantang Caves, 21 miles south of Sandakan, November 22-26, 1958, T. C. Maa; 1 ♀, Samawang, near Sandakan,

July 12, 1927; 1 ♀, Bettotan, near Sandakan, August 10, 1927. MALAYA: 2 ♀, Pahang, Kuala Terengan, 220 m, December 17, 1958, and King George V National Park, Gua Che Yatik, December 16, 1968, J. L. Gressitt; 1 ♀, Negri Sombilan, Bukit Tinggi, January 17, 1930, H. M. Pendlebury. SUMATRA: 2 ♀, November 26, 1967, W. Diehl. (BBM, BM, CBP, MCZ, MZB, USNM, ZCBS)

Female.—Length 8.5–10 mm; wing 8–10 mm; antenna 1.8–2 mm. Frons dark grayish, nearly twice as high as width at vertex, slightly widened below; midfrontal and paired dark spots fused into triangular or cordate black spot with apex dorsal; callus large, touching eyes, about 0.8 times as high as wide, with upper margin convex and straight, lower margin shiny, smooth, yellowish brown to dark brown; subcallar area with small shiny triangle, weakly cleft; no interantennal velvety spot; face and parafacials gray with no dark spots; beard sparse, pale. Antenna yellow orange, style darker; scape slender, slightly expanded distally with dark hair; flagellum long, slender, tapered. Palpus dull yellow with black and pale hair. Scutum nearly uniformly yellow brown with striping indistinct, clothed with mostly yellowish hair; scutellum slightly paler on disk; pleuron nearly uniformly grayish brown. Wing brown with small whitish spots in usual pattern; costal cell pale; subapical band small, not reaching hind margin; small triangles in all posterior cells. Halter yellow, sometimes slightly darkened. Fore coxa pale brown, femur dark brown; tibia white, distal one-fourth to two-fifths dark; tarsus dark; midleg and hind leg almost uniformly yellowish brown, tibia and tarsus slightly darkened. Abdomen dorsally dark brown with narrow pale-brown incisures; venter reddish brown with grayish areas laterally; dorsum dark haired except on incisures, venter mostly pale haired.

Distribution.—Borneo, Malaya, Sumatra.

This species is close to *malayensis* and *kerri* but can be recognized by uniformly dark midtibia and hind tibia. It is also generally larger than *malayensis*.

The name is the Greek noun meaning mist or darkness, referring to the dusky appearance of the species.

Haematopota adusta, new species

(Figs. 118, 245)

Holotype, female, Taliparamba, north Malabar, 15.IX.23, on bullock, P. V. Isaac (BM). Paratypes, 5 ♀, same data as holotype but also 10 and 16.IX.23, and Gersoppa, north Canara, India, 7, IX 1907, T. R. Bell (BM, USNM).

Female.—Length 11–11.5 mm; wing 9–9.5 mm; antenna 1.8 mm. General color yellowish brown. Frons yellow brown, height and width subequal, nearly parallel-sided; midfrontal spot small, indistinct; paired spots velvety brown, small, well separated from both eye and callus; callus yellowish brown, 3–3.5 times as wide as high, just touching eye at lower corner or narrowly separated; upper and lower margins nearly straight; subcaller spot brownish, with small cleft; face and parafacials grayish, slightly more yellowish above; upper parafacial with small brownish spots and small crescentic concentration of spots near eye at lower margin of upper parafacial. Antenna nearly uniformly yellowish brown; scape slender, cylindrical, subequal to first flagellomere in length; pedicel short with short dorsal projection; flagellum slender. Palpus yellow brown with black hair. Notum brown, humeri, three faint slender stripes, and indistinct markings anterior to scutellum paler; pleuron uniformly grayish brown with pale brownish hair. Wing brown with slender pale markings consisting of subapical band not reaching hind margin, three distinct rosettes, and series of transverse marks in posterior cells some distance from hind margin. Halter knob brown. Legs yellow brown; all tibiae with two pale bands. Dorsum of abdomen brown with narrow pale incisures; venter slightly paler.

Distribution.—India (southwest coast).

This species is readily recognizable by its large size, general yellow brown, and two pale rings on all tibiae.

The name is the Latin adjective for "burnt by the sun, brown, tanned."

***Haematopota albihaltes*, new species**

(Figs. 10, 132)

Holotype, male, Loei Province, Thailand 17° 29' N, 101° 44' E, from tree, May 21, 1969, C. Dettongchai (CU). Paratypes: 1 ♂, Dan Sai District, Loei Province, Thailand 17° 16' N, 101° 09' E, about light, June 10, 1969, Dettongchai; 1 ♂, Pakse, Sedone Province, Laos, light trap, May 31, 1967. (BBM, CU)

Male.—Length 10 mm; wing 8 mm; antenna 2.1–2.2 mm. Upper large-faceted part of eye yellowish brown with central darker band; lower small facets dark brown; frontal triangle gray pollinose; callus dark brown, reaching to lateral edge of scape; rather small brownish interantennal spot; upper parafacial solidly black tapered laterally; lower parafacial and face pale; beard concolorous. Scape shiny black, nearly 2.5 times as long as thick, cylindrical, base abruptly narrowed, apex with slender dorsal hair tuft;

pedicel with long slender dorsal projection, shorter ventral one; flagellum brown, strongly compressed, first flagellomere higher than length of style, and flagellum shorter than scape. Palpus grayish brown, tapered to acute apex. Scutum dark brown with humerus, three indistinct stripes anteriorly and band across hind margin pale; scutellum black; pleuron gray, lower anepisternum brown. Wing dark brown with oblique irregular band from behind stigma to apex of anal cell; subapical band complete, strong, widened posteriorly; apex of first posterior cell solidly white, pale triangles in posterior cells 2, 3, and 5; yellowish bands across cells R and M merging behind. Halter entirely white. Legs almost completely black; fore coxa pale basally and two very indistinct brownish bands on each midtibia and hind tibia; midtarsus pale basally; hind femur and tibia with long black hair fringes; hind tibia slightly thickened. Abdomen mostly black with no pale incisures; first tergum narrowly and second rather broadly paler laterally; first and second sterna nearly white, rest of venter black.

Distribution.—Laos, Thailand.

We have seen no female with which this can be associated nor does it closely resemble any.

The name refers to the entirely white halter, which contrasts with the partially darkened halter of *u-nigrum*.

***Haematopota albimanica*, new species**

(Figs. 51, 175)

Haematopota angustisegmentata Schuurmans Stekhoven: Philip, 1963, p. 520 (in part, Vietnam).

Holotype, female, Mt. Sontra, about 500 m, Quang Nam, Vietnam, March 13, 1966, landing on human, F. S. Santana (USNM No. 72017). Paratypes: VIETNAM: 2 ♀, same data as holotype; 9 ♀, 20 km north of Pleiku, 650 m, May 9, 1960, L. M. Quate; 1 ♀, Pleiku, 700 m, May 8–14, 1960, Quate; LAOS: 1 ♀, Ban Van Eue, Vientiane Province, May 31, 1965. (BBM, BM, CBP, USNM)

Female.—Length 7.5–9 mm; wing 7.5–8 mm; antenna 2.2–2.4 mm. Frons rather dark gray, about 1.5 times as high as width at vertex, slightly widened below; midfrontal spot distinct, black; paired spots rather variable in shape, touching eyes, narrowly separated from callus; callus black, protuberant, 2.5 to 3 times as wide as high, touching eyes, upper margin nearly straight or broadly convex, sometimes with low middorsal angle, lower mar-

gin nearly straight; distinct black interantennal spot; face and parafacials gray, upper parafacial with some dark-brown speckling; beard white. Scape reddish brown with black hair, cylindrical, about three times as long as thick; pedicel short with short dorsal projection; flagellum dark except at base, first flagellomere as long or slightly shorter than scape. Palpus gray with mixed black and pale hair. Scutum dark brown very faintly striped; distinct gray band on posterior margin including prescutellar sclerite; scutellum dark; pleuron entirely gray. Wings gray brown, with small spots in usual pattern; subapical band narrow, usually complete, nearly straight or slightly sinuous; all posterior cells with strong gray triangles at margin, or that in cell 4 very small or lacking. Halter knob dark. Fore coxa gray except for brown distal fourth; fore femur dark brown with some grayish basally and posteriorly; midfemur and hind femur reddish gray, darkened distally; all tibiae two-thirds to three-fourths white, midtibia and hind tibia sometimes (type and topotypes) with some dark encroaching on white part making partial double band; base of midtarsus and hind tarsus indistinctly pale. Abdomen dark brown above with only narrow yellowish incisures; venter reddish gray, darkened slightly posteriorly medially.

Distribution.—Laos, Vietnam.

The paratypes from in and near Pleiku were determined as *angustisegmentata* by Philip and are certainly close to that species, but there are slight differences, combined with remoteness from Borneo, that make this identification very doubtful. In *angustisegmentata*, no pale spot at apex of cell R; two spots near base of cell R₃ joined along anterior margin; pale marginal spots of posterior cells shorter, not running along margin so much; scape shorter in relation to first flagellomere; no median spot on frons in type specimen. It seems unlikely that the specimen from Bidang later determined by Schuurmans Stekhoven is that species.

The holotype and topotypes of *albimanica* are slightly different from the Pleiku specimens, but the agreement is rather close and they were collected only 200 km apart so that we are considering them conspecific. The Quang Nam specimens have a less regular subapical band on the wing; the fore tibia is not quite so extensively white; the midtibia and hind tibia have less white and an indication of double banding. This species also resembles *albiocrea*, which was also determined as *angustisegmentata* by Philip, but it can be easily separated by the characters given in the key.

The name is derived from the Latin *albus* + *manica*, white-sleeve.

Haematopota albimedia, new species

(Figs. 57, 183)

Holotype, female, Bhagavati, Mysore, India, P. S. Nathan (MCZ). Paratypes: 2 ♀, 2 ♂, same data as holotype; 2 ♀, same but July 31, 1938; 2 ♀, same but 1908 ft, June 28 and October 2, 1937; 4 ♀, 1 ♂, Shimoga, Mysore State, March 24, May 25, September 16, 1936; 3 ♀, same but 1865 ft, October 4 and 16, November 9, 1937 (all Nathan). (BM, CBP, CU, LZG, MCZ, USNM)

Female.—Length 8–10.5 mm; wing 7.5–8.5 mm; antenna 1.6–2 mm. Frons dark gray, width at vertex slightly greater than height, nearly parallel-sided; no midfrontal pollinose spot but often a more or less distinct, raised, subshiny inverted V above callus; paired spots rather small, subcircular, sometimes touching eyes, well separated from callus; callus dark brown, slightly reddish below at sides, about 3.5 times as wide as high, broadly touching eyes, upper margin weakly trilobed; lower margin concave centrally, slightly convex laterally; subcallar area with distinct inter-antennal dark spot; face and parafacials gray; narrow broken brownish band across middle of parafacial and top of face; parafacials above this faintly brownish with some dark stippling. Antenna yellowish, flagellum slightly darkened except at base; scape cylindrical, about three times as long as thick; pedicel short and stout with scarcely any dorsal projection; flagellum long and slender, first flagellomere compressed but not high basally, subequal in length to scape and pedicel combined. Palpus dark brownish with mostly dark hair. Scutum dark brown with five gray stripes, median one very slender; humeri pale reddish gray; scutellum dark brown; pleuron generally dark grayish. Wing gray with pale markings; subapical band complete, posteriorly joined to continuous row of pale spots along wing margin and also joined to one of submarginal row of oblique flecks; cells R and M, cell R_4 to furcation, and discal cell almost entirely pale, producing striking pale stripe on disk of wing. Halter with dark knob. Legs almost entirely dark brown, base of fore tibia with yellowish-brown band, midtibia and hind tibia also slightly paler but without distinct bands. Abdomen dark brown, dorsum with broad lateral gray stripe and faint indications of small sublateral gray spots.

Male.—Length 9–9.5 mm; wing 7.5–8 mm; antenna 1.4–1.5 mm. Large and small facets of eye sharply differentiated; frontal triangle with small triangular or trapezoidal shiny yellow spot; antenna shorter and paler than female, only extreme tip dark;

sides of abdomen more yellowish brown than gray; no sublateral spots. Otherwise essentially like female.

Distribution.—India (Mysore).

This species is readily distinguished by its dark color, broad frons, and very distinctive central pale stripe on the wing. It falls into the *denshamii*-group of the Ethiopian region but differs from all the species keyed by Oldroyd (1952) in that group.

***Haematopota albiocrea*, new species**

(Figs. 52, 184)

Chrysozona angustisegmentata (Schuurmans Stekhoven): Philip, 1960b, p. 60 (Malaya).

Haematopota angustisegmentata Schuurmans Stekhoven: Philip, 1963, p. 520 (Malaya).

Holotype, female, Malaya, Perak, Batang Padang, Jor Camp, 1,800 ft, March 9, 1924, H. M. Pendlebury (BM). Paratypes: All Malaya and all collected by Pendlebury except as noted: 2 ♀, same data as holotype; 4 ♀, same, but March 10, 1924, and March 3, 16, 1925; 4 ♀, Pahang, Lubok Tamang, 3,500 ft, March 5, 10, 28, 1924; 2 ♀, Pahang, Balu Balai, Jerantut, March 19, 1927; 1 ♀, Kedah, near Jitra catchment area, April 4, 1928; 1 ♀, Selangor, Bukit Kutu, 3,500 ft, March 10, 1931; 1 ♀, Selangor, 16 m. Ulu Gombak, March 1956, W. W. MacDonald; 1 ♀, Ulu Gombak, Selangor, March 12, 1958, W. W. M.; 1 ♀, east coast Malay Peninsula, Tioman I., June–July 1916, HCR and CBK. (BM, CBP, MCZ, USNM)

Female.—Length 7–8 mm; wing 7–7.5 mm; antenna 1.8–2 mm. Frons brownish gray, about two-thirds as wide at vertex as high, slightly divergent below; midfrontal spot small, black; paired spots rather large, nearly round, touching eyes and nearly touching callus; callus dark brown to black, broadly touching eyes, upper margin usually with strong, acute, median projection, lower margin nearly straight; dark-brown interantennal spot, finely cleft below; face and parafacials gray, upper parafacial with dark-brown area, broken by pale area in certain lights; beard pale. Scape shiny yellow orange, cylindrical, slightly swollen in basal third, with dark hair, sparse on dorsum; pedicel dark with distinct dorsal projection; flagellum dark brown, slender, tapering, about 1.2 times as long as scape. Palpus rather slender, grayish brown with mostly dark hair. Notum dark brown, humeral area, hind margin of scutum, and prescutellar sclerite gray; three slender gray stripes and pair of spots posterior to transverse

suture faintly indicated; pleuron gray with brown spot on posterior part of anepisternum. Wings brown with small pale spots in usual pattern; subapical band slender, usually complete and reaching hind margin, straight or curved inward; pale triangles at margin in all posterior cells or lacking in cell 4. Halter knob yellow, with some brown basally. Legs brown with pale markings as follows: Base of fore coxa; basal three-fourths or more of all tibiae. Abdomen dark brown dorsally with narrow pale incisures, first two slightly wider and sometimes with middorsal triangular expansion; venter brownish medially with broader gray incisures.

Distribution.—Malaya.

This is the species represented by Malayan records of *angustisegmentata*. We have not seen any specimens of *angustisegmentata* from Borneo, but the two descriptions by Schuurmans Stekhoven make identity with either Malayan or Vietnam specimens so determined doubtful. Schuurmans Stekhoven mentioned both the anterior and posterior tibiae as being half white but the white not reaching the base, whereas in *albiocrea* the tibiae are much more than half white and the white comes to the base; he also does not mention any brown spot on the anepisternum.

The name of this species is derived from the Latin *albus* + *ocrea*, white-legging.

***Haematopota albofasciatipennis* Brunetti**

(Figs. 68, 194)

Haematopota albofasciatipennis Brunetti, 1912, p. 458; Senior-White, 1927, pp. 17, 19.

Type.—♂, Bhowali (Kumaon) (IM).

Female.—Length 6–7 mm; wing 6–6.4 mm; antenna 1.5 mm. Frons gray, height and width subequal, slightly widened below; midfrontal spot minute or absent; paired spots large, black, subquadrate, touching or slightly separated from eyes and callus; callus reddish brown, 3.5 times as wide as high, touching eyes, upper and lower margins nearly straight; subcallar area with rather large blackish-brown interantennal spot; face and parafacials gray, upper face with dark marking and upper parafacials mostly brown with transverse yellowish-gray interruption. Antenna yellowish brown, distal part of flagellum darker; scape slender, cylindrical, slightly curved upward in profile; subequal to first flagellomere in length; pedicel short; flagellum slender, slightly longer than rest of antenna. Palpus brown with mixed dark- and pale-yellowish hair. Scutum brown, humerus and pre-

scutellar sclerite paler; three slender stripes anteriorly, lateral stripe expanding to rather indistinct spot behind transverse suture; pleuron gray with indistinct brown stripe. Wings brown with a pattern of many small spots in usual pattern and broad subapical band crossing wing; hind margin with nearly continuous row of shallow triangles. Halter knob yellowish brown. Legs brownish, darker distally, with white bands; fore coxa pale basally; fore tibia with subbasal white band about one-third of tibia; midtibia with two bands; hind tibia with strong basal band and narrow subapical band, usually as faint spot only. Abdomen uniformly brown with narrow pale incisures.

Male.—Not seen by us. Described in detail by Brunetti.

Distribution.—Indian Himalayas (Uttar Pradesh).

We have seen three ♀ from Darjeeling and one ♀ from Mohand, near Dehra Dun, June 22, 1908.

This is the first description of the female. The small size, contrast of small discrete wing spots and broad subapical band, large frontal spots, leg pattern, and unpatterned abdomen will distinguish it from all species we know.

***Haematopota alticola* (Philip), new combination**

(Figs. 53, 178)

Chrysozona alticola Philip, 1961, p. 85.

Type.—Mahthantir Gah, Kashmir, 4,000 m (CBP).

Female.—Length 10 mm; wing 7.5 mm; antenna 2.1 mm. Frons dark gray, paler around frontal spots and bordering eyes, height and width at vertex subequal, slightly widened below; midfrontal spot small, elongate; paired spots large, subovoid, transverse, not touching eyes or callus; callus black, about five times as wide as median height; upper margin with median notch, lateral margin abruptly, obliquely truncate so that only lower corner touches eye; lower margin concave centrally; large, triangular black interantennal spot; face and parafacials gray, face with two strong black spots above; upper parafacial rather evenly dotted with black; beard heavy, white. Scape dark, covered with gray pollinosity, cylindrical, about four times as long as thick, slightly transversely wrinkled; pedicel with dorsal projection; flagellum almost uniformly nearly black, slender, first flagellomere subequal to scape in length. Palpus stout, nearly white, with mixed black and white hair. Scutum brown; humeral callus, a broad indistinct stripe behind it, three slender central stripes, and indistinct marks on posterior margin grayish; scutellum grayish discally; pleuron

gray, heavily clothed with long white hair. Wing brown with pale pattern; subapical band sinuous, joining with oblique spot near end of first posterior cell; hind border of wing with nearly uniform slender pale border. Halter pale except for basilateral dark area. Coxae and femora gray pollinose; tibiae dark except for pale bands; fore tibia about two-fifths white, midtibia with two strong pale bands, hind tibia with basal fourth white. Abdomen mostly gray on dorsum, with four rows of irregular brown spots; venter mostly gray.

Distribution.—India (Kashmir).

This species has distinct Palaearctic affinities, having the uniformly dotted upper parafacials and the pruinose scape characteristic of so many species of that fauna. It is close to *longeantennata* Olsufiev, but the antenna of *alticola* is shorter, the wing has a distinct pale hind margin, and the hind tibia has only one distinct pale band.

Haematopota alyta, new species

(Figs. 121, 248)

Holotype, female, Cinchona, Coimbatore, Anamalai Hills, India, 3500 ft, May 1956, P. S. Nathan (CU).

Female.—Length 7 mm; wing 7.5 mm; antenna 1.8 mm. Frons grayish brown, width at vertex 0.8 of height; small pale spot in place of dark midfrontal spot; paired spots moderate in size, round, narrowly separated from eyes and callus; callus black, protuberant, 2.5 times as wide as high, broadly touching eyes, upper and lower margins nearly straight; subcallar area with large triangular black interantennal spot flanked by brownish laterally; face and parafacials gray, upper parafacial with irregular brown markings; beard white. Antenna black; scape shiny, swollen, cylindrical but constricted near middle, nearly 2.5 times as long as thick; pedicel with short dorsal projection; flagellum rather slender, first flagellomere shorter than scape. Palpus slender, grayish with mixed pale and dark hair. Notum dark brown, humerus, a pair of crescentic spots before scutellum, and pre-scutellar sclerite gray; pleuron gray with brown area centrally. Wing brown with unusual pattern consisting of pale streaks outlining most of cells; subapical band faintly indicated; continuous oblique pale streak from stigma to end of vein $R_2 + x$; hind margin of wing continuously pale from center of cell R_3 to anal area, which is broadly pale. Halter knob dark brown. Legs dark brown except for pale bands on basal half of fore coxa, basal third of fore tibia, two on midtibia, basal third of hind tibia and indistinct,

narrow subapically; midtarsus and hind tarsus pale basally. Abdomen dark brown with narrow pale incisures; tergum II with faint middorsal pale stripe; venter gray near base.

Distribution.—India (Madras).

The unusual wing pattern distinguishes this from all other oriental *Haematopota*.

The name is the Latinized Greek adjective meaning continuous, unbroken, in reference to the fusion of the spots of the wing pattern.

***Haematopota amala*, new species**

(Figs. 59, 136)

Holotype, female, Assam, Manipur, Pherjol, 900 ft, September 3, 1960, Schmid (CBP). Paratypes, 2 ♀, same data (CBP, USNM).

Female.—Length 7 mm; wing 6.5 mm; antenna 1.5 mm. Frons dark grayish; midfrontal spot very small, indistinct; paired spots black, rather large, nearly touching eye and callus, and in certain lights surrounded by narrow ring of white; callus dark brown, transverse, slightly tapered laterally to eyes, slightly flattened and wrinkled medially; subcallar area with pair of yellowish-brown, denuded triangles from callus and no velvety interantennal spot. Face light-brownish pollinose; parafacials gray, upper part a solid dark spot in lateral view but in front view this is broken into spots; beard sparse, dark brown. Antenna yellowish brown, flagellum dark except for some reddish basally; scape shiny, slender; flagellum slender; first flagellomere subequal in length to scape. Palpus brown with dark hair. Scutum dark brown with pair of gray sublateral stripes each ending in spot just behind transverse suture; pair of pale spots before scutellum, prescutellar sclerite dark; pleuron dark brown with gray marks anterior and posterior to spiracular areas, above fore coxa, and before halter base. Wing dark brown with contrasting white pattern; subapical band rather broad, complete, sinuous; pale triangles at margin in all posterior cells. Halter yellowish brown, knob darker. Legs dark brown with white as follows: Nearly basal half of fore tibia; basal third of midtibia with faint subapical yellowish band; base of first midtarsomere; basal two-fifths of hind tibia; all but apex of hind basitarsus. Abdomen dark brown with narrow gray posterior bands and grayish area laterally on terga I and II; venter dark brown, pale bands very narrow.

Distribution.—India (Assam).

This species would run to *unizonata* in Ricardo (1911) but may

be distinguished by the smaller size, presence of no more than a trace of gray posteriorly on the scutum, and the yellow shiny triangles below the frontal callus. The complete, single subapical wing band separates it from other related species.

The name is the Latinized Greek adjective meaning soft, tender, weak, in reference to the small delicate nature of this species.

Haematopota ampla, new species

Holotype, female, Ra Ham, Tonkin, April 8-9, 1929, R. E. Wheeler (MCZ).

Female.—Length 10 mm; wing 10 mm; antenna 2.2 mm. Frons gray with central brown area, truncate above, obscuring usual spots; width at vertex 0.56 of height, widened below; midfrontal spot vertical, almost reaching callus; paired spots oblique, rectangular, well separated from eyes, nearly touching dorsolateral margins of callus; callus nearly black, two-thirds as high as wide, upper margin strongly convex, lower margin shallowly concave; beneath callus a pair of shiny yellow triangles, cleft between only slightly darkened; face pale brownish gray, parafacials grayer without dark spots; beard sparse, brownish. Scape yellow brown, cylindrical, slightly expanded distally, about 2.6 times as long as distal thickness; pedicel short with no dorsal projection; flagellum long and slender, darkened beyond base, first flagellomere distinctly longer than scape; scape, pedicel, and subbasal ring on flagellum black haired. Palpus yellowish with black hair. Scutum brown with five grayish stripes, midstripe very slender anteriorly, wide posteriorly, ending in large discal spot on scutellum, submedian spots very slender, indistinct; sublateral stripes rather wide; pleuron gray. Wing brown with usual pattern of pale spots; costal cell hyaline; subapical band complete, straight, with irregular margins; spots of central area of wing coarse; cell R_1 basad of furcation mostly pale; discal cell with base and two large hourglass-shaped bands pale; all but posterior cell 4 with triangles at margin. Halter yellow. Legs brown; fore coxa yellowish basally; fore tibia with basal third white; midtibia and hind tibia each with two pale bands. Abdomen brown with gray incisures, those on terga I-II forming small median triangles; venter brownish with grayish incisures.

Distribution.—Vietnam.

This species is related to two Philippine species, *monticola* and *volneri*, but these lack a middorsal stripe on the scutum and extensively pale cell R_1 , and the subapical band is curved and irregular. If the dorsal stripe of the thorax were not so slender

anteriorly, the species would run to *atrata*, which has, however, no central brown area on the frons and the subapical band of the wing is partially or completely double. The type was determined as *cordigera* by Bequaert, which has, however, fore tibia nearly half white, cell R, basad of furcation not mostly pale, subapical band of wing curved inward, stronger submedian spots on scutum, and fore coxa entirely pale. This is also closely related to *longipennis* from South India, which has, however, a pale spot just before and just beyond the furcation and the upper parafacial distinctly speckled.

The name is the Latin adjective, *amplus*, large.

***Haematopota angustisegmentata* Schuurmans Stekhoven**

(Fig. 177)

Haematopota angustisegmentata Schuurmans Stekhoven, 1928, p. 435.

Chrysozona angustisegmentata (Schuurmans Stekhoven): Philip, 1960b, pp. 60, 76 (Borneo only).

Type.—Middle East Borneo (LU).

Female.—Length 8–8.5 mm; wing 7 mm; antenna (scape and pedicel only) 0.9–1 mm. Frons gray brown, about 0.8 times as wide at vertex as height, nearly parallel-sided; no midfrontal spot; paired spots rather small, brown, round, nearly touching eyes and callus; callus dark reddish, about twice as wide as high, irregular above, broadly concave below, touching eyes; subcallar area with dark-brown interantennal spot and very short rounded shiny lobes at either side; face and parafacials gray; upper parafacial with variable, weakly darkened area dependent on light angle. Scape brownish yellow, rather long and slender; pedicel short, stout, with forwardly curved, short dorsal projection; flagellum missing. Palpus slender, tapering, pinkish gray, with mostly white hairs. Notum yellow brown with mostly short pale hairs, unpatterned except for distinct gray band anterior to scutellum; pleuron dark brownish gray. Wing brown with small pale spots in usual pattern; subapical band narrow, weakly sinuous, crossing wing; distinct marginal triangles in all posterior cells. Halter with pale stem, dark knob. Legs mostly dark brown except for white banding; fore coxa grayish at base; midfemur and hind femur reddish brown; fore tibia about three-fifths white; midtibia about four-fifths white; hind tibia about two-thirds white. Abdomen dark brown with distinct gray incisures dorsally and ventrally, venter slightly paler basally.

Distribution.—Borneo.

This description is based on two specimens from Balikpapan.

Mentawiri River, East Borneo, determined by Oldroyd as *equitibiata*, which has, however, the fore tibia not more than half white, coarser wing pattern, smaller paired frontal spots, strong midfrontal spot, and gray band before scutellum. It is possible that this is *borneana*, though the palpal and abdominal coloration does not agree well with the description of that species. The species most closely related to *angustisegmentata* is *fukienensis*, which is separable by characters given in the key.

It appears unlikely that the specimen Schuurmans Stekhoven determined in 1932 is the same species, but without seeing the specimen its identity cannot be determined. Philip (1960b, 1963) used the name *segmentata* S. S. for this specimen, but this spelling was a lapsus. The species that Philip (1960b) determined as *angustisegmentata* from Malaya is *albiocrea* and that for 1963 is *albimanica*.

Haematopota annandalei Ricardo

(Figs. 22, 146)

Haematopota annandalei Ricardo, 1911, p. 335; Brunetti, 1924, p. 100; Senior-White, 1927, p. 17; Ouchi, 1940, p. 256; Philip, 1963, p. 520.
Chrysozona annandalei (Ricardo): Liu, 1958, p. 152.

Type.—♀, Government Gardens, Shillong, Assam, India (BM).

Female.—Length 8–9 mm; wing 8.5 mm; antenna 2.7–2.34 mm. Frons gray with large brown triangle at vertex, and white areas margining eyes and paired spots; width at vertex 0.76 of height, strongly widened below; midfrontal spot present, small to rather large; paired spots subquadrate, touching eyes and narrowly separated from callus; callus dark brown to black, about four times as wide as high, touching eyes, upper and lower margins nearly straight and centrally with pair of low protuberances; subcallar area brown, mesally darker with distinct depression; face and parafacials solid black to level of lower margin of eye; below this white with white beard. Antenna black; scape shiny, swollen, cylindrical, about twice as long as high with dark hairs; flagellum about three-fourths length of scape, tapering slightly, style short and blunt. Palpus pale, tapering, with mixed black and white hairs. Scutum dark brown, slightly paler laterally, with pair of sublateral white stripes its entire length, widened at transverse suture as well as posteriorly and curving laterad and forward before scutellum; prescutellar sclerite and scutellum dark; pleuron gray, sternum slightly darker. Wings brown with pale spots; subapical band single, usually broken, not reaching hind margin in cell R, but touching pale spot in margin of posterior cell 1;

posterior cells 1, 3, and 5 with marginal pale spots. Halter pale with knob partially darkened. Legs dark with white banding; subbasal band on fore tibia one-fourth to one-third length of segment; midtibia with two bands; hind tibia with subbasal band about one-fourth length of segment and rarely a very faint subapical band, fringe well developed; midtarsus and hind tarsus pale basally. Abdomen black dorsally with gray incisures; venter gray to brown with pale incisures.

Male.—Described by Brunetti; not seen by us.

Distribution.—Burma, India (Assam, Maharashtra).

Additional specimens seen by us are 3 ♀, Lanabum, Mali Hka Valley, Kachin Hills, Upper Burma, 1,000 ft, April 2, 1926.

The combination of long swollen scape, solid black area of upper parafacial, absence of broad pale band over scutoscuteellar suture, and single, reduced subapical band of wing will distinguish this species.

***Haematopota annulipes* Schuurmans Stekhoven**

Haematopota annulipes Schuurmans Stekhoven, 1926, p. 98.

Type.—Balun, Padang Highlands, Sumatra (AM).

Female.—Length 9.8 mm; wing 9.4 mm. Frons dull olive brown, black haired, widened below; midfrontal spot sharply triangular; paired spots velvety black, bordered with white, roundish, touching eyes but not callus; callus brown black, strongly convex, reaching eyes, about 2.5 times as wide as high, upper margin concave below each paired spot, lower margin concave above large black interantennal spot; face with two rudimental black spots on upper border; parafacials with black spot broken transversely; lower parafacial and beard white. Scape shining brown red, slightly swollen, about 2.5 times as long as thick; pedicel brown black, black haired, with small dorsal projection; flagellum black, rather broad at base, first flagellomere subequal to scape in length. Palpus olive brown, mainly white haired, swollen at base, rather suddenly tapering. Notum brown, grayer on fore border with indication of two longitudinal stripes; pleuron gray with brown streaks. Wing brown with pale spots in usual pattern; subapical band rather narrow but complete and evenly curved inward; spots of wing rather small and isolated; pale marginal triangles in posterior cells 2, 3, and 5. Legs generally brown with paler bands as follows: Fore coxa basally; fore tibia subbasal, about one-third of segment; midtibia and hind tibia each with two pale bands, distal one on hind tibia incomplete. Abdomen black brown with

pale incisures particularly on terga I and II; venter brown with distinct pale incisures.

Distribution.—Sumatra.

We have seen for certain only the type of this species. A specimen in the MCZ collected between Takengan and Bireuen, Sumatra, 1937, by C. T. and B. B. Brues is perhaps this species, but it is smaller and the subapical band of the wing is irregular, broken, and does not reach the hind margin. Schuurman Stekhoven thought that *annulipes* had been confused with *lunulata* by Wulp and Osten Sacken. If we have interpreted *lunulata* correctly, *annulipes* is distinguishable by having the subcallar area without shiny triangles, a broken black spot on the upper parafacial, a stouter scape, less connected spots on the wings, a second incomplete band on the hind tibia, and no pale triangle on tergum II.

***Haematopota arcei*, new species**

(Figs. 44, 168)

Holotype, female, THAILAND, Songkhla Province, Rattaphum District, Tha Chamuang Canton, 6° 58' N, 100° 8' E, November 25, 1969, Arce Wanchitnai (CU). Paratypes: 305 ♀, from same locality and following dates: March 14, 15; April 2, 3, 19, 20, 21, 26, 27, 28, 30; May 1, 2, 3, 4, 6, 7, 8, 17, 18, 21, 23, 24, 28, 31; July 5, 7, 9, 19, 23, 24; August 4, 14, 22, 26; September 8, 17, 20, 25; October 5, 6, 7, 9, 10, 11, 12, 13, 14, 16, 17, 19, 20, 22, 23, 25; November 6, 8, 9, 11, 12, 13, 14, 15, 16, 18, 19, 20, 22, 23, 25; December 3, 6, 7, 8, 9, 10, 17, 19, 20, 21, 22, 25, 27; (all Wanchitnai). (BM, CBP, CU, USNM)

Female.—Length 9.5–11.5 mm; wing 8.5–10.5 mm; antenna 2.4–2.8 mm. Frons yellowish gray, width at vertex about 0.75 height, distinctly widened below; midfrontal spot very small, brownish; paired spots rather large, nearly round, touching eyes, narrowly separated from callus; callus black or dark brown with slightly irregular surface, about 2.5 times as wide as high, touching eyes; upper margin angulate; lower margin shallowly concave; subcallar cleft slightly darkened; upper face and parafacials solidly black, parafacials tinged with dark brown when viewed obliquely from front; lower face and parafacials pale yellowish gray; beard pale yellow. Scape yellowish to reddish brown, subshiny, cylindrical, about four times as long as thick, subequal in length to flagellum; pedicel with distinct dorsal projection; first flagellomere slender, basal fourth brownish, bare,

rest slightly tapered, dark, with fine pilosity; style stout, black. Palpus yellowish brown with mixed black and pale hair. Scutum brown with pale-yellow hair and paler marks on humerus, three slender stripes, broader sublateral stripe behind transverse suture, small spot just anterior to lateral corner of scutellum, pre-scutellum, and disk of scutellum; pleuron mostly yellowish gray. Wing rather dark brown with many spots in usual pattern; subapical band consisting of two or three spots, posterior spot usually slightly distad and overlapping more basad, crescentic anterior spot; marginal spots in posterior cells 1, 3, and 5 and sometimes others, those in third and fifth narrow triangles running along wing margin; no spot in cell R₁ immediately behind base of vein R₁ or in base of discal cell. Halter with nearly black knob. Fore coxa brown with yellowish-gray spot anteriorly at base; femora dark brown, hind femur with rather dense fringe of black hair near apex below; tibiae dark brown, all about two-fifths white basally; midtarsus and hind tarsus faintly paler basally. Abdomen brown with gray pattern of incisures, triangle on tergum II, slender middorsal stripe sometimes indistinct, and sublateral spots on IV-VII; venter gray with rather broad central stripe.

Distribution.—? India, Thailand.

A single specimen in the British Museum bears the labels "Jalor 21/7 '01—No. 2(a)—Species 11" and appears to be a faded specimen of *areei*, but because of the faded condition of the specimen and distant locality, it is not included as a paratype.

This species is closely related to *burmanica* but lacks any trace of a second subapical pale band on the midtibia and hind tibia and the scape is as long or longer than the flagellum. If the gray at the base of the scutellum is lacking, *areei* would run to *tio-muncensis*, from which it differs in being larger with less white on the midtibia.

This species is named in honor of the collector, who obtained all these specimens as well as many other species in southern Thailand.

Haematopota assamensis Ricardo

(Figs. 17, 138)

Haematopota assamensis Ricardo, 1911, p. 343; Senior-White, 1927, p. 17.

Type.—Nongpoh, Khasi Hills, Assam (BM).

Female.—Length 9–11 mm; wing 7.5–11 mm; antenna 1.5–2.1

mm. Frons gray, brownish near vertex, about three-fourths as wide at vertex as high, distinctly wider below; midfrontal spot small to absent; paired spots variable in size, black ovoid, or irregular in shape, separated from eyes and callus; callus usually black, sometimes partially or completely yellow orange, lower corner just touching eye, upper margin trilobed, lower margin deeply concave; strong black interantennal spot; face and parafacials gray except for narrow black band across upper face and strong solid black spot on upper parafacial; beard white. Scape 1.5 to 2 times as long as height at apex, distinctly narrowed toward base, yellowish gray, with abundant black hair dorsally and ventrally; pedicel yellowish with black hair, dorsal projection strong; flagellum orange brown, first flagellomere compressed, its greatest height slightly greater than length of style, its length greater than that of scape. Palpus gray with mixed white and dark hairs. Scutum brown with paler grayish pattern on humerus, three slender lines anteriorly, broader stripes laterally, pair of yellowish spots behind transverse suture, and pair of crescentic spots on posterior margin; scutellum mostly gray except posterior margin; pleuron gray with long white hair. Wing pale brown with gray markings in usual pattern; subapical band broad anteriorly, sinuous, extending into cell R₁ only a short distance; posterior cells except cell 4 usually with triangles in hind margin. Halter with partial or complete dark knob. Legs: Coxae all gray with pale hair; tibiae mostly pale, apices darkened; fore tibia with basal half pale except for usually narrowly darker base; mid-tibia yellowish brown with two subequal pale bands; hind tibia variable but usually with two rather broad pale bands; hair on legs mostly long and sometimes noticeably more so on apex of hind tibia. Dorsum of abdomen dark brown with narrow yellowish incisures; usually more or less distinct middorsal pale stripe from terga II to VII and often small sublateral pale spots on terga VI and VII; sides of terga and all of venter gray, often indistinctly brownish on midventer.

Distribution.—India (Assam), Thailand, Vietnam.

In addition to numerous specimens from Assam we have seen one from Pa Ham, Tonkin, Vietnam, April 12, 1929, and one from 17 km northwest of Loei, Thailand, July 7, 1966.

This species resembles *rossi* but has a slender, usually single, subapical band on the wing and little or no gray sublaterally on the abdomen; the larger size, dull pollinose scape, and double band on the hind tibia will distinguish it from *personata*.

Haematopota atomaria Walker

(Figs. 54, 179)

Haematopota atomaria Walker, 1857, p. 112; Bigot, 1891, p. 79; Ricardo, 1906, p. 117; 1911, p. 332; Pratt, 1909, p. 392; Schuurmans Stekhoven, 1926, p. 127.

Chrysosoma atomaria (Walker): Philip, 1960b, p. 76.

Haematopota quatei Philip, 1963, p. 532 (new synonymy).

Types.—♀, *atomaria*, Sarawak, Borneo (BM); ♀, *quatei*, Tenompok, British North Borneo (BBM).

Female.—Length 7.5–9.5 mm; wing 7.5–10.5 mm; antenna 1.5–1.8 mm. Frons grayish brown, width at vertex about 0.57 of height, distinctly widened below; midfrontal spot variable, sometimes scarcely visible, sometimes well developed; paired spots large, slightly higher than wide, touching eyes, narrowly separated from callus; callus dark reddish brown to black, smooth, protuberant, 2–2.5 times as wide as high, touching eye, upper margin convex, sometimes distinctly pointed and flattened above, lower margin rather deeply concave in center, strongly convex laterally; interantennal black spot large; face and parafacials gray, upper parafacial with darkened area broken transversely; beard white. Antenna dark brown to black; scape shiny, cylindrical, two to three times as long as thick; pedicel with dorsal projection short; flagellum slender, slightly longer than scape. Palpus small, slender, brown with long dark hair. Scutum dark brown, humeri, faint anterior stripes ending in weak postsutural spots, and pair of crescentic spots on posterior margin, pale; scutellum brown, paler at sides; pleuron brown or grayish. Wing brown with usual pattern of gray spots; subapical band irregular, usually broken and not quite reaching hind margin; posterior cells with marginal spots in some, particularly large in cells 2, 3, and 5. Halter knob dark brown. Legs dark brown; usually gray spot on base of fore coxa anteriorly; narrow, nearly basal pale band on fore tibia; midtibia with two bands; hind tibia with narrow subbasal band. Abdomen dark brown with gray incisures on terga and sterna.

Male.—Very similar to female except for usual sexual differences. Frontal callus distinct, bilobed.

Distribution.—Borneo, ? Malaya.

We have seen the type series of both *atomaria* and *quatei* and do not believe that these are sufficiently different to consider that more than one species is involved. The type of *atomaria* is in fair condition; the second specimen is very poor and the third specimen was not found. Both specimens showed the dark area of the up-

per parafacial broken into spots; the subapical wing band of the type is complete, a condition which is not usual in other specimens. Pratt (1909) recorded the species from Malaya, but this has not been confirmed.

Haematopota atrata Szilady

(Figs. 2, 123)

Haematopota atrata Szilady, 1926, p. 7.

Chrysazona atrata (Szilady): Liu, 1958, p. 152.

Type.—♂, Canton, China (NMW).

Female.—Length 9–11 mm; wing 8–10 mm; antenna 1.67–2.08 mm. Frons yellowish gray, clothed with black hairs and some pale hairs on and below paired spots; width at vertex 0.70 of height, usually only slightly widened below; midfrontal spot very small or absent; paired spots rather large, oval or subtriangular, usually narrowly touching eyes, well separated from callus; callus yellow brown to dark brown, shiny, about 2.2 times as wide as high, touching eyes, upper margin convex with short flattened dorsal extension, lower margin concave, subcallar area with pair of shiny yellow triangular projections from lower margin of callus with no interantennal black spot; face and parafacials gray, slightly yellower above; beard white. Scape yellow brown, with black hair, cylindrical, about twice as long as thick; pedicel scarcely produced above; flagellum long and slender, blackish beyond base. Palpus pale yellowish, rather slender, tapered, with mostly black hair, some fine pale hair below. Notum brown to blackish with median gray stripe the entire length, widened posteriorly, pair of very narrow brownish submedian stripes anteriorly, and broader pair of gray stripes behind pale humeral callus; pair of gray triangles before scutellum fused with median stripe, and posterior lateral angles of scutum each with pale spot; pleuron gray with pale hair. Wing gray brown with pale spots; subapical band partially doubled, usually surrounding lens-shaped dark spot; all posterior cells with large marginal triangles usually joining submarginal spots of preceding cells. Halter yellow, knob usually partially darkened. Legs mostly reddish brown; coxae gray; fore tibia with basal or subbasal white band one-fourth to one-third length of segment; midtibia and hind tibia each with two usually narrow and often indistinct yellowish bands; hind tibial fringe indistinct; midtarsus and hind tarsus slightly paler basally. Abdomen with narrow pale incisures and middorsal gray stripe, widest on tergum II and composed of narrow triangles on succeeding terga, and small sublateral spots

on terga III or IV to VI; sides of terga III-V gray; venter gray to brown with abundant pale hair.

Male.—Length 10 mm; wing 8.5 mm; antenna 1.6 mm. Eyes bare, enlarged facets reddish; frontal triangle with yellow pollinosity surrounding shiny yellow divided callus; face and parafacials gray; beard brownish. Antenna nearly uniformly yellow. Palpus yellow with mixed dark and pale hairs, swollen, apex acute. Notum dark brownish with some grayish laterally and broad median gray stripe, widened posteriorly and crossing disk of otherwise red scutellum; pleuron gray pollinose and pilose. Wing pattern essentially as in female but small pale spot behind furcation. Halter with pale stem, brown knob. Coxae and femora reddish with rather long pale pile; fore tibia brown with indistinct subbasal pale band; midtibia brown with two not very distinct yellow rings; hind tibia brown with rather faint subbasal and subapical bands. Abdomen reddish brown, first and last two terga slightly darker; incisures of terga I-V narrowly red expanding mesally into contiguous truncated reddish-orange triangles; venter reddish yellow basally, darkened posteriorly. This is the first description of the male.

Distribution.—Southern China (Fukien, Hainan, Kiangsi, Kwangsi, Kwangtung).

We have seen 21 ♀ and 1 ♂ specimens as follows: FUKIEN: Minhow, May 16, 1938; HAINAN: You Boi, May 30, June 5, 7, 1904; Ta Han, July 4, 1935; Fan Ta, July 17, 1935; Lismui, August 3, 1935; KWANGSI: Honam (near Canton), August 23, 1918; Tsangwu, May 1936; Hong San, June 26, 1936; Honam Island, P'an Yu District (♂); KWANGTUNG: Tain Leong San, June 1-7, 1936; Yim Na San, June 14, 1936.

This species resembles *hainani*, also from Hainan, which has, however, much more white on the fore tibia and a single, usually complete subapical wing band.

***Haematopota atriventer* Schuurmans Stekhoven**

Haematopota atriventer Schuurmans Stekhoven, 1926, p. 101.

Type.—Peak of Korinchi, Sumatra (AM).

Female.—Length 12 mm; wing 12 mm. Frons yellowish gray, height and width subequal, sides nearly parallel; midfrontal spot strong; paired spots distinct, subquadrate, separated from eyes and callus; callus brownish black, upper margin convex, lower margin nearly straight; strong interantennal spot; face and parafacials gray, upper parafacial with irregular dark blotches; beard white. Scape rather long, yellow brown with black hair; flagellum

elongate, slightly longer than scape; palpus slightly swollen basally, tip blunt, mainly dark haired. Scutum dark brown with pair of pale stripes ending in postsutural spots; pleuron uniformly dull gray. Wing brown with pale spots small, separate, rosettes not developed; subapical band slender, not reaching hind margin; no spots on hind margin. Fore coxa yellowish brown basally, darker apically; femora yellowish brown; midfemur whitish on basal half; fore tibia with narrow white basal band; midtibia with two pale bands; hind tibia about three-fourths white with very faint darker break; hind basitarsus scarcely paler basally. Abdomen dark brown with narrow pale incisures; venter similar, sides grayish.

Distribution.—Sumatra.

This species is very close to *nigricans* from the same locality. We have seen types of both species but did not make a direct comparison, one being in Amsterdam, the other in London. It is probable that the characters mentioned in the key are sufficient to distinguish them, but these may prove to be variable. The wing pattern also seems to be less developed in *atriventer*. It is a distinctly larger species than *equitibiata*.

***Haematopota badia* Philip**

(Figs. 108, 235)

Haematopota badia Philip, 1963, p. 522.

Type.—DeLinh (Djiring) Vietnam, 1200 m, April 22–28, 1960 (BBM).

Female.—Length 7.5–9 mm; wing 6.5–8.5 mm; antenna 0.8–1.5 mm. Frons gray or brownish gray, width at vertex slightly less than two-thirds of height with nearly parallel sides; midfrontal spot absent or very small and indistinct; paired spots rather small, ovoid, narrowly separated from eyes; callus reddish brown to nearly black, slightly more than twice as wide as high, touching eyes, broadly convex above, shallowly concave below; subcallar area pollinose with small interantennal black spot, face and parafacials gray, unspotted; beard yellowish. Antenna yellow orange with only tip of flagellum blackened; scape short, less than twice distal height, expanded distally, pollinose with black hair; pedicel short and stout; flagellum about twice length of scape; first flagellomere nearly twice as long as high; style short and thick. Palpus with mostly black hairs. Scutum dark brown with five slender paler stripes anteriorly, only small expansion of sublateral stripe behind transverse suture, and seven stripes on posterior part of

scutum; no distinct prescutellar pale band; scutellum brown, slightly paler posteriorly; pleuron brownish gray. Wing brownish gray with pattern of mostly slender spots; subapical band slender, sinuous, not reaching posterior margin; no pale marginal markings in posterior cells. Halter yellow orange. Legs yellowish brown, slightly darkened distally; fore tibia with subbasal band about one-third length of tibia; midtibia and hind tibia each with two subequal pale bands. Abdomen brown with yellowish incisures, faint yellowish middorsal stripe, and usually indistinct yellowish sublateral spots on posterior terga; venter almost uniformly yellowish brown.

Distribution.—Vietnam.

In addition to the original localities this species has been seen from Fyan and 65 km south of Dalat.

In addition to the characters given in the key this species has a slightly different subapical band on the wing than *hardyi* being more S-shaped rather than a crescentic row of spots.

Haematopota barri, new species

(Fig. 164)

Holotype, female, Hasimara, W. Bengal, on elephant, March 18, 1958, R. M. Bateman (CU). Paratypes, 2 ♀, same data as holotype (CU).

Female.—Length 11.5–12 mm; wing 10.5 mm; antenna 2.5 mm. Frons brown, paler along eye margin and around spots, slightly higher than width at vertex, slightly widened below; midfrontal spot rather large, triangular; paired spots subquadrate, touching eyes, separated from callus; callus yellow brown, distinctly depressed medially producing two slightly roughened knobs; width about four times as great as height, touching eyes, upper and lower margins nearly straight; subcallar area with pair of very shallow shiny lobes from callus, median cleft, but only slight darkening bordering cleft; face and parafacials gray, upper part of each dark brown; in certain lights brown of upper parafacial is distinctly darker along lower margin, but color does not break into irregular spotting. Antenna orange brown, flagellum except at base dusky; scape rather stout, scarcely more than twice as long as thick, cylindrical, but upper surface concave near middle, and sides bulging slightly; pedicel with distinct dorsal projection; flagellum moderately heavy, first flagellomere slightly shorter than scape; tapering, height subequal to length of style. Palpus pale yellowish with mostly pale hair. Scutum brown with paler markings, including humerus, slender median stripe, pair of

submedian stripes with widened spot behind transverse suture, sublateral stripe doubled behind transverse suture, and four small spots on posterior margin; prescutellar sclerite and scutellum brown; pleuron mostly yellowish gray. Wing brown with pattern of numerous nearly complete paler circles; subapical band consisting of slender very sinuous inner band from spot on anterior margin, and broken outer band consisting of three rather faint spots; pale spots at margin in most posterior cells. Halter knob brown. Legs yellowish brown, paler on basal half of fore coxa, narrow subbasal band on fore tibia, and subbasal and subapical band on each midtibia and hind tibia. Dorsum of abdomen brown with slender middorsal stripe on terga II-VI and strong sublateral spots on terga II-VII, yellowish gray; venter almost uniformly yellowish gray.

Distribution.—India (West Bengal).

This species has been determined as *cingalensis* from Ceylon, and the holotype was compared with the fragmentary type of *cingalensis* and was said to agree except for the scape of the type being thinner. If we have identified *cingalensis* correctly, from six specimens from Ceylon, it differs in being distinctly smaller and in having the midfrontal spot much smaller or absent, the upper parafacial with distinct spotting, and a large black interantennal spot. It is also close to *burmanica* as indicated in the key.

The name of this species is the genitive of the Latin *barrus*, elephant, the host of the type series.

Haematopota bicolor, new species

(Figs. 41, 165)

Holotype, female, Pherjol, Manipur, Assam, 900 ft, September 3, 1960 Schmid (CBP). Paratypes: ASSAM: 1 ♀, Lushat, Manipur, 2,800 ft, July 19, 1960, Schmid; 2 ♀, Bangbakhulen, Manipur, 3,500 ft, July 28, 1960, Schmid; 1 ♀, Jorhat District, Hermitte; NEPAL: 1 ♀, Katmandu Valley, August 18, 1967, Diehl and Schacht. (BM, CBP, USNM, ZCBS)

Female.—Length 11–11.5 mm; wing 10.5–11 mm; antenna 2.05–2.25 mm. Frons yellowish gray with short black hair, about four-fifths as wide as high, slightly widened below; midfrontal spot very small; paired spots small, brown to nearly black, separated from eyes and callus; callus shiny yellow brown with narrow median darkened depression and upper margin in middle and ends usually darkened; lower margin concave; subcallar area with large interantennal black spot; upper parafacial with solid black spot; face and lower parafacial pale gray; beard white. Antenna

yellow brown, tip of flagellum darkened; scape subequal in length to first flagellomere, slightly expanded distally, thinly gray pollinose with black hair; extreme base of first flagellomere weakly set off from rest of it by depression with black hairs beyond this both above and below; rest of flagellomere tapering to style. Palpus pale yellow gray with mixed black and white hairs. Notum almost uniformly yellowish brown; pleuron pale gray. Wings rather pale brown, pale markings not strongly contrasting; subapical band single, not reaching hind margin and usually extending only just beyond vein R₁; no pale spots at wing in posterior cells. Halter pale yellow, knob usually more or less darkened laterally. Coxae pale yellow with pale hair; femora the same but fore and hind femora darkened near apex with some dark hair; fore tibia darkened on apical half; midtibia slightly darkened near middle and apex; hind tibia darker with subbasal and subapical pale band and fringe of short hairs; tarsi dark, midtarsus and hind tarsus pale at base. Abdomen pale yellow gray with two rows of large brown spots on terga II-VI not touching hind margins, producing broad median pale stripe and narrow lateral stripes; venter entirely pale except for darkened sternum VII, bearing erect dark hair.

Distribution.—India (Assam), Nepal.

The rather slender first flagellomere, unbroken black spot on upper parafacial, at most only faint marginal spots in some posterior cells, banded legs, and strong median stripe on abdomen will distinguish this rather large species (see discussion under *pallida*).

***Haematopota biguttata*, new species**

(Fig. 81)

Holotype, female, INDIA, Madras. Sothupari, December 1, 1958, 1,500 ft, Schmid (CBP). Paratype, ♀, S. India, Nilgiri Hills, IX-X, 1947, P. S. Nathan (BM).

Female.—Length 8.5–9 mm; wing 7.5–8 mm; antenna 2.2 mm. Frons square, brownish gray with pale gray above median spot and around paired spots; midfrontal spot strong, triangular; paired spots subquadrate, nearly touching eyes, separated from callus; callus orange or dark reddish brown, about three times as wide as high, distinctly separated from eyes, upper and lower margins nearly parallel, shallowly curved upward in middle; beneath callus a pair of small, equilateral, shiny triangles between which lies a velvety black interantennal spot; face and parafacials gray, former with pair of large round black spots laterally;

upper parafacial with sparse black speckling above and comma-shaped concentration of spots near eye opposite spots on face; beard sparse, white. Scape yellow with black hair, very long and slender, gradually expanded distally; pedicel about two-thirds as long as deep, pale, with short dorsal projection; flagellum dark reddish brown, slender, slightly longer than scape. Palpus pinkish gray with mixed pale and dark hairs. Scutum dark brown; humerus contrastingly pale; more or less distinct pattern of paler stripes, lateral indistinct, sublateral very slender, ending in spots behind transverse suture, and median very slender, reaching scutellum; posterior margin and prescutellar sclerite pale; scutellum dark brown; pleuron yellowish gray. Wings grayish brown with numerous spots in circles; subapical band slender, straight, with irregular margins, extending across wing; all posterior cells with shallow triangles at wing margin. Halter pale with knob darkened laterally near base. Coxae gray; femora brownish with gray streaks ventrally; fore tibia dark brown with subbasal third white and distinct partial subapical ring of pale hairs; midtibia with two narrow pale bands; hind tibia of unusual shape, dorsal margin swollen near base, with distinct constriction beyond it; pair of rather indistinct pale bands, one at constriction, one at outer third; between these, on dorsal margin, row of short, rather heavy dark hairs; bases of midtarsus and hind tarsus pale. Dorsum of abdomen dark brown with narrow pale incisures, slender middorsal line, and sublateral spots on terga IV-VII; venter pale with midventral brown stripe.

Distribution.—India (Madras).

This species is very easily distinguished by the combination of frontal callus not touching eyes, black spots on face, unicolorous fore coxa, partial subapical band of fore tibia, and peculiar shape of hind tibia. It appears to be related to *algira* (Kroeber).

The name refers to the two black spots on the face.

Haematopota biharensis, new species

(Figs. 66, 192)

Holotype, female, Pusa [near Patna], Bihar, India, August 31, 1913 (BM). Paratypes: 6 ♀, same data as holotype; 1 ♀, India, Mrs. Hamilton; 1 ♀, Government Farm, Kamrup, Assam, May 10, 1919, Ghosh. (BM, USNM)

Female.—Length 7–8 mm; wing 6–7.5 mm; antenna 1.75–2 mm. Frons gray, paler along eye margins and around paired spots; width at vertex and height subequal; midfrontal spot absent or indistinct; paired spots large, subcircular, separated from eyes

and callus; callus a reddish-brown, narrow, transverse band, narrowly separated from eyes, usually with median projection above; dark subcallar tomentose spot; face and parafacials gray, upper parafacial with minute dark spots, usually clumped along lower margin of area; beard sparse, pale. Antenna yellow brown, flagellum slightly darkened; scape slender, cylindrical, subshiny, longer than first flagellomere; flagellum slender, tapered. Palpus yellowish gray with dark-brown hair. Scutum brown with three slender gray stripes; scutellum brown with narrow gray hind margin; pleuron gray brown. Wing brown with pattern of pale spots; subapical band starting in apex of cell R_1 , broadened apically leaving little or no dark at apex, and then narrowing to merge with continuous pale gray hind margin of wing. Halter stem pale, knob dark. Legs brown with white band on basal third to half of fore tibia; midtibia and hind tibia with basal pale and sometimes faint subapical one. Abdomen brown with slender median interrupted pale stripe and small gray sublateral spots on terga II-VII; venter brown with narrow pale incisures.

Distribution.—India (Assam, Bihar).

This species is close to *marginala*, which has, however, the hind tibia more distinctly double-banded, scape shorter, and abdomen more extensively patterned with gray.

Haematopota bilineata Ricardo

(Figs. 99, 150)

Haematopota bilineata Ricardo, 1911, p. 350; Senior-White, 1927, p. 18.

Type.—Igatpuri, Bombay, India (BM).

Female.—Length 6.5-9.5 mm; wing 6.9-8.5 mm; antenna 1.6-1.8 mm. Frons dark brown, width at vertex about 0.8 of height, slightly widened below; slender gray line at vertex to small dark, triangular midfrontal spot; paired dark spots oblique, nearly touching eyes and callus; callus shiny, black, transverse, upper margin weakly convex and emarginate sublaterally, lower margin nearly straight; subcallar area paler brown with dark interantennal spot; face dark gray; upper parafacial extensively dark with paler central area showing in certain lights; midparafacial pale gray and below this brown; beard dark. Antenna black; scape swollen, cylindrical, shiny, subequal in length to flagellum; first flagellomere rather short, about 1.7 times as long as high; style short, stout. Palpus dark brown with dark hair. Scutum dark brown, humerus and posthumeral area grayish, and pair of narrow grayish stripes fading at transverse suture; pleuron dark with dark hair. Wing dark brown with small white spots;

subapical band incompletely doubled, outer from posterior margin, inner from anterior margin; pale triangles in all posterior cells but cell 4. Halter dark brown. Legs dark brown, fore tibia with narrow subbasal white band; midtibia with two indistinct pale bands; hind tibia with two small pale spots, not always forming rings, fringe indistinct; hind basitarsus about half or less white. Abdomen dark brown with narrow gray incisures dorsally and some gray laterally on tergum 11.

Distribution.—India (Goa, Maharashtra).

This description is based on two females from Murnugao, Goa, India. These specimens show slight discrepancies in color of antenna and palpus and length of scape from the type, but the agreement is close otherwise so that we believe the determination to be correct.

The combination of swollen scape as long as flagellum, upper parafacial not solidly black, first flagellomere not strongly compressed or higher than length of style, absence of prominent white spots behind transverse suture, and broken, partially doubled subapical wing band will distinguish this species from *picca* and related species. We have keyed this species in two places on the chance that the scape might not quite attain the length of the flagellum. If so, it would run near *schmiedi*, which has, however, a coarser wing pattern, a sinuous, not partially doubled subapical band, a hind basitarsus more than half pale, and no pronounced brown area on the lower part of the parafacial.

Haematopota biorbis, new species

(Figs. 5, 126)

Holotype, female, Vietnam, Trang Bom, 31 miles northwest of Saigon, July 14, 1932, M. Poilane (USNM No. 72018). Paratypes: VIETNAM: 2 ♀, same data as holotype; 1 ♀, same but August 5; 2 ♀, Trang Bom Arboretum, August 12 and 18, 1932 (all Poilane); THAILAND: 1 ♀, no further data, C. F. Harley; 4 ♀, Kok Chang Trad, July 31, 1929; Kuh Leheng Is., August 1, 1927; 1 ♀, Koh Chang Is., August 1 and 2, 1929 (all W. R. S. Ladell); 3 ♀, Nakhon Ratchasima Province, Pok Chang District, Mu Si Canton, Klong Yai, June 24, July 21, September 5, 1969 (all G. R. Ballmer); CAMBODIA: 1 ♀, no further locality, June 1909, J. Surcouf. (BM, CBP, MNHP, USNM)

Female.—Length 8–9.5 mm; wing 7.5–9.5 mm; antenna 1.6–2 mm. Frons about twice as high as width at vertex, wider below, yellowish gray, with triangular patch of dark hairs at vertex; no

midfrontal or paired spots; callus large, shiny, protuberant, occupying about lower two-fifths of frons, broadly touching eyes, upper margin a pointed arch, lower margin straight; pair of shiny yellowish triangles from lower margin with black interantennal spot between; face and parafacials entirely gray, upper parafacial tinged with yellowish; beard yellowish. Antenna orange yellow; scape cylindrical, about twice as long as thick, with dark brown to black hair; pedicel short and stout with no dorsal projection; flagellum very slender, ratio of scape to first flagellomere about 3:4. Palpus yellowish orange with mostly black hair. Notum dark brown with three grayish-yellow stripes; sublateral stripe from humerus to above wing base, tapering posteriorly; middorsal stripe from anterior margin to apex of scutellum, broad, but tapered anteriorly; pleuron yellowish brown. Wing brown with yellowish pattern consisting of small triangles in wing margin and series of small submarginal spots in posterior cells, and two connected rings in distal half of wing; base of first posterior cell and center of discal cell mostly pale; subapical band consisting of long anterior and small posterior spot, or latter missing. Halter knob clear yellow. Legs almost uniformly pale yellow except for fore tibia, which is white except for small dark band at apex, very faint white band at base of hind tibia, and slightly darkened tarsi. Dorsum of abdomen dark brown except for paler incisures, narrow tapered triangle on tergum II and sides of this tergum; venter mostly pale yellowish brown, slightly darkened postero-medially.

Distribution.—Cambodia, Thailand, Vietnam.

Specimens from Thailand are slightly larger, pale markings of wing are slightly less extensive, and area of dark hairs at vertex is narrower and more sharply defined than those from Cambodia and Vietnam. *H. biorbis* is close to *cirrina*, which has, however, a subshiny area at the vertex, the pale pattern in the anal-axillary area consists of pale blotches and not slender stripes, and it is a slightly darker species.

The name refers to the two circular marks in the distal part of the wing.

Haematopota biroi Szilady

(Figs. 36, 161)

Haematopota biroi Szilady, 1926, p. 5.

Types.—♀, ♂, Bombay (NE).

Female.—Length 6.5–8 mm; wing 5.75–7.5 mm; antenna 1.2–1.6 mm. Frons gray, width at vertex about 0.9 times height,

slightly widened below; midfrontal spot very small or absent; paired spots circular or often oblique, median-dorsal side flattened, usually narrowly separated from eyes and callus; callus orange brown to nearly black, three or more times as wide as high, touching or very narrowly separated from eyes, upper margin concave beneath each paired spot, lower margin shallowly concave; subcallar area with distinct velvety blackish interantennal spot; face and parafacials nearly white, upper parafacial with irregular darker grayish spots in certain lights; beard sparse, pale. Antenna yellow orange, darkened distally, sometimes from middle of first flagellomere; scape weakly shiny, about three times as long as thick, slightly expanded distally; scape with very short dorsal projection; flagellum rather slender, tapering, about 1.25 to 1.65 times as long as rest of antenna. Palpus reddish gray with mostly dark hairs. Scutum dark grayish, rather indistinctly striped with paler gray; scutellum pale gray; pleuron pale yellowish gray. Wing pale gray with rather broad paler markings in usual pattern; subapical band broadest anteriorly, sinuous and tapering posteriorly, usually curving into vein R_{4+5} and with small grayish spot at wing margin in cell R_1 ; hind margin of wing usually with continuous border of flat pale triangles, but these sometimes very faint. Halter stem pale, knob dark brown. Legs almost uniformly yellow brown. Abdomen brownish above, often more yellowish basally, with grayish incisures, and often faint middorsal pale triangles and, on posterior terga, small sublateral spots; venter yellowish brown.

Male.—Essentially as in female except for usual sexual differences. Interantennal spot distinct; scape cylindrical but shorter than in female.

Distribution.—India.

Szilady's material of this species is apparently lost, but we believe that this is the species he had. We have seen 16 specimens of this species from Bombay and the Central Provinces including one male. This is close to *cana*, but the scape is yellower and slightly shinier than in *cana*, there are usually faint indications of sublateral spots on the abdomen, and there are pale markings on the hind margin of the wing.

Haematopota bizonata Schuurmans Stekhoven

(Figs. 120, 247)

Haematopota bizonata Schuurmans Stekhoven, 1932, p. 62; Philip, 1963, p. 522.

Chrysozona bizonata (Schuurmans Stekhoven): Philip, 1960b, p. 75.

Type.—S. Malang, Borneo (HAMM).

Female.—Length 8.5–10.5 mm; wing 7.5–9.5 mm; antenna 2.25–2.5 mm. Frons dark brownish gray; midfrontal spot very small or absent; paired spots large, round, black, nearly touching callus and eye; callus dark reddish brown to black, slightly wrinkled centrally, broadly touching eyes, broadly convex above, lower margin produced as pair of more reddish, short, shiny triangles; velvety dark interantennal spot below; upper parafacial solidly black; upper face brownish, lower face and parafacials gray; beard rather sparse, white. Antenna rather uniformly dark reddish; scape subshining, cylindrical, slightly longer than first flagellomere; flagellum slender, tapering. Palpus dark gray with mixed black and pale hairs. Scutum mostly blackish brown, humerus slightly reddish; usually band of bright orange hairs across hind margin of scutum extending onto scutellum mesally (see variation below); pleuron mostly gray. Wing brown with reduced pattern; basal half slightly paler than distal half; irregular pale blotch behind end of subcosta at least crossing into discal cell; few very small scattered pale spots and often marginal triangles in posterior cells 2, 3, and 5 and strong, slightly curved subapical band. Halter reddish, knob dark. Coxae mostly grayish, fore coxa brown on distal half; femora dark with black hair, midfemur slightly reddish; fore tibia slightly swollen, basal half white; midtibia white, apical sixth black; hind tibia slightly more than half white; tarsi all black. Abdomen dark dorsally, side of tergum I and narrow hind margins on terga I and II grayish; venter gray, slightly darkened medially.

Distribution.—Borneo.

Additional records of this species are 7 ♂: Forest Camp, 19 km north of Kalabakan, North Borneo, 17.X., 28.X., 10.XI, 11.XI, 18.X., 1962, and Qroir Hill Tawau, North Borneo, 26. VII, 1962; last two specimens differ in having rather sparse metallic green hairs in place of golden hairs on hind margin of scutum. This appears to be only a color variant confined to this one difference.

The unusual wing pattern readily distinguishes this species.

Haematopota brevis Ricardo

(Figs. 74, 203)

Haematopota brevis Ricardo, 1906, p. 122; 1911, p. 349; Senior-White, 1927, p. 18.

Haematopota brevis Senior-White, 1925, p. 209; 1927, p. 18.

Types.—♂, ♀, *brevis*, Kanthalla, Ceylon (BM); ♀, *ricardonis*, Ratnapura District, Ceylon (LU).

Female.—Length 9.5–11 mm; wing 7.5–9 mm; antenna 1.3–1.5 mm. Frons grayish brown, width at vertex about 0.65 height; triangle above small or scarcely visible midfrontal spot rather distinctly swollen; paired spots triangular, one angle usually reaching eyes, ventral angle rarely reaching callus; callus smooth, shiny, protuberant, yellow to yellowish brown, height about 0.45 to 0.60 of width, usually distinctly separated from eyes, upper margin convex, usually with blunt median extension, lower margin weakly concave; subcallar area yellowish brown, median cleft usually narrowly darkened above; face and parafacials gray, slightly yellowish above, upper face with pair of brown spots, upper parafacials irregularly dotted with brown. Antenna yellow to yellow brown; scape short, expanded distally, slightly grayish pollinose with short black hair above; pedicel with short dorsal projection; first flagellomere rather broad basally, tapered to style, slightly longer than scape; style about two-thirds length of first flagellomere. Palpus yellow brown with mostly dark hair, rather stout basally, tapering to slender apex. Scutum brown patterned with paler yellowish brown as follows: Humerus and antenlae, three stripes anterior to transverse suture, middle one very slender, pair of strong triangular spots behind transverse suture, rather broad median stripe on posterior half tapering to slender line both anteriorly and posteriorly, pair of curved spots on posterior margin; scutellum pale on posterior margin and slender median stripe; pleuron grayish brown with rather shiny dark-brown area on lower anepisternum. Wing dark brown with heavy pattern of concentric white rings and yellowish marks: subapical band double; posterior cells with strong marginal triangles, usually lacking in cell 4. Halter with yellow knob. Legs mostly dark brown; fore coxa pale basally; fore tibia with narrow subbasal band; midtibia and hindtibia each with two pale bands; midtarsus and hind tarsus pale basally. Dorsum of abdomen brown with narrow midstripe, incisures, terga I–II laterally, and sublateral spots on terga III–VI paler; venter brownish with pale incisures.

Male.—Similar in wing pattern and thoracic and leg coloration to female. Large and small facets of eye sharply differentiated; frontal triangle with strong black spot; parafacials heavily dotted with brown throughout; antenna small.

Distribution.—Ceylon, South India.

There is a type female and type male of *brevis* in the British Museum as well as paratypes. As the male has lost its head we select the female as lectotype.

This species is quite distinctive in the Oriental fauna because

of the heavily doubled wing pattern, frontal structures and color, and antennal shape and size. The type of *ricardonis*, supposed to have been deposited in the British Museum, apparently was not received there. Senior-White suggested that this might be a wet-zone form of *brevis*. Most of the specimens we have seen fall between the two sets of characters he gives to differentiate *brevis* and *ricardonis*; rarely do the paired spots touch the callus and rarely is the callus darkened. Occasionally the wing pattern is not as complex as here figured, but in all other respects the agreement is very close.

Haematopota brunnipes, new species

(Fig. 35)

Holotype, female, Mezali, Minbu District, Burma, 1928, E. Feegrade No. 93 (BM). Paratype, 1 ♀, same data as holotype (BM).

Female.—Length 8.5–10 mm; wing 7.5–8 mm; antenna 1.9 mm. Frons grayish brown, width at vertex slightly less than height, vertex distinctly concave; midfrontal spot very small; paired spots rather large, subcircular, narrowly separated from eyes and callus; callus yellow, slightly darkened at ends, about three times as wide as high, touching eyes, upper margin shallowly convex or sinuous, lower margin weakly concave or straight; subcallar area yellowish pollinose, median cleft edged with brown; face and parafacials gray, upper parafacial irregularly marked with brownish; beard rather sparse, pale brownish. Antenna yellow orange, flagellum darkened beyond base; scape rather shiny with dark hair, cylindrical, nearly three times as long as thick; pedicel with short dorsal point; flagellum long and slender, first flagellomere subequal to scape in length. Palpus rather straight, brown, with darker brown hair. Scutum brown with three continuous paler stripes; scutellum with large discal gray spot; pleuron gray. Wings brown with usual pattern of gray spots; subapical band complete, slightly widened posteriorly and joined to continuous pale border along posterior margin of wing, inner margin serrate. Knob of halter dark brown. Legs almost uniformly brown with no evidence of banding; fore coxa slightly paler basally. Abdomen brown; slender middorsal stripe and sides rather broadly gray; venter rather shiny dark brown, sides narrowly gray.

Distribution.—Burma.

This bears some resemblance to *albofasciatiennis* but differs in being larger, having no bands on the tibiae, and having a pale middorsal stripe on the abdomen.

Haematopota burmanica Senior-White

(Figs. 40, 169)

Haematopota burmanica Senior-White, 1922b, p. 147; 1927, p. 20.**Type.**—Bandaung, N. Toungae, Burma (BM).

Female.—Length 8.5–11 mm; wing 8–10 mm; antenna 1.8–2 mm. Frons gray with dusky areas near vertex; width at vertex about 0.87 of height, slightly wider below; midfrontal spot small, distinct; paired spots rounded above, usually concave ventrolaterally, nearly touching eyes and callus; callus black to yellowish, nearly four times as wide as high, touching eyes, upper margin shallowly concave to either side of center, lower margin parallel with dorsal margin; subcallar area with large black interantennal spot; face with pair of dark fused spots above, rest gray; upper parafacial solidly black, lower parafacial gray; beard white. Antenna dark reddish brown to nearly black; scape and pedicel with black hair; scape cylindrical, about 2.5 times as long as thick; pedicel with distinct dorsal projection; first flagellomere slightly shorter than scape, 2–2.5 times as long as high, weakly tapered distally; style stout. Palpus gray with mostly black hair. Notum dark brown with rather indistinct striping, pair of spots behind transverse suture, rather wide gray area across scuto-scutellar suture leaving only hind margin of scutellum dark; pleuron gray. Wings dark brown with usual pattern of slender pale spots; subapical band small, just crossing vein R_1 from anterior margin; rarely with spot on hind margin; triangles in hind margin of wing variable. Halter knob mostly dark. Coxae gray, apical half of fore coxa brown; femora mostly gray, darkened apically; slightly less than basal two-fifths of fore tibia white; midtibia and hind tibia each with two pale bands; midtarsus and hind tarsus pale basally; hind femur with fringe of black hairs ventrally; dorsum with narrow pale incisures, widest on tergum II where it widens middorsally in triangle; terga II–V with slender middorsal gray stripe and VII with two gray spots; venter dark brown centrally, grayish laterally near base.

Distribution.—Burma.

We have seen a syntype of this species in the British Museum in poor condition. It differs from the original description in having the frontal callus yellow. We have determined nine specimens from the Nam Tamai Valley, Upper Burma, and Kambaiti, North-east Burma, as this species. The original description of the species does not mention the gray across the scutoscuteellar suture, but this was evident in the syntype. The specimen is close to *latifascia*,

but the subapical band of the wing is less developed and the scape is distinctly smaller.

***Haematopota burtoni*, new species**

(Figs. 119, 246)

Holotype, female, Mg. Phieng, Sayaboury Province, 400 m, Laos, August 20, 1967, F. G. Howarth (CU). Paratypes: LAOS: 1 ♀, Ban Van Eue, Vientiane Province, May 15-31, 1965; NORTHEAST BURMA: 2 ♀, Pankataung Road, Sadon-Myt-kyina, July 8, 1934, Malaise; THAILAND: 1 ♀, Srisatchanalai District, Mae Mok Canton, Lampang Province, July 18, 1966, Burton. (BBM, CU, SM, USNM)

Female.—Length 8–9.5 mm; wing 7.75–9.5 mm; antenna 1.8–2.3 mm. Frons dark gray, small spot above each corner of callus paler; midfrontal spot small; paired spots medium sized, subquadrate, touching eyes; callus reddish brown to black, broadly touching eyes, wrinkled, and slightly flattened mesally, convex above, weakly concave below; velvety black interantennal spot; face and parafacials gray, upper parafacial with irregular dark spots and blotches; beard white. Antenna slender, scape subshiny, yellow brown, cylindrical, with abundant black hair; first flagellomere reddish brown; style dark. Palpus reddish gray with mixed dark and pale hairs. Scutum reddish brown, clothed with yellowish hair, with three very slender, indistinct paler stripes, sublateral stripe ending at transverse suture in small paler spot; tip of scutellum faintly grayish; pleuron gray with white hair. Wing brown with pattern of small isolated spots; subapical band of three to five pale spots; posterior margin usually with no pale spots. Halter yellowish brown. Fore tibia pale on basal third; midtibia and hind tibia each with two pale bands, basal one broader; tarsi dark. Abdomen brown above with narrow yellowish incisures and median stripe faintly indicated only on tergum II; venter almost uniformly gray pollinose.

Distribution.—Burma, Laos, Thailand.

This species resembles *abacis*, but the frontal callus is higher, the wing spots are much smaller, the subapical band is composed of small spots rather than being a usually complete band, and the scutellum is uniformly dark.

We are pleased to dedicate this species to J. J. S. Burton, who provided us with so much material from Thailand of the genus *Haematopota*.

Haematopota cana Walker

(Figs. 37, 162)

Haematopota cana Walker, 1848, p. 207; Bigot, 1891, p. 79; Ricardo, 1906, p. 116; 1911, p. 330; Senior-White, 1927, p. 16.

?*Haematopota biroi* var. *montium* Szilady, 1926, p. 6.

Types.—*cana*, N. Bengal (BM); *montium*, Matheran, near Bombay (NE).

Female.—Length 7–7.5 mm; wing 6–6.5 mm; antenna 1.2–1.3 mm. Frons square or slightly wider than high, parallel-sided, gray, paler around dark spots; midfrontal spot small; paired spots subtriangular, one corner touching eye, one nearly touching callus; callus a narrow yellowish-brown to dark-brown band, touching eyes, straight or shallowly trilobed above, concave below, above antennae; interantennal spot grayish brown, sometimes poorly defined; face and parafacials gray, upper parafacial with irregular dark markings in certain lights. Antenna dark, first flagellomere faintly reddish; scape less than twice as long as thick, cylindrical, grayish pollinose with dark hair; pedicel small; flagellum moderate high basally, first flagellomere nearly as long as scape, distinctly tapered; style rather stout. Palpus yellowish brown with mostly dark-brown hair. Notum brownish gray with almost no pattern; pleuron slightly paler gray. Wings pale gray with pattern of slightly paler, slender spots; subapical band a very slender spot not reaching hind margin, sinuous, sometimes scarcely visible; rest of pattern very faint with no spots at hind margin of wing. Halter knob reddish brown. Legs almost uniformly grayish brown with no banding except paler bases of midtarsus and hind tarsus. Dorsum of abdomen reddish brown, paler at sides; venter pale grayish brown.

Male.—A single specimen from Singara, Nilgiri Hills, S. India, 3,400 ft., May 1954, P. S. Nathan, is probably this species, but the identity is uncertain. Another male associated with *inconspicua* in the British Museum is possibly the same. The scape is gray pollinose and globose and the flagellomere is more reddish, but it agrees well with the female in other respects.

Distribution.—India.

The type has the head missing and the abdomen glued on. In addition to the possible males mentioned previously, we have seen the following females: Eight, Belgaum, Bombay Province, August 11, 1910, T. B. Fletcher; five, Poona, Bombay Presidency, (several dates), H. Cogill; two, Belgaum, North Canara, T. R.

Bell; two, Bombay, June and July 1909; four, Lonavala, Western Ghats, India, June 1918, C. S. Swaminath.

This species resembles *biroi*, but the less developed wing markings, without spots on the hind margin and less developed subapical band, the usually shorter, grayer scape, and the lack of any small sublateral gray spots on the abdomen will usually separate it from *biroi*. The description of *biroi* var. *montium* appears to indicate this species, but the description is short and the type lost so that this is only a speculation.

***Haematopota casca*, new species**

(Fig. 141)

Holotype, male, Assam, Bhairabruna, Kameng, 700-1000 ft, May 18-22, 1961 (CBP).

Male.—Length 8 mm; wing 7 mm; antenna (scape and pedicel only) 0.67 mm. Upper part of eye distinctly pilose with large facets sharply differentiated from small lower facets; frontal triangle yellow with distinct dark interantennal spot; scarcely any shiny callus; face and parafacials gray, upper parafacial solidly black; beard dense, white. Scape swollen, about 1.5 times as long as thick, shiny black on upper part, yellow beneath, with long hair mixed pale and black; pedicel with long dorsal projection, shorter ventral one; flagellum missing. Palpus stout, pale yellow with pale hair; body rather heavily covered with long, mostly dark hair. Notum dark with faint indications of pale areas around humeri and anterior to scutellum; pleuron generally dark gray. Wing heavily patterned with white, subapical band nearly filling out apex of wing with partial doubling proximally; heavy marginal triangles in all posterior cells but cell 4. Halter with yellowish-brown knob. All femora mostly yellowish brown, hind femur with heavy black hair distally; all tibiae darker with two rather broad yellowish bands on each; hind tibia slightly swollen with long hairs; all tarsi missing. Abdomen nearly black, with narrow pale incisures, reddish on sides both dorsally and ventrally.

Distribution.—India (Assam).

We describe this species even though represented only by a male in rather poor condition because it appears to be quite distinctive. The closest species to it may be *marginata*, the wing apex being very similar as well as the male scape and parafacial pattern, but the rest of the wing pattern of *marginata* is quite different (cf. figs. 202 and 141); the male abdomen is much more extensively

yellow, the tibial bands are less apparent, and the hind femur and tibia are not as heavily clothed with long hair.

The name is the Latin adjective, *cascus*, old, in reference to the decrepit appearance of the type specimen.

Haematopota chekiangensis Ouchi

(Figs. 112, 239)

Haematopota chekiangensis Ouchi, 1940, p. 256; Leclercq, 1966, p. 181.

Chrysozona chekiangensis (Ouchi): Liu, 1958, p. 153.

Type.—♀, Tienmushan, Chekiang Province, China (SSI).

Female.—Length 10–12 mm; wing 9–10 mm; antenna 2–2.5 mm. Frons gray, paler around midfrontal and paired spots, subequal in height and width; midfrontal spot small to half length of paired spot, triangular; paired spots large, subquadrate, touching or narrowly separated from callus and eyes; callus about three times as broad as high, touching eyes, slightly narrowed laterally, chestnut brown to nearly black; interantennal spot blackish; face and parafacials gray; upper parafacial with small black spots, sometimes partially fused. Antenna orange brown, flagellum darkened distally; scape subshiny, slightly expanded distally, slightly shorter than first flagellomere; pedicel with pronounced dorsal projection; first flagellomere slender, abruptly tapered basally, gradually so distally. Palpus rather stout, yellowish, with black hair. Scutum dark brown with slender median gray stripe and slightly wider sublateral pair, latter slightly widened behind transverse suture and before scutellum; scutellum with grayish central spot. Wing with usual pattern of spots; subapical band slender, usually not reaching hind margin; triangles in posterior cells usually present except in cell 4. Halter yellow with brown knob. Fore coxa brown, darkened distally; fore femur yellowish brown, midfemur and hind femur more yellowish, tips darkened; fore tibia dark, basal two-fifths with narrow nearly complete subapical band; basitarsi of midleg and hind leg widely pale basally. Abdomen dark brown with yellowish-brown incisures; gray triangle on tergum II and sometimes on succeeding terga; venter brown mesally, gray laterally.

Distribution.—South China.

Additional records are 9 ♀, Taipaishan, Shensi Province, China [labeled as Theuse Prov., Taipaishan], July 20, 1905; 1 ♀, Golden Buddha Mt. north of Chunking, Szechuen Province, July 31, 1907, sucking human blood, W. A. Maw.

This species slightly resembles *philipi*, which, however, is

slightly smaller, lacks the strong dorsal projection on the pedicel, and otherwise differs as keyed.

Haematopota chinensis Ouchi

(Figs. 47, 170)

Haematopota chinensis Ouchi, 1940, p. 253; Leclercq, 1966, p. 75.

Chrysozona chinensis (Ouchi): Liu, 1958, p. 153; 1962, p. 121.

Type.—Tienmushan, Chekiang Province, China (SSI).

Female.—Length 10 mm; wing 8.5–9 mm; antenna 2.5–2.8 mm. Frons dark gray, slightly wider than high, sides slightly divergent below; midfrontal spot well developed, vertical; paired spots large, subquadrate, touching callus and eyes; callus dark reddish, four times as wide as high, upper margin nearly straight but slightly irregular, lower margin weakly concave; pair of large triangular projections below callus, curving laterally over antennal bases, slightly paler than callus; cleft between these triangles darkened; upper parafacials and face dusky brown, paler in certain lights; lower face and parafacials gray with pale hair. Scape shiny, black with dark hair, nearly four times as long as thick, cylindrical but with distinct dorsal depressions near middle and subapical; pedicel with strong dorsal projection; flagellum rusty black, slender, subequal in length to scape; style blunt, one-fourth of total length of flagellum. Palpus yellowish gray with mixed dark and pale hairs. Notum dark brown with pair of slender gray stripes anteriorly and small pale spots just behind transverse suture; humerus yellowish brown; pleuron dark grayish with pale hair. Wings dark brown with mostly small white spots in usual pattern; subapical band complete, sinuous; large marginal triangles in posterior cells except cell 4. Halter with brownish knob. Legs dark with single narrow subbasal white band on fore tibia; midtibia and hind tibia each with narrow subbasal and narrow subapical pale band; midtarsus and hind tarsus pale basally. Abdomen dark, slightly paler laterally on terga II and III.

Male.—Similar to female, differing as follows: Eyes pilose above, upper facets enlarged; frontal triangle yellowish gray above bilobed transverse callus; pollinose black interantennal spot below callus; face and parafacials dark grayish brown, upper part slightly darker. Scape shiny black, swollen, about twice as long as thick, with no dorsal depressions; flagellum shorter than scape. Thorax and abdomen dark, stripes on thorax scarcely visible.

Distribution.—China (Chekiang, Fukien).

These descriptions are based on specimens collected in Fukien by T. C. Maa. The data are Chungang: Bohea Hills, April 20, 24, 28, May 3, 1940 (5 ♂); Chungang: Kuatan, May 3, 1942 (♀); Shaowu, Tachulan, May 16, 1942 (♀). The only significant difference between the male and female is in the more swollen scape and slightly shorter flagellum. The wing pattern and body coloration are so similar that we believe the male to be correctly associated. The female of this species is quite recognizable by the broad frons, shape of antenna (fig. 47), dusky-brown upper parafacial, and narrow tibial bands separated from the base.

***Haematopota chvalai*, new species**

(Fig. 228)

Holotype, female, North Coorg, Santikoppa, May 4–10, 1914, Fletcher (BM). Paratypes: 1 ♀, same data as holotype; 1 ♀, Sidapur, Coorg, May 13–14, 1914, Fletcher; 1 ♀, same, March 11, 1917, T. R. N.; 1 ♂, South Coorg, Pillibetta, May 15–26, 1914, Fletcher (BM); 1 ♂, Charangade, Nilg Hills, South India, 3,500 ft, May 1950, P. S. Nathan. (BM, CU, USNM)

Female.—Length 9.5–10 mm; wing 9.5 mm; antenna 2.2 mm. Frons mottled gray and brown, about 0.79 as wide as high, nearly parallel-sided; midfrontal spot a small brown triangle; paired spots reddish brown, vertical, touching eyes, well separated from callus; callus reddish yellow, slightly rugose, about six times as wide as height at middle, touching eyes usually only at lower corner, upper margin two broad, convex lobes, lower margin shallowly concave; interantennal spot brownish; face near top with two faint oblique brownish spots, part above these gray, that below browner; parafacials yellowish gray with some irregular dark-brown speckling above; beard rather sparse, brown. Antenna yellow, style darkened; scape cylindrical, about three times as long as thick, subshiny, with black hair; pedicel a shallow crescent; flagellum slightly longer than rest of antenna, slender, the style rather heavy and compressed. Palpus rather dark brown with abundant brown hair. Scutum dark reddish brown laterally, paler between the sublateral stripes anteriorly; slender median stripe, humerus, and pair of crescentic areas before scutellum yellowish gray; scutellum pale yellowish orange; pleuron brown. Wings dark brown with pale markings in usual pattern; subapical band double, outer band reaching hind margin, inner band broken shortly beyond vein R₁; area of wing behind end of sub-

costa rather extensively pale; usually all posterior cells with pale triangles at margin, particularly in 1, 3, and 5. Halter with brown knob. Legs dark brown; base of fore coxa slightly paler; fore tibia with narrow subbasal pale band; midtibia and hind tibia each with two narrow, well-defined bands; midtarsus and hind basitarsus mostly pale. Abdomen dark brown with gray incisures above and below; terga III-VI with irregular grayish sublateral spots.

Male.—Antenna entirely yellow; scape shorter and stouter, flagellum very slender; upper parafacial with very small brownish spots; beard yellow brown; palpus paler than in female, with concolorous hair; lateral pale stripe on scutum behind humerus; scutellum pale only on disk; midleg and hind leg paler brown.

Distribution.—South India.

The shape and color of the callus with its dorsal notch and slightly attenuated sides, the shape and color of the paired spots, the pattern on the face, the size, leg coloration, and double subapical band on the wing, all make this a rather distinctive species.

We take pleasure in naming this in honor of Milan Chvala, a student of Tabanidae, who assisted us with material for this study.

Haematopota cilipes Bigot

(Figs. 7, 128)

Haematopota cilipes Bigot, 1890, p. 205; 1891, p. 77; Ricardo, 1906, p. 126; 1908, p. 57; 1911, p. 360; Austen, 1922, p. 432.

Chrysozona cilipes (Bigot): Philip, 1906b, p. 75.

Type.—Laos (LU).

Female.—Length 9.5–11.5 mm; wing 8.5–10.5 mm; antenna 3–4 mm. Width of frons 0.75 to nearly as wide as high, widened below, gray, with brownish area at vertex; midfrontal spot usually represented by pale spot with median streak above, sometimes with small black center; paired spots black, subquadrate, touching eyes, separated from callus; callus orange brown to dark brown, flattened, and roughened centrally, about 2.5 times as high as wide, upper margin nearly straight with small dorsal projection, lower margin shallowly concave; subcallar area shiny with two triangles well separated by pale pollinose cleft; face gray with pair of diffuse blackish spots above; parafacials gray with brownish or dark-gray band from facial pit to eye, widened toward eye; beard long, white. Scape long, cylindrical, subequal to flagellum in length, subshiny, yellowish orange to dark brown with abundant mixed dark and pale hairs; pedicel with strong

dorsal projection and black hairs; flagellum dark brown, slightly compressed, tapering very little; style stout, blunt. Palpus yellowish with mixed dark and pale hair. Scutum brown with five rather indistinct paler stripes, sublateral pair broadest; pair of pale triangles behind transverse suture and pair of crescentic pale spots before scutellum; scutellum pale except for darkened posterior margin; pleuron gray with brownish central area. Wing dark brown with pale spots; subapical band strong, complete, curved; spots of disk of wing rather large, arranged in crescentic band; other spots of variable size, irregular, circular arrangement not very evident. Halter with dark knob. Legs reddish brown to nearly black; fore coxa gray except for brown distal third; fore tibia rather stout, dark, with subbasal white band; midtibia with two pale bands; hind tibia stout, compressed, with two pale bands, usually merged ventrally; hind femur with dorsal fringe of long white and shorter dark hairs and heavy ventral fringe of black hairs; hind tibia with heavy fringe of mostly dark hairs. Abdomen black; terga II-VII with strong gray incisures; venter pale except for mesal darkening on posterior sterna.

Distribution.—Burma, Cambodia, India (Assam), Laos, Thailand.

We have seen this species from Jorhat District, Assam, Rangoon, Burma, Cambodia, Sayaboury and Sedone Provinces, Laos, and Sukhothai, Prachuap-Kiri Khan, Songkhla, and Trang Provinces, Thailand.

The combination of heavy fringes on the hind legs, pale upper parafacial, broad pale area on base of scutellum, wing pattern (fig. 128), and strong abdominal incisures will distinguish this species.

Haematopota cingalensis Ricardo

(Figs. 101, 229)

Haematopota cingalensis Ricardo, 1906, p. 119; 1911, p. 351; Senior-White, 1927, p. 18.

Type.—♀, 19th milestone, Candy Road, Ceylon (BM).

Female.—Length 8–9.5 mm; wing 6.5–8 mm; antenna 1.7–1.8 mm. Frons slightly higher than width at vertex, slightly widened below, brownish gray, paler around paired spots, bordering eye, and median streak at vertex; midfrontal spot minute or absent; paired spots large, circular, black, nearly touching eyes and callus; callus nearly black, 2.5 to 3 times as wide as high, usually touching eyes, upper margin weakly trilobed, lower margin nearly straight; subcallar area with pair of shallow, shiny, yellowish

lobes from callus; interantennal spot large, black; face gray with pair of brownish spots on upper part; parafacials gray with small brown spots at top and crescentic larger spot below these, widest near eye; beard white. Scape yellow, shiny, cylindrical, longer than first flagellomere; pedicel short, with little or no dorsal projection; flagellum dark, slightly paler at base, slender, tapering very little. Palpus reddish gray with mixed dark and pale hair. Scutum brownish gray with humerus and five slender stripes paler, submedian pair expanded behind transverse suture and before scutellum; scutellum narrowly gray centrally, reaching posterior margin; pleuron mostly clear gray. Wings gray with pale spots in usual pattern; subapical band usually double, joined anteriorly and sometimes posteriorly; usually most or all posterior cells with narrow pale triangles at margin. Halter with brown knob. Coxae gray; femora brownish gray; tibiae darker, fore tibia with narrow subbasal pale band and sometimes faint indication of subapical band; midtibia and hind tibia each with two narrow pale bands; midtarsus and hind tarsus pale basally. Abdomen brown dorsally with distinct gray middorsal stripe and sublateral longitudinal gray spots on terga III-VII; venter gray, brownish in middle posteriorly.

Male.—Large and small facets of eye sharply differentiated; frontal triangle gray with small crescentic shiny frontal callus; antenna shorter than in female, scape shiny, slightly swollen; dark area of upper parafacial solid black; pale bands of tibiae, particularly fore tibia, narrower than in female; abdomen slightly reddish basally.

Distribution.—Ceylon.

We have seen more than 100 specimens of this species from Kantalai, November 12, 1953; E. Province, Rambukkan Oya, 25 miles northeast of Bibile, March 8, 1962; S. Province, Haycock Mt., 1600 ft, 21 miles north northeast of Galle, January 29, 1962; Okkampitiya, December 1-10, 1967; Kandy, 1600 ft, September 9-12, 1967 and 1800 ft, January 15-24, 1970; Katugastota, Kandy, 1600 ft, July 29, 1967; Kahalla, Katugastota C. P., 1600 ft, August 27, 28, September 20, 1967; 8 miles west of Wattegama, Monagala District, December 11-20, 1967. Four males were collected at the same time as 62 females.

The wing pattern of this species is rather variable. The spots may be slender or rather broad; the outer part of the hind margin of the wing varies in both number and size and sometimes is completely lacking, sometimes forming a nearly continuous stripe. The long scape distinguishes this species from the two new species, *melloi* and *zophera*, from southern India.

Haematopota cingulata Wiedemann

(Figs. 34, 124)

Haematopota cingulata Wiedemann, 1828, p. 216; Bigot, 1891, p. 79; Ricardo, 1906, p. 115; 1911, p. 326; Meijere, 1911, p. 280; Nieschulz, 1926, p. 385; Schuurmans-Stekhoven, 1926, p. 75; 1928, p. 431; Philip, 1963, p. 524. *Chrysozona cingulata* (Wiedemann): Philip, 1960a, p. 29; 1960b, p. 75.

Type.—Java (LM).

Female.—Length 8–10.5 mm; wing 8–10 mm; antenna 2–2.5 mm. Frons gray, slightly brownish across upper half; width at vertex about 0.57 of height, strongly widened below; no distinct midfrontal spot; paired spots triangular, brownish, sometimes large and sometimes very small and indistinct; frontal callus large, protuberant, flattened above, usually slightly wider than high, dark brown; subcallar area shiny, often weakly demarked from callus, usually slightly paler; no interantennal dark spot; face mostly brown pollinose with dark hair; parafacial gray pollinose without spots above, but lower genae bordering eyes blackish, subshining. Antenna yellowish, flagellum usually darkened distally; scape cylindrical, about 3.5 times as long as thick; first flagellomere longer than scape, slender. Palpus dark brown, tapered, with dark hair. Scutum brown, in clean specimens with broad grayish stripe, tapering posteriorly, crossing scutellum; pleuron dark, subshining, with some areas of grayish pruinosity. Wing brown with pale stripes as figured, discal cell darkened basally. Halter entirely pale. Legs yellowish to brown; fore coxae gray pollinose; fore tibia two-thirds white basally; midtibia about half white basally; hind tibia with about basal third white on dorsal surface. Abdomen dark brown with distinct gray incisures.

Distribution.—Java, North Borneo.

Mainland records of this species probably refer to the closely related *howarthi*. Two syntypes of this species were seen in the Leiden Museum. Additional specimens seen by us are 1 ♀, Buitenzorg, Java, March 1909; 2 ♀, Samaurang, near Sandakan, North Borneo, July 13, 14, 1927; 1 ♀, Gunteng Bay, southwest Java, March 1937; 2 ♀, Tjigeunteuz, Udjungkulon, West Java, July 15, 1955.

Greased specimens of this species will not show the middorsal gray stripe of the thorax, but the wing pattern is distinctive; the continuous, submarginal pale stripe from the wing margin in cell R_4 to the axillary cell is found only in this species and *howarthi*. *H. cingulata* appears to be infrequently collected, but it may be abundant locally in shady locations. It has been collected on cattle and horses, and Nieschulz (1926) transmitted surra with it.

Haematopota circina Philip*Haematopota circina* Philip, 1963, p. 524.**Type.**—22 km south of Nha Trang, Vietnam (BBM).

Female.—Length 8–9 mm; wing 7.5–8.5 mm; antenna 1.9 mm. Frons narrowly gray bordering eyes, rest subshining black; width at vertex about 0.58 of height, slightly divergent below; callus black, covering more than lower half of frons, lower part smooth and protuberant, upper part slightly flattened and irregular; midfrontal spot small, brownish; paired spots slender, lying beside dorsal lobe of callus; all spots somewhat obscured; above median spot a large subshiny black area; subcallar area with pair of shiny triangles between which lies velvety black interantennal spot; face brownish, parafacials gray; beard brownish and white. Antenna yellowish, flagellum slightly darkened distally; scape about three times as long as thick, cylindrical; pedicel short without dorsal projection; flagellum long and very slender, first flagellomere longer than scape. Palpus dark gray, stout, with mostly black hair. Notum dark brown, grayish anteriorly with gray middorsal stripe that widens posteriorly to scutellum and continues slightly narrowed across scutellum; rather broad gray stripe from humerus to above wing; pleuron gray. Wing dark brown with three distinct, usually complete pale circles; base of cell R₁ and discal cell largely pale; subapical band straight, complete; all posterior cells with small marginal triangular spots; anal and axillary cells with large pale blotches. Halter pale yellow. Fore coxa grayish, darker distally; femora yellowish to dark brown; all tibiae white except for narrow apical dark band; midtarsus and hind tarsus slightly paler basally. Abdomen dark brown with narrow gray incisures; venter slightly grayish laterally.

Distribution.—Vietnam.

This species most closely resembles *biorbis*, which is, however, more yellow, with no paired frontal spots or shiny dark area at vertex, and two slender, pale stripes in anal-axillary area of wing.

Haematopota clarkeana, new species

(Figs. 102, 230)

Holotype, female, Bako National Park, Sarawak, September 27, 1966, J. F. G. and Thelma Clarke (USNM No. 72019).

Female.—Length 9 mm; wing 7.5 mm; antenna 1.8 mm. Frons gray, width at vertex about 0.86 of height, slightly widened below; midfrontal spot distinct, triangular; paired spots ovate,

slightly oblique, nearly touching eyes and callus; callus black, strongly protuberant, about three times as wide as high, upper margin weakly convex with indistinct dorsal angle, lower margin triangularly indented in middle, concave on each side; face and lower parafacials gray, upper parafacial with brown spot transversely broken by yellowish streak below. Antenna yellow orange, style darkened; scape moderately stout, cylindrical, about 2.5 times as long as thick, shorter than width of frons at vertex; pedicel with distinct dorsal projection; first flagellomere about 1.5 times as long as high, distinctly tapered distally. Palpus yellowish gray with mixed dark and pale hair. Scutum brown with three slender, paler stripes anteriorly; scutellum uniformly brown; pleuron gray. Wing brown with usual pattern of paler spots; subapical band indistinctly doubled, outer arm broken across vein R_4 ; inner arm not reaching hind margin; small pale marginal spots in all but posterior cell 4. Halter with brown knob. Fore coxae uniformly yellow; femora yellow to brown, fore femur darkest; fore tibia dark with narrow basal pale band; midtibia and hind tibia each with two bands, proximal one on hind tibia separated from base; bases of midtarsus and hind tarsus narrowly paler. Abdomen brown above, with very faint middorsal stripe on tergum II and very small, faint paler median spots on terga III-VI; venter dark brown centrally, gray laterally.

Distribution.—Borneo.

This species most closely resembles *cingalensis* of Ceylon but lacks the strong abdominal pattern of that species and the scape is shorter.

We are pleased to name this species in honor of the collectors.

***Haematopota contracta*, new species**

(Figs. 91, 219)

Holotype, female, Cinchona, Coimbatore, Anamalai Hills, India, April 1957, P. S. Nathan (CU). Paratype: Females, all P. S. Nathan as follows: Type locality (some labeled in addition, Madras and some with altitudes of 3,500 ft, 1050 m, or 1066 m); April 1956 (165); April 1957 (7); April 1959 (8); April 1960 (7); April 1964 (22); May 1956 (57); May 1957 (7); May 1960 (5); May 1963 (94); May 1964 (30); May 1965 (80); May 1968 (50); September 1956 (72); Kadamparai, Anamalai Hills, 1,066 m, May 1960 (21); May 1963 (145). (BBM, BM, CBP, CNC, CU, LZG, UCR, USNM, ZIL)

Female.—Length 7–9.5 mm; wing 6.5–9 mm; antenna 1.6–2.2 mm. Frons gray, partially tinged with brown, width at vertex

0.6 to 0.8 of height, distinctly widened below; midfrontal spot usually small, pale, but often with small dark spot in certain lights; paired spots round or subquadrate, touching eyes, narrowly separated from callus; callus shiny black, protuberant, one-third to two-fifths as high as wide, touching eyes, upper margin nearly straight, lower margin shallowly concave; subcallar area with large, keystone-shaped, black interantennal spot; face gray often with pair of small dark spots near top; parafacials gray below with dark-brown blotching above, usually transected obliquely by narrow diagonal yellowish area; beard white. Scape shiny black, about 2.5 times as long as thick, slightly constricted at midlength, basal part slightly thicker than apical part; pedicel black, stout, with short dorsal projection; flagellum faintly tinged with brownish, slender, subequal to scape in length. Palpus grayish brown with dark hair. Scutum dark brown with faint indications of paler stripes, pair of spots behind transverse suture, and a pair of rather distinct transverse crescentic gray spots at hind margin; prescutellar sclerite gray; scutellum entirely dark brown; pleuron mottled gray and brown. Wing brown with pale spots in usual pattern; subapical band a row of irregular spots usually crossing wing and sometimes completely joined; pale triangles at margin usually in all posterior cells but cell 4. Halter with dark knob. Legs dark brown; fore coxa grayish anteriorly on basal half; fore tibia about two-fifths white basally; midtibia and hind tibia each with distinct subbasal white band and slightly narrower, yellowish subapical band; midtarsus and hind tarsus pale at base. Abdomen dark brown above with pale-yellowish incisures; occasionally with grayish middorsal streak on tergum II and small yellowish sublateral spots on posterior terga; venter mostly dark with pale incisures.

Distribution.—India (Madras).

This very abundant species closely resembles *echma*, also from South India, and possibly represents local races of one species. In *echma* the scape is usually rather cylindrical and not swollen basally, its medioventral surface is distinctly reddish, the first flagellomere is redder, the subapical band of the wing tends to fade posteriorly, and the size averages slightly larger. All specimens of *contracta* came from the Anamalai Hills and all *echma* from the Nilgiri Hills.

The name is in reference to the slight narrowing of the scape.

***Haematopota cordigera* Bigot**

Haematopota cordigera Bigot, 1891, p. 76; 1892, p. 626; Ricardo, 1906, p. 125.

Haematopota fuscifrons Austen, 1908, p. 411 (unjustified new name); Ricardo, 1911, p. 357; Senior-White, 1927, p. 18.

Type.—India (BM).

Female.—Length 9.5 mm; wing 8.2 mm; antenna (except flagellum) 0.7 mm. Frons gray with inverted cordate dark-brown area centrally obscuring paired spots; width at vertex about 0.61 of height, sides nearly parallel; callus shiny dark brown, smooth, protuberant, with flattened middorsal lobe extending between lobes of dark frontal area; height, including lobe of 0.4 of width, convex above, narrowly touching eyes; strong pair of shiny triangles below, with no darkened area in cleft or between antennae; face gray with pair of brown spots above; parafacial with faint darker gray markings above. Scape yellow, cylindrical, about three times as long as thick, only slightly expanded distally; pedicel with short dorsal projection; flagellum missing. Palpus slender distally, yellowish gray with mostly dark hair. Scutum brown with gray stripes faintly indicated anteriorly, pair of distinct triangles behind transverse suture, and pair of crescentic transverse spots anterior to scutellum; prescutellar sclerite gray; scutellum brown, broadly gray centrally. Wing brown with rather small pale spots in usual pattern; subapical band curved inward, crossing wing with arm from it joining marginal triangle in posterior cell 1; semicircle of small spots around furcation but no spot immediately behind it; distinct marginal triangles in all posterior cells. Halter entirely pale yellow. Hind legs of type missing; fore coxa entirely yellowish gray; fore femur brown, midfemur paler on basal three-fourths; fore tibia nearly half white; midtibia with three dark and two pale bands, all subequal in width. Dorsum of abdomen brown with narrow gray incisures and sides of terga I–II gray; venter mostly pale gray.

Distribution.—India.

The wing of the type was figured by Ricardo (1906), not (1917) as stated by Philip (1963).

This species has been confused with both *malayensis* (as *meditafrons*), *ampla*, and *tenasserimi*. It differs from the first in less extensive white on fore tibia, spot above furcation, complete subapical band (rare in *malayensis*), distinct pair of gray spots behind transverse suture, and absence of middorsal triangle on tergum II; *ampla* differs in having cell R, basad of furcation mostly pale, subapical band of wing nearly straight but irregular, less developed submedian spots on scutum, and fore coxa brownish distally; *tenasserimi* differs in having shinier, stouter scape, more protuberant dorsal lobe of frontal callus, and first pale band

of midtibia broad and reaching base. We have seen only the type specimen.

***Haematopota corrigata*, new name**

(Fig. 130)

Haematopota confluens Schuurmans Stekhoven, 1926, p. 112 (not *Tylopelma confluens* Enderlein, 1925 = *Haematopota albihirta* Karsch, 1888).

Type.—Sibohoean, Djandi Lobi, Binanga, Tapanoei, Sumatra (LU).

Female.—Agreeing in all particulars with *javana* except wing pattern as shown in figures 130 and 140.

Distribution.—Sumatra, Thailand.

This species so closely resembles *javana* that it may be no more than an aberration. The type was collected at the same locality as 23 specimens of *javana* and we have seen 2 specimens from Songkhla Province, Rattaphum District, Tha Chamuang Canton, Thailand, collected October 15 and 17, 1969, a locality in which *javana* is very abundant.

We propose a new name because *confluens* is a secondary homonym; Enderlein's species is firmly established as a synonym in the genus *Haematopota*. The name is derived from the Latin *corrigo*, to set right.

***Haematopota crassitibia*, new species**

Holotype, female, Maymyo, Upper Burma, 3,500 ft, August 19–21, 1914, Fletcher (BM).

Female.—Length 7.5 mm; wing 7.5 mm; antenna 2 mm. Frons gray, width at vertex 0.72 of height, slightly widened below; midfrontal spot small, dark; paired spots large, slightly higher than wide, touching eyes and narrowly separated from callus; callus orange brown, narrowly separated from eyes, 3.3 times as wide as high, upper margin convex, lower margin nearly straight; subcallar area with large brown interantennal spot; face and parafacials gray, latter irregularly spotted with brown above; beard white. Antenna yellowish, flagellum beyond base darkened; scape shiny, cylindrical, about twice as long as wide, about four-fifths length of first flagellomere; flagellum long, narrow, style blunt. Palpus pale yellowish with mixed dark and pale hairs. Scutum grayish brown with four broad, faint, gray stripes merging posteriorly to form pale area before scutellum, including prescutellar sclerite; scutellum brown with grayish center. Wing with punctate pattern; costal cell pale, stigma dark; preapical

band single, broad, curved; hind margin of wing with continuous pale border. Halter pale with partially darkened knob. Legs yellowish, darker distally, with pale markings as follows: Basal half of fore coxa; narrow, indistinct basal band on fore tibia; two bands on midtibia, distal one faint; two bands on hind tibia, basal one about one-third length of segment, subapical one small, faint, incomplete; midbasitarsus and hind basitarsus basally; fore tibia and tarsus subequal in length, tibia distinctly swollen. Abdomen brown, sides of terga gray, and faint median stripe posteriorly; terga II-VI with sublateral gray spots; venter grayish, darker posteriorly.

Distribution.—Burma.

This species is keyed as having a single hind tibial band, subapical one being so faint and incomplete. If considered as having two bands, it would go to *melloi* or *zophera*, from both of which it is readily separated by the continuous pale hind margin of the wing.

The name refers to the thickened fore tibia.

***Haematopota cristata* Schuurmans Stekhoven, new status**

(Figs. 110, 237)

Haematopota irrorata ssp. *cristata* Schuurmans Stekhoven, 1926, p. 88.

Type.—Air (Gaung Ketjil, Sumatra (LM)).

Female.—Length 9-12 mm; wing 9.5-11 mm; antenna 1.75-2 mm. Frons dark brown, about 0.62 times as wide at vertex as high, slightly widened below; midfrontal spot indistinct and sometimes merged with dorsal darkened triangle, or rather well developed, vertical; paired spots rather large, distinct, touching eyes; callus black or rarely dark reddish, protuberant, slightly more than twice as wide as high, touching eyes, upper margin convex or weakly trilobed, lower margin shallowly concave; subcallar area with median dark opaque cleft spot; face and parafacials yellowish gray, small area of irregular darkening at upper corner of parafacial; beard heavy, pale. Antenna black, rarely tinged with reddish; scape shiny with some gray pollinosity basally and dorsally, distinctly narrower at base than at apex, about 1.5 times as long as distal height; pedicel with rather short dorsal projection; first flagellomere about twice as long as high, tapering. Palpus dark brown with mostly dark hair. Scutum dark brown with yellowish markings as follows: Pair of faint stripes anteriorly; pair of distinct spots behind transverse suture; sides rather broadly anterior to, and narrowly behind, antecubital, but callus itself mostly dark; rather broad sinuous band on hind margin,

sometimes with short median stripe extending forward from it; scutellum entirely dark; pleuron clear yellowish gray. Wing brown with pattern of small, rather indistinct yellowish spots; subapical band faintly indicated across vein R_4 or absent; no pale spots on hind margin of wing. Halter with brownish knob. Legs: Coxae gray; fore femur dark; midfemur and hind femur yellowish brown; fore tibia dark, basal two-fifths white; midtibia and hind tibia with two pale bands; tarsi dark. Dorsum of abdomen dark brown, fore margin of tergum II and hind margins of all terga narrowly yellowish; venter mostly pale.

Distribution.—Sumatra.

We have seen 23 specimens including 5 topotypes. In the Amsterdam Museum are four of the original series but none labeled as type. In Leiden, where the type is supposed to be, there are eight from Sumatra, but none bear type data.

Although originally described as a subspecies of *irrorata*, *cris-tata* is quite distinct because it is larger and has a shorter, darker antenna and a strong, prescutellar pale band.

***Haematopota crossi*, new species**

(Figs. 16, 137)

Holotype, female, Sohawa, Jhelum District, Punjab, India, on camel, April 7, 1922. H. E. Cross (BM). Paratypes: 3 ♀, same locality, but March 4, April 5 (on camel), April 16 (on buffalo); 2 ♀, India (pres. by H. E. Cross); 1 ♂, near Birganj Lothar, Nepal, 450 ft, September 11, 1967. (BM, CNC, USNM)

Female.—Length 9–10 mm; wing 7.5–8 mm; antenna 1.5–1.6 mm. Frons pale gray, occasionally with brownish areas near vertex or between paired spots, square to slightly wider than high, sides subparallel; midfrontal spot distinct, black; paired spots black, round, usually well separated from eyes, narrowly from callus; callus yellow brown, convex centrally above, tapering to narrow point laterally, not quite reaching eyes; lower margin with deep median angular notch; interantennal spot large, black; face gray; upper parafacial gray with subquadrate black spot at top, laterally, well separated from antennal base; beard white. Scape yellowish-gray pollinose, less than twice as long as distal width, narrowed toward base; pedicel short and stout with distinct projections both above and below; first flagellomere compressed, slightly longer than scape, not greatly tapered distally; style stout, slightly longer than height of first flagellomere. Palpus pale yellow with concolorous and few black hairs. Thorax brown-

ish gray with humerus, pair of spots behind transverse suture, crescentic spots before scutellum, and three indistinct slender stripes, paler; scutellum brown, hind margin gray; pleuron gray. Wing pale brown with wide paler markings in usual pattern; apical band doubled, sinuous, rather complete; posterior cells except usually cell 4 with large triangles in margin. Halter knob pale with small basal brown spot. Coxae and femora pale yellowish gray, hind femur slightly darkened near apex and with moderately developed tuft of long hair; fore tibia dark on basal half; midtibia and hind tibia darkened each with two broad pale bands; hind tibia slightly swollen, tibial fringe rather long; fore tarsus dark; first tarsomere of midleg mostly pale; succeeding tarsomeres of hind leg pale basally giving banded appearance. Abdomen mostly pale gray leaving double row of brown spots centrally, inner margins of spots nearly straight, other margins concave; traces of sublateral row of brown spots.

Male.—Very similar to female in wing pattern, thorax, and pattern of legs, including unusually long hind tibial hairs and banding of hind tarsus. Differs from female as follows: Large faceted area of eye extensive and sharply differentiated from small faceted area; frontal triangle gray with small shiny triangular callus above the interantennal spot; black of upper parafacial reaching antenna; scape swollen, shiny, yellow; flagellum with style more slender and paler; abdomen much yellower, pattern of stripe and spots less distinct because of this.

Distribution.—India (Punjab), Nepal.

The reduced yellow frontal callus, strong paired frontal spots, small but solid black spot on upper parafacial, and general grayishness will readily distinguish this species from all others included here.

We are pleased to name this species in honor of the collector of the types, who published on the transmission of surra by Tabanidae and ticks in the Punjab.

Haematopota demeilloni, new species

(Figs. 31, 157)

Holotype, female, Phibun Mangsahan District, Ubon Ratchathani Province, Thailand, 15° 14–15' N, 105° 13–14' E, about water buffalo, July 24, 1969, Pie Chaemmanee (CU). Paratypes: 23 ♀, same data as holotype; 3 ♀, same, but July 22, 23, 25. (CBP, CU, USNM)

Female.—Length 7–9 mm; wing 6–7.5 mm; antenna 1.2–1.4 mm. Frons gray with paler rings around usually strong mid-

frontal spot and paired spots; width at vertex subequal to height, slightly widened below; paired spots large, nearly round, touching eyes, usually narrowly separated from callus; callus black, about six times as wide as high, upper margin straight with small median triangular projection, lower margin shallowly concave centrally; subcallar area yellowish gray with rather weak, brownish triangle in middle, often cleft; face and parafacials nearly white, upper parafacial with rather small dark area, appearing solid when viewed from side but broken and evanescent when viewed from in front. Antenna brownish black; scape short, strongly expanded distally; pedicel with strong dorsal point; first flagellomere compressed, greatest height longer than style, style abruptly narrower. Palpus slender, gray with mixed dark and pale hair. Notum dark gray with five rather broad pale gray stripes; pair of strong curved gray marks before scutellum but prescutellar sclerite dark; scutellum dark basally, posterior margin gray; pleuron gray. Wings dark gray with pattern of large spots; subapical band strong and usually second band more distinct, but this sometimes faint or absent; all posterior cells with triangular spots at wing margin. Halter pale, knob darkened laterally. Legs dark with paler markings; fore coxa almost entirely gray; femora mostly gray except near apex; fore tibia pale yellowish on basal fourth; midtibia and hind tibia each with two rather broad pale bands; midtarsus and hind tarsus only slightly paler basally. Abdomen slender, dark brown with more or less developed slender median gray stripe or at least triangle on tergum II, strong gray incisures, lateral margin of terga, and usually small gray sub-lateral spots on posterior terga; venter gray with median row of dark subquadrate spots.

Distribution.—Thailand.

In addition to the type series we have seen specimens from Krabi and Satun Provinces. This species resembles *demellonis* from Goa, but wing spots are distinctly smaller, stripes on scutum thinner, pale bands of hind tibia not as broad, and double subapical band is connected both anteriorly and posteriorly.

We are pleased to dedicate this species to Botha de Meillon, eminent medical entomologist and good friend.

Haematopota demellonis Senior-White

Haematopota demellonis Senior-White, 1922b, p. 146; 1927, p. 20.

Type.—Nova Goa, Portuguese India (BM).

Female.—Length 6.5 mm. Frons yellow gray, white margining eyes and above paired spots; median white stripe above; mid-

frontal spot lacking; paired spots large, slightly oblique, narrowly touching eyes and callus; callus shiny black, upper margin straight except for small median triangular projection; lower margin shallowly concave; interantennal spot black; face and parafacials pale gray; upper parafacial with broken dark spot. Antenna dark brown, flagellum paler; scape short, expanded distally; pedicel with strong dorsal projection; first flagellomere greatly compressed, much higher than length of style, style much narrower at base than height of first flagellomere at apex. Palpus yellowish with mostly pale hair. Notum dark yellowish gray with fine slender pale stripes; scutellum pale gray with pair of darker spots near base; pleuron dark gray. Wing pale gray with pattern of paler spots rather slender and disconnected; subapical band double, joined anteriorly and posteriorly; not all posterior cells with pale spots at margin. Halter pale with darkened knob. Femora dark grayish with white hair; fore tibia pale at base; mid-tibia and hind tibia with two pale bands, but second band of hind leg indistinct. Abdomen mostly gray with two rows of rather large dark-brown spots concave laterally; incisures narrowly pale yellowish gray; venter gray with broad median dark stripe.

Distribution.—South India (Goa).

The type is in good condition. It is closest to *demeilloni* and may be separated as noted in key and following description of *demeilloni*.

Haematopota dissimilis Ricardo

Haematopota dissimilis Ricardo, 1911, p. 331; Senior-White, 1927, p. 16.

Type.—Baste, N. Canara, India (BM).

Female.—Length 7.5 mm; wing 7 mm; antenna 1.5 mm. Frons brown, width at vertex about 0.75 of height, slightly widened below; midfrontal spot small, diamond-shaped; paired spots large, nearly touching eye and callus; callus orange brown, slightly less than three times as broad as high, broadly touching eyes, with broad, irregular dorsal projection nearly reaching median spot; lower margin deeply concave above antenna; pair of triangular shiny projections to either side of dark interantennal spot; face yellowish brown with pair of darker brown spots above; parafacials gray, upper part with irregular brown spotting; beard sparse, brownish. Antenna reddish brown, slightly darkened distally; scape shiny with rather long dark hair, cylindrical, three times as long as thick; pedicel with small dorsal projection; first flagellomere slender, subequal in length to scape; style rather

compressed. Palpus grayish brown with long dark hair. Scutum brown, very faintly striped; scutellum almost uniformly brown; pleuron gray with some brown areas. Wing brown with pale spots in usual pattern; subapical band partially doubled, overlapping centrally; small spots at margin in most posterior cells. Halter knob brown. Legs yellowish brown with paler areas as follows: Faintly on base of fore coxa; narrow subbasal band on fore tibia; two narrow bands on midtibia; narrow subbasal band on hind tibia; base of midtarsus and very narrowly base of hind tarsus. Abdomen almost uniformly brown with narrow pale incisures.

Distribution.—South India.

The foregoing description is based on the type and other specimens of the type series from Basti (as written on label). It appears closest to *oporina*, also from South India, which differs, however, not only in the characters given in the key but in having the subapical band of the wing not doubled and the scape slightly more swollen.

Haematopota echma, new species

(Figs. 97, 226)

Holotype, female, Ootacamund, Nilgiris, May 13, 1924, P. V. Isaac (BM). Paratypes: 2 ♀, same as holotype, 7 ♀, same but May 12; 2 ♀, Coonoor, Nilgiris, May 12, 1924, August 22-31, 1923, Isaac; 1 ♀, Coorg, June 1927, P. J. Barraud; 1 ♀, Ootacamund, 7,500 ft, April 19, 1948, P. S. Nathan; 4 ♀, Moyar Camp, Nilgiri Hills, 2800 ft, May 1954, Nathan; 4 ♀, Singara, Nilgiri Hills, 3400 ft, May 1948 and 1954, Nathan; 14 ♀, Cherangode, Nilgiri Hills, 3500 ft, May and October 1950, Nathan; 43 ♀, 2 ♂, Naduvatam 1958, Nathan; 10 ♀, 1 ♂, same, May 1958; 2 ♀, 1 ♂, same, 6000 ft, May 1 and 3, 1950; 1 ♀, 1 ♂, same, April 1958; 1 ♀, same, Sept. 25, 1950. (BM, CBP, CU, MCZ, USNM)

Female.—Length 7.5-10.5 mm; wing 7.5-10 mm; antenna 1.6-2.2 mm. Frons brownish gray, width at vertex about 0.75 of height, slightly widened below; midfrontal spot small, usually not seen except when viewed from below; paired spots rather large, subquadrate or slightly crescentic, usually touching eyes, separated from callus; callus nearly black, protuberant, and slightly rugose centrally, more than twice as wide as high, touching eyes, upper margin nearly straight with small middorsal projection, lower margin straight centrally, curved downward laterally; subcallar area with large interantennal black spot; face gray, often more or less dark speckled above; parafacials

gray with irregular dark speckling above but never solidly dark; beard white. Scape dark, shiny, with dark hair, medioventral surface usually redder than dorsolateral surface, cylindrical, little more than twice as long as thick; pedicel short, stout, weakly crescentic; flagellum dark reddish, long and slender, distinctly longer than scape. Palpus yellowish gray, mostly dark-haired. Scutum brown with rather faint paler lines anteriorly, pair of grayish spots behind transverse suture and some gray before scutellum, including prescutellar sclerite; scutellum dark, posterior margin faintly grayish; pleuron gray. Wings pale gray brown with usual pattern; subapical band slender, sinuous, usually broken into spots and not reaching hind margin, sometimes faintly doubled; marginal triangles at wing margin usually small, not very distinct, and sometimes completely absent. Halter with dark knob. Fore coxa gray, distal third brown; femora yellowish gray, fore femur darkened anteriorly, midfemur and hind femur narrowly distally; fore tibia dark, basal third pale; midtibia and hind tibia each with two pale bands; tarsi dark, base of midtarsus and hind tarsus paler. Abdomen brown with yellowish incisures and rather distinct middorsal gray stripe and on posterior terga gray sublateral spots; venter almost uniformly yellowish gray.

Male.—Similar to female except for usual sexual characters and in having upper parafacial solidly black with lower margin of black area slightly irregular and scape slightly more swollen and shinier. There is a small bilobed frontal callus.

Distribution.—India (Madras).

This species is very close to *contracta* and the differentiating characters are given under that species. Both species less closely resemble *hindostani* and *montana* also from southern India, but the antennae of *hindostani* and *montana* are darker and the subapical band of the hind tibia is more developed.

The name, a Greek noun, refers to the obstacle this species presented in the progress of this work because of the difficulty in defining it.

Haematopota elegans Schuurmans Stekhoven

Haematopota elegans Schuurmans Stekhoven, 1926, p. 108.

Type.—Tasikmalaja, Java (LU).

Female.—Length 8.5–8.8 mm; wing 8–8.2 mm. Frons pale brown, width at vertex about 0.73 of height, slightly wider below; median spot lacking; paired spots black, slightly vertical, separated from eyes and callus; callus reddish brown, about 2.5 times as wide as high, broadly touching eyes, upper margin ir-

regular, lower margin concave; beneath callus pair of shiny triangles and black interantennal spot; face pale gray, parafacials slightly yellower with transverse dark streak tapering medially; beard white. Antenna yellow, becoming darker distally to black style; scape cylindrical, about 2.2 times as long as thick, distinctly shorter than long slender first flagellomere; pedicel with distinct dorsal projection. Palpus yellow brown, with mixed yellow and black hair. Notum brown, anteriorly with three slender pale stripes; pleuron reddish brown. Wing gray with small spots in usual pattern; subapical band double, inner arm not reaching hind margin; pale triangles in all posterior cells. Halter with brown knob. Fore coxa not distinctly bicolored; femora reddish brown, fore femur darkest; fore tibia with basal two-fifths white; midtibia and hind tibia each with two bands, basal one of hind tibia rather wide, reaching base; midtarsus and hind tarsus pale at base. Abdomen reddish brown basally, darker distally, with grayish incisures on terga I-III.

Distribution.—Java.

We have seen two paratypes in poor condition in the Leiden Museum and the description and key characters are derived largely from these. If the fore coxa is considered to be bicolored, this will go to *pungens* in the key, and it is possible that these are conspecific, but *pungens* is usually larger and has a paler halter.

Haematopota ensifer Schuurmans Stekhoven

Haematopota ensifer Schuurmans Stekhoven, 1926, p. 79.

Type.—Gamboeng, on the Goenoeng Tiloe, Reserve Preanger Regencies, Java (LU).

Female.—Length 9.5–10.5 mm; wing 8.8–10.5 mm. Frons with irregular grayish pattern; no midfrontal dark spot; paired spots semicircular, touching eyes, separated from callus and narrowly from eyes; callus black, triangular, narrowly separated from eyes, lower margin shallowly concave; subcallar area with small shiny brown spot; face and parafacials gray, browner along eye borders and upper parafacial with transverse brownish streak; beard pale gray. Antenna yellowish brown, darkening to black style; scape short, scarcely twice as long as thick, slightly thickened distally; pedicel without strong dorsal projection; flagellum rather long and slender. Palpus long and slender with mixed gray and dark hair. Notum brown with three slender yellowish stripes anteriorly and strong white stripe starting narrowly near transverse suture and abruptly widened posteriorly to cover center of scutellum; pleuron gray. Wings generally dark grayish with slender

pale flecks; subapical band broken into two or three small spots; hind margin with pale triangles only in posterior cell 5; darker spots at furcation, base of posterior cells 2 and 3, and across middle of wing. Halter brown. Fore coxa yellowish at base, darker beyond; femora brown; fore tibia with subbasal white band narrowly separated from base; midtibia and hind tibia each with two pale bands; tarsi slightly paler basally. Abdomen with white central streak on terga I-II, continuation of the latic stripe, rest of dorsum dark brown except for small pale spots on terga V-VI; venter olive brown centrally, gray laterally.

Distribution.—Java.

This species was described from six specimens, five of them from the type locality; a paratype with no data is in the Leiden Museum. This species is very distinctive because of the unusual thoracic-abdominal pattern, which the describer aptly called 'sword-shaped.' The wing pattern is unusual also as the general appearance is of gray wing with darker spotting.

Haematopota equina, new species

Holotype, female, Assam, Cherrapanji, on horse. June 18, 1918, A. G. Ramaswami (BM). Paratype, 1 ♀, same data as holotype (BM).

Female.—Length 8.6–10.5 mm; wing 9–10 mm; antenna 1.7–1.9 mm. Frons yellowish gray, width at vertex about 0.92 of height, slightly widened below; midfrontal spot small (indistinct in holotype); paired spots dark brown, subtriangular, external angle truncate, touching eye, not touching callus; callus yellowish brown, smooth, about three times as broad as high, nearly touching eyes, upper margin straight or slightly convex, lower margin with center half distinctly concave; interantennal spot a light brown triangle; face and parafacials yellowish, upper parafacial with irregular brown spotting; eyes with short sparse pile. Antenna yellow, apical half of last flagellomere black; scape dull, about twice as long as thick, with black hair; pedicel with no dorsal projection; first flagellomere long and slender, distinctly longer than scape, slightly swollen near base. Palpus yellow, rather slender, with black hair; beard yellowish. Scutum yellow brown with five rather indistinct paler stripes; scutellum uniformly yellow; pleuron yellow. Wing pale grayish with rather slender pattern, not broken into round spots; subapical band consisting of anterior curved part and posterior extension, not crossing vein R_5 ; no marginal spots in posterior cells. Halter knob slightly browned. Legs almost uniformly yellow, tarsi darker distally. Dorsum of

abdomen uniformly yellow brown except rather broad middorsal yellow stripe and narrow incisures; venter uniformly yellow with yellow hair.

Distribution.—India (Assam).

This species is similar to *limbata* and *roralis* but is much yellower than either. It lacks the strong black upper parafacial spot of *limbata* and the long scape and large sublateral abdominal spots of *roralis*.

The name refers to the animal on which the type was collected.

Haematopota equitibiata Schuurmans Stekhoven

Haematopota equitibiata Schuurmans Stekhoven, 1926, p. 92.

Haematopota acutibibia Szilady, 1926, p. 10 (emend. of *equitibia*, lapsus).

Type.—Muara Sako, Sumatra (AM).

Female.—Length 8 mm; wing 8.2 mm. Frons brown, height and width subequal, scarcely widened below; midfrontal spot strong; paired spots large, round, touching eyes, nearly touching callus; callus about twice as wide as high, broadly touching eyes, upper margin coming to a blunt point, lower margin concave; subalar area with brown interantennal spot; face and cheeks pale gray, upper parafacial with transverse dark streak below irregular dark spotting. Antenna yellow brown, darkening to black style; scape a slender cylinder, longer than first flagellomere; flagellum slender. Palpus brown with mostly dark hair. Notum brown with two indistinct paler stripes anteriorly; pleuron uniformly grayish brown. Wing gray with usual pattern of pale spots; subapical band slender, not reaching hind margin; pattern in central area of wing rather coarse; pale triangles on hind margin in all but posterior cell 4. Fore coxa white basally, brown apically; all femora dark brown; fore tibia about half white; midtibia nearly all white; hind tibia about three-fifths white; all tarsi dark. Abdomen brown with narrow pale incisures, those on venter wide.

Distribution.—Sumatra.

We have seen the type and paratype in the Amsterdam Museum. This is similar to *atriventer* but is distinctly smaller with a longer scape, dorsally more angulate callus, and coarser wing pattern.

Haematopota famicis, new species

(Fig. 143)

Holotype, male, Yim Na San, east Kwangtung, China, June 15, 1936 (USNM No. 72020).

Male.—Length 10.5 mm; wing 8 mm; antenna 2.2 mm. Smaller facets of eye occupying lower fifth; frontal triangle yellowish gray; shiny frontal callus touching eyes and black interantennal spot; face and lower parafacials pale gray, upper parafacial solidly black. Antenna black; scape a shiny swollen cylinder probably equal to flagellum in length; first flagellomere about twice as long as high, weakly tapering to apex; style missing (length of antenna estimated). Palpus pinkish gray, tapered. Notum dark brown, reddish laterally; gray area before scutellum; pleuron dark gray. Wing brown with usual pattern of small pale spots; subapical band complete, rather broad posteriorly; large marginal triangles in all but posterior cell 4. Halter with dark-brown knob. Legs almost uniformly dark brown, hind tibia with strong black fringe; midtibia with two indistinct yellowish bands; hind tibia with faint subbasal yellowish band; tarsi dark, hind pair scarcely darker basally. Dorsum of abdomen black with narrow pale incisures and triangle on tergum II; venter grayish, darker distally, with mostly pale hair.

Distribution.—South China.

This species is closely related to *abatrata* and females might run to that species in the key. However, in *famicis* the scape is slightly less swollen, the first flagellomere is more slender and black rather than brown, the bases of the midtarsus and hind tarsus are darker, and the venter is paler with pale rather than black hairs.

The name is the genitive of the Latin *famex*, bruise, referring to the black beneath the eyes.

Haematopota fasciata Ricardo

Haematopota fasciata Ricardo, 1911, p. 358; Senior-White, 1927, p. 18.

Type.—Shillong, Assam (BM).

Female.—Length 8–10 mm. Frons blackish brown; midfrontal spot strong; paired spots touching eyes and usually callus; callus nearly black, narrow, both upper and lower margins nearly straight; interantennal spot black; face and parafacials gray; upper parafacial with transversely broken brown spot. Antenna reddish yellow, darkened distally; scape a straight, slender, shiny cylinder; flagellum slender. Palpus reddish yellow, slender, with mostly black hairs. Notum blackish. Wing brown with small spots in usual pattern; subapical band complete, crossing wing, concave distally; all posterior cells with pale marginal triangles. Legs reddish yellow, fore pair darker; fore tibia with basal pale band; midtibia and hind tibia each with two pale bands which

may be quite indistinct or evanescent on hind tibia; midtarsus and hind tarsus pale basally. Dorsum of abdomen brown, more reddish on basal terga, with white incisures; no sublateral pale spots; venter reddish yellow.

Distribution.—? Burma, India (Assam), Thailand.

Two specimens in the Vienna Museum determined by Szilady, one as *irrorata* and one as *fasciata*, collected at Tenasserim, Burma, are very close and the latter may correctly be determined, but the specimens are not in good condition and the callus is somewhat too convex above so that the determination is not certain. A specimen from Khao Yai National Park, 33 km southwest of Pakchong, Khorat Province, Thailand, April 27, 1965, D. L. Deonier, appears to be this species.

This species is close to *hardyi*, also from Assam, but *fasciata* has a strong midfrontal spot, the scape is straighter and not expanded distally, and the bands on the hind tibia are less distinct. It is also close to *helviter*, which has, however, the subapical band of the wing usually incomplete and broken and the frontal callus higher and more convex above.

Haematopota flavipuncta, new species

(Figs. 96, 224)

Holotype, female, Cherangode, Nilgiri Hills, South India, 3,500 ft, October 1950 (BM). Paratypes: 1 ♀, 2 ♂, same data as holotype; 2 ♀, Devala, India, Nilgiri Hills, 3,200 ft, September and October 1960, P. S. Nathan; 2 ♀, Cherambadi Wynaad, October 1913, F. M. Howlett. (BM, CU, USNM)

Female.—Length 8–11 mm; wing 8–9 mm; antenna 1.7–1.8 mm. Frons grayish brown with pale gray narrowly bordering eyes and frontal spots, width at vertex about 0.8 of height, slightly widened below; midfrontal spot very small; paired spots large, subquadrate, touching eyes, usually broadly, nearly touching callus; callus reddish brown to black, slightly more than three times as wide as high, broadly touching eyes, upper and lower margins nearly straight; subcallar area with large black interantennal spot; face gray with pair of dark spots above; parafacials gray below, nearly solidly dark brown above but broken transversely with grayish in certain lights; beard white. Scape shiny reddish brown to nearly black with black hair, cylindrical, about twice as long as thick; pedicel with scarcely any dorsal projection; flagellum about 1.5 times as long as scape, reddish brown, darker distally; first flagellomere compressed but longer than high; style stout. Palpus grayish brown with mostly black hair, slender distally.

Scutum brown with pale gray markings as follows: Humerus and short stripe behind it; indication of three stripes at anterior margin; pair of strong spots behind transverse suture; large area in front of scutellum, longest centrally with pair of curved spots to either side of pale prescutellar sclerite; central anterior part of median pale area tinged with yellow; scutellum dark brown; pleuron gray, lower and posterior part of anepisternum brown. Wing dark brown with usual pale pattern; subapical band partially doubled, outer band broad at both wing margins, narrower centrally; pale triangles at wing in all posterior cells except cell 4; darker brown spots at furcation, apex of distal cell and apex of cell M. Halter knob brownish laterally. Legs dark brown to black; basal half of fore coxa pale; basal two-fifths of fore tibia, subbasal and subapical bands on midtibia, and basal and subapical bands on hind tibia white; base of midtarsus and hind tarsus pale. Abdomen dark brown with sides of terga I-IV and incisures gray; venter brown with rather broad gray incisures.

Male.—Large and small facets of eye sharply differentiated; frontal triangle with distinct transverse shiny callus; interantennal dark spot narrower than in female; dark area of upper parafacial more broken into spots; antenna yellower; scape about 1.5 times as long as thick; flagellum entirely yellow with black hair above and below near base. Thorax, wings, and legs essentially as in female. Abdomen paler brown, gray markings less contrasting.

Distribution.—India (Madras).

This species is related to *biguttata*, which has, however, a long slender scape and entirely gray fore coxa. It is even closer to *marceli*, which has, however, first flagellomere slenderer and darker, subapical band of wing rarely doubled, and sides, not center, of pale area anterior to scutellum extended forward.

The name refers to the yellowish area anterior to the whiter posterior band of the scutum.

Haematopota fletcheri, new species

(Figs. 27, 152)

Holotype, female, Mandalay, Burma, September 2-4, 1914, Fletcher (BM). Paratypes (all Burma): 6 ♀, 1 ♂, same data as holotype; 1 ♀, same but August 16-19, 1914; 1 ♀, Tatkon, September 6-7, 1914; 1 ♀, Minbu, August 6-8, 1914 (all Fletcher); 4 ♀, Mezali, Pwinbyu, Minbu District, 1928, E. Feegrade; 1 ♀, Pyinmana, September 9, 1914; 2 ♀, Mandalay, June 13 and August 29, 1911. (BM, CBP, USNM)

IB 1488 (1974) USDA TECHNICAL BULLETINS UPDATA
THE ORIENTAL SPECIES OF THE TRIBE HAEMATOPOTINAE (DIPTERA: TABANIDAE)
STONE, R. PHILIP, C. B. 2 OF 3

Female.—Length 9.5–10.5 mm; wing 7.5–8.5 mm; antenna 1.3–1.6 mm. Frons pale brownish gray, width at vertex 0.57 to 0.73 of height, only slightly widened below; narrow brownish triangle at vertex but no distinct midfrontal spot; paired spots reddish brown, irregular in shape, of variable size, usually slender vertical streaks not touching eyes; callus yellow brown, wrinkled, with median depression, tapered laterally and touching eyes at ventral corners, if at all; lower margin weakly bilobed; subcallar area with median cleft margined with brown; face yellowish brown slightly mottled with darker brown; parafacials gray, upper part irregularly dotted with brown; beard white. Antenna almost uniformly yellowish; scape grayish pollinose with black hairs above, not much longer than distal thickness, distinctly narrowed basally; pedicel with short dorsal projection; first flagellomere moderately high subbasally, tapered to style, subequal in length to scape. Palpus yellowish brown with black hair, tapered distally. Scutum brown, rather distinctly patterned with grayish yellow on anterior margin, three stripes that fuse posteriorly, sublateral stripes, and paired crescentic spots in front of scutellum; scutellum pale centrally and on posterior border; pleuron yellow gray with brown area on lower anepisternum. Wing pale grayish with paler spots in usual pattern; subapical band doubled, variable, but inner arm usually complete, broad at both ends, slender and sinuous between; outer band faint and usually not reaching margins; usually triangles in all posterior cells, large and distinct, or sometimes faint. Halter knob partially brownish laterally. Legs mostly brown except for pale bands, base of fore coxa and entire midfemur paler, fore and hind femora and all tibiae and tarsi darker; fore tibia with narrow subbasal band; midtibia and hind tibia with two distinct bands; midtarsus and hind tarsus white basally. Abdomen brown with distinct pale middorsal stripe, sublateral spots on terga II or III–VII; sides of terga I–II broadly gray, narrowly so on III–IV; incisures rather broadly gray dorsally and ventrally.

Male.—Large and small facets of eye sharply differentiated; cruciform brown spot on frons; antenna smaller than in female; beard brownish; palpus stout and shorter than in female; color pattern of body, wings, and legs essentially as in female.

Distribution.—Burma.

This species is related to *brevis*, which has, however, a larger, shinier, less wrinkled frontal callus and the wing pattern is more doubled and usually has yellowish as well as white markings.

We are pleased to dedicate this species to T. Bainbrigge Flet-

cher, who worked extensively on the biology of the Tabanidae and other Diptera of medical importance while serving as Imperial Pathological Entomologist at Pusa, India.

Haematopota formosana Shiraki

(Figs. 61, 188)

Haematopota formosana Shiraki, 1918, p. 109.

Chrysozona formosana (Shiraki): Kroeber, 1922, p. 149; Shiraki, 1932, p. 262; Liu, 1958, p. 154.

? *Chrysozona ornata* Kroeber, 1922, p. 154.

Types.—♀, *formosana*, Kosempo, Ako Prefecture, and Tauran, Shinchiku Prefecture, Formosa (LU); ♂, *ornata*, Suihenkyaku, Formosa (NE).

Female.—Length 10.5 mm; wing 9 mm; antenna 2.5 mm. Frons clear gray, width at vertex about 0.84 of height, distinctly widened below; midfrontal spot scarcely visible in Taiwan specimen but distinct in Shiraki's figure and specimens from Fukien; paired spots round, black, touching eyes, separated from callus; callus black, about 3.5 times as wide as high, broadly convex above, usually with small middorsal projection, scarcely touching eyes, shallowly biconvex below; pair of short triangles concolorous with callus below, separated by rather wide blackened cleft; face and lower parafacials gray; upper parafacial with small brownish spot at top, crescentic spot below this; beard white. Antenna brownish black; pedicel black haired with strong dorsal projection; flagellum slender, slightly longer than scape. Palpus nearly straight, subequal to flagellum in length, gray with mostly dark hair. Scutum brown with humeral callus, three short stripes from anterior margin and transverse band on posterior margin gray; scutellum brown; pleuron gray. Wing gray brown with pale spots in usual pattern; subapical band complete or broken, crescentic, sometimes not reaching hind margin; cells 1-3 with marginal triangles, cell 5 with narrow marginal border distally, in Taiwan specimen, not as extensive in others. Halter with dark knob. Fore coxa gray, extreme apex slightly darkened; femora dark brown, midfemur and hind femur with some gray pollinosity; fore tibia with rather narrow basal pale band; midtibia with two bands; hind tibia with basal band and trace of subapical band on anterior side. Dorsum of abdomen dark; hind margin of tergum I and prominent median triangle on tergum II gray; venter dark grayish.

Male.—No specimens known other than the tentative synonym *ornata*.

Distribution.—China (Fukien), Taiwan.

We have seen a female of *formosana* from Chiatung, Houpi, Chiai, Taiwan, biting buffalo, June 12, 1958 (S. Y. Liu). In addition, we have seen six females from Fukien collected by T. C. Maa as follows: Changtung, Tsingshanpu, June 15, 1940; Chungan, Bokea Hills, July 23, 1939; Chungan, Kuatun, August 1945; Shaowu, KuHsien Kai, August 1944; Shaowu, September 15, 1942. Shiraki (1932) synonymized *ornata*, known only from the male, and said he had taken it in copula with *formosana*. The original description of *ornata* leaves some doubt about the synonymy; the shape of the antenna and black on the upper parafacial do not agree well. Until another species is found on Taiwan more closely agreeing with *ornata*, we questionably retain the synonymy.

Distinguishing characters for this species are rather long, slender antenna, shiny triangular projections beneath frontal callosus, spotted upper parafacial, distinct gray band on hind margin of scutum, and banding of hind tibia; more distal band is represented by faint spot only.

***Haematopota fukienensis*, new species**

(Fig. 176)

Holotype, female, Fukien, South China, Chungan: Upper Kuatun, 1400 m, August 4-6, 1945, T. C. Maa (BBM). Paratypes: 1 ♀, same data as holotype; 1 ♀, same, but Kuatun, August 25, 1945, T. Maa. (BBM, USNM)

Female.—Length 8.5-10 mm; wing 9-9.5 mm; antenna 2.25-2.5 mm. Frons dark gray, width at vertex about 0.65 of height, widened below; median spot small; paired spots large, subquadrate, touching eyes, narrowly separated from callus; callus black tinged with reddish, about three times as wide as high, touching eyes, with distinct dorsal median angle above, lower margin nearly straight; large dark interantennal spot; face and parafacials gray, upper parafacials with sparse irregular speckling; beard white. Scape yellow brown with dark hair, long and slender, cylindrical; pedicel with distinct dorsal projection; flagellum dark brown except at base, slender, about 1.35 times as long as scape. Palpus brownish gray with dark hair. Notum dark brown, faintly marked with pair of paler stripes anteriorly, small postsutural spots, and narrow prescutellar grayish band; pleuron grayish brown. Wings brown with pale spots in usual pattern; subapical band rather narrow, sinuous, reaching hind margin narrowly in one paratype; posterior cell 1 with or without marginal spot; 2, 3, and 5 with

triangles. Halter knob brown. Legs brown, all tibiae pale basally, first about two-thirds, midtibia and hind tibia about three-fourths; midtarsus and hind tarsus only narrowly, faintly paler basally. Abdomen brown with narrow pale incisures above and below.

Distribution.—China (Fukien).

This species is close to the Malayan *albiocrea*, but it is larger, the scape is slenderer and less shiny, and the fore tibia is only about two-thirds white.

***Haematopota fulvipes*, new species**

(Fig. 39)

Holotype, female, Sohawa, Jhelum, Pakistan (BM).

Female.—Length 10 mm; wing 8 mm; antenna 2.1 mm. Frons gray, height slightly greater than width at vertex, slightly wider below; midfrontal spot very faint; paired spots small, well separated from eyes and callus; callus yellow, about 1.6 times as wide as height at middle, sides rounded and touching eyes at lower edge only, center with triangular projection above, lower margin nearly straight; subcaular area yellowish pollinose, narrow, median cleft distinct but not blackened; face and parafacials almost uniformly yellowish gray. Antenna yellow orange, scape subshiny with black hair, cylindrical, about twice as long as thick; pedicel with short dorsal projection; first flagellomere slender, slightly shorter than scape. Palpus slender, yellowish, with mostly pale hair. Scutum blackish with five slender gray stripes, inner pair forming rather indistinct triangles behind transverse suture; scutellum faintly grayer centrally; pieuron pale yellowish gray with pale hair. Wings pale brown, cells R and M and basal halves of cells R_1 , R_5 , and discal cell hyaline; subapical band slender, sinuous, not reaching hind margin; narrow bars across posterior cells but no pale marks on hind margin in these cells. Halter entirely pale. Legs yellow gray to pale yellow brown with no bands. Dorsum of abdomen gray with pair of brown submedian stripes, and sublateral stripes on terga V–VII; venter almost uniformly pale gray.

Distribution.—Pakistan.

This rather large pale species is distinguished by its uniformly yellowish legs, hyaline area of central part of wing, and almost uniformly pale head except for paired spots and faint midfrontal spot.

***Haematopota fumigata*, Schuurmans Stekhoven**

Haematopota fumigata Schuurmans Stekhoven, 1926, p. 106.

Type.—Mlangi, District Toeban, Residency Rembang, Java (LU).

Female.—8.2–8.8 mm; wing 7.8–8 mm. Frons grayish black with paler median stripe and margining eye; height and width subequal; no midfrontal spot; paired spots not touching eyes or callus; callus black, about twice as wide as high, triangular above, nearly straight below; denuded triangle below callus; no inter-antennal black spot; face dark gray with brownish-gray border; parafacials with irregular broken black spot above, yellowish white below this, and dark gray below that; beard grayish white. Antenna reddish brown; scape slightly swollen, nearly as long as first flagellomere; latter rather stout basally. Palpus black, brown distally, with black hair. Scutum black with brownish stripes; scutellum dark; pleuron dark brownish with dark hair. Wing dark with pattern of elongate spots; subapical band double; joined anteriorly; pale marginal triangles in all posterior cells. Halter with white stem, partially brownish knob. Fore coxa brown; femora yellowish brown with some gray pruinosity; fore tibia white on basal half except for narrow yellowish-brown base, apical half black; midtibia with two yellow-brown bands and extreme base and apex also paler; hind tibia with two yellow-brown bands and small basal yellow band; midtarsus and hind tarsus pale basally. Abdomen black with narrow whitish incisures above and below.

Distribution.—Java.

This species has not been seen; the description and keying are adapted from the originals. It is close to *elegans* but has a narrower frons and the pale markings of the wing are less broken into small spots.

Haematopota glenni Philip

(Figs. 12, 134)

Haematopota glenni Philip, 1963, p. 525.

Type.—20 km north of Pleiku, Vietnam (BBM).

Female.—Length 9–12 mm; wing 8–11 mm; antenna 2–2.5 mm. Frons gray with brown triangular area at vertex divided by slender gray line; width at vertex two-thirds or slightly more of height; midfrontal spot very small or lacking; paired spots rather large, ovoid, separated from eyes and callus; callus shiny dark orange brown to black, about four times as wide as height in center, touching eyes, both upper and lower margins sinuous, parallel; subcallar area entirely velvety black except for pale crescent above each antenna; face and parafacials solidly velvety black above level of lowest margin of eye, rest nearly white with

heavy white beard. Antenna: Scape shiny reddish brown, slightly darker dorsally at apex, black haired, stout, about twice as long as thick; pedicel with rather long dorsal projection; first flagellomere brown, compressed, less than twice as long as high, tapering little beyond highest point; style flattened, distinctly narrower in profile than end of first flagellomere and shorter than height of latter. Palpus pale with white hair. Scutum dark brown with gray markings as follows: Lateral stripe covering humerus and antealare; pair of submedian stripes, broad anteriorly, usually narrowed posteriorly, and prescutellar band with sinuous anterior margin; scutellum gray except for brown posterior margin; pleuron gray, lower part of anepisternum and katepisternum dark brown. Wing dark brown with pale pattern of small spots, these slightly larger in diagonal area across disk of wing; subapical band crossing wing, doubled behind; posterior cells with white areas at margin, usually filling out margin in cell 1, lacking in cell 4. Halter with dark-brown knob. Legs: Coxae dark brown; fore femur dark, midfemur mostly pale; hind femur dark with dense fringe of long hairs both dorsally and ventrally on distal half, basal hairs of dorsal fringe white; fore tibia slightly swollen, dark except for white band on basal two-fifths; midtibia with broad white band in middle; hind tibia stout, dark, with heavy dorsal fringe of black hairs and with two pale bands more or less developed. Abdomen black with gray posterior bands on terga II-VII; venter almost uniformly dark gray.

Distribution.—Cambodia, Laos, Thailand, Vietnam.

Additional specimens seen by us are LAOS: Nam Guak, April 26, 1932; Muong Kaw, Muong Tourakom, 180 m, Vientiane Province, May 22, 1968, Howarth; THAILAND: 17 km northwest of Loey, Loey Province, May 18, 1967, Burton; same, July 7, 1966, Pinger.

This is a strongly patterned species with upper parafacial solidly black, scutum with pair of prominent gray stripes, and hind legs heavily haired with swollen tibia. The most closely related species is *procyon*, which has, however, fore tibia with indistinct yellowish band at most, not broad white one, and two indistinct yellowish bands on hind tibia, not single broad central one.

***Haematopota gracilicornis*, new species**

(Figs. 84, 212)

Holotype, female, Bang Kaeo Canton, La-un District, Ranong Province, Thailand, 10° 10' N, 98° 46' E, May 11, 1970, G. R.

Ballmer (BBM). Paratypes: 3 ♀, same data as holotype; 11 ♀, same locality but May 12, 13, 14, 16, 18, 20. Ballmer; 3 ♀, Amphoe Muang, Phangnga, Phangnga Province, Thailand, 8° 28–29' N, 98° 32' E, June 5 and 6, 1969, about water buffalo, J. J. S. Burton. (BBM, BM, CBP, CU, USNM)

Female.—Length 7–9 mm; wing 6.5–8 mm; antenna 1.5–1.9 mm. Frons dark brown, entirely black haired; width at vertex about 0.57 of height, widened below; vertex with central dark triangle tapering below, sometimes nearly reaching callus; no distinct midfrontal spot; paired spots oblique triangles or rectangles, or round, sometimes connected above to dark area of vertex, nearly touching eyes, narrowly separated from callus; callus shiny black, about 0.7 as high as wide, broadly touching eyes; upper margin convex with flattened middorsal lobe; lower margin nearly straight; subcallar area with two short, denuded, orange-brown triangles, divided by darkened cleft but no distinct inter-antennal dark spot; face and parafacials pale gray with faint dark band between base of palpus and eye. Antenna yellow orange, flagellum beyond base slightly darker; scape slender, cylindrical, slightly expanded distally, distinctly shorter than first flagellomere; pedicel without dorsal projection; flagellum usually long and slender, subequal in length to terminal palpal segment. Palpus yellow brown with black hair. Notum brown, anteriorly with humerus and five rather indistinct yellowish stripes and small spots at transverse suture; faint pale marks on hind margin of scutum; pleuron yellowish gray. Wing rather dark brown with pale marks in usual pattern; subapical band with strongly sinuous inner arm, sometimes broken, and more or less developed outer arm; all posterior cells with marginal triangles. Halter entirely pale or knob faintly marked with brown. Fore coxa grayish, slightly brownish distally; fore and hind femora dark, brownish, midfemur grayish basally; fore tibia dark, about basal two-fifths white; midtibia and hind tibia each with two strong whitish bands; tarsi scarcely paler basally. Dorsum of abdomen dark brown with narrow pale incisures and slender triangle on tergum II; venter mostly gray, slightly darker centrally.

Distribution.—Thailand.

This species closely resembles *pungens*, which has, however, a paler callus, slightly heavier antenna, and a differently patterned frons (figs. 84, 85). Specimens from the type locality were collected around man and vehicles.

Haematopota gregoryi, new species

(Figs. 94, 222)

Holotype, female, Ningyuenfu, China, July 28, D. C. Graham (USNM No. 72021). Paratypes: CHINA: 1 ♀, same data as holotype; 1 ♀, Shuan-tan-Tsing, Lanchow, Yunnan, 7-8000 ft, June 15, 1922; 1 ♀, Jugah River, Yunnan, 7-9,500 ft, July 28, 1922, J. W. Gregory. (BM, USNM)

Female.—Length 10-11.5 mm; wing 9.5-10.5 mm; antenna 2-2.34 mm. Frons dark gray, paler at upper corner and around paired spots, height subequal to width at vertex, strongly widened below; midfrontal spot small to medium-sized; paired spots subtriangular or round, touching eyes and narrowly separated from callus; callus 4.5 times as wide as high, touching eyes, black, slightly wrinkled, median third slightly concave both above and below; subcallus with black interantennal spot; face and parafacials gray, upper parafacial with numerous separate black spots; beard white. Antenna black, extreme base of flagellum reddish; scape shiny, about 0.7 times length of flagellum, rather stout and expanded distally; first flagellomere low, tapering; style rather stout. Palpus reddish gray with mostly black hairs, stout basally. Notum dark brown with three narrow gray stripes, sublateral pair ending in strong white spots behind transverse suture, mesal stripe with triangular expansion at apex of scutellum; prescutellum dark and hind margin of scutum with narrow paler border; pleuron dark gray. Wing gray brown; pale markings small, narrow; subapical band sinuous, just crossing vein R_4 ; no pale spots at wing margin in posterior cells. Halter stem yellowish, knob dark brown. Coxae dark gray; rest of legs mostly reddish brown; fore tibia with subbasal pale band and rather distinct smaller, often incomplete subapical band; midtibia and hind tibia each with two subequal pale bands; hind tibial fringe moderately long; tarsi dark, base of midtarsus and hind tarsus yellowish brown. Abdomen dark brown with narrow gray incisures; tergum II with median gray triangle; following terga with median gray stripe and distinct sublateral gray spots on terga IV-VI; venter mostly dark gray.

Distribution.—China (Sichang?, Yunnan).

This species cannot be confused with any other Oriental species. The dark color, scutal pattern, double-banded fore tibia, antennal shape and color, and lack of pale spots on the hind margin of the wing all distinguish it. It bears considerable resemblance to certain Palaearctic species, such as *crassicornis* (Wahlberg),

tamerlani Szilady, or *caspica* Abbassian-Lintzen, but the wing pattern is mostly of small spots rather than continuous circles as in the first two and *caspica* has the paired frontal spots more oval and separated from the eyes and the scape is longer and more slender than in *gregoryi*.

The type locality is uncertain. D. C. Graham wrote that he hoped to visit Ningyuenfu from Szechaan but did not state where it was. It is probably Ningyuan in Sikang, now known as Sichang.

We name this species in honor of J. W. Gregory, who collected it in Yunnan in 1922 and also a *Tipula* named in his honor by F. W. Edwards.

Haematopota gressitti Philip

(Figs. 60, 187)

Haematopota gressitti Philip, 1963, p. 526.

Type.—Sepilog Forest Reserve, Sandakan Bay (Northwest), British North Borneo (BBM).

Female.—Length 9–11 mm; wing 8–10 mm; antenna 2–2.5 mm. Frons gray brown, width about 0.62 of height, slightly widened below; no midfrontal spot; paired spots usually triangular, separated from callus but one angle touching eye; frontal callus reddish brown to black, about 2.5 times as wide as high, touching eyes, convex above, shallowly concave below, with pair of shiny triangles extending onto subcallar area, separated by dark cleft; face and parafacials brownish gray, in certain lights with brownish pattern on upper parafacial but this not strongly contrasting; beard yellowish white. Antenna yellowish brown, flagellum darkened beyond base; scape subshiny, rather slender, subequal or slightly shorter than first flagellomere; flagellum long, slender, tapering. Palpus dark gray brown with mostly black hair. Scutum dark brown, paler on humerus and on either side of it, with three or five indistinct stripes anteriorly; scutellum often with paler hind margin; pleuron mostly yellow gray, darkened area on lower half of anepisternum. Wings gray brown with usual pattern of spots; preapical band rather narrow, broken in cell R_4 ; small triangle at margin in each posterior cell. Halter pale yellow brown. Legs dark with base of fore coxa pale, and white basal bands on all tibiae, 0.25 to 0.40 length of segment; hind basitarsus sometimes paler at base. Abdomen brown with posterior margins of terga and sterna, and lateral margin of at least tergum II, paler.

Distribution.—Borneo.

Additional records for this species are 7 ♀, North Borneo,

Bukit Kretam, 1952, and Bettotan, near Sandakan, July 20, August 6, 17, 1927, East Borneo, Babidjoelan 400 ft, June 1937, and Pelawan, May 1937.

Among the species with a single basal band on the hind tibia and shiny triangles below the frontal callus, this species can be distinguished by being rather large without distinct black spots on the upper parafacial.

Haematopota hainani, new species

(Figs. 6, 127)

Holotype, female, Ta Han, Hainan I., June 23, 1935 (USNM No. 72022). Paratypes: HAINAN: 8 ♀, same locality as holotype, June 13, 16, 18, 21-24, 1935; 3 ♀, 1 ♂, Dwa Bi, July 22-24, 28, 1935; 1 ♀, Cheung-kon ts'uen, Ka-luk-kang (18 mi. east of Nam-fung), Kiungshan Distr., F. K. To, April 13-14, 1935; 3 ♀, Tai-pin-ts'uen, Lanka-heung, Lai-mo-ling (Mt. Range), Kiungshan District, F. K. To, May 5-7, 10-11, 1935; 5 ♀, 1 ♂, Five Fing. Mts., June 9, 1935; 1 ♀, top of Lin Fa Ling, near Nodoo, August 7, 1929; 1 ♀, Taai-po, 27 mi. ex Nam-fung, Lin-kao District, F. K. To, September 19-24, 1932. (BM, CBP, CU, USNM, ZCBS)

Female.—Length 8.5-10.5 mm; wing 9-10 mm; antenna 2.1-2.5 mm. Frons gray tinged with yellow, 0.6 to 0.7 as wide as high; midfrontal spot small or absent; paired spots large, higher than wide, touching eyes and callus; callus large, shiny, yellow brown to dark brown; upper margin convex with flattened median projection, lower margin weakly concave; subcallar area with pair of shiny triangles separated by blackened cleft, area below this yellow; face and parafacials uniformly gray. Antenna yellow, flagellum distally darkened; scape cylindrical, shorter than first flagellomere, slightly shiny, with black hair; flagellum slender, tapering. Palpus rather stout basally, mostly black haired. Notum brown with broad median pale yellow stripe entire length and less distinct pale lateral stripe from humerus to wing base; pleuron yellowish gray. Wing dark brown with usual pattern of small spots; subapical band single, usually complete and widest at hind margin, curved inwardly; all posterior cells with triangles at margin. Halter clear yellow. Legs: Coxae yellowish gray; fore femur dark brown, midfemur pale, slightly darkened at apex, hind femur yellow brown, darkened slightly on distal half; fore tibia with basal three-fourths white, apical fourth dark, midtibia and hind tibia brown with two rather broad white bands; fore tarsus dark; midbasitarsus and hind basitarsus white on basal half. Dorsum of abdomen dark brown with pale incisures; usually

small gray triangle on tergum II and rarely indistinct lateral gray spots on posterior terga; venter yellowish brown to brown with abundant pale hair.

Male.—Eyes large, upper part with large yellow facets, lower part with small black facets; small black cleft spot above antenna flanked by two small shiny spots. Coloration essentially as in female but thorax darker with scutal stripes not so evident; wing spots slightly more slender.

Distribution.—China (Hainan).

This species resembles *atrata*, also from Hainan, which has, however, the fore tibia with much less white and the subapical band of the wing partially or completely doubled.

***Haematopota hardyi*, new species**

(Figs. 109, 236)

Holotype, female, 10 miles north of Tinsukia, Assam, India, in jungle, April 5, 1944, D. E. Hardy (USNM No. 72023). Paratypes: 4 ♀, same data as holotype; 1 ♀, same but March 29, 1944; 1 ♀, Kaiphundai, Manipur, Assam, 100 ft, May 20, 1960, Schmid; 1 ♀, Khapum Manipur, Assam, 2,500 ft, May 27, 1960, Schmid; 2 ♀, Lower Ging Lebong, 4,500 ft, June 2–9, 1909, F. M. Howlett; 4 ♀, Darjeeling, June 26, 1911, R. Singh; 1 ♀, Chabua, Assam, July 26, 1943, Hardy. (BM, CBP, USNM)

Female.—Length 8–10 mm; wing 7–10 mm; antenna 1.8–2.2 mm. Width of frons at vertex 0.75 to 0.85 of height, scarcely widened below, yellowish gray; midfrontal spot usually minute; paired spots black, subtriangular or subquadrate, touching eyes, separated from callus; callus yellowish to yellow brown, about four times as wide as high, nearly touching eyes, upper and lower margins nearly straight; strong, nearly black interantennal spot; face and parafacials yellowish gray; upper face with narrow brown band; upper parafacials irregularly dotted with brown. Scape yellow orange with black hair, 2–2.5 times as long as high, slightly expanded distally; pedicel with short blunt dorsal projection; first flagellomere yellow orange, slightly longer than scape, slender, tapering; style darkened. Palpus yellow brown, rather slender with mostly black hair. Notum brown, humerus and three rather distinct slender anterior stripes paler; scutellum faintly grayish at tip; pleuron yellow gray. Wing brown with spots in usual pattern; subapical band curved, concave distally, crossing wing but sometimes broken; pale marginal spots of variable size in most posterior cells. Halter knob brown. Legs brown; fore coxa yellow at least basally; fore tibia with narrow

subbasal yellowish band; midtibia and hind tibia with two rather narrow yellowish bands; midtarsus and hind tarsus slightly paler basally. Dorsum of abdomen brown with narrow pale incisures and faintly indicated to distinct middorsal stripe, and, on posterior terga, faint sublateral spots; venter yellowish brown, slightly darkened medially.

Distribution.—India (Assam, Bengal).

This species falls into the large group with double bands on the midtibia and hind tibia and is not particularly distinctive. The absence of a pale band on the posterior margin of the scutum and the narrower subbasal band of the hind tibia distinguish it from the closely related *thurmanorum*. It was first determined as *fasciata*, but an examination of the type of *fasciata* showed differences as noted under that species.

We dedicate this species to D. Elmo Hardy, dipterist of the University of Hawaii and collector of the holotype and some of the paratypes while serving with the Army during World War II.

***Haematopota helviventer*, new species**

(Figs. 116, 243)

Holotype, female, 30 km north of Mg. Vang Vieng, Vientiane Province, Laos, March 15, 1968, 1050 m, F. G. Howarth (CU). Paratypes: LAOS: 23 ♀, 15 to 30 km north of Mg. Vang Vieng, March 12–18, 1968 (F. G. Howarth, et al.); 1 ♀, Nam Guak, April 26, 1933 (A. Kerr); THAILAND: 1 ♀, Nakhon Nayok Province, Khao Yai National Park, 5–6. VI. 65, malaise trap, P. D. Ashlock; 1 ♀, same locality, 23. IV. 1970; VIETNAM: 5 ♀, Lai Chan, April 13, 1929, R. E. Wheeler. (BBM, BM, CBP, CU, MCZ, USNM)

Female.—Length 8–11 mm; wing 8–10.5 mm; antenna 1.8–2.5 mm. Frons yellow brown, about 0.75 as wide as high, slightly widened below; midfrontal spot small or scarcely visible; paired spots rounded, small to medium, usually with lateroventral projection touching eyes but distinctly separated from callus; callus reddish brown to black, touching eyes, 2 to 2.5 times as wide as high, upper margin strongly convex and often with small median projection; pair of narrow, yellowish sclerotized lobes below but these not triangular; subcallus with black median spot; face and upper parafacials orange yellow; lower parafacials yellow white; lower margin of upper parafacials with dark streak and some small spots in upper angle; beard pale. Scape yellow, subshiny, about 2.25 times as long as greatest height, evenly thickened from base; flagellum slender, tapering, but with blunt

tip, first flagellomere about 1.2 length of scape. Scutum brown with five rather indistinct paler yellow stripes and yellow hair, sublateral pair ending in small triangles behind transverse suture, slender median stripe reaching four-lobed transverse pale prescutellar area; prescutellar sclerite pale; scutellum brown, slightly paler on midline; pleuron uniformly yellowish gray. Wing gray brown, slightly darker in radial area beyond stigma; subapical band single, narrow, crescentic, broken in cell R_4 ; triangles of varying size in margins of all but posterior cell 4. Halter stem pale, knob dark. Coxae pale except for dark-brown apical third of fore leg; femora yellow brown to orange yellow, fore femur darkest; fore tibia dark with basal third white; midtibia with two broad pale bands; hind tibia with basal third white and subapical incomplete yellow band. fringe moderately long; tarsi dark, midtarsus and hind tarsus each with pale basal band. Abdomen dark brown dorsally with yellowish incisures; venter nearly uniformly yellow gray, last sternum dark and sometimes penultimate sternum darkened medially.

Distribution.—Laos, Thailand, Vietnam.

This species is nearest to *badia*, but the longer antenna and the pale area anterior to the scutellum will separate *helviventer*. If the hind tibia has only a weak subapical band, one might run it to *unizonata* in the key, but in *unizonata* the pale markings of the body are whitish rather than yellowish brown, the palpus has some white hairs, and the venter is distinctly banded. It is also close to *spenceri*, but the frontal callus of *spenceri* is proportionately broader with less convex upper margin.

The name is a Latin noun, compound of *helvus*, yellow, and *venter*, belly.

Haematopota hindostani Ricardo

(Figs. 98, 221)

Haematopota hindostani Ricardo, 1917, p. 226; Senior-White, 1927, p. 18.

Type.—Bababuddin Hills, Mysore (BM).

Female.—Length 8–10 mm; wing 7–8.5 mm; antenna 1.6–2 mm. Frons gray, width at slightly concave vertex subequal or slightly less than height, brownish gray; midfrontal spot small; paired spots medium sized to large, subquadrate, touching eyes, sometimes touching callus; callus black sometimes tinged with reddish, 3–3.5 times as wide as high, broadly touching eyes, upper margin nearly straight, lower margin slightly concave; very shallow shiny lobes below callus but these never forming triangles; strong black

interantennal spot; face and parafacials gray, upper parafacial with irregular brown markings. Scape orange brown, cylindrical, slightly swollen on basal half, about three times as long as thick; pedicel with scarcely any dorsal projection; first flagellomere orange brown, sometimes dusky distally, subequal to scape in length; style black. Palpus yellowish gray, rather slender, tapered, with mixed dark and pale hair. Scutum brown; humerus and area posterior to it slightly paler; three indistinct slender stripes anteriorly, single one posteriorly; rather strong gray band in front of scutellum, including prescutellar sclerite; posterior margin of scutellum sometimes faintly paler; pleuron gray or yellowish. Wings brown with small pale spots in usual pattern; subapical band irregular, usually broken in cell R_4 ; posterior cells except cell 4 with triangular marginal spots. Halter with brown knob. Fore coxa scarcely darkened distally; femora mostly yellowish brown; fore tibia dark brown with basal third white; midtibia and hind tibia each with two pale bands, subapical band of hind tibia sometimes rather indistinct; midtibia and hind tarsus pale at base. Abdomen brown dorsally with pale incisures, faint, slender middorsal stripe, and rather indistinct sublateral spots on posterior segments; venter gray, brownish centrally, with pale incisures.

Male.—Large and small facets of eye distinctly differentiated; frontal triangle with small bilobed shiny yellowish-brown callus; scape shiny, swollen, not twice as long as thick; otherwise essentially as in female.

Distribution.—India (Madras, Mysore).

One male was collected at 3,400 ft at Singara in the Nilgiri Hills, May 1948, along with a number of females, and one at Valparai, Coimbatore, September 2, 1937. We have seen nearly 100 specimens of this species from the Nilgiri Hills.

This species falls into the difficult group that includes *contracta*, *eckma*, *marceli*, and *montana*; *contracta* has a shiny black scape; *eckma* has at most one marginal wing spot in the posterior cells and the antenna is not thickened subbasally; *marceli* has a stronger, differently shaped pale band in front of the scutellum; *montana* has a longer scape and more regular subapical band on the wing.

Haematopota holtmanni, new species

(Figs. 83, 211)

Holotype, female, Busuanga I., 4 km north of San Nicolas,

May 21, 1962, H. Holtmann (BBM). Paratypes: 19 ♀, same data as holotype; 88 ♀, 2 ♂, same but from May 20 to June 2; 38 ♀, 1 ♂, Cullion I., from June 6 to 15 (all Holtmann); 1 ♀, Balabac I., 10 km south of Balabac, May 1, 1962, M. Thompson. (BBM, BM, CBP, USNM)

Female.—Length 8–10 mm; wing 7.5–9 mm; antenna 1.8–2.4 mm. Frons dark grayish brown, width at vertex from 0.53 to 0.70 of height, slightly widened below; midfrontal spot absent or minute; paired spots round or triangular, touching eye, narrowly separated from callus; callus shiny, nearly black, protuberant, about 2.5 times as wide as high exclusive of rather developed middorsal projection, touching eyes broadly; lower margin concave but scarcely differentiated from pair of shiny median triangles, distinctly separated by cleft, margins of cleft dull black; face and parafacials entirely gray; beard pale. Scape shiny orange brown, cylindrical, about three times as long as thick; pedicel with dorsal projection; flagellum very long and slender, first flagellomere usually distinctly longer than scape, orange to dusky brown, style black. Palpus dark brown gray with mostly black hair. Scutum dark brown with five grayish stripes, central one slender, submedian one widened immediately behind transverse suture and at hind margin, where it is slightly widened and curved outward, and slightly wider sublateral stripe from humerus; scutellum dark brown, slightly grayish on disk; pleuron gray. Wing dark brown with pale spots in usual pattern; subapical band partially doubled, outer arm irregular, broken, widest at anterior and posterior ends; inner arm consisting of spot fused to outer band anteriorly and another spot just behind vein R_4 ; just behind furcation a darkened area rarely enclosing more or less distinct pale spot; all or nearly all posterior cells with pale triangles at margin. Halter knob brownish. Legs mostly dark brown; fore coxa pale except near apex; about basal third of fore tibia white; midtibia with two yellowish bands; hind tibia with yellowish-white basal band and faint pale-brownish subapical band. Abdomen dark with narrow pale incisures; sublaterally a row of rather large gray spots particularly visible when viewed from behind; venter dark, grayish laterally.

Male.—Large and small facets of eyes sharply differentiated; frontal triangle pale-brownish pollinose with median incision but no distinct blackening. Antenna distinctly shorter than in female, yellow orange except for blackened style distally; pedicel with no dorsal projection. Coloration of body and legs generally paler brown, but all pale pattern much less distinct.

Distribution.—Philippines (Balabac, Busuanga, Culion Islands).

This species is related both to *torrevillasi* and *abbreviata*, closest to the latter. In *abbreviata* the midfrontal spot of frons is usually more distinct, paired spots larger, upper projection of callus less developed, subcallar area not widely cleft medially, scape longer in relation to its thickness, usually well-developed pale spot behind furcation, pale bands of abdomen wider, and gray sublateral spots lacking.

We dedicate this species to H. Holtmann, collector of all but one type series specimens.

***Haematopota howarthi*, new species**

(Figs. 4, 125)

Holotype, female, LAOS, Mg Phieng, Sayaboury Province, 400 m, August 20, 1967, F. G. Howarth (CU). Paratypes: LAOS: 12 ♀, same data as holotype; 1 ♀, same but June 12; 4 ♀, Muang Phone Hong, Vientiane Province, July 17, 1966, Howarth; 3 ♀, Mg. Pakse, Sedone Province, 100 m, Sept. 3, 1967, Howarth; CAMBODIA: 3 ♀, 40 km east southeast of Khong, June 10, 1952, C. Wharton; 3 ♀, same but 50 km, June 14, 1 ♀, no further data, John Surcouf; 1 ♀, 22 km south of Kha Trang, Nov. 20–26, 1960, C. M. Yoshimoto; THAILAND: 1 ♀, Loei Dansei, Na Hauto, May 12, 1955, R. E. Elbel; 2 ♀, Nakhon Nayok Province, Khao Yai Nat. Park, June 5, 5–6, 1965, P. D. Ashlock; 30 ♀, 9 ♂, Loei Province, April 19–22, 25–27, May 1, 6, 20, 21, 26, 31, June 1, 5, 7, 13, 18, 20, 21, 26, 27, July 3, 5, 6, October 1, 2, 1969, C. Dettongchai, Pie Chaemane; 6 ♀, Chumphon Province, June 12, 13, October 1, 2, 1969, J. J. S. Burton, Aree Wanchitnai; 1 ♀, Ubon Ratchathani Province, June 12, 1969, J. J. S. Burton. (BBM, BM, CBP, CU, FSCA, USNM)

Female.—Length 9.5–11 mm; wing 8.5–10 mm; antenna 2–2.4 mm. Frons gray, slightly more than twice as high as width at vertex, distinctly wider below; no distinct midfrontal or paired spots, but with irregular dark markings above callus; callus orange to dark brown, occupying nearly half of height of frons, strongly convex above, touching eyes only at lower corners, lower margin nearly straight; subcallar area shiny with pair of median triangles; cleft between triangles slightly darkened; face with broad central dark-brown area, tapered below; parafacials pale gray except for darkened area below bordering eye; beard short, white near palpus, dark laterally. Scape yellowish brown, subshiny, cylindrical, about three times as long as thick; pedicel short,

stout, without dorsal or ventral projections; flagellum long and slender, darkened beyond base, first flagellomere distinctly longer than scape. Palpus dark gray with mostly dark hairs. Scutum dark reddish brown laterally, broadly pale gray medially; antealare more or less grayish; scutellum broadly gray centrally; pleuron pale gray with white hair except for dark shiny area on anterior anepisternum and katepisternum and dark postalar callus. Wing dark brown with three longitudinal curved pale stripes: first from base of wing through upper part of cell M and curved up to reach wing margin beyond stigma; second from anterior margin of axillary cell curving forward and usually joining first stripe at wing margin; third from base of wing nearly to wing margin and separated from vertical margin of axillary cell and then angled and running near hind margin of wing to wing margin at apex of cell R.; discal cell dark along posterior margin only; cell M hyaline, other pale markings milky white. Halter pale yellow. Coxae gray with white hair; femora with pale hair; fore femur mostly dark; midfemur reddish distally; hind femur orange on distal half; all tibia dark with white area on extensor surface on more than basal half; tarsi all dark. Abdomen black with gray pattern as follows: Tergum I laterally and sometimes medially; tergum II as broad median triangle crossing tergum; narrow hind margins of other terga; venter grayish medially toward base with gray incisures.

Male.—Eyes bare, upper facets larger, sharply differentiated from smaller lower facets; frontal triangle shiny, yellowish brown; callus large, protuberant, shiny dark brown; cleft below callus blackened. Midstripe of scutum and pale area on disk of tergum II yellower than in female. All tibiae entirely dark with black hair. Coloration of rest of head, body, wings, and legs as in female.

Distribution.—Cambodia, Laos, Thailand, Vietnam.

This species is close to the Indonesian *cingulata*, which has, however, dark shading across base and apex of discal cell and pale area of fore tibia encircling tibia basally.

We take pleasure in dedicating this species to the collector of the holotype and other specimens, F. G. Howarth.

Haematopota immaculata Ricardo

(Figs. 105, 233)

Haematopota immaculata Ricardo, 1911, p. 359; Senior-White, 1927, pp. 18, 21.

Type.—Kanara, Bombay, India (BM).

Female.—Length 8–8.5 mm; wing 7–8 mm; antenna 1.6–1.7 mm. Frons gray tinged with brown, width at vertex and height subequal, slightly widened below; midfrontal spot usually distinct when viewed from below; paired spots rather small, transverse or subquadrate, usually touching eyes, widely separated from callus; callus black to dark reddish, three or slightly more times as wide as high, touching eyes, upper margin nearly straight, sometimes with small middorsal point, lower margin shallowly concave in center; subcallar area yellowish with median cleft but usually no dark interantennal spot; face and parafacials gray, upper parafacial minutely speckled and short streak of dark from eye toward antennal base; beard sparse, white. Antenna yellow orange, flagellum darkened distally; scape subshiny, cylindrical, slightly expanded distally, about three times as long as thick, with black hair; pedicel with short dorsal projection; flagellum slender, first flagellomere slightly longer than scape, style rather stout. Palpus pale yellowish brown, rather slender, tapering, with mixed pale and dark hair. Notum dark brownish with indistinct paler stripes anteriorly and pale humerus; pleuron almost uniformly gray. Wings pale brown, usual pattern of paler markings not strongly contrasting; subapical band slender, just crossing vein R₁ and if continued sharply turned basad; no pale spots at wing margin in posterior cells. Halter with knob mostly brown. Legs yellow brown, banding indistinct; fore coxa entirely yellowish gray; fore tibia slightly paler on basal third; midfemur and hind femur with two very faint pale bands. Abdomen dorsally brown, rather broadly gray laterally toward base; sometimes faint mid-dorsal paler triangle on tergum II; usually pale sublateral spots on terga III–VI; venter gray, slightly darkened centrally.

Distribution.—India (Maharashtra).

This description is based on the type in the British Museum and six other specimens, most of them of the original series. The type is badly discolored and appears to have a dark interantennal spot. Other topotypes lack this spot and this is probably the normal condition. This species resembles several other small species from South India, particularly *cana*. The pale leg bands of *immaculata* are so faint that they could be overlooked and the species might then key to the vicinity of *cana*. The latter, however, is smaller and usually differs in having a dark interantennal spot, dark-gray shorter scape, and more blotches on the upper parafacial.

Haematopota inconspicua Ricardo

(Figs. 115, 242)

Haematopota inconspicua Ricardo, 1911, p. 358; Senior-White, 1927, p. 21.**Type.**—Igatpuri, Bombay, India (BM).

Female.—Length 5.5–7.5 mm; wing 6 mm; antenna 1.2 mm. Frons gray, width at vertex and height subequal, widened below; midfrontal spot indistinct; paired spots rather large, triangular, one angle nearly touching eye, ventral angle narrowly separated from callus; callus dark brown, about four times as wide as high, touching eyes; upper margin shallowly concave beneath each paired spot, lower margin concave above antennae; strong dark interantennal spot; face and parafacial pale gray, upper parafacial with broken darkened area. Scape yellowish pollinose with short dark hair, about twice as long as thick; pedicel about one-third length of scape scarcely prolonged above; flagellum slender, first flagellomere distinctly longer than scape, yellowish, style darker. Palpus grayish brown with fine yellowish hair. Scutum grayish brown, faintly striped; scutellum brown; pleuron gray with darker areas. Wing brown, with rather coarse pale marks in usual pattern: subapical band crescentic, complete; series of oblique marks in posterior cells nearly or quite joined with posterior triangles in all posterior cells but cell 4. Halter knob brown. Legs brown with small yellowish-brown bands, one on fore tibia and two each on midtibia and hind tibia; midtarsus and hind tarsus pale at base. Abdomen brown with distinct gray incisures.

Distribution.—India (Maharashtra, Mysore).

We have seen topotypes dated July 19 and 26, 1904, 1 ♀, Lonovala, Western Ghats, 3,000 ft, June 1918, 1 ♂, Karwar, Kanara, July 26, 1907, and 1 ♀, Kanara, August 1907.

This small species slightly resembles *albofasciatipennis*, but the wing pattern is different (figs. 194, 243) and the leg bands of *inconspicua* are yellower and less distinct. A male in the British Museum is probably *cana* rather than *inconspicua*.

Haematopota indiana Bigot

(Figs. 67, 193)

Haematopota indiana Bigot, 1891, p. 78; 1892, p. 627; Ricardo, 1906, p. 124; 1911, p. 328; Senior-White, 1927, p. 22.

Type.—Originally given as "Bengale"; type bears label "Margherita," which is in Assam (BM).

Female.—Length 7.5–8.5 mm; wing 7 mm; antenna 2 mm. Frons

gray, width at vertex two-thirds of height, slightly widened below; midfrontal spot a small vertical streak; paired spots large, black, touching eyes and nearly touching callus; callus dark reddish brown, about four times as wide as high, touching eyes, upper and lower margins nearly straight; black interantennal spot; face yellowish gray with slender brownish transverse mark above; parafacials gray with irregular brown spotting above in two patches; beard sparse, white. Scape long and slender, orange yellow with dark hair; pedicel with very small dorsal projection; flagellum reddish at base, darkened to black style; first flagellomere slender, subequal in length to scape. Palpus slender, dark grayish with mostly black hair. Scutum brown, grayish on humeral area, three slender rather indistinct stripes and pair of fused curved spots on posterior margin; scutellum uniformly brown; pleuron gray with brown area on lower anepisternum. Wing brown with pattern of spots in rosettes; subapical band rather broad, complete, straight; all posterior cells with gray triangle in margin. Halter with brown knob. Fore coxa brown with gray patch anteriorly near base; femora yellowish brown, fore femur darkest; all tibiae with broad basal white band covering half of fore and hind tibiae, three-fourths to four-fifths of midtibia; midtarsus and hind tarsus pale basally. Abdomen brown with middorsal grayish stripe from terga II to V; terga I-III with gray lateral margins; pale incisures very narrow; venter brown centrally, gray laterally.

Distribution.—India (Assam).

This description is based on two specimens from Manipur, Assam, one Songpekmon, 900 ft. September 1, 1960, the other Tipaimukh, 80 ft. September 6, 1960, both collected by Schmid. These differ from Ricardo's redescription of the type by not being 9 mm long, by having a pale spot at the margin of the fourth posterior cell (but this is shown in figure), and by having the midstripe of the abdomen not "very distinct." The type, now in the British Museum, has lost its head.

This species is closely related to the Himalayan *albofasciaticennis*, which, however, lacks a middorsal abdominal stripe and has stronger incisures, narrower pale band on fore tibia, and midtibia and hind tibia with indistinct subapical bands.

Haematopota irregularis Schuurmans Stekhoven

(Figs. 58, 185)

Haematopota irregularis Schuurmans Stekhoven, 1926, p. 101; 1928, p. 432; 1932, p. 61.

Chrysozona irregularis (Schuurmans Stekhoven): Philip, 1960b, p. 61.

Type.—Mount Dulit (as Bukit), Sarawak, Borneo (BM).

Female.—Length 8–10 mm; wing 7–9.5 mm; antenna 2 mm. Frons brown pollinose, slightly less than twice as high as width at vertex, usually rather distinctly widened below; midfrontal spot lacking or distinct black triangle, apex down, often with subshiny area above it; paired spots subspherical touching eyes, narrowly separated from callus; callus shiny black, about twice as wide as high, broadly touching eyes, convex and slightly angulate above; shallowly concave below; subcallar area with pair of small shiny brownish triangles; interantennal area with a somewhat indistinct black spot bordering cleft; face and parafacials clear yellowish gray except for some irregular dark speckles on upper parafacial; beard pale. Scape slender, cylindrical, about three times as long as thick, orange brown with black hair; pedicel rather stout without strong dorsal projection; first flagellomere 1.5 to 2 times as long as high, tapered distally, mostly orange brown; style black, blunt apically, longer than height of first flagellomere. Palpus dark brown with mostly black hair. Scutum dark brown centrally with only faint indication of lines anteriorly; broad yellowish lateral area from humerus to scutellum, sometimes joined posteriorly in front of scutellum; this area separated from pleuron by distinct dark stripe; scutellum dark brown sometimes paler on disk; pleuron mostly gray. Wings dark brown with pale-yellowish markings; two distinct rosettes, one around furcation, one around apex of discal cell; subapical band narrow, sometimes very small, not reaching either anterior or posterior wing margins; posterior margin of wing usually without pale spots. Halter yellow. Legs: Fore coxa gray, apical fourth abruptly dark brown; midcoxa brown; hind coxa slightly grayish; rest of legs nearly black except for white basal areas on tibiae, 0.5–0.6 of fore tibia, 0.75 of midtibia, and 0.4–0.5 of hind tibia. Abdomen dark brown with rather broad yellowish incisures dorsally, forming middorsal triangles on terga II–V; no sublateral pale spots; sterna I–II mostly pale, succeeding sternum with broad pale hind margins.

Distribution.—Borneo, Malaya, Sumatra.

Additional specimens seen by us are Harei Parei, Mt. Kinabalu, 5,000 ft, April 22, 1929; Benkoelen, Moeara Tenam, West Sumatra, 1,200 ft, June 1935; Kinabalu Nat. Park, Sabah, Borneo, 5,300 ft, June 19, 1968, F. G. Howarth; Paring, Ranau, British North Borneo, October 10, 1958, T. C. Maa. Another specimen is labeled "INDIA ex coll. Brunetti. Brit. Mus. 1927–184," but it is quite possible that this specimen was not collected in India.

This species is close to *equitibiata*, which, however, is smaller, lacks broad yellowish lateral area on scutum, has more white on hind tibia, and has very narrow, whitish abdominal incisures.

Haematopota irrorata Macquart

(Figs. 107, 200)

Haematopota irrorata Macquart, 1838, p. 167 (163); Osten Sacken, 1881, p. 419; Wulp, 1882, p. 19; Bigot, 1891, p. 75; Ricardo, 1906, p. 115; 1911, p. 352; Meijere, 1911, p. 281; Edwards, 1919, p. 27; Schuurmans Stekhoven, 1926, p. 86; Nieschulz, 1927, p. 231; Schuurmans Stekhoven, 1932, p. 61; Mackerras, 1964, p. 163.

Chrysosoma irrorata (Macquart): Philip, 1960b, pp. 61, 75.

Type.—♀, locality unknown but from Java Museum (MNHP).

Female.—Length 7.5–9.5 mm; wing 7–8.5 mm; antenna 2–2.5 mm. Frons gray brown, about 1.4 times as high as width, nearly parallel-sided; midfrontal spot small or lacking; paired spots of moderate size, narrowly separated from frons, sometimes touching eyes; callus black or dark brown, shiny, slightly protuberant, touching eyes, upper margin evenly convex or shallowly concave beneath each paired spot, about two-thirds as high as width; subcallar area with triangular red-brown pollinose spot; face yellow brown; parafacials grayer with dark dappling on upper parafacial usually evident in certain lights; beard sparse, dark. Antenna orange brown, flagellum usually darkened from just beyond widest part; scape slender, cylindrical, about three times as long as thick, with black hair; pedicel with scarcely any dorsal projection; flagellum long and slender, first flagellomere slightly longer than scape. Palpus yellowish to gray brown with dark hairs. Notum nearly uniformly yellow brown, humerus slightly paler; pleuron yellow gray. Wing brown, markings pale yellowish; subapical band small, consisting of small spot to either side of vein R₁, sometimes entirely lacking; no spots in posterior cells at wing margin. Halteres yellowish brown. Legs: Coxae yellowish gray; fore femur dark brown, midfemur and hind femur yellowish brown; fore tibia dark brown, basal third white; midfemur and hind femur with two pale bands, second one on hind femur sometimes very small or absent; tarsi brown. Abdomen yellowish brown dorsally, incisures narrowly paler; venter yellowish, slightly darkened posteromedially.

Male.—Frontal triangle with well-developed dark spot in one male but lacking in other. Thorax, abdomen, and wings essentially as in female, but segments IV–VII of abdomen distinctly darker; legs with pale banding scarcely visible.

Distribution.—Borneo, Java, Malaya, ? Papua, Sumatra.

Mackerras reported two females from Lake Murray, Papua, one of which was identified by Oldroyd as *irrorata*. This is considerably west of the known range of the species, but the excellent figures given by Mackerras agree very well with the Oriental species. We have seen nearly 2,400 specimens of this species mostly from North Borneo. There is one female at Leiden from Java and one in the British Museum from Sumatra. The two males were collected with many females in North Borneo, October 1962.

This species is extremely common where it occurs. The general yellowish-brown coloration with no distinct thoracic or scutal pattern and the wing pattern (fig. 200) will usually serve to distinguish the species.

***Haematopota jacobsoni* Schuurmans Stekhoven**

(Figs. 64, 190)

Haematopota jacobsoni Schuurmans Stekhoven, 1926, p. 129.

Type.—Semarang, Java (LM).

Female.—Length 8 mm; wing 8.5 mm; antenna 1.8 mm. Frons mixed yellow gray and brown, width at vertex about 0.8 of height, slightly divergent below; midfrontal spot variable, usually present; paired spot subquadrate, brown, touching eyes, nearly touching callus; callus dark reddish brown; protuberant, less than three times as wide as high, touching eyes at lower corners; upper margin weakly convex with middorsal projection; lower margin concave; subcallar area with pair of grayish triangles shiny and yellow only in dorsolateral corners; no distinct interantennal dark spot; face and parafacials gray, upper parafacial faintly blotched with darker gray; beard rather sparse, white. Antenna yellow brown, flagellum darkened distally; scape slightly more than twice as long as thick distally, cylindrical; pedicel without distinct dorsal projection; flagellum slender, first flagellomere distinctly longer than scape, little tapered, base of style distinctly narrower than apex of first flagellomere. Palpus grayish brown, rather stout basally with mostly black hair. Scutum brown with five gray stripes, lateral pair broadest, sublateral pair widened to spot behind transverse suture; scutellum brown; pleuron gray with brownish central spot. Wing brown with rather coarse pale pattern; subapical band doubled from anterior margin, posteriorly ending in first two of a series of six triangles along posterior margin of wing; first basal cell largely pale. Halter with brown knob. Legs brown; fore coxa gray; fore tibia with rather narrow

subbasal pale band; no other bands on legs. Abdomen gray with broad middorsal brown stripe and narrow midventral stripe.

Distribution.—Java.

This description is based mostly on a paratype in the junior author's collection, but we have seen the type and four paratypes in Leiden. This species is rather easily distinguished by the wing pattern (double subapical band, six pale triangles on posterior margin) (fig. 190), the leg pattern (band on fore tibia only), and the antenna, frons, and lack of distinct parafacial darkening (fig. 64).

Haematopota javana Wiedemann

(Figs. 15, 140)

Haematopota javana Wiedemann, 1821, p. 100 (as *javana*); 1828, p. 218; Wulp, 1882, p. 19; Bigot, 1891, p. 77; Ricardo, 1906, p. 115; 1911, p. 340; Meijere, 1911, pp. 282, 286; Fletcher, 1921, p. 46; Senior-White, 1922a, p. 107; Schuurmans Stekhoven, 1926, p. 113; Szilady, 1926, p. 18; Senior-White, 1927, pp. 17, 22; Schuurmans Stekhoven, 1928, p. 434; Zimsen, 1954, p. 11; Philip, 1963, p. 527.

Haematopota nigra Wiedemann, 1821, p. 101.

? *Haematopota asiatica* Rondani, 1875, p. 461.

Chrysozona javana (Wiedemann): Philip, 1960b, pp. 62, 76.

Types.—♀, *javana*, Java (ZMC); ♂, *nigra*, Java (?ZMC); ♀, *asiatica*, no locality (?MCG).

Female.—Length 8–11 mm; wing 7.5–10 mm; antenna 1.5–2.2 mm. Frons reddish gray, paler in streak above and around median spot, around paired spots, and margining eyes, width at vertex about 0.8 of height, distinctly widened below; midfrontal spot small, often reddish; paired spots medium sized to rather large, reddish brown to black, separated from eyes and callus; callus large, orange brown to black, touching eyes, both upper and lower margins sinuous; narrow dark line usually present running up from deep notch in lower margin in which lies large black inter-antennal spot; upper face and upper parafacials solidly black, forming three separated spots; rest of lower head nearly white with long white hair. Antenna orange brown; scape and pedicel with rather heavy black hair; scape about twice as long as thick, slightly enlarged distally; pedicel short with distinct dorsal projection; flagellum very compressed, first flagellomere about twice as long as high, apex distinctly higher than style, which is shorter than height of first flagellomere. Palpus yellowish with mostly pale hair. Notum brown with yellowish-gray markings as follows: Very slender median stripe; large triangular submedian spot behind transverse callus, often with slender anterior stripe to it;

slender, short, sublateral stripe posteriorly; broad lateral stripe from humerus to above wing base; band anterior to and across basal half of scutellum with four anterior lobes; pleuron yellowish gray. Wing brown with pale markings mostly in curved streaks rather than small spots; subapical band slender, sinuous, usually with second, often less distinct band beyond it; posterior cells except cell 4 with large marginal triangles; costal cell brown with pale spot at apex. Halter with brown knob. Coxae gray, fore coxa darkened on apical half or more; femora yellowish brown or yellowish, apex of hind femur darkened; fore tibia slightly swollen, brown, basal two-fifths pale; midtibia with two rather broad pale bands; hind tibia usually rather distinctly enlarged with two rather distinct pale bands; midbasitarsus and hind basitarsus mostly pale; hind femur usually with unusually long hairs near apex, distal ones black, more basal ones white; hind tibial fringe strong. Abdomen brown with pale incisures, gray laterally on terga II-IV, slender middorsal stripe on terga II-IV or V, expanding posteriorly on II, and sometimes faint sublateral streaks on posterior terga; venter yellowish gray with broad central brown stripe on posterior terga.

Male.—Length 8-10 mm. Resembles female except for usual sexual differences and following: Frontal triangle pollinose with small, shiny, transverse rectangle above interantennal black spot; scape more swollen and shiny, with mostly pale hair and usually darkened dorsally; notum with pale markings less developed except for broad scutoscuteellar band; pleuron dark with heavy dark hair; legs with pale bands usually indistinct and therefore with less pale hair; abdomen yellowish brown, slightly darkened posteriorly, with pale incisures but middorsal stripe less distinct.

Distribution.—Burma, India, Java, Laos, Malaya, Sumatra, Thailand, Vietnam.

H. javana was described from the female only in the Westermann collection. There are two syntypes in the Copenhagen Museum as reported by Zimsen. The male "Type" reported by Philip (1963) to be in Copenhagen could not be the type of *javana*, described only from the female, but might be a type of *nigra*, which Wiedemann synonymized in 1828. Philip (1960b) reported a female in the Vienna Museum as type, and this may be the same specimen we borrowed from there, but this is from the Winthorn collection and is therefore questionably a syntype. Ricardo (1911) reported the type of *asiatica* in the Genoa Museum in bad condition but "very probably not a specimen of *javana* at all." As Rondani's description, credited in part to Wiedemann, agrees rather well with the original description of *javana*, it seems well

to leave it as a tentative synonym of *javana* until someone can reexamine the type.

This is a variable, widespread species requiring placing in three couplets in the key, as the scape might be considered either pollinose or shiny, and the hind femur might be interpreted as having a heavy tuft of hairs near the apex or not. The broad gray scutoscutellar band will distinguish it from species that resemble it otherwise. Fletcher (1921) described and figured the larva, pupa, and male; the larva was found in soil among roots of indigo and *Panicum* grasses.

***Haematopota jellisoni* (Philip), new combination**

(Figs. 49, 172)

Chrysazona jellisoni Philip, 1960a, p. 30.

Type.—Assam-Burma area, Ledo Road (CBP).

Female.—Length 9.5 mm; wing 8 mm; antenna 2.2 mm. Frons dark gray, width at vertex and height subequal; midfrontal spot well developed; paired spots large, round, nearly touching eyes and callus; callus shiny dark reddish, about 3.5 times as wide as high, touching eyes, protuberant; upper margin straight centrally with flattened median projection; lower margin concave above antennae; subcallar area with pair of shiny yellow triangles in middle, weakly divided by cleft; no interantennal dark spot; face and parafacials gray, dark spot tapering inwardly near middle of parafacial with small black dots above; beard rather short, brownish. Scape yellow, cylindrical, four times as long as thick; pedicel with weak dorsal projection; flagellum long and slender, darkened beyond base; first flagellomere subequal in length to scape. Palpus brown with black hair, stout basally. Scutum reddish brown with three indistinct slender pale stripes and slight graying behind yellowish humeri; scutellum brown; pleuron gray, brown across lower half of anepisternum. Wings brown with white spots in usual pattern; subapical band complete, broad along posterior border; strong marginal triangles in all posterior cells. Halter with brown knob. Coxae and femora all dark brown; all tibiae white basally, dark apically, white covering about 0.4 of fore tibia, 0.8 of midtibia and hind tibia; basal two-thirds of midbasitarsus and hind basitarsus white. Dorsum of abdomen dark brown with narrow gray incisures; trace of sublateral pale spots posteriorly; venter dark brown with narrow pale incisures.

Distribution.—?Assam, ? Burma.

The extent of white on legs and absence of interantennal dark

spot will distinguish this species from all those with single white area on all tibiae.

***Haematopota jiri* Chvala**

Haematopota jiri Chvala, 1969, p. 51.

Type.—Jiri, Nepal, 1,900 m (ZCBS).

Female.—Length 9 mm; wing 9.5 mm. Frons grayish tinged with yellow below and laterally, height slightly greater than width at vertex, distinctly wider below; midfrontal spot strong, vertical; paired spots large, rounded, touching eyes and nearly touching callus; callus shiny brown or brownish yellow, nearly four times as wide as high, upper margin nearly straight with small median triangle, lower margin concave above antennae; interantennal spot black, triangular; face and parafacials pale gray, latter with only trace of brownish band above. Scape yellowish, cylindrical, brown, about three times as long as thick, with black hair; flagellum black, slender, first flagellomere slightly shorter than scape. Palpus brownish yellow, slender, tapering, black haired, with some pale hairs ventrally. Scutum dark brown with three faint pale stripes; hind margin of scutellum pale pollinose; pleuron gray with whitish hair. Wing dark brown with pale spots in usual pattern; subapical band strong, sinuous, ending in vein R_5 ; pair of pale spots in cell R_1 beyond subapical band; pale marginal triangles in all but posterior cell 4. Halter with brown knob. Legs mostly dark brown; fore tibia with basal third whitish; midfemur and hind femur brownish yellow; midtibia with two pale bands; hind tibia pale on basal two-thirds with very indistinct darker break. Abdomen reddish brown on terga I–III, dark on rest of dorsum with pale-yellowish incisures; venter yellowish basally, darker apically, with pale incisures.

Distribution.—Nepal.

We have seen only one very poor specimen of this in the British Museum so this description is based almost entirely on the original. If the hind tibia were considered to have two pale bands, it would run to *helviventer* or *spenceri*, differing from the former in the shape of the frontal callus and from both in having almost no dark area on the upper parafacial.

***Haematopota kashmirensis*, new species**

(Figs. 88, 216)

Holotype, female, Kashmir, River Kisangung, Gurez., 8,000 ft, 1926, F. J. Mitchell (BM). Paratypes: 1 ♀, Baltistan, 30 miles up

stream from Skardo, India, June 13, 1933, Capt. Gregory; 1 ♀, Naran, near Gilgit, Pakistan, on human, R. K. Enders. (BM, USNM)

Female.—Length 8.5–9 mm; wing 8 mm; antenna 2 mm. Frons slightly wider than high, gray; midfrontal spot well developed; paired spots rather large, oblique, not touching eyes or callus; callus black, transverse, narrowly separated from eyes, both upper and lower margins sinuous; subcallar area tomentose with black spot; face and parafacials gray; upper parafacial with abundant, separate dark spots; beard white. Antenna dark; scape rather short, cylindrical, dark gray pollinose; flagellum slender. Palpus slightly swollen basally, gray with black and white hairs. Notum nearly black; scutum with five slender gray stripes, only middle one reaching scutellum; pleuron pale gray. Wing brown with pale spots in usual pattern, those of Indian paratype slightly broader than in holotype; subapical band slender, curved, not reaching hind margin; posterior cells all with entire margins pale. Halter with knob dark, stem pale. Fore tibia with basal third white; midtibia and hind tibia with two white bands. Abdomen blackish with pale incisures; strong gray triangle on tergum II and smaller ones on terga III–VII; sublateral gray spots on terga III–VI; venter dark gray, slightly paler laterally, with narrow pale incisures.

Distribution.—India (Kashmir), Pakistan.

The entirely gray pollinose scape of this species is suggestive of several Palaearctic species and seems to be as close to *atropathenica* Abbassian-Lintzen as any other species, but *kashmirensis* is slightly smaller and the pale markings of the wing are much narrower. It is close to *alticola*, but the hind tibia of *alticola* has a single pale band, the palpus is slightly less attenuated, the halter knob is mostly pale, and the abdomen is more heavily patterned with large gray sublateral spots on tergum II and following.

Haematopota kaulbacki, new species

(Fig. 196)

Holotype, female, Nam Tamai Valley, Upper Burma, Lat 27° 42' N, Long 97° 54' E, 3,000 ft, July 26, 1938, R. Kaulback (BM). Paratypes: 1 ♀, same data as holotype; 1 ♀, same but August 29; 3 ♀, same but 4,000 ft, August 14; 2 ♀, same but 6,000 ft, August 2. (BM, USNM)

Female.—Length 8–10 mm; wing 8–9.5 mm; antenna 1.75–2 mm. Frons grayish brown, width at vertex about 0.72 of height,

scarcely widened below; midfrontal spot small, brownish, sometimes indistinct; paired spots subtriangular, one corner touching eye, narrowly separated from callus; callus rather dark yellowish brown, about 2.5 times as wide as high, touching eyes, upper margin weakly convex, lower margin nearly straight; subcellar area with rather large blackish interantennal spot; face and parafacials gray, former slightly brownish centrally, upper parafacial with some brown speckling above. Scape yellowish with black hair, about 2.5 times as long as height at apex, gradually thickening from base to apex; pedicel with strong dorsal extension; flagellum darkened beyond base, at least 1.5 times as long as scape, slender. Palpus pale yellowish with black hair, slender. Scutum brown, humerus, three slender stripes on anterior half, two curved transverse spots before scutellum, and prescutellar sclerite paler brownish; pleuron grayish. Wing brown with paler spots forming two broken rings and other marks in usual pattern; subapical band slender, sinuous, usually broken, not crossing vein R_2 ; posterior cells 3, 5, and sometimes 2 with pale triangles at margin. Halter knob brown. Legs mostly brown; fore coxa gray on basal half; fore tibia white on basal two-fifths; mid-tibia with two pale bands; hind tibia with basal 0.4 white and trace of subapical pale spot. Abdomen yellowish brown with paler yellowish incisures.

Distribution.—Burma.

This is a predominately brownish species, slightly resembling *unizonata* but with a less extensive, contrasting, pale area before the scutellum, a different wing pattern, and a less pronounced dark triangle next to the eye on the upper parafacial.

We dedicate this species to R. Kaulback, collector of the specimens.

***Haematopota kerri*, new species**

(Fig. 181)

Holotype, female, Wieng Chan, Muang Baw, Laos, April 27, 1932, A. Kerr (BM). Paratype, 1 ♀, same data (BM).

Female.—Length 11.5 mm; wing 10.5 mm; antenna (scape only) 0.8–1 mm. Frons nearly twice as high as width at vertex, distinctly widened below, gray laterally with broad brown central area above down to small black midfrontal spot, which is joined to paired spots, which are large, oblique, fused ventrally and touch eyes and callus; callus dark reddish brown, about twice as wide as high, broadly touching eyes; upper margin convex,

lower margin nearly straight, scarcely differentiated from subcallar triangular shiny area; no black interantennal spot; face and parafacials gray. in paratype the face browner with dull brownish area on parafacials above. Scape reddish brown, cylindrical, about three times as long as thick; pedicel with weak dorsal projection; flagella missing. Palpus yellowish brown, rather stout basally with mixed yellowish and dark hair. Scutum reddish brown with two rather indistinct slender pale stripes expanding into strong spots at transverse suture; pair of crescentic pale spots on posterior margin; scutellum uniformly brown; humerus and antealare pale; pleuron mostly yellowish gray. Wings brown with usual pattern of pale spots; subapical band consisting of rather narrow curved band anteriorly and large subtriangular spot on hind margin; holotype with pale spots at wing margin in all posterior cells, small in cells 2 and 4; in paratype lacking in these cells; spots of central part of wing coarse. Halter entirely yellow. Fore coxae pale on basal half, brownish distally; all femora dark brown; tibiae dark except for banding as follows: Basal two-thirds of fore tibia white; subbasal third of midtibia white and very faint subapical yellowish band; subbasal fourth of hind tibia white; all tarsi entirely dark. Abdomen dark brown dorsally with narrow white incisures expanding laterally on terga I-II; venter dark, slightly grayish laterally.

Distribution.—Laos.

This bears some resemblance to *lineata*, which is, however, larger, has more white on the fore tibia, and has a strong mid-dorsal white stripe on the notum.

We dedicate this species to A. Kerr, collector of the two specimens.

Haematopota knekidis, new species

Holotype, female, Insein, Burma, June 6–August 14, Fletcher (BM).

Female.—Length 8 mm; wing 7.5 mm; antenna 1.17 mm. Frons as wide as high, widened below, yellowish-gray pollinose with brown, mesally divided area above small brown midfrontal spot; paired spots rather small, brown, margins blurred, well separated from both eyes and callus; callus yellowish, slightly darkened laterally and along upper margin, 0.75 times as high as wide, narrowly separated from eyes, upper margin trilobed, lower margin concave centrally; subcallar area with large dark-brown spot; face and parafacials gray, upper parafacial with dark-brown spot, broken vertically mesad of eye margin; beard white.

Antenna yellow orange; scape shorter than first flagellomere, expanded distally; first flagellomere higher than length of style, two-thirds as high as long, end slightly higher than second flagellomere. Palpus slender but with slightly swollen base, with mixed black and white hair. Scutum brown with three rather indistinct narrow pale stripes and lateral and posterior margins pale; scutellum with basal half pale, distal half brown; pleuron mostly gray. Wing pale gray, paler pattern little contrasting; subapical band complete, sinuous, reaching hind margin in cell R_5 ; marginal spots in posterior cells except cell 4. Halter with pale stem, dark knob. Coxae gray; fore femur yellowish brown; midfemur and hind femur paler, darkened at apex, hind femur with abundant recumbent white hair on basal two-thirds; fore tibia brown with basal third white; midtibia and hind tibia each with two broad pale bands; hind tibial fringe moderately long; tarsi dark, midtarsus and hind tarsus paler basally. Abdomen dark brown above with strong pale incisures; faint mesal gray stripe on terga II-V; venter gray, darkened posteriorly.

Distribution.—Burma.

A note by E. E. Austen on the specimen suggested that it was a new species near *assamensis*. The larger size, darker wing, and solid black spot on the upper parafacial distinguish *assamensis*.

The name of this species is the Greek genitive meaning "with a pale spot or dim cloud," referring to the weakly contrasting wing pattern.

Haematopota krombeini, new species

(Figs. 63, 195)

Holotype, female. Parayanalankulam, Vav. District, Ceylon, October 22, 1969, Krombein and Karunaratne (USNM No. 72024). Paratypes, 13 ♀. same data (CBP, USNM).

Female.—Length 6.8–9 mm; wing 5.8–8 mm; antenna 1.8–2.5 mm. Frons grayish with rather developed transverse darker subshiny area across vertex, sometimes extending down sides; width at vertex and height subequal; midfrontal spot lacking or represented by rather broad dorsal extension of callus; paired spots round, large, ringed with white, narrowly separated from eyes and callus; callus nearly black, broadly touching eyes, upper margin concave to either side of dorsal projection, lower margin nearly straight centrally, curved downward abruptly laterally; subcallar area with large triangular black interantennal spot; face brownish centrally with narrow darker lateral margins; parafacials gray with irregular dark markings above; beard sparse,

pale. Scape shiny yellowish brown to rather dark brown, basal half distinctly swollen, apical third weakly so; pedicel with distinct dorsal projection; flagellum dark except at extreme base, slender, slightly longer than scape. Palpus dark brown with brownish hair. Scutum dark brown with very slender faint median pale stripe, pale sublateral stripe reaching to transverse suture where it is enlarged, and pale humerus and posthumeral spot; scutellum entirely dark; pleuron mostly grayish with some brown; sterna brown. Wing dark brown with pattern of rather small pale spots; subapical band slender, irregular, often partially doubled; small pale marginal spots in most posterior cells. Halter pale with dark-brown knob. Legs mostly dark brown; fore tibia with small subbasal band; midtibia with two pale spots, subapical one sometimes indistinct; hind tibia with very narrow subbasal band or spot; midtarsus and hind tarsus distinctly pale at base. Abdomen dorsally black with incisures very narrowly paler; lateral margins of anterior terga gray, becoming narrower posteriorly; terga II with faint median grayish triangle; terga III-VI with longitudinal grayish spots; venter completely dark.

Distribution.—Ceylon.

The rather unusual frons (fig. 63), general dark color, basally swollen scape, and narrow tibial bands with only one on the hind tibia will distinguish this species.

We are pleased to dedicate this species to Karl V. Krombein, former chairman of the Department of Entomology, USNM, who collected several Tabanidae in Ceylon including this new *Haematopota* species.

***Haematopota lata* Ricardo**

(Figs. 30, 156)

Haematopota lata Ricardo, 1906, p. 121; 1911, pp. 344, 401; Schuurmans-Stekhoven, 1926, p. 91; 1929, p. 506; Senior-White, 1927, pp. 17, 22; Philip, 1963, p. 527.

Chrysosona lata (Ricardo): Liu, 1958, p. 154.

Type.—Khasi Hills District, India (BM).

Female.—Length 10–11 mm; wing 8–9 mm; antenna 2.17–2.5 mm. Frons brown, darker inverted triangle on vertex with apex at small, round, black midfrontal spot; paler areas near eyes and between paired spots and callus; paired spots large, black, touching eyes, separated from callus; callus yellow to black, touching eyes, 3–3.5 times as wide as high, both upper and lower margins nearly straight; pair of yellow-orange, shiny triangles below callus, cleft between without velvety black spot; face and para-

facials yellowish gray; pair of darker spots below antennae and upper parafacial with irregular darker spots; beard pale. Antenna dark brown to blackish; scape stout, cylindrical, darker above with black hairs; first flagellomere about 0.83 length of scape, distinctly compressed and about 0.6 as high as length; style stout, short. Palpus stout, pale yellow with mixed dark and pale hairs. Scutum dark brown with strong yellowish-gray pattern as follows: Humerus and spot behind it, spot above wing base, pair of strong submedian stripes from anterior margin each ending in triangle behind transverse suture; pair of narrow sublateral stripes from transverse suture, widened posteriorly and not reaching large patch across scutoseutellar suture; this patch sinuous, comprising slender median projection, sublateral angles, and rounded lateral lobes anteriorly, the hind margin on scutellum; pleuron gray with dark area along suture below anepisternum. Wing gray brown with pale spots; stigma dark; subapical band single, irregular, often broken or not reaching hind margin; marginal triangles in posterior cells 1, 3, and 5 and usually small one in cell 2. Halter pale with sides of knob darkened. Fore coxa gray except for darkened apical third; fore femur dark anteriorly, slightly grayish posteriorly; fore tibia slightly swollen, white on about basal two-fifths, rest dark; midfemur mostly reddish gray; midtibia dark with two broad yellow bands; hind femur reddish gray, darkened distally with rather heavy fringe of black hair; hind tibia with two bands, subapical one slightly narrower than subbasal one; tarsi all dark except for most of midbasitarsus and hind basitarsus. Dorsum of abdomen dark with distinct gray incisures, paired sublateral gray spots on terga III or IV-VII, and faint gray median stripe on posterior segments; venter gray with median dark stripe, widened posteriorly.

Distribution.—Burma, China (Yunnan), India (Assam), Laos, Thailand.

The type and paratypes differ from most specimens in having the frontal callus yellow rather than black. We have seen many females collected by F. C. Howarth 25-30 km north of Mg. Vang Vieng, Vientiane Province, Laos, 400 m, March 12, 1968, mostly from horse, a single female collected by H. S. Fuller, 20 miles west of Myitkyina, Burma, another by R. Griffiths at Lake Indawgyi, Burma, February 1962, and three specimens from Chiangmai and Loei Provinces, Thailand. These from Thailand were unusually small.

This is a dark species that can be recognized by pair of shiny yellow triangles below frontal callus, broken dark pattern of up-

per parafacial, pair of gray stripes on anterior scutum, strong gray band on scutoscutellar suture, bicolored fore coxae, and less than half white fore tibia.

Haematopota latifascia Ricardo

(Figs. 20, 144)

Haematopota latifascia Ricardo, 1911, p. 356; Senior-White, 1927, p. 18.

Haematopota beesonii Senior-White, 1922b, pp. 107, 145; 1927, p. 16; Beeson, 1941, p. 341 (new synonymy).

Types.—*latifascia*, Shillong, Assam (BM); *beesonii*, Bendaung, North Toungoe, Burma (BM).

Female.—Length 7–11.5 mm; wing 6–10 mm; antenna 1.7–2.6 mm. Frons yellowish gray, little higher than width at vertex, slightly wider below; midfrontal spot usually strong, sometimes V-shaped; paired spots strong, often diamond-shaped or concave on lateroventral margin; callus reddish to dark brown, transverse, upper and lower margins nearly straight; strong black interantennal spot; upper face and parafacials solid black, lower margin nearly straight; lower face and parafacials white; beard white. Antenna reddish brown; scape stout, cylindrical, about 2.5 times as long as thick, slightly constricted in middle, with dark hair; pedicel with distinct dorsal projection; first flagellomere slightly compressed, about twice as long as high, tapering only slightly; style stout, blunt. Palpus rather slender, yellow, with mixed pale and dark hair. Scutum brown with five rather distinct paler brown stripes, submedian pair ending behind transverse suture in broadened spots; rather broad, quadrilobed pale area in front of scutellum; base of scutellum pale, apex darker; pleuron pale brownish. Wings brown with usual pattern; subapical band usually complete, broad, slightly curved inward; marginal triangles large in posterior cells 1, 2, and 5, usually smaller in 3, absent in 4. Halter with brown knob. Fore coxa pale on basal half anteriorly; fore and hind femora dark, midfemur yellowish brown except at apex; fore tibia white on basal third, distal part slightly swollen; midtibia with two pale bands; hind tibia pale on about basal two-fifths with faint trace of subapical band; midtarsus and hind tarsus pale basally; end of hind femur ventrally and distal part of hind tibia with fringe of black hairs. Dorsum of abdomen brown with pale incisures and rarely faint middorsal triangles; sometimes pale sublateral spots on posterior terga; venter mostly dark brown, slightly grayish laterally.

Distribution.—Burma, India (Assam), Laos, Thailand.

All specimens we have seen were collected in March, April,

or May. We have keyed this species in two places because the shape and size of the scape are somewhat intermediate. However this is interpreted, the species can be recognized by the black upper face and parafacials, pale base of the scutellum, rather broad, usually unbroken, subapical wing band, and the leg pattern. There is great variation in size; two specimens from Thailand are unusually small.

The type of *beesoni* lacks head and abdomen, but a "cotype" of same locality and date agrees well in coloration of wing and legs. These specimens resemble *burmanica* from the same locality, but the wing pattern is different.

Beeson (1941) reported that this species "attacks elephants and also men who have been riding elephants and still smell of elephants."

***Haematopota libera*, new species**

(Figs. 106, 234)

Holotype, female, University campus. Khon Kaen Province, Thailand, 16° 27' N, 102° 49' E, July 4, 1969, J. J. S. Burton (CU). Paratypes: 211 ♀, same data as holotype; 16 ♀, Nakhon Sawan Province, Thailand, June 27, 1969, Burton. (BM, CBP, CU, USNM)

Female.—Length 7–8 mm; wing 5.5–6.5 mm; antenna 1.3–1.5 mm. Frons gray, paler around paired spots, height and width subequal, slightly wider below; midfrontal spot strong; paired spots rather small, round, well separated from eye and callus; callus black, about three times as wide as high, touching eyes, upper margin weakly convex, lower margin shallowly concave above antennae; subcallar area yellowish gray with darkened cleft but no distinct interantennal spot; face and parafacials gray, usually with short dark streak across upper parafacial and faint mottling above this; beard sparse, pale. Scape short, dull yellowish gray, slightly expanded distally; pedicel with short dorsal projection; flagellum long and slender, yellowish basally darkening to blackish style; first flagellomere about 1.8 times as long as scape. Palpus rather slender, tapered, gray with mixed black and pale hair. Scutum blackish with five gray stripes, three central ones slender, lateral one rather broad and split posteriorly; scutellum gray with pale hair. Wing pale gray with pattern of fine paler spots; subapical band slender, sinuous, not reaching hind margin, sometimes greatly reduced; no pale spots on hind margin. Halter knob brownish laterally. Coxae and femora gray; fore tibia brown, faintly yellowish at base; midtibia and hind tibia each

with two faint yellowish bands, sometimes scarcely visible; hind tarsus faintly paler at base. Abdomen blackish with middorsal stripe, row of rather large sublateral spots, and lateral margin gray; venter gray with rather broad brown midventral stripe.

Distribution.—Thailand.

This small, slender species can be distinguished from most species by the weakly patterned wing and legs and strong abdominal pattern. It is keyed out in two places because of the variation in distinctness of the leg pattern.

The name is the Latin adjective, *libera*, free, in honor of the day that most of the specimens were collected.

Haematopota limbata Bigot

(Figs. 34, 160)

Haematopota limbata Bigot, 1891, p. 78; 1892, p. 626; Ricardo, 1906, p. 115; 1911, p. 325; Senior-White, 1927, p. 16.

Type.—♀, Bengal, India (BM).

Female.—Length 10 mm; wing 10.5 mm; antenna 1.6 mm. Eyes rather distinctly pilose; width of frons at vertex about 0.71 of height, strongly divergent below; midfrontal spot very small and indistinct; paired spots dark reddish brown, moderate in size, round, separate from eyes and callus; callus orange brown, about 3.5 times as wide as high, touching eyes at lower corners; upper margin weakly convex, lower margin concave; subcallar area with large keystone-shaped dark interantennal spot; face and parafacials gray; upper face with slender brownish marks; upper parafacial with solid black spot; beard white. Antenna orange brown; scape about twice as long as height at apex, slightly curved downward near base and expanded distally; pedicel with weak dorsal point; first flagellomere compressed, height about half of length; style at base distinctly narrower than height of apex of first flagellomere; scape, pedicel, and base of flagellum with black hair. Palpus pale brownish gray. Notum dark brownish, indistinctly striped; pleuron slightly grayer. Wings yellow brown with pattern of slender paler spots; subapical band slender, widely separated from anterior and posterior margins; no distinct spots on hind margin of wing. Halter knob darkened near base. Legs almost uniformly yellow brown with no banding. Abdomen dark brown with strong middorsal gray stripe; venter almost uniformly brown.

Male.—Eyes pilose, large and small facets distinctly differentiated; frontal triangle gray pollinose with no callosity; scape

distinctly swollen, shiny, only 1.4 times as long as thick; first flagellomere tapering more than in female. Scutum grayer centrally. Abdomen redder basally. Otherwise essentially as in female.

Distribution.—India (Assam, West Bengal).

This description is based on two specimens with the following data: ♀, Khasi Hills, Assam, ex Bigot collection (BM); ♂, Jarain, Khasi Hills, Assam, 2,800 ft, April 13, 1960, Schmid (CBP). Uniformly colored legs, shape of antenna (fig. 34), solid dark area of upper parafacial, wing pattern (fig. 160), and gray stripe of abdomen easily distinguish this species.

Haematopota lineata Philip

Haematopota lineata Philip, 1953, p. 528.

Type.—BanMeThuot, Vietnam (BBM).

Female.—Length 6.5–8.25 mm; wing 6.5–8 mm; antenna (scape and pedicel) 1.4 mm. Frons gray with large dark central area, nearly twice as high as width at vertex, slightly widened below; midfrontal and paired spots obscured by thick crescentic dark band bordering dorsal margin of callus, with pair of oblique extensions above; callus shiny dark reddish, slightly protuberant, about 1.25 times as high as wide, broadly touching eyes, convex above, nearly straight below; subcallar area with two large shiny triangles faintly demarked from callus, partially cleft below; no interantennal dark spot; face and parafacials gray with faint gray crescentic spot on upper parafacial; beard white. Antenna orange yellow, style slightly darkened; scape cylindrical, slightly expanded distally, about three times as long as thick; pedicel with no dorsal projection; flagellum long and slender, first flagellomere distinctly longer than scape. Palpus yellowish with mostly dark hair. Notum brown; pale-yellowish pattern consists of humerus, anterior margin, strong middorsal stripe widening posteriorly to end of scutellum, hind margin of scutellum, and rather broad lateral stripe; pleuron gray. Wing brown with pale spots in usual pattern; subapical band consisting of two elongate spots from opposite margins tapering and overlapping centrally; distinct pale triangles in all posterior cells. Halter entirely pale yellow. Fore coxa mostly gray, slightly brownish distally; fore femur dark brown; midfemur and hind femur paler, darkened near apex; fore tibia slightly more than three-fourths white; midtibia with two rather narrow pale bands, one subbasal, other subapical; hind tibia with basal fourth white and with rather indistinct, narrow, subapical band; midtarsus and hind tarsus pale

basally. Abdomen brown with pale incisures particularly centrally on tergum I; median middorsal line faintly indicated; venter mostly dark.

Distribution.—Vietnam.

A specimen taken 40 km N of Dilinh, Vietnam, 540 m, April 26, 1960 (Leach) has also been seen. It is distinctly smaller than the type.

This species is near *circina* and *biorbis*, but the wing pattern is different in these two species, consisting of nearly complete contiguous rings not broken into small spots, and both have a black interantennal spot.

Haematopota lineola (Philip), new combination

(Figs. 42, 166)

Chrysozona lineola Philip, 1960a, p. 30.

Type.—Tak, Pra Tung Chung, Thailand (USNM).

Female.—Length 11–13 mm; wing 10.5–11 mm; antenna 2.34–2.5 mm. Frons yellow brown, with mixed pale and dark hair; width about 0.84 times height, nearly parallel-sided; median spot small; paired spots rather small, subtriangular, separated from eyes and callus; callus dark brown to black, 3.5–4 times as wide as high, touching eyes, upper and lower margins weakly curved, often with short middorsal projection; subcallar area yellowish brown, pollinose, darkened along median cleft; face and parafacials dark brown to black above, white below; beard white. Antenna reddish brown, distal part of flagellum more or less darkened; scape about three times as long as high, cylindrical, in dorsal view inner margin distinctly convex; pedicel with long dorsal projection; first flagellomere about 0.83 length of scape, slender, tapering; style blunt. Palpus pale yellowish, rather slender, with mixture of dark and pale hair. Notum brown, indistinct stripes, and disk of scutellum paler; pleuron yellowish gray. Wing brown with pattern of distinct pale spots; subapical band broken, either crescentic or with overlapping ends across vein R₁; posterior marginal spots in all but posterior cell 4. Halter yellow with darkened knob. Coxae yellow brown, fore coxa darker on distal half; femora dark brown, basal two-thirds of midfemur and hind femur paler; fore tibia with basal third white; midtibia and hind tibia with two pale bands, basal band slightly broader, particularly on hind leg; hind tibial fringe moderately long. Abdomen dark brown; mid-dorsal stripe of gray triangles, that on tergum I on hind margin only, wide, on II expanding posteriorly to reach lateral margin,

others narrower; sides of terga I-III extensively pale; venter gray with strong midventral dark-brown stripe.

Distribution.—Laos, Thailand.

We have seen additional specimens from LAOS: 11 km west of Ban Reun, Ban Na Pheng, Vientiane Province; Wapi, Wapikhamthong Province, July 15, 1967; THAILAND: Sam Ngow Tak, May 17, 1959; 17 km northwest of Loey, May 18, 1967; Pasak Valley, Oct. 22, 1932.

***Haematopota litoralis* Ricardo**

(Figs. 21, 145)

Haematopota litoralis Ricardo, 1913, p. 546; Annandale, 1913, p. 245; Senior-White, 1927, p. 17.

Haematopota rhizophorae Senior-White, 1921, p. 387; 1927, p. 17 (new synonymy).

Types.—*litoralis*. Puri, Orissa coast, India (BM); *rhizophorae*, Trincomalee Harbor, Ceylon (BM).

Female.—Length 9-10 mm; wing 7-7.5 mm; antenna 1.8-2 mm. Frons brown with gray bordering eyes, median and paired spots and stripe at vertex to midfrontal spot; width at vertex about 0.8 of height, slightly widened below; midfrontal spot minute; paired spots large, subquadrate, ventrolateral corner rounded off, touching eyes, narrowly separated from callus; callus nearly black, upper margin distinctly concave so that it is much higher at eye border than in center; lower margin nearly straight; large inter-antennal black spot merging with solid black of upper face and parafacials; lower face and parafacials nearly white with white hair. Antenna dark reddish brown to black; scape stout, shiny, with black hair, about twice as long as thick, slightly depressed above near middle; pedicel with strong dorsal and ventral prolongations; flagellum strongly compressed, slightly shorter than scape. Palpus yellowish gray with mixed black and gray hair. Scutum brown with humerus, three indistinct stripes anteriorly, and pair of small spots behind transverse suture pale; prescutellar sclerite and curved transverse mark to each side gray; scutellum with hind margin and slender median stripe grayish; pleuron brown with broad gray stripe. Wings brown with rather doubled pattern of slender pale spots; subapical band partially doubled, both arms fragmented; all or nearly all posterior cells with marginal triangles. Halter knob brown. Legs dark, fore tibia with narrow oblique subbasal white band and midtibia and hind tibia each with two slender bands well separated from ends of segment; basitarsus of midleg and hind leg broadly white. Abdomen above

brown with gray pattern consisting of median row of spots on terga II-VI, sublateral spots on III-VII, and lateral spots on I-V, latter large anteriorly, becoming smaller; venter solidly dark brown.

Distribution.—Ceylon, India (Orissa).

In addition to the type series from Orissa we have seen a single female from Ceylon (2 miles west of Pesolai, Mannar I., Man. District, 10 ft, March 24, 1970, Davis and Rowe). This species is probably confined to a dry coastal habitat. Annandale found both sexes in considerable abundance closely associated with the cactus *Opuntia elatior*. Black of upper face and parafacials, strongly compressed flagellum, poorly developed gray pattern on scutum, and distinctive abdominal pattern distinguish this from related species. The type of *rhizophorae* in the British Museum has the characteristic abdominal pattern of *litoralis*, not accurately described by Senior-White, and in every other respect shows no differences from *litoralis*.

Haematopota longipennis, new species

(Figs. 77, 206)

Holotype, female, Ammatti, south Coorg, India, 3400 ft, May 16, 1951, P. S. Nathan (CU). Paratypes: 1 ♀, same data as type; 3 ♀, same but month only, no collector or altitude; 3 ♀, Singara, Nilgiri Hills, South India, 3400 ft. June 1948; 1 ♀, same but May 1948, Nathan; 1 ♀, Cherângade, Nilgiri Hills, May 1950, 3500 ft. Nathan; 1 ♀, Pollibetta, south Coorg, May 15-26, 1914, Fletcher; 1 ♀, Coorg, June 1927, Barraud; 3 ♀, Periambadi, Coorg, May 28, 1917, T. R. N.; 1 ♀, Sidapur, Coorg, June 1, 1917, Y. R. Rao; 1 ♀, same but June 23, 1917, 3000 ft, T. R. N.; 1 ♀, Amarambulam Forest, Malabar, South India, 500-1500 ft, Sept. 20, 1938; 1 ♀, Taliparamba, north Malabar. Sept. 20, 1923, on bullock, P. V. Isaac. (BM, CSP, CU, MCZ, USNM)

Female.—Length 10.5-12.5 mm; wing 10-11.5 mm; antenna 2.2-2.5 mm. Frons 0.55 to 0.69 times as wide at vertex as high, widened below; center with large dark-brown patch surrounding and obscuring midfrontal and paired spots; broadly touching callus, narrowly separated from eyes by pale yellowish-brown area; callus shiny, protuberant, smooth, yellow orange to deep reddish brown, about twice as wide as high, broadly touching eyes, convex above, nearly straight below; subcallar area with shiny triangle, concolorous with callus; no interantennal dark spot; face and clypeus grayish, mottled with brownish above; beard pale brownish. Antenna long and slender, yellow brown; scape cylindrical,

about three times as long as thick, with black hair; pedicel short and stout with distinct dorsal projection; flagellum very slender. first flagellomere usually about 1.2 times as long as scape. Palpus yellow brown rather stout basally, with mixed dark and pale hairs. Notum dark brown with yellowish-gray markings as follows: Very slender median stripe that widens before scutellum and ends in broad spot on scutellum not reaching hind margin; pair of slender submedian stripes, broad anteriorly but rapidly tapering and evanescent posteriorly, not reaching pair of post-sutural spots; humerus and broad lateral stripe to above wing base; pair of crescentic transverse spots anterior to scutellum; pleuron mostly gray with more or less distinct darker central spot. Wings brown with rather coarse pale spots in usual pattern; subapical band a straight oblique stripe from anterior margin and large posterior marginal spot near center of cell R_1 , these sometimes joined; posterior cells 1, 3, and 5 usually with large marginal spots, cell 2 with very small one; rather distinct darker spot at furcation. Halter pale. Fore coxa pale basally, darker apically; fore and hind femora dark, midfemur slightly paler; fore tibia white on basal third; midtibia and hind tibia each with two pale bands. Abdomen dark brown with gray incisures.

Distribution.—India (Madras).

This species resembles *cordigera* but is larger, browner, frontal dark patch is larger and more uniform, and white of fore tibia is confined to basal third. It even more closely resembles *monticola*, which is, however, slightly smaller, lacks strong pale lateral stripes on scutum, and has cell R_1 , distal half of first basal cell, and base of cell R_1 extensively pale.

Haematopota lunulata Macquart

(Fig. 46)

Haematopota lunulata Macquart, 1848, p. 175 (15) (as *Hoematopota*); Wulp, 1882, p. 20; Ricardo, 1906, p. 115; 1911, p. 354; Meijere, 1911, pp. 281, 286; Schuurmans Stekhoven, 1926, p. 123; 1928, p. 434.

Haematopota stantoni Ricardo, 1916, p. 403.

Chrysozona lunulata (Macquart): Liu, 1958, pp. 155, 158; Philip, 1960b, pp. 62, 76.

Types.—*lunulata*, Java (MNHP); *stantoni*, Kuala Lumpur, Malaya (BM).

Female.—Length 8.5–9 mm; wing 8.5–9 mm; antenna 2.3–2.5 mm. Frons gray, height slightly greater than width at vertex, slightly wider below; midfrontal spot very small or absent; paired spots moderate to large, subquadrate, touching eyes and nearly

touching callus; callus chestnut brown to black, about two-fifths as high as width, touching eyes, upper margin only slightly convex, lower margin weakly concave; subcallar area with very short, broad shiny triangles from callus and rather distinct, inter-antennal black spot; face narrowly darkened above; parafacials and cheeks gray, upper parafacial with solid velvety black area; beard pale. Antenna with scape slender, cylindrical, about three times as long as thick, slightly shiny, reddish brown with dark hair; pedicel with distinct dorsal projection; flagellum long and slender, darker except at base, slightly longer than scape. Palpus gray with mixed dark and pale hairs. Notum reddish brown with mixed yellowish and dark hairs; sometimes poorly defined pale prescutellar pale band. Wing dark brown with small pale spots in usual pattern; subapical band slender, crossing wing, outer margin concave; posterior cells 1 and 4 usually without marginal spots, others usually with. Halter knob yellow brown to nearly black. Legs: Coxae gray, fore coxa abruptly darkened at or beyond middle; femora and tibiae dark except for some paling of basal halves of midfemur and hind femur and white bands on tibiae; basal 0.4 of fore tibiae, 0.8 of midtibia, and 0.6 of hind tibia white. Abdomen reddish brown to dark brown above, incisions with little if any paling, narrow gray triangle on tergum II, and tergum VII often with two pale gray submedian spots; venter pale gray except for some brown in middle of terga VI and VII, sometimes extending to IV.

Distribution.—Borneo, Java, Malaya, ? Philippines, Sumatra, Thailand.

Osten Sacken (1882, p. 97) listed this species from the Philippines, but it is not clear whether he was only referring to a species resembling *lunulata* or not. Kroeber (1924, p. 9) reported Osten Sacken's statement, but he probably did not see additional specimens either. Philip (1959, p. 615) suggested that the species Osten Sacken had was probably *rolneri*. We have seen specimens not previously recorded from Soekaboemi, Java, January 10, 1909, Bulsit Besar, Kha chong Trang, Thailand, September 10, 1959, Songkhla Province, Rattaphum District, Tha Chamuang Canton, Thailand, September 27, 1969, and Satun Province, Thung Nui, Thailand, May 28, 1970.

This species has been synonymized with *borneana*, but this seems doubtful. From the original description it would appear that *borneana* has more distinct abdominal incisions and the hind basitarsus pale. It is also doubtful that both Rondani and Ricardo would have missed the black of the upper parafacial in describing the type of *borneana*.

Haematopota maculata Meijere

Haematopota maculata Meijere, 1911, p. 283; Schuurmans Stekhoven, 1926, p. 85.

Type.—Semarang, Java (AM).

Female.—Length 9 mm; wing 9.8 mm. Frons olive brown, width at vertex about 0.8 of height, slightly widened below; no mid-frontal spot; paired spots triangular, one angle reaching eye, separated from callus; callus protuberant, reddish brown, about twice as high as wide, touching eyes broadly, upper margin convex medially, lower margin weakly concave centrally; interantennal spot brownish, triangular; face and parafacials white with white hair; scape yellow brown, cylindrical, slightly more than twice as long as thick; pedicel with short dorsal projection; flagellum long and slender, yellow brown basally, darkened to black style; first flagellomere about 1.5 times length of scape. Palpus slender, yellowish brown with black hair. Scutum brown with three slender, rather indistinct stripes; scutellum concolorous, margin paler; pleuron entirely gray. Wing brown with pale pattern but no distinct rosettes of spots; subapical band double, fused anteriorly; posterior cells with squares, darkened centrally at wing margin in cells 1 and 2, similar squares, broken basally in cells 3 and 4, and parallel streak in cell 5; cells R and M, discal cell, a broad area from stigma to beyond furcation, and base of all posterior cells covered by pale area. Halter with dark-brown knob. Legs almost uniformly yellowish brown except as follows: Fore tibia with basal two-thirds white, apical third and tarsus dark; midtibia and hind tibia with basal two-thirds pale, weakly broken into two bands, distal third dark; midtarsus and hind tarsus dark, narrowly pale basally. Dorsum of abdomen brown with no distinct pattern; venter dark grayish.

Distribution.—Java.

Only the type specimen is known of this species. The distinctive wing pattern separates it from all other known Oriental species.

Haematopota malabarica, new species

(Figs. 33, 159)

Holotype, female, Walayar Forest, south Malabar, India, August 1952, P. S. Nathan (CU). Paratypes: 6 ♀, same data as holotype; 9 ♀, 1 ♂, same but June and July 1957, September 1956 and 1959, October 1959; 2 ♀, Coimbatore District, South India, July 25, 1939; 4 ♀, Coimbatore, September–October 1947, July 1948 and 1953, September 1946; 3 ♀, 1 ♂, south Malabar,

South India, September–October 1947; 1 ♀, Karikal Territory, South India, September–October 1947; 2 ♀, Kerala, Walayar Forests, August 1960 and September 1964 (213 m); 1 ♀, Malayan (probably Walayar) Forest, July 22, 1939 (probably all P. S. Nathan); 1 ♀, Dhomy Forests, May 26, 1922, Ram and Krishna; 1 ♀, Nadungayam, Malabar, South India, 200 ft, September 16–22, 1938; 1 ♀, Taliparamba, north Malabar, September 20, 1923, on bullock, P. V. Isaac; 1 ♀, Kanara, Bombay, August 1907, P. G. Patel; 1 ♀, Mormugao, Goa, India, J. C. Bridwell. (BM, CU, LZG, USNM)

Female.—Length 9–12 mm; wing 7.5–9 mm; antenna 1.7–1.8 mm. Frons grayish brown, usually clear gray between paired spot and eye, below; height and width subequal or height slightly greater; midfrontal spot distinct; paired spots subquadrate, circular or oblique, usually touching eyes, usually well separated from callus; callus yellow, wrinkled, about five times as wide as high, touching eyes, upper margin nearly straight, lower margin sinuous; subcallar area yellowish, prominent, upper border narrowly shiny; deep darkened cleft between antennae; face and lower parafacials clear gray; upper parafacial brownish with irregular darker brown spots; beard white. Antenna orange brown; scape stout, cylindrical, slightly shorter than flagellum, black haired; pedicel with short dorsal projection and rather long black hair; flagellum compressed, height greater than length of style; first flagellomere about two-thirds as high as length, with black hair near base both above and below. Palpus pale yellowish with mixed black and pale hair. Scutum brownish, slightly paler anteriorly with rather narrow indistinct striping; pair of more or less distinct transverse crescentic marks before scutellum; scutellum dark brown; pleuron mostly gray. Wing yellow brown with small spots in usual pattern; subapical band slender, sinuous, often partially doubled; usually some posterior cells with small marginal triangles. Halter knob brownish. Fore coxa yellowish brown, paler basally; femora rather pale yellow brown; fore tibia brown with narrow subbasal pale band and usually patch of yellowish hairs subapically on outer side; midtibia and hind tibia each with two narrow bands. Abdomen brown with pale incisures, indistinct median line, rather long sublateral spots and pale lateral margins; venter grayish, often with brownish midventral stripe.

Male.—Frontal triangle yellowish pollinose with distinct inter-antennal black spot; pale spots anterior to scutellum more distinct. Coloration otherwise essentially as in female.

Distribution.—India (Goa, Madras, Maharashtra).

Unless one carefully measures the relative lengths of the scape and flagellum, this might appear to run in the key to the group with swollen scape as long as flagellum. There it would run to *pachycera*, which has, however, a prominent gray area on the hind margin of the scutum, a much coarser wing pattern, and a pale halter. It somewhat resembles *prolixa*, which has, however, the first flagellomere longer than the scape, no interantennal dark spot, the scutum distinctly striped, and the scutellum gray centrally.

***Haematopota malayensis* Ricardo**

(Figs. 56, 182)

Haematopota malayensis Ricardo. 1916, p. 404; Schuurmans Stekhoven. 1926, p. 133.

Haematopota mediatifrons Schuurmans Stekhoven, 1926, p. 132; 1928, p. 435; Philip, 1963, p. 528 (new synonymy).

Chrysozona malayensis (Ricardo): Philip, 1960b, pp. 62, 75.

Chrysozona mediatifrons (Schuurmans Stekhoven): Philip, 1960b, pp. 63, 75.

Types.—*malayensis*, Kuala Lumpur, Malaya (BM); *mediatifrons*, Bandar, Sumatra (AM).

Female.—Length 8–11 mm; wing 7.5–9 mm; antenna 1.7–8 mm. Frons brown, about twice as high as width at vertex; central part usually with cordate darkened area consisting of fused vertical midfrontal spot and oblique paired spots, rarely indistinctly separated; callus dark brown, shiny, protuberant, occupying at least lower third of frons, broadly touching eyes, nearly straight below, broadly convex above, less than twice as wide as high; subcallar area with pair of shiny triangles from callus, separated by small dark interantennal spot; face, parafacials, and cheeks entirely gray; beard white. Antenna yellow orange; scape about three times as long as thick, cylindrical, slightly expanded apically, black haired; pedicel short with no dorsal extension; flagellum long and slender, two to three times as long as scape. Palpus yellow brown with mostly black hair. Scutum dark brown; three very slender stripes of pale hair often visible anteriorly; scutellum often grayish discally; pleuron dark grayish with white hair. Wing brown with pattern of medium-sized pale spots; subapical band slender, single, not reaching hind margin; sometimes faint second band from posterior margin nearer wing tip; small pale marginal triangle usually present in all posterior cells. Halter yellow. Legs: Coxae yellowish to gray; fore femur dark; midfemur and hind femur yellow; tibiae dark except for fore tibia about

0.75 white; midtibia with two narrow bands; hind tibia with narrow basal band and sometimes trace of subapical band. Abdomen dark brown above and below with distinct pale incisures; often slender grayish triangle on tergum II.

Distribution.—Borneo, Malaya, Sumatra.

This was a very abundant species 19 km north of Kalabakan, North Borneo, between October 16 and November 21. We have also seen 10 specimens from East Borneo in September and October.

The type of *mediatifrons* agrees with many specimens of *malayensis* very well. This species falls into the group that includes *cordigera*, *ampla*, and *tenasserimi*. It may be closest to *cordigera* if *cordigera* should prove to have a single pale band on the hind tibia, but it differs from *cordigera* in having a dark interantennal spot and more white on the fore tibia. The other two species have two definite pale bands on the hind tibia.

Haematopota marceli, new species

(Figs. 89, 217)

Holotype, female, Anamalai Hills, South India, 4–5,000 ft, September 1946, P. S. Nathan (CU). Paratypes: 25 ♀, same data as holotype; 13 ♀, same but June 1963 and June 31, August 17, 21, 26, 27, 1946; 1 ♀, Cherangade, Nilgiri Hills, 3,500 ft, Nov. 1950; 1 ♀, Devala, Nilgiri Hills, October 1960; 47 ♀, 1 ♂, Cinchona (labeled variously as Coimbatore, Anamalai Hills, Madras, 1,066 m, or 3,500 ft), May 1956, 1957, 1960, 1962, 1963, 1964, 1965, 1968; 30 ♀, 1 ♂, Kadamparai, Anamalai Hills, Madras, 1,066 m, May 1960, 1963; 24 ♀, 1 ♂, Valparai, Coimbatore District, 3,500 ft, September 1, 2, 3, 7, 9, 10, 11, 13, 14, 16, 20, 22, October 30, December 1937 (all P. S. or T. R. S. Nathan); 1 ♀, Santhanabad, Malabar District, 2,500 ft, October 7, 1967, Ponniah. (BM, CBP, CNC, CU, LZG, UCR, USNM, ZIL)

Female.—Length 9–11 mm; wing 7.5–10 mm; antenna 1.7–2.2 mm. Frons rather dark brownish gray, width at vertex about 0.75 of height, distinctly widened below; midfrontal spot very small or absent; paired spots subquadrate, touching eyes, narrowly separated from callus; callus black to dark reddish brown, about 2.5 times as wide as high, broadly touching eyes, upper margin straight or slightly concave, lower margin concave centrally; subcallar area with large black interantennal spot; face and parafacials gray, upper part of parafacial with irregular brown spotting; beard white. Scape dark reddish to black, shiny, with dark

hair, cylindrical, 2-2.5 times as long as thick; pedicel short, stout with short dorsal projection; flagellum dark reddish to black, moderately slender, first flagellomere subequal to or slightly shorter than scape. Palpus yellowish gray with rather long dark hair. Scutum dark brown with rather indistinct striping although submedian stripes may be rather distinct and form pair of spots behind transverse suture; strong white area in front of scutellum, including prescutellar sclerite, central part wide, extending forward at sides to join submedian stripes, lateral lobes small, slightly curved forward laterally; scutellum dark brown; pleuron gray with darker areas. Wing dark brown with usual pattern of pale spots; subapical band variable, usually consisting of irregular disconnected spots, sometimes partially doubled; posterior margin with variable number of pale triangles, most often missing in posterior cells 1 and 4. Halter with dark knob. Legs dark; base of fore coxa pale; fore tibia with subbasal white band covering fourth to third of segment; midtibia and hind tibia each with two distinct white bands; bases of midtarsus and hind tarsus pale. Abdomen dark with distinct pale incisures above and below.

Male.—Bilobed shiny area on frontal triangle above interantennal spot; scape shorter and stouter than in female. Coloration very similar to that of female.

Distribution.—India (Madras).

This species resembles two other abundant species of South India, *contracta* and *echma*, but the large prescutellar pale area with middle third extending straight forward on the sides is characteristic. It is the largest of the three species, and the scape is more uniformly cylindrical than it is in *contracta* and more uniform in color than in *echma*. *H. marceli* occurs in both the Anamalai and Nilgiri Hills, not being confined to one or the other as are the other two species.

We take pleasure in dedicating this species to Marcel Leclercq, authority on Palacaretic Tabanidae, who generously loaned us his Oriental *Haematopota*.

Haematopota marginata Ricardo

(Figs. 73, 202)

Haematopota marginata Ricardo, 1911, p. 347; Senior-White, 1927, pp. 17, 23.

Types.—Female, Pusa, Bengal (BM); male, Goalbathan, East Bengal (IM).

Female.—Length 8-8.5 mm; wing 6.5-7.5 mm; antenna 1.4-1.8 mm. Frons gray, paired spots and eyes bordered by white, slightly

higher than width at vertex, widened below; midfrontal spot distinct, round or oval; paired spots large, round, separated from eyes and callus; callus orange brown, about four times as wide as high, touching eyes, upper margin nearly straight, usually with small middorsal projection, lower margin nearly straight centrally, strongly convex laterally; subcallus yellowish gray with dark-brown interantennal spot; face and parafacials gray, upper parafacial speckled or streaked with brown. Antenna yellow brown, flagellum darkened distally; scape about 2.5 times as long as thick, cylindrical, basal half slightly swollen; pedicel with weak dorsal projection; flagellum slender, first flagellomere about 1.25 times as long as scape. Palpus grayish brown with mostly dark hair. Scutum with five rather indistinct gray stripes; pleuron gray with brown areas. Wing rather pale gray with strong pale pattern and darker areas with central yellowish areas; subapical band broad, narrowly separated from apex or sometimes completely filling end of wing; often much narrower band basad of broad band; all posterior cells broadly pale at wing margin and row of oblique streaks before this marginal stripe; double rosette around apex of discal cell. Halter knob brown. Legs yellowish brown; fore tibia with distinct basal pale band; midtibia and hind tibia each with two indistinct pale bands. Dorsum of abdomen brown with middorsal gray stripe and sublateral gray spots, which may be fused with gray lateral border; venter gray laterally, brown centrally.

Male.—Described by Ricardo as follows: "Eyes with the lower third composed of small facets. Antennae yellowish, the first joint very stout, almost as long as the first annulation of third joint, the second very small, the third joint slender, only slightly wider at base, the first two joints with black pubescence; the black spot between the antennae present and a small shining yellow frontal callus. Abdomen with the first four segments reddish yellow, the posterior border of fourth and other segments blackish. Legs rather paler than in female, and the ring of tibiae not always apparent. Wings identical in design, the small transverse bars smaller, reduced to spots."

Distribution.—Bangladesh, India (Assam, Bihar).

The preceding description of the female is based on specimens bearing the following data: Chapra (as Sardan) Bihar; Goalbathan, East Bengal 9.VII.09; Pusa, Bihar, 20.VII.15, 9.VIII.16, and 3.VII.11. We have not seen the male.

This species is rather distinctive because of the broad subapical wing band and complex wing pattern with double rosettes and yellowish as well as nearly white marks. There is some resem-

blance to *biharensis*, which has, however, the first flagellomere shorter than the scape, subapical spots in the posterior cells smaller and less fused, and less extensive pale abdominal pattern.

***Haematopota melloi*, new species**

Holotype, female, Port. India, Nova Goa, pres. by F. de Mello per G. Ricardo, 25.IX. 1920 (BM).

Female.—Length 7.5 mm; wing 6.75 mm; antenna (scape only) 0.5 mm. Frons gray, paler across vertex and surrounding midfrontal and paired spots; height and width subequal, scarcely wider below; midfrontal spot distinct; paired spots large, subquadrate, touching eyes and nearly touching callus; callus dark reddish, protuberant, three times as wide as high, broadly touching eyes, upper margin nearly straight except for low, rounded, middorsal projection, lower margin nearly straight; subcallar area pale above antennae with strong interantennal black spot; face and parafacials gray, short lateral transverse streak on upper parafacial; beard sparse, pale. Scape yellow orange, subshiny, about twice as long as thick, gradually expanded distally; pedicel without dorsal projection. Palpus dark gray with black hair, base distinctly swollen. Scutum blackish brown with five rather faint but broad grayish stripes; humerus pale; hind margin of scutum with rather broad gray area; scutellum brown with large gray discal area; pleuron gray. Wing dark brown with usual pale pattern rather coarse; subapical band complete, forked posteriorly; pale triangles in all but posterior cell 4. Halter with brown base and knob. Fore coxa gray, narrowly darker distally; femora almost uniformly dark brown; fore tibia white on basal third; midtibia with two narrow yellowish bands; hind tibia with narrow basal pale band and less distinct subapical band; midtarsus and hind tarsus narrowly pale basally. Dorsum of abdomen brownish with broad gray incisures, indistinct median stripe, and sublateral spots; venter mostly grayish.

Distribution.—India (Goa).

This species resembles *circumscripta* Loew of East Africa, but in *melloi* the hind margin of the wing is not continuously pale and the frontal callus is distinctly higher. It is a shorter, stouter fly than *hindostani*, which is grayer and has scape slightly swollen on basal half and less strongly marked legs.

***Haematopota mokanshanensis* Ouchi**

Haematopota mokanshanensis Ouchi, 1940, p. 259 (misspelled as *mokanshanensis*, correct under figure); Leclercq, 1966, pp. 81, 185.

Types.—Mokanshan and Chusan Island, Chekiang Province, China (SSI).

Female.—Length 10 mm; wing 9 mm; antenna 2 mm. Frons grayish tinged with dark above, about 1.4 times as high as width at vertex, slightly wider below; midfrontal spot small; paired spots subquadrate, touching eyes broadly, separated from callus; callus shiny black, about three times as wide as high, lateral margins nearly touching eyes, upper margin weakly trilobed, lower margin shallowly concave; interantennal spot brownish black; base of antenna surrounded by yellowish ring; face grayish with black band beneath antennae; upper parafacial speckled with irregular black spots; beard sparse, white. Antenna orange yellow, style tinged with black; scape cylindrical, slightly thicker distally as long as first flagellomere. Palpus orange yellowish, slightly swollen basally with mixed black and yellow hair. Notum brownish black, scutum with three grayish stripes and lateral margins tinged with brownish yellow; pleuron grayish yellow with mostly rather long yellowish-white pubescence. Wings pale brown, with rather coarse pattern, rosettes not broken into spots; subapical band double, fused anteriorly, outer arm broad, irregular, reaching hind margin, inner arm slender, sinuous, ending in vein R_5 ; strong marginal triangles in posterior cells 1, 3, and 5, small one in cell 2; transverse band basad of stigma mostly white; basal third of wing mostly dark. Halter pale yellow with brownish knob. Fore coxa gray on basal half, brownish black distally with long thick white hairs; fore femur brownish black, midfemur and hind femur mostly orange yellow; fore tibia with yellowish-white basal band; midtibia and hind tibia each with two pale bands; hind femur and tibia with rather long hair. Abdomen brownish black, sides of terga I–IV narrowly paler; incisures grayish and terga IV–VII with small, grayish sublateral spots; venter yellowish gray.

Distribution.—China (Chekiang).

The preceding description and placement in key are derived from the original description as we have not seen the species. A male from Foochow in the British Museum may possibly be this species, but there are sufficient differences to make this uncertain.

Haematopota montana Ricardo

(Figs. 92, 220)

Haematopota montana Ricardo, 1917, p. 225.

Haematopota montana Ricardo: Senior-White, 1927, p. 23.

Type.—Bababuddin Hills, Mysore, 4,700 ft (BM).

Female.—Length 6–10.5 mm; wing 5.5–9 mm; antenna 1.8–2.7 mm. Frons grayish brown, width at vertex about 0.81 of height, slightly widened below; midfrontal spot small to scarcely visible; paired spots large, circular or subquadrate, usually touching eyes, narrowly separated from callus; callus dark reddish brown to black, about three times as wide as high, touching eyes broadly, upper margin straight, sometimes with small median projection, lower margin weakly curved; subcallar area with large black interantennal spot; shiny extension downward from callus at each end, laterad of antennal base; face and parafacials grayish yellow, upper face often with pair of dark spots, upper parafacial irregularly mottled with dark brown; beard white. Scape shiny yellow orange to dark reddish, about three times as long as greatest thickness, which is at basal third, segment rather distinctly tapering in outer two-thirds; pedicel with scarcely any dorsal projection; flagellum reddish brown, blackened distally, long and slender, first flagellomere slightly shorter than scape, tapering only slightly distally. Palpus usually rather dark reddish gray with mostly black hair. Scutum brown, rather indistinctly narrowly striped, usually with rather distinct pair of triangular spots behind transverse suture and with strong prescutellar gray band that includes prescutellar sclerite; scutellum dark; pleuron mostly gray. Wings brown with pale spots in usual pattern; subapical band complete, usually rather broad and nearly straight; usually all posterior cells with strong pale triangles. Halter with brown knob. Fore coxa gray, darkened near apex; femora mostly dark brown; fore tibia about two-fifths white; midtibia with two pale bands; hind tibia with basal white band and indistinct pale subapical spot; basitarsi of midleg and hind leg white on basal half. Dorsum of abdomen dark brown with pale incisures, narrow mid-dorsal stripe, and pale sublateral spots on posterior terga; venter usually mostly dark with rather broad gray incisures.

Distribution.—India (Madras, Mysore).

We have seen more than 100 specimens of this species from southwestern India (Anamalai Hills, Coorg, Nilgiri Hills) only. The report from Shillong, Assam, (Senior-White, 1927) needs to be reconfirmed. The specimen that Philip (1963, p. 529) reported from Thailand was probably *pungens*. Seasonally it has been collected from March to June, but it appears to be most abundant in May.

This is a variable species in size and to some extent in wing pattern. The scape is rather characteristic being usually uniformly colored, longer than the width of the frons at the vertex,

with a slight subbasal swelling; the subapical pale area on the hind tibia is reduced to a small spot; the prescutellar pale area involves the prescutellar sclerite and does not project forward strongly medially or submedially. It is closely related to *marcelli* and *hindostani*, but both of these have the subapical band of the wing broken and irregular.

***Haematopota monticola* (Philip), new combination**

(Figs. 78, 207)

Chrysosoma monticola Philip, 1959, p. 612.

Type.—Mount Makiling, Luzon, Philippines (USNM).

Female.—Length 8–9.5 mm; wing 7.5–9 mm; antenna 7.5–9 mm. Frons gray on upper fourth, deep brown below, midfrontal and large paired spots scarcely evident in general dark color; width at vertex about 0.7 of height, distinctly widened below; callus large, protuberant, shiny, occupying nearly half of frons; upper margin convex, usually with median angle; lower margin shallowly concave, scarcely differentiated from median and lateral shiny projections, median one extending between antennae with almost no middle crease; face yellowish gray or partially brown; parafacials yellow gray, sometimes with indistinct spotting above and usually with dark mark near base of palpus; beard pale. Scape yellow orange, cylindrical, subshiny, at least five times as long as thick; pedicel with no dorsal projection; flagellum long and slender, about 1.5 times as long as scape, style black and first flagellomere dusky distally. Palpus brownish with dark hair. Scutum brown, very faintly striped, but with pair of large fused yellow-gray spots on posterior border including prescutellar sclerite; scutellum with large yellow-gray central spot, margin brown; pleuron contrastingly patterned with yellow gray above, mostly dark brown below. Wing brown with pale pattern; subapical band partially doubled, inner arm usually complete, outer arm short, extending forward from large posterior fusion; marginal triangles usually present in all posterior cells; rest of markings consisting mostly of extensive pale areas near base of radial sector, three rings of narrow spots, and scattered small flecks. Halter clear yellow. Legs brown with pale areas as follows: Basal half of fore coxa anteriorly; nearly basal half of fore tibia; two broad bands on midtibia, intervening dark area often faint; basal band on hind tibia and usually subapical band, which may be indistinct or partially fused with basal band; bases of midtarsus and hind tarsus narrowly paler. Abdomen brown with distinct but narrow

pale dorsal incisures, pale lateral margins, and usually narrow ventral incisures.

Distribution.—Philippines (Luzon).

This species is closely related to *rolneri* of Samar, which has, however, reduced pale markings near the center of the wing anteriorly, no pale marginal spots in the posterior cells, and less gray on the scutellum. Possibly *rolneri* is no more than a melanistic subspecies of *monticola*.

***Haematopota mouchai*, new species**

(Figs. 29, 155)

Holotype, female, Pusa, Bihar, India, July 13, 1920, S. C. Sarkar (BM). Paratypes: INDIA: 5 ♀, same locality as holotype, August 9, 1916, D. Nandan; October 2, 1910; October 5, 8, 10, 1915, T. B. Fletcher; 2 ♀, Kanchrapara, Bengal, July 9, 1923, M. A. Cazier; 1 ♀, Jorhat District, Assam, W. Hermette; BANGLADESH: 1 ♂, Dacca, September 2, 1945, D. Leston; NEPAL: 1 ♀, Kathmandu Valley, W. Dierl and W. Schacht; 1 ♀, Chisapani Garhi District, 5 miles west of Hitaura, 500 m, September 28, 1,600 ft, H. Brydon. (AMNH, BM, MCZ, USNM, ZCBS)

Female.—Length 7.5–10 mm; wing 7–9 mm; antenna 1.6–1.8 mm. Frons gray, about as broad as high, slightly widened below; midfrontal spot small, paired spots larger, slightly oblique; callus reddish brown to nearly black, about 3.5 times as wide as high, touching eyes, concave below each paired spot and convex below to each side of center; subcallar area with large interantennal black spot; face narrowly above and upper parafacials velvety black, rest of face and lower parafacials gray with white hair. Antenna orange brown; scape about two-thirds as long as distal height, slightly thicker distally, clothed with black hair; pedicel crescentic with black hair; first flagellomere less than twice as long as high, slightly tapered distally but distinctly wider than base of style. Palpus rather slender, creamy white with mostly black hair. Scutum grayish brown clothed with short pale hair, with four darker brown stripes; pleuron gray, brownish spot on lower anepisternum. Wing dark brown with usual pattern; subapical band usually composed of two overlapping bands, but in holotype these fused to make single broad sinuous band; all posterior cells with marginal triangles or that in cell 4 lacking. Halter yellow with knob partially darkened. Legs: Coxae yellowish gray; femora yellowish brown, apices slightly darkened with dark hair; fore tibia slightly swollen, dark, slightly less than half white basally; midtibia and hind tibia each with two pale bands which may be

partially fused; tarsi darkened, midtarsus and hind tarsus slightly paler basally. Abdomen blackish with very narrow pale incisures, somewhat interrupted middorsal gray stripe, and row of discrete grayish spots on each side; venter mostly gray with row of brownish midventral patches; entire abdomen with pale hair.

Male.—Length 10 mm; wing 9 mm; antenna 1 mm. Eye facets large, narrow band of small facets below; postocular hairs long, black; frontal triangle pale yellowish; distinct interantennal black area; parafacials and face as in female; scape shiny yellow, cylindrical, not quite twice as long as thick, with long black hair; first flagellomere about twice as long as high, strongly tapering basally and apically, base and apex bare, midpart with black hair; style shorter than greatest height of first flagellomere. Palpus thicker and blunter than in female. Rest of body essentially as in female, but general color more yellowish and pale areas of tibiae and tarsi much less distinct; hind tibial fringe rather long, black.

Distribution.—Bangladesh, India (Bihar, West Bengal), Nepal.

This species is close to *punctifera* but can be separated by the characters given in the key. It also resembles *jarana*, which has, however, a broad scutoscutellar gray band, transutural gray spots on the scutum, a darkened antenna, and a thickened hind tibia.

We are pleased to name this species in honor of the late Josef Moucha, Czech worker on Tabanidae, who made available to us Tabanidae from Nepal.

Haematopota nathani, new species

(Figs. 24, 148)

Holotype, female, Kodaikanal, Pulney Hills, India, 6,500 ft, May 22, 1953, P. S. Nathan (CU). Paratypes: 2 ♀, 1 ♂, same data as holotype; 4 ♀, Kadamparai, Anamalai Hills, Madras State, India, 3,500 ft, May 1963, T. R. S. Nathan; 5 ♀, Naduvattam, Nilgiri Hills, India, 1958 (2 labeled April), P. S. Nathan; 1 ♀, same but 6,000 ft, May 1950; 1 ♀, Cinchona, Anamalai Hills, 3,500 ft, May 1968, Nathan; 1 ♀, same, 1,066 m, April 1964; 1 ♀, Trichonopoly, Inde Meridionale, 1911, F. Caius. (BM, CU, LZG, MNHP, UCR, USNM)

Female.—Length 9–11.5 mm; wing 8–10 mm; antenna 2–2.5 mm. Frons nearly two-thirds as wide at vertex as high, distinctly widened below, dark gray, paler at eye margin above and bordering frontal spots; midfrontal spot large, black, vertical; paired spots quadrate, touching eyes broadly, separated from callus; callus black, about 3.5 times as wide as high, touching eyes,

slightly depressed and irregular centrally, upper and lower margins nearly straight or with small middorsal triangular projection; subcallar area dull black centrally; face and parafacials gray, upper parafacial dark brown with transverse grayish band containing dark speckles; beard nearly white. Antenna black; scape and pedicel with black hair; scape stout, subshiny, cylindrical, 2.5-3 times as long as thick; pedicel with strong dorsal projection; flagellum subequal to scape in length, first flagellomere moderately slender, style rather thick; palpus basally pale with some pale hair, distally darker gray with black hair. Scutum dark brown with distinct paler markings consisting of pair of slender sublateral stripes reaching from anterior margin to transverse suture followed by pair of strong white spots behind suture, and pair of widely separated crescentic marks on posterior margin; scutellum dark; pleuron gray above with white hairs, dark below. Wing brown with small and moderately large pale spots in usual pattern; subapical band sinuous, reaching wing margin at end of vein R_4 but rather broadly broken in cell R_4 ; large triangles at wing margin in posterior cells 3 and 5 and basal hind margin of axillary cell broadly pale. Halter with dark knob. Legs dark with white as follows: Subbasal third of fore tibia; two bands on midtibia; basal two-fifths of hind tibia; small indistinct spot subapically on hind tibia; base of midtarsus and hind tarsus. Abdomen black with gray incisures above and below.

Male.—Eye densely hairy; large and small facets of eye not sharply differentiated; scape shiny with long black hair, very swollen, its length about 1.5 greatest thickness, longer than flagellum; upper parafacial nearly black but brownish in certain lights; palpus brown, very swollen; hair of head and palpus very long, dark; anterior white stripes of scutum slender and incomplete; white spots behind transverse suture very strong; pleural hairs all dark; white subbasal bands of tibiae narrower than in female; subapical bands of midtibia and hind tibia scarcely visible. Otherwise essentially as in female.

Distribution.—India (Madras).

This species is closely related to *annandalei*, which has, however, solidly black upper parafacials, dark extending across top of face, less white on fore tibia, wing narrower basally, and basal hind margin of axillary cell not so extensively pale.

We are pleased to dedicate this species to P. S. Nathan, the avid commercial collector, who provided, through various collections, so much of the material utilized in this study.

Haematopota nepalensis, new species

(Fig. 98)

Holotype, female, Godavari, Kathmandu Valley, Nepal, June 2, 1967, W. Dierl and W. Schacht (ZCBS).

Female.—Length 9 mm; wing 8 mm; antenna 2 mm. Frons gray, narrowly paler bordering eyes, paired and midfrontal spots and median line at frons; width at vertex five-sixths of height, strongly widened below; midfrontal spot large, triangular; paired spots irregularly quadrate, narrowly separated from eyes and callus; callus about 4.5 times as broad as high, touching eyes at lower corners, protuberant, slightly wrinkled centrally; upper and lower margins irregular, subparallel; subcallar area with large dark interantennal spot; face and parafacials gray with pair of small widely separated black spots on upper face and black spots, partially fused, on upper parafacial; beard white. Antenna black; scape about 2.5 times as long as thick, slightly swollen, tapered at each end, shiny except for thin gray pollinosity above near base; pedicel with strong dorsal projection; flagellum slender, scarcely higher toward base, slightly longer than scape; palpus thin with blunt tip, with short black hairs laterally, long pale hairs on basal part ventrally. Notum brown with humeri, three slender stripes anteriorly, pair of distinct spots behind transverse suture, four small spots on posterior margin of scutum, and slender midline on scutellum paler; pleuron gray. Wings gray with pale spots in usual pattern; subapical band strongly sinuous, terminating behind in pale triangle of posterior cell; very faint more distal pale band; large marginal triangles in posterior cells 1, 3, and 5, smaller one in cell 2. Halter pale with black knob. Legs mostly dark gray; fore coxa paler basally; pale band of fore tibia sub-basal nearly one-third length of tibia; midtibia and hind tibia each with two pale bands; midtarsus and hind tarsus pale basally. Abdomen blackish; tergum II with median triangle and sides pale; posterior to this a pale middorsal stripe and strong gray sublateral spots on terga III–VII; venter almost uniformly gray.

Distribution.—Nepal.

This somewhat resembles *tamerlani* Szilady, but *nepalensis* is a more slender less hairy species, the upper parafacial is blotched rather than evenly speckled, and the scape is shinier; *schmidt*, which it somewhat resembles, has no trace of sublateral pale spots on the abdomen.

Haematopota nigricans Schuurmans Stekhoven

Haematopota nigricans Schuurmans Stekhoven, 1926, p. 97.

Type.—Korinchi Peak, Sumatra (BM).

Female.—Length 12.2 mm; wing 12.7 mm; antenna (scape only) 1 mm. Frons about 0.8 of height, brown, scarcely widened below; midfrontal spot lacking; paired spots small, well separated from eye and callus; callus about three times as wide as high, narrowly separated from eyes, upper margin convex, lower margin nearly straight; subcallar area with black interantennal spot; face and parafacials gray, upper parafacial with elongated dotted darkened area not forming solid black spot. Scape yellow brown, cylindrical, about 3.5 times as long as thick; pedicel without distinct dorsal projection; flagellum missing. Palpus rather slender, dark, with dark hair. Notum brown. Scutum with two whitish stripes; pleuron uniformly yellow brown with white hair. Wing dark brown with spots small in usual pattern; subapical band composed of three spots; no triangles on hind margin except in posterior cell 5. Halter brown. Fore coxa yellow brown, darker distally; all femora dark brown; fore tibia with subbasal pale band occupying less than half of length; midtibia with two pale bands; hind tibia pale on basal three-fifths, with only very faint darker interruption; all tarsi dark. Abdomen both dorsally and ventrally brown with slender pale incisures.

Distribution.—Sumatra.

We have seen only the type of this species and this description is derived from that examination. It is larger than most related species and the lack of a midfrontal spot plus dark femora will separate it from the otherwise similar *atriventer*.

***Haematopota nigrita* Schuurmans Stekhoven**

Haematopota nigrita Schuurmans Stekhoven, 1926, p. 100.

Type.—Bahrong Baroe, Korinchi, Main Range, 4,000 ft, Sumatra (BM).

Female.—Frons slightly higher than width at vertex, widened below, dark gray; midfrontal spot strong, triangular; paired spots rather large, rounded, touching eyes, well separated from callus; callus black, subtriangular, about three times as wide as high, touching eyes, lower margin nearly straight; parafacials with two dark spots above, upper one small, round, lower one paralleling eye. Scape shiny, black, slightly swollen; flagellum missing. Palpus yellow brown, rather slender, black haired. Scutum brown with two rather narrow white stripes expanded to small triangles at transverse suture; scutellum uniformly brown. Wings dark brown with usual pattern of spots; subapical band curved inward, not reaching hind margin; posterior cells 1-4 with pale

triangles at margin. Legs brown, hind legs missing; basal half of fore tibia brown; midtibia with two pale bands; fore tarsus and midtarsus pale basally. Abdomen brown above with narrow pale incisures; venter with gray incisures broader.

Distribution.—Sumatra.

The type is in very poor condition and we have seen no other specimens that can be assigned here. The type and original description are not sufficient to permit keying. The type had been determined by Ricardo as *luta*, but it differs from that species in many characters.

Haematopota oporina, new species

(Figs. 62, 189)

Holotype, female, Muthikolam, Coimbatore District, South India, 3,000 ft, September 23–26, 1938 (BM). Paratypes: INDIA: 2 ♀, same data as holotype; 1 ♀, Siruvani, Coimbatore, 3,000 ft, August 11, 1938, P. S. Nathan; 1 ♀, Coimbatore, November 1950. (BM, CU, USNM)

Female.—Length 7–9 mm; wing 6.5–8.5 mm; antenna 1.41–1.67 mm. Frons gray brown, with short erect dark hair; width about 0.74 of height, widened below; midfrontal spot very small or absent; paired spots black, subquadrate, touching eyes and nearly touching callus; callus shiny chestnut brown, three times as wide as high, touching eyes, upper margin nearly straight or weakly angulate, lower margin concave; subcallar area with pair of yellow, shiny triangles, mesal cleft darkened; upper face and parafacials yellow brown with irregular dark-brown markings and spots; lower face and parafacials gray; beard sparse, dark. Antenna orange brown, style dark; scape shiny, cylindrical, slightly swollen, subequal to first flagellomere in length; style short and blunt; first flagellomere slightly widened basally. Palpus brown with brown hair, tapering from slightly swollen base. Thorax almost uniformly brown with yellowish-brown hair; humerus and surrounding area paler and five very slender stripes from anterior margin of scutum to just behind transverse suture. Wing dark brown with strongly contrasting pale spots; subapical band a curved row of four spots, sometimes partially fused; some or all posterior cells with pale triangle at wing margin. Halter yellow brown, knob slightly darkened. Legs nearly uniformly brown, tibiae each with narrow white or yellowish band at base, strong on fore tibiae, sometimes faint or evanescent on midtibia and hind tibia; hind tibial fringe indistinct; midtarsus and hind tarsus

pale at base. Abdomen brown with narrow yellowish incisures and sides of terga I-II pale.

Distribution.—India (Madras).

The name is the Latinized Greek adjective *oporinos*—autumnal. This somewhat resembles *hindostani*, which, however, lacks shiny subcallar triangles, but it has a pale band in front of the scutellum and more distinctly marked legs.

***Haematopota orba*, new species**

Holotype, female, Chisapani Garhi, Nepal, July 14, 1967. W. Dierl and W. Schacht (ZCBS).

Female.—Length 6.5 mm; wing 6 mm; antenna 1.5 mm. Frons dark brownish gray, narrowly white bordering eye and in small spot laterally below paired spot; width at vertex subequal to height, widened below; midfrontal spot strong, narrowly bordered with yellowish; paired spots large, round, nearly touching eyes and callus; callus black, about five times as wide as high, touching eyes, upper and lower margins nearly straight with small middorsal projection; large interantennal black spot below callus, narrow pale streak to each side reaching eye; face and parafacials gray, upper parafacial with irregular dark mottling; beard white. Antenna nearly black; scape nearly four times as long as thick, cylindrical, lower margin slightly convex, subshiny with black hair; pedicel with strong dorsal projection; flagellum moderately slender; first flagellomere subequal to scape in length, in profile scarcely tapering distally; style rather stout. Palpus rather slender, dark brown with dark hair. Notum dark brown with mixed dark and pale hair, only humeri and narrow pale band before scutellum paler; pleuron pale gray with brown area centrally. Wing dark brown with small spots in usual pattern; subapical band strong, straight, crossing wing; slender marginal triangles in all posterior cells, very small in cell 4. Halter with basal half of stem and knob dark. Legs dark brown; fore tarsus pale basally and all tibiae with about basal third white; midbasitarsus and hind basitarsus broadly pale basally. Abdomen dark brown, terga with slender pale incisures, that on tergum I widened laterally.

Distribution.—Nepal.

This small species closely resembles *pisinna*, but the scape is distinctly longer and the flagellomere is three rather than two times as long as high.

The name is the Latin noun for orphan in reference to being one of the species based on a single specimen. It does not refer to the large orblike paired frontal spots.

Haematopota pachycera Bigot

(Figs. 23, 147)

Haematopota pachycera Bigot, 1890, p. 206; 1891, p. 76; Ricardo, 1908, p. 59; 1911, p. 336; Austen, 1922, p. 432; Schuurmans Stekhoven, 1926, p. 130; 1928, p. 435.

Potisa pachycera (Bigot): Surcouf, 1909, p. 454.

Haematopota validicornis Ricardo, 1911, p. 333.

Chrysozona pachycera (Bigot): Philip, 1960b, p. 75.

Types.—*pachycera*, Cambodia (MNHP); *validicornis*, Biserat, Siam (BM).

Female.—Length 9.5–11 mm; wing 8–10.5 mm; antenna 2.5–3 mm. Frons brown, width at vertex and height subequal, slightly widened below; midfrontal spot very small, brown, indistinct, or lacking; paired spots small, brown, subtriangular, one angle usually touching eye; callus large, yellowish, sometimes darkened laterally, slightly rugose, touching eyes, upper margin weakly convex, lower margin straight or slightly sinuous; pair of broad, shallow triangles below callus; no interantennal dark spot; face and parafacials mostly yellowish gray; dark spot touching eye near middle of parafacial. Scape stout, about three times as long as thick or even shorter, yellow to brown, shiny, with short black hair; pedicel short with slender dorsal projection; flagellum subequal in length to scape, dark brown, style sometimes orange; first flagellomere compressed, less than twice as long as greatest height, apex broader than base of very short style. Palpus yellow brown, tapering, with mixed dark and pale hair. Scutum striped with brown and grayish, latter forming very slender median stripe, submedial pair anteriorly ending in spot behind transverse suture, and broad sublateral stripe that splits posteriorly; gray area in front of scutellum; scutellum variable, sometimes entirely dark, sometimes grayish leaving only pair of brownish anterior spots; pleuron yellow gray often with indistinct brown streak behind base of fore coxa. Wing brown, irregularly marked with pale spots in usual pattern; subapical band touching both margins but usually broken in cell R_4 ; large pale spot in margin of posterior cell 1 and usually marginal spots in other posterior cells. Halter with pale-yellow knob. Legs brown, paler on basal half or less of fore coxa, basal third of fore tibia, two bands on midtibia and hind tibia, and base of hind basitarsus; hind femur with only moderately developed black fringe. Abdomen brown dorsally, broadly gray laterally with rather broad gray incisures, and terga IV–VI with sublateral gray spots; venter gray, darkened in center posteriorly.

Distribution.—Cambodia, Laos, Malaya, Thailand, Vietnam.

This species is variable in color of style, shape of scape, and color of scutellum. It may be distinguished from related species by antennal shape (fig. 23), absence of heavy black spot at top of parafacial, and relatively undeveloped hind femoral fringe.

***Haematopota pallida*, new species**

(Figs. 43, 167)

Holotype, female, Chiang Mai Province, Mae Sai District, Thailand, July 17, 1969, about water buffalo, J. J. S. Burton (CU). Paratypes: 4 ♀, same data as holotype; INDIA: 1 ♀, Mohand, near Dehra Dun, September 4, 1908; 1 ♀, Khani, western Bengal, 2,050 ft, September 16, 1959; NEPAL: 1 ♀, near Birganj Lothar, 450 ft, September 8, 1967. (BM, CBP, CNC, CU, USNM)

Female.—Length 9–11 mm; wing 9–10 mm; antenna 1.8–2 mm. Frons gray; width at vertex about 0.87 of height, slightly widened below; midfrontal spot very small; paired spots rather small, subtriangular, well separated from eyes and callus; callus rather pale yellow brown, slightly darkened at top center and near eyes, about 3.5 times as wide as high, upper margin broadly angular in center, sides obliquely truncate so that callus touches eyes only below; lower margin biconvex; subcallar area bright yellow with large central keystone-shaped black interantennal spot; face and parafacials gray except for solid dark spot on upper parafacial, lateroventral corner of which is truncate. Antenna yellow orange with only last flagellomere darkened; scape nearly twice as long as distal thickness, expanding from base to apex; pedicel with dorsal projection; first flagellomere subequal to scape in length, slightly more than half as high as long. Palpus pale yellowish gray with mostly black hair. Notum grayish brown with humerus, antealare, three stripes and prescutellar area indistinctly paler; pleuron gray. Wing pale gray brown with usual pattern of pale spots; subapical band a narrow mark from anterior margin crossing vein R_1 , broken or turning abruptly toward vein R_2 ; sometimes faint spot at hind margin midway between veins R_1 and R_2 ; pale spots usually at margin of all but posterior cell 4. Halter knob brownish laterally. Coxae and femora pale yellowish gray, femora darkened distally with rather strong black hairs particularly on fore femur; fore tibia with basal third white; midtibia and hind tibia each with two pale bands. Abdomen brown with lateral margin and rather broad middorsal stripe grayish; terga and sterna with narrow pale incisures.

Distribution.—India (West Bengal). Nepal, Thailand.

This is extremely close to *bicolor*, which has, however, a darker flagellum, first flagellomere longer in relation to its height, paired frontal spots with slender projection reaching eye, and wing spots fainter, yellower, slightly smaller, with no distinct spots on hind margin in posterior cells.

The name was suggested by the rather pale thorax, wings, legs, and abdomen, distinctly paler than the somewhat similar *lineola*.

Haematopota pattoni, new species

(Figs. 95, 223)

Holotype, female, Kodaikanal, South India, 7,000 ft, March 26, 1936 (BM). Paratypes: 1 ♂, same locality, May 1913; 2 ♀, Naraikkadden, Tinnevely District, South India, 2,500–3,000 ft, March 12, 1936; 1 ♀, Kaniyani, near Dohnavur, South India, 5,000 ft, March 12, 1936; 1 ♀, Guindy, Madras, South India, W. S. Patton; 1 ♂, Pulney Hills, 3–5,000 ft, South India, May 10–31, 1917, P. S. Nathan. (BM, MNHP, USNM)

Female.—Length 7.5–11 mm; wing 7.5–9.5 mm; antenna 1.9–2 mm. Frons gray, marked with brown above strong midfrontal spot; width at vertex 0.57–0.83 of height, strongly widened below; paired spots medium to rather large, touching eyes, narrowly separated from callus; callus black, rather roughened centrally, about 3.5 times as wide as high, touching eyes, upper margin straight or weakly convex, lower margin shallowly concave centrally; interantennal spot deeply cleft in middle, reddish brown to black; face and parafacials gray; upper face with pair of rather distinct dark spots; top of parafacial and short transverse streak from eye below this, blackish; beard white. Antenna black or nearly so; scape shiny, cylindrical, 2.5 or slightly less times as long as thick, apex slightly tapered; first flagellomere tapering rather strongly from near base, about 0.80 as long as scape; style stout. Palpus yellowish with black hair except for white hairs basally below. Notum dark brown with strong pale-gray pattern as follows: Pair of sublateral stripes to transverse suture and behind this pair of strong triangular spots; humerus and pair of often indistinct stripes behind it; pair of large curved spots on posterior margin not involving prescutellar sclerite, concave anterolaterally; most of scutellum except hind margin; pleuron gray. Wing gray brown with pattern of usually rather coarse spots in usual pattern; subapical band strongly curved, not reaching hind margin; large marginal triangles in all but posterior

cell 4; no pale spot anterior or posterior to basal section of vein R_1 . Halter with orange-brown knob. Coxae gray, fore coxa brown on distal half; rest of legs dark brown with sharply defined white bands; all tibiae with rather narrow subbasal bands; midtibia and hind tibia with subapical band and these tarsi pale at base. Abdomen dark brown above, with strong gray incisures, rather developed triangle or stripe on tergum II, and usually pale sublateral spots on terga III-VI; venter brown with gray incisures.

Distribution.—India (Madras).

The black antenna, narrower frons strongly widened below, strong gray thoracic pattern with hind margin of scutellum dark, and strong leg banding distinguish this species from *abacis*.

We take pleasure in dedicating this species to one of the collectors, W. S. Patton, the eminent medical entomologist, who worked so extensively on disease transmission by various Diptera.

Haematopota paucipunctata Schuurmans Stekhoven

(Figs. 72, 201)

Haematopota paucipunctata Schuurmans Stekhoven, 1926, p. 89; 1928, p. 432.

Type.—Gamboeng, Tea estate on Goenoeng Tiloe, 1450 m, Pre-anger Regencies, on horse (L').

Female.—Length 9–10 mm; wing 9–10.5 mm; antenna 2.25–2.5 mm. Frons grayish brown, usually paler around pollinose spots, about 0.70 to 0.77 times as wide at vertex as high, slightly widened below; midfrontal spot minute or absent; paired spots rather small, usually obliquely vertical, lower end touching eyes; callus dark reddish brown, disk slightly flattened and slightly irregular, about 2.5 to 3 times as wide as high; upper margin rather evenly convex, lower margin nearly straight; distinct black pollinose interantennal spot; face and parafacials yellowish gray, upper parafacial with upper and lower area of irregular brown flecks; beard rather sparse, pale. Antenna long and slender, yellow brown; scape shiny or subshiny, cylindrical, 3.5–3.75 times as long as thick; pedicel with short dorsal projection; flagellum long and slender, first flagellomere slightly shorter than scape. Palpus slender, yellow brown, with mixed dark and pale hairs. Notum yellow brown, pale brownish anterior stripes and pair of spots behind transverse suture indistinct; rarely narrow pale band before scutellum; pleuron paler, yellowish gray. Wing brown with pale spots in usual pattern; subapical band narrow, single, starting at wing margin in cell R_2 and crossing vein R_1 ; hind margin of wing only rarely with one or two pale spots. Halter knob yel-

low brown to rather dark brown. Legs yellowish to yellow brown; fore coxa darker distally; fore tibia with narrow subbasal pale band; midtibia and hind tibia with two pale bands. Abdomen dorsally yellow brown with only very narrow paler incisures; venter mostly yellow brown with narrow pale incisures.

Distribution.—Java, Sumatra.

We have seen nine specimens bearing the following data: JAVA: No further data; Batavia; WEST JAVA: Soekanagara, 500–700 m, Feb. 1940; Gedeh Tjisaroea Zd 1200 m, March 24, 1935; Tjisarua, 1000 m, Nov. 19, 1952; G Tjonkoewang, Djampang Mts., Nov. 1938; SOUTH SUMATRA: Southwest Lampongs, Mt Tanggamoos, 600 m, December; Wai Lima, Lampongs, Nov.–Dec. 1921. One specimen had an indecipherable locality but was collected at 1000–1500 (?), July 25, 1920.

The first two specimens were determined by Szilady as *immaculata* and *irrorata*, respectively. The scape is longer and the frons narrower than in *immaculata* and the subapical band is longer and the fore tibial band shorter than in *irrorata*. See also note under *pudleburqi*.

Haematopota perhumani, new species

(Figs. 76, 205)

Holotype, female, LAOS, Vientiane Province, Ban Van Eue, 750 m, malaise trap, forest streambed, April 10–11, 1965, J. L. Gressitt (BBM). Paratypes: 14 ♂, same data as holotype; 291 ♀, 5 ♂, same locality, May 15–31 and July 31, 1965; March 15, 29, 30, April 15, 29, August 15, November 30, 1966; May 15, June 30, 1967; 10 ♀, Phou-kow-kuei, 800 m, April 14, 14–16, 16, 17, 1965, Gressitt; 3 ♂, 2 km west of Mg Vang Vieng, Vientiane Province, 250 m, jungle, crepuscular, March 11, 1968, F. G. Howarth; 3 ♂, same but 3 km west, 300 m, March 17; 3 ♀, same but 28 km north, 200 m, March 12; 1 ♂, same but 39 km north, 500 m, March 15. (BBM, BM, CBP, CU, USNM)

A series of 33 ♀ from Wapikamthong Province, April 15, 1967, seem to be the same species but are slightly smaller, and 1 ♀ from Sayaboury, Sayaboury Province, April 13, 1966, is also small. We do not include these in the paratype series.

Female.—Length 8–11 mm; wing 7.5–10 mm; antenna 1.8–2.2 mm. Frons brownish, slightly less than twice as high as width at vertex, slightly divergent below; dark spots on frons variable, diffuse, brownish, usually midfrontal spot and paired spots joined to form an inverted V; callus yellow brown to dark brown, pro-

tuberant, about twice as broad as high, upper margin convex usually with small, median, flattened single or double projection; subcallar area with pair of well-developed shiny triangles; no interantennal dark spot; face yellowish gray; parafacials gray, upper part with variable dull brownishness in certain lights; beard white. Scape shiny yellow orange, slightly more than twice as long as thick, slightly shorter than first flagellomere; pedicel short, crescentic; flagellum tapering, darkened except at base. Palpus yellow brown, moderately stout at base with decumbent black hairs laterally and dorsally, erect pale hairs ventrally. Scutum reddish brown with paler striping; lateral stripe rather broad, grayish, submedian stripe slender, yellowish, ending behind transverse suture in spot; median stripe very slender, expanding posteriorly; pair of crescentic transverse pale spots on posterior margin; scutellum broadly pale yellowish centrally; pleuron pale yellowish brown. Wing brown with usual pattern, spots rather coarse; subapical band complete, curved, often irregular; posterior cells except cell 4 with strong marginal triangles in distal corners. Halter knob pale yellow. Legs mostly yellow brown; fore tibia white except for dark apical sixth; midtibia and hind tibia each with two pale bands, basal one rather broad; midbasitarsus and hind basitarsus pale basally. Abdomen reddish brown with pale-yellowish incisures and faint narrow middorsal triangles; venter paler, particularly basally.

Male.—Large and small facets of eye sharply differentiated; frontal triangle pollinose, gray above, yellowish below central faintly brownish area; upper parafacials only faintly yellowish above. Scape yellow, shorter than in female with long erect black hair; flagellum orange, slender. Body and wing coloration essentially as in female. Legs mostly yellow bands of same size but less distinct.

Distribution.—Laos.

This species belongs to the group that includes *cordigera* and *rarifrons*, with extensive white on fore tibia, dark spots on frons diffuse and rather confluent, distinct shiny triangles below callus, and yellow halteres. From *cordigera* it differs in being much paler, and from *rarifrons* in having the abdominal incisures narrower and yellower, not widened laterally, and no sublateral spots on abdomen, whereas there is more white on fore tibia.

We are pleased to dedicate this species to L. L. Pechuman, one of the leading students of Tabanidae in America, who provided much of the material on which this work is based.

Haematopota pendleburyi, new species

(Figs. 71, 199)

Holotype, female, Lumu Lumu, Mt Kinabalu, British North Borneo, 5,500 ft, April 18, 1929, H. M. Pendlebury (BM). Paratypes: 2 ♀, same data as holotype; 20 ♀, same but April 7, 9, 11-17, 22; 6 ♀, Kinabalu National Park, Sabah, Borneo, Malaysia, 5,500 ft, June 20, 1968, F. G. Howarth. (BM, CBP, CU, MCZ, USNM)

Female.—Length 9–10.5 mm; wing 9–11.5 mm; antenna 2.2–2.6 mm. Frons brownish gray, width at vertex about 0.6 of height, slightly widened below; midfrontal spot variable but usually small or indistinct, with narrow pale stripe above to vertex; paired spots large, dark, subcircular to oval, touching eyes, narrowly separated from callus; callus dark reddish brown to black, about twice as wide as high, upper margin broadly convex with small middorsal projection, lower margin shallowly concave; subcallar area with keystone-shaped dark interantennal spot; face and lower parafacials gray, upper parafacial irregularly spotted with brown. Scape shiny orange brown, cylindrical, about three times as long as thick, base distinctly tapered; scape and pedicel heavily black haired; pedicel with distinct dorsal projection; flagellum orange to dusky brown, long and slender, first flagellomere subequal to scape in length. Palpus slender, brownish gray with mixed dark and pale hairs. Notum brown, humerus and broad area anterior to scutellum paler; pleuron gray. Wings rather pale brown with rather slender pale marks in usual pattern; subapical band slender, oblique, running usually from end of vein R_1 to vein R_4 , broken in cell R_4 ; posterior margin entirely dark or with some indistinct pale triangles. Halter knob brown. Fore coxa with basal half gray, distal half brown; femora uniformly yellow brown to dark brown, fore femur darkest; all tibiae two-fifths to one-half white basally; tarsi all dark. Dorsum of abdomen brown with very narrow yellowish incisures; venter slightly yellower with broader bands.

Distribution.—Borneo.

This species has been confused with *paucipunctata* from Java and Sumatra, which has, however, paired frontal spots smaller, obliquely vertical and not so dark, pale area anterior to scutellum very narrow, pale bands on legs narrower, proximal ones subbasal rather than basal, and midtibia and hind tibia each with narrow subapical band.

This species is dedicated to the holotype's collector, Henry Maurice Pendlebury (1893-1945), who was entomologist with

the Federated Malay States Museum at Kuala Lumpur and who did extensive collecting in Malaya.

Haematopota personata Philip

(Figs 18, 139)

Haematopota personata Philip, 1963, p. 520.

Type.—Doi Sutep, Chiangmai, 1278 m, Thailand (BBM).

Female.—Length 6.5–9 mm; wing 5.5–8 mm; antenna 1.3–1.8 mm. Frons gray bordering eyes, median and paired spots, and narrowly in middle of vertex, rest brown; width at vertex about 0.7 of height, considerably widened below, vertex concave and dorso-median margin of eye curved downward more than usual; mid-frontal spot usually well developed; paired spots touching callus, slightly separated from eyes; callus shiny black, broadly touching eyes, upper margin nearly straight, lower margin convex at either side of center; interantennal spot large, black; upper face and upper parafacials solidly black; below white with heavy white beard. Scape black, shiny, swollen, less than twice as long as thick; pedicel with distinct dorsal projection; flagellum reddish brown, strongly compressed, slightly larger than scape; style slightly tapered. Palpus white with long white hair except for brown tip. Notum mostly dark brown; three very faint anterior lines; pair of large white triangles behind transverse suture; pair of diagonal gray spots anterior to sides of scutellum; prescutellar sclerite dark; scutellum slightly grayish in center and at sides; pleuron dark except for small central patch bearing white hairs. Wing brown with usual pale pattern; subapical band of wing sinuous, just crossing vein R_1 ; usually large white marginal spots in all posterior cells but cell 4; anal margin of wing broadly pale. Halter knob brown. Legs brown, anterior and posterior femora and tibiae with heavy long hair; fore tibia slightly swollen, white on basal third; midtibia with two pale bands; hind femur with long hairs white dorsally toward apex, rest black; hind tibia slightly swollen, with basal white band and subapical partial, yellowish band; midtarsus and hind tarsus pale basally. Abdomen dark with gray incisures, triangle on tergum II. and small sub-lateral spots on posterior terga.

Distribution.—Burma, Laos, Thailand.

We have seen additional material from the McKami River, Thailand, February 3, 1928. Kunlong [Burma], April 2, 1942, and 30 km n. Mg. Vang Vieng, Vientiane Province, Laos, 400 m, on horse, March 12, 1968. The shiny swollen black scape, black

of upper face and parafacials, heavily haired legs, and wing, notal, and abdominal pattern will distinguish this species from related ones.

Haematopota philipi Chvala

(Figs. 111, 238)

Haematopota philipi Chvala, 1969, p. 49.

Type.—Nepal, "Prov. Nr 3 East," Junbesi, 2750 m (ZCBS).

Female.—Length 8.3–11 mm; wing 8.8–11.5 mm; antenna 1.7–2 mm. Frons grayish brown, width at vertex about 0.8 of height, distinctly widened below; midfrontal spot distinct, usually round; paired spots rather small, subtriangular to round, touching eyes, separated from callus; callus black, slightly more than three times as wide as high, touching eyes, upper and lower margins nearly straight; triangular interantennal dark spot; face and parafacials gray, upper parafacial tinged with yellow and irregularly spotted with brown; beard rather sparse, mostly white. Scape reddish brown, cylindrical, distinctly enlarged distally, length about 2.5 times greater than thickness; pedicel with short dorsal projection; flagellum dusky, first flagellomere slender, subequal to scape in length. Palpus slightly swollen basally, tapering with mostly black hair. Notum brown with slender median pale stripe entire length of scutum, sublateral stripes ending in spot behind transverse suture, and posterior margin of scutellum slightly reddened and sometimes grayish area on disk; pleuron gray. Wings large, pale brown with pattern of slender paler spots; subapical band a small spot crossing vein R_1 , sometimes reaching anteriorly to wing margin; no pale spots at margin in posterior cells. Halter knob brown. Coxae gray, fore coxa slightly darkened distally; rest of legs reddish brown; fore tibia with faint small basal or subbasal pale band; midtibia and hind tibia each with two faint bands; midtarsus and hind tarsus scarcely paler basally. Abdomen above dark brown with strong yellowish incisures and yellowish-gray spots forming stripe from terga II to VI or VII, spot on II forming distinct triangle; venter gray, slightly brownish medially.

Distribution.—India (Assam), Nepal.

In addition to paratype material we have seen seven specimens from Pulchanki, Katmandu, Nepal, 8000 ft, July 21 and 27, 1967, and a specimen from Sivohi, Manipur, Assam, 4800 ft, June 26, 1960. This species closely resembles *sparsa*, which has, however, wing shorter in relation to body, entire coloration paler and pale

marks of thorax, wings, abdomen, and legs slightly larger, except dorsal abdominal incisures are less distinct.

Haematopota picea, new species

(Figs. 25, 149)

Holotype, female, Fong District, Chiang Mai Province, Thailand, May 5, 1969, J. J. S. Burton (CU). Paratypes: 3 ♀, Chiang Dao District, Chiang Mai Province, May 7, 1969, Burton and Chaemmanee; 2 ♀, same locality, 425 m, April 27, 1970, about man, G. R. Ballmer. (BBM, CU, USNM)

Female.—Length 10.5–11.5 mm; wing 9–10 mm; antenna 3.2–3.3 mm. Frons rather dark gray, paler around spots, along eye margins, and in narrow stripe above small but distinct midfrontal spot; width at vertex about 0.85 of height, slightly wider below; paired spots rather large, round or subquadrate, touching eyes, narrowly separated from callus; callus black, central part rough and slightly flattened; width about three times height, broadly touching eyes, both upper and lower margins nearly straight; beneath callus a strong, shiny, weakly cleft median triangle, and below this an interantennal velvety black spot; upper part of face darkened, rest pale gray; facial pits large; lower half of parafacials gray, upper half darkened when viewed from sides nearly solidly black except for narrow silvery streak bordering callus and eye; when viewed from front upper part of darkened area fading to brownish gray with small black spots; beard rather sparse, pale. Antenna nearly black; scape slightly swollen, cylindrical, slightly depressed dorsally near middle, about four times as long as thick, subequal to or slightly longer than flagellum; pedicel with strong dorsal projection; flagellum moderately slender, tapered. Palpus dark gray, slightly paler ventrally with mixed dark and pale hair. Scutum dark brown with mostly yellow hair, particularly at hind margin, humerus, very slender middorsal stripe, pair of broader sublateral stripes anteriorly, and narrow hind margin paler; scutellum uniformly dark; pleuron gray above, brown below, and sternum brown. Wings dark brown with mostly small pale spots; usually strong round spot just beyond stigma; subapical band strong, crossing wing, widened posteriorly; hind margin of wing usually nearly continuously white, posterior cells 1–3 with strong white triangles, others with slender marginal band; holotype with no pale margin in posterior cell 4. Halter brown at base and knob, pale between. Fore coxa brown, slightly grayed at base anteriorly; femora dark brown; fore tibia dark brown with only very faint narrow subbasal paler band; mid-

tibia with two narrow yellowish bands; hind tibia with narrow, indistinct subbasal band, posterior fringe strong, black, except white at band; hind femur with rather long black fringes above and below; tarsi all dark. Abdomen nearly black, sides of terga I-IV rather broadly grayish and with rather broad gray incisures; venter nearly uniformly dark with very narrow paler incisures.

Distribution.—Thailand.

This species appears to be most closely related to *chinensis*, and if the scape were considered not to be swollen would run in the key to that species or *brunnipes*. The shiny subcallar area will separate it from *brunnipes*; faint yellowish leg bands rather than narrow but bright white bands will separate it from *chinensis* as well as slightly larger size and somewhat different subapical wing band. If one considered the hind femur to be tufted, *picea* would run to *cilipes*, which differs in having scutellum with prominent white base.

The name refers to the generally pitchy-black appearance.

Haematopota pisinna, new species

Holotype, female, Jabalpur, India, September 1957, P. S. Nathan (CU).

Female.—Length 6.5 mm; wing 6 mm; antenna 1.4 mm. Frons dark brownish gray, subshiny, height and width at vertex subequal; midfrontal spot small; paired spots rather large, triangular, one angle touching eye; lower margin distinctly separated from callus; callus nearly black, touching eyes, upper and lower margins nearly straight; subcallar area pruinose with small dark inter-antennal spot; face and parafacials gray, upper parafacial blotched with brown; scape shiny reddish brown, cylindrical, about twice as long as thick; pedicel with no dorsal projection; flagellum nearly black, first flagellomere subequal to scape in length, height about half of length; style stout; palpus yellowish brown. Scutum and scutellum in poor condition, mostly dark brown; pleuron dark grayish. Wing rather pale brown with spots in usual pattern; subapical band double but outer arm faint; posterior cells 2-5 with pale margins each connected to oblique band in preceding cell. Halter brown, stem with pale band. Legs dark except for pale band at base of each tibia, very faint subapical band on midtibia, and pale base to midtarsus; hind tarsus missing. Abdomen dark brown with rather strong gray incisures and some pale laterally on anterior terga.

Distribution.—India (Madhya, Pradesh).

This is one of the smallest species (*pisinna*, Latin adjective,

little). It can be distinguished from most species by this and the single narrow band on the hind tibia, rather broad frons, and short, shiny scape.

***Haematopota procyon*, new species**

(Figs. 13, 135)

Holotype, female, 17 km northwest of Loey, Loey Province, Thailand, May 18, 1967, J. J. S. Burton (CU). Paratypes: 14 ♀, same data as holotype; 4 ♀, same but May 16, ex cattle, R. R. Pinger; 2 ♀, Chiang Mai Province, Fang (Agr. Exp. Station) 600 m, May 14, 1965, P. D. Ashlock; 10 ♀, Chiangai Province, Huai Kaeo, May 20, 29, June 8, 1969; 1 ♀, Chiang Mai Province, Chiang Dao District, May 7, 1969; 4 ♀, Nakhon Ratchasima Province, Pak Chong District, Klang Dong Canton, June 25, 1969; 3 ♀, Saraburi Province, Muak Lek District, June 24, 1969, Kaeo Sem-porn or Burton; 1 ♀, 40 km south of Loey, July 12, 1966, Pinger. (BBM, CBP, CU, USNM)

This species so closely resembles *glenni* that we consider it sufficient to note the observed differences from that species without giving a complete description. Black across face and upper parafacials with straight ventral border rather than with slight notch at suture and slight upward curve at eye margin. Fore tibia entirely dark instead of with strong white basal band; midtibia with two indistinct reddish bands rather than with broad central white band.

Distribution.—Thailand.

This species was associated with *glenni* at the type locality and it may be only a color variant, but the characters mentioned here are constant and show no intergradation.

The name is suggested by the black mask, reminiscent of that worn by the raccoon (*Procyon loturus*).

***Haematopota prolixa*, new species**

(Figs. 32, 158)

Holotype, female, 40 km, west southwest of Khong, Cambodia, June 10, 1952, C. Wharton (USNM No. 72025). Paratypes: 6 ♀, same data as holotype; 3 ♀, Whatrang, Annam, J. J. Vassal (1 labeled 1906-198). (BM, CBP, FSCA, PIP, USNM)

Female.—Length 7.5-8.5 mm; wing 7-8 mm; antenna 1.5-2 mm. Frons subquadrate or slightly higher than width at vertex, slightly widened below, yellowish gray; midfrontal spot distinct or very faint; paired spots small to moderate in size, subcircular,

separated from eye and callus; callus yellow, protuberant, rather irregular, three to four times as wide as high, touching eyes, upper margin nearly straight, lower margin weakly concave; subcallar area yellow pollinose with distinct median cleft, no dark interantennal spot; face gray; parafacials gray, upper part more yellowish with small dark spot near eye at lower corner of yellowish area; beard white. Antenna yellow orange; scape subshiny, cylindrical, at least twice as long as thick; pedicel short and stout with strong dorsal projection; flagellum compressed, height near base greater than length of style and about half length of first flagellomere. Palpus grayish yellow with mostly dark hair. Scutum brownish with five distinct grayish stripes; scutellum gray centrally and laterally; pleuron gray. Wing gray brown, slightly darker distally with many small spots in usual pattern; subapical band slender, crescentic, usually broken and often with spot or incomplete band more distad; posterior cells with narrow marginal spots, usually absent in cell 4. Halter with dark knob. Legs generally yellowish to brown; fore coxa scarcely darker distally; single pale band at base of fore tibia and two on each midtibia and hind tibia, all indistinct. Dorsum of abdomen brown with gray pattern consisting of middorsal stripe, rather large sublateral spots, and lateral margin; venter gray with narrow median brown stripe.

Distribution.—Cambodia, Vietnam.

This species is close to *knekidis*, which, however, has a paler wing, a brown interantennal spot, and the scape is distinctly expanded distally.

The name is the Latin adjective meaning long, in reference to the strong dorsal projection on the pedicel.

Haematopota punctifera Bigot

(Figs. 28, 154)

Haematopota punctifera Bigot, 1891, p. 79; 1892, p. 629; Ricardo, 1906, p. 125; 1911, p. 327; Meijere, 1911, p. 286; Schuurmans Stekhoven, 1926, p. 122.

Type.—Java (BM).

Female.—Length 6.5–7.5 mm; wing 6–7 mm; antenna 1–1.2 mm. Frons at vertex about 0.75 of height, slightly widened below, yellowish with white median streak, and white bordering of eyes and paired spots; under certain lights median streak shows slender midfrontal spot, but this is usually not visible; paired spots rather large, elongate, oblique-vertical, usually well separated from eyes and narrowly from callus; callus dark reddish brown, upper mar-

gin concave to either side of dorsal projection, reaching eyes; lower margin shallowly concave above antennae, abruptly turned downward laterally; subcallar area yellow above antenna, dark between antennae and at ends; face and parafacials gray, face sometimes narrowly dark above, upper parafacial with black spot broadest medially, barely reaching eyes and beneath this a slender incomplete streak inward from eyes; beard white. Scape dusky reddish, short, strongly thickened distally, height at apex about three-fourths of length; pedicel with short dorsal and ventral projections; flagellum almost uniformly yellow orange, first flagellomere compressed, its greatest height distinctly greater than short compressed style. Palpus pale yellowish, slender with mostly long pale hairs basally, shorter dark hairs apically. Scutum brown with five gray stripes, median very slender, submedian broader but tapering behind, and sublaterals broadest; scutellum gray with two short brown stripes; pleuron gray with slender brown stripe. Wings pale brown with pale spots in usual pattern; subapical band partially or completely doubled, one or both bands broken into spots; all posterior cells with pale triangles at wing margin. Halter with dark brown knob. Coxae and femora mostly grayish, tibiae and tarsi brown with pale bands; fore tibia with basal two-fifths yellowish; midtibia and hind tibia each with two pale bands; midtarsus and hind tarsus pale basally. Dorsum of abdomen with middorsal stripe of slender triangles and sublateral row of gray spots rather connected to lateral gray margins; venter gray with brown central stripe on posterior sterna.

Distribution.—Burma, Cambodia, India, Java, Laos, Thailand.

We have seen 15 specimens from southwest India, Assam, Burma, Cambodia, Thailand, and Laos but none except the type from Java. The type has the pedicel and flagellum missing and the center of the frons has a triangular denuded area that is probably the result of abrasion. The agreement of the type with the specimens we have seen seems to be satisfactory. If the species described were confined to southwest India, the identity with a species from Java would be very doubtful, but as its other distribution bridges the gap, an extension to Java is not unreasonable. The distribution would be similar to that of *javana*. It has been collected in May and June and again in late August, September, and October.

This is the smallest of the species with a greatly compressed flagellum. Double subapical band of wing, scarcely visible mid-frontal spot, short scape with expanded apex, and coloration of top of parafacial serve well to distinguish it.

Haematopota pungens Doleschall

(Figs. 85, 213)

Haematopota pungens Doleschall, 1856, p. 407; Meijere, 1911, pp. 282, 286; Schuurmans Stekhoven, 1926, p. 103; Nieschulz and Ponto, 1927, p. 141; Philip, 1963, p. 530.

Chrysozona pungens (Doleschall): Philip, 1960b, pp. 63, 75.

Type.—♀, Oenerang, Java (LU).

Female.—Length 7–11 mm; wing 7.5–11 mm; antenna 2–2.5 mm. Frons gray with brown, split triangle at vertex, width of frons at vertex about 0.65 of height, widened below; no midfrontal spot; paired spots variable in size, subquadrate, touching eyes and nearly touching callus; callus reddish brown, slightly protuberant, nearly twice as wide as high, upper margin convex, often with middorsal lobe, lower margin shallowly concave; beneath callus two shiny triangles, narrow cleft between them slightly darkened; face, parafacials, and cheeks nearly uniformly yellowish gray with trace of diffuse darker spot near eye slightly above level of facial pits; beard sparse, pale. Antenna yellowish brown, style and sometimes distal part of first flagellomere darker; scape subshiny with black hair, cylindrical, thickest at apex, about twice as long as thick; pedicel short and stout with scarcely any dorsal projection; flagellum long and slender, first flagellomere distinctly longer than scape. Palpus slender, tapering, with mostly black hair. Scutum brown with three slender pale stripes anteriorly, broader pale band from humerus to above wing base, pair of triangular spots behind transverse suture, and pair of transverse crescentic spots on hind margin; scutellum often with weak pale spot on disk; pleuron nearly uniformly yellowish gray. Wing brown with paler markings in usual pattern; subapical band usually double, but sometimes single, only inner band from anterior margin present, not crossing wing; pale marginal triangles in most or all posterior cells. Halter usually entirely pale. Legs yellowish brown with pale bands; fore coxa gray with darkened apex; fore tibia with basal pale band less than half length of segment; midtibia and hind tibia with two pale bands, basal one on hind tibia broad; bases of midtarsus and hind tarsus pale. Dorsum of abdomen brown with narrow pale incisures; venter brown with rather broad gray bands and some gray laterally.

Male.—Similar to female with usual sexual differences: large and small facets of eye sharply differentiated; frontal triangle entirely pollinose; hairs of scape long, slender, brown; thorax less distinctly patterned; halter with dark knob; legs darker, bands weakly developed, and subbasal band of midtibia missing.

Distribution.—Borneo, Java, Sumatra.

We have seen 14 specimens from Java and 4 from Borneo. Specimens recorded from mainland Asia do not appear to be this species. It has been questionably synonymized with *irrorata*, which, however, lacks the strongly developed shiny triangles below the callus and has a distinctly broader frons with a much reduced subapical band on the wing.

***Haematopota roralis* Fabricius**

(Figs. 38, 163)

Haematopota roralis Fabricius, 1805, p. 107; Wiedemann, 1821, p. 97; 1828, p. 215; Bigot, 1891, p. 78; Ricardo, 1906, p. 116; 1911, p. 323; Schuurmans Stekhoven, 1926, p. 110; Senior-White, 1927, p. 16; Isaac, 1932, p. 278.

Type.—♀, Tranquebar (Madras, India) (ZIL).

Female.—Length 10.5–13 mm; wing 7.5–9 mm; antenna 2.2–2.8 mm. Frons yellow gray with dark-brown area near vertex, width at vertex about 0.82 of height, distinctly widened below; midfrontal spot lacking or extremely minute, with pale middorsal streak above it in clean specimens; paired spots rather small, black, circular, widely separated from eyes and callus; callus pale yellow, protuberant, nearly three times as wide as high, touching eyes ventrally at least; upper margin nearly straight, usually with triangular middorsal extension; lower margin shallowly concave, yellowish, cleft bordered with brown; face and parafacials yellowish gray, upper parafacial finely stippled with darker color; beard pale. Antenna yellow, flagellum slightly darkened distally; scape subshiny, cylindrical, about three times as long as thick, usually with weak constriction near middle; pedicel with short dorsal projection; flagellum slender, slightly longer than scape. Palpus pale yellow, slender, with mixed dark and pale hairs. Scutum blackish brown with five pale stripes, lateral pair broad; pair of brownish transverse crescents on posterior border; scutellum grayish in central stripe and along margin; pleuron gray. Wing brown with pale marks in usual pattern; subapical band slender, usually reduced to streak across vein R_4 , sometimes curved basad to reach vein R_5 ; hind margin of wing entirely dark but continuous row of submarginal spots; basal cells often extensively pale. Halter knob partially darkened. Legs almost uniformly pale yellow brown. Abdomen brown with five rather continuous rows of gray spots forming stripes wider than intervening brown part; venter gray usually with darker median stripe.

Male.—Length 10 mm; wing 7.5–8 mm; antenna 1.5 mm. Eyes bare, large facets sharply differentiated from small facets; frontal triangle pale, with shining yellow callus below; interantennal dark spot strong; antenna yellow, scape short, slightly swollen, shiny, with long black hair; flagellum very slender; palpus about twice as long as thick with nipplelike tip, nearly white with mixed dark and pale hair. Thoracic coloration, wings, and legs as in female; abdomen slightly more yellowish.

Distribution.—Ceylon, India (Madras), ? Malaya.

We have seen this species from Parayanalankulam, Ceylon, and Coimbatore, Madras, India. It has been reported from Bengal and Malaya, but we have not verified these records. This species is distinctive in the combination of protuberant yellow callus, nearly unmarked parafacial, rather long antenna, no posterior marginal spots on wing, entirely pale legs, and strongly striped abdomen. Its closest relative is *fulripes*, differentiated as given in the key and following the description of that species. Isaac described in some detail the biology of the species with color illustrations of the adult, egg, larva, and pupa.

Haematopota rubida Ricardo

Haematopota rubida Ricardo, 1906, p. 120; Pratt, 1909, p. 392; Ricardo, 1911, p. 338; Schuurmans Stekhoven, 1926, p. 78; Senior-White, 1927, p. 17.

Type.—Burma (BM).

Female.—Length 10 mm. Frons gray, darker in center; no mid-frontal spot; paired spots rather small, round, separated from eyes and callus; callus brown, protuberant, narrowly separated from eyes, upper margin with median lobe, lower margin deeply concave; interantennal spot large, square, black; face and parafacials gray below, solidly black above, black area tapered laterally. Scape swollen, yellow, with black hair, nearly as long as flagellum; first flagellomere compressed, high, tapering to blunt apex, reddish yellow, darker at apex and on narrower style. Palpus yellow with black hair above, white hairs below. Scutum reddish brown with paler stripes, darker at sides; scutellum gray; pleuron gray with white hairs. Wing brown with pale markings not forming rosettes; subapical band single, sinuous, ending in vein R₁; all posterior cells with large marginal triangles and oblique bands; strong oblique band, tapering posteriorly from base of cell R₁ to axillary cell; proximal part of axillary cell broadly pale. Legs reddish brown, fore and hind pairs darkest; fore tibia with pale ring at base; midtibia yellowish brown with two indis-

tinct yellowish bands; hind femur broad with fringe of black hairs ventrally and long black hairs dorsally and tuft of white on apical half; hind tibia short and broad with faint yellowish bands and fringed with long black hairs above and below; midtarsus and hind tarsus pale yellow basally. Dorsum of abdomen reddish brown, darker distally with narrow yellow incisures; venter yellowish gray.

Distribution.—Burma, Malaya.

This species is similar to *singularis* but can be distinguished from that species by the characters given in the key. The photograph of the wing (Ricardo, 1911) is overexposed and misleading, as it shows too strong a pale area at apices of basal cells.

***Haematopota scanloni*, new species**

(Figs. 8, 129)

Holotype, male, Udon Thani, Ampur Muand, Thailand, September 1962, J. F. Scanlon (USNM No. 72026). Paratypes: 4 ♂, same data as holotype; 2 ♂, Chiangmai, Ampur Muand, July 1962, Scanlon. (BM, CBP, USNM)

Male.—Length 8.5–10 mm; wing 8–9 mm; antenna 2–2.1 mm. Eyes with large and small facets sharply differentiated, small facets below frontal callus except posteriorly; frons pale gray above with well-developed, shiny transverse callus extending between eyes; subcallar area pale yellow with distinct cleft but no dark spot; face and parafacials gray, upper parafacial filled with many minute pale-brownish spots, which in certain lights may look almost solidly brownish; beard white. Scape yellow, shiny, cylindrical, slightly more than twice as long as thick, with sparse hairs, mostly ventral; pedicel very small but with strong dorsal and ventral processes; first flagellomere darker than scape, compressed, about two-thirds as high as long, distinctly higher than length of style, which is pale yellow. Palpus stout, pale yellowish with abundant long pale hair. Scutum blackish with considerable amount of grayish bloom particularly laterally and on hind margin; humerus pale and three slender paler stripes on anterior part, sublateral stripes crossing transverse suture and then becoming slender dark streaks; scutellum brown, narrowly paler anteriorly; pleuron nearly uniformly gray. Wings gray brown, pattern mostly of large pale areas forming principally two irregular, oblique bands, one from stigma and one across basal cells to hind margin; subapical band rather broad, complete, usually curved inward; posterior cell 1 with large pale area at wing margin, merging with large triangle in cell 2; other posterior cells

with small triangles except usually cell 4. Halter white. Legs mostly dark with dark hair; fore coxa pale anteriorly near base; midtibia usually with pair of indistinct pale bands; hind femur and tibia heavily clothed with long black hair; hind tibia slightly widened and with indistinct basal yellowish band. Abdominal segments I-III bright yellow, rest of abdomen dark brown with indication of yellowish middorsal stripe on tergum IV and rarely small gray sublateral spots on posterior terga.

Distribution.—Thailand.

This species falls into the group with long hairs on the hind femur and tibia and enlarged hind tibia. It differs from *cilipes* particularly in the wider flagellum and from *singularis* in lacking a darker upper parafacial and in having a rather broad white band across the basal fourth of the wing.

We are pleased to dedicate this species to John F. Scanlon, who has done so much to increase knowledge of the medically important insects of Southeast Asia.

Haematopota schmidi, new species

(Figs. 100, 227)

Holotype, female, Assam, Mawlang, Khasi Hills, June 12, 1960, 4,000 ft, Schmid (CBP). Paratypes: 2 ♀, same data as holotype; 1 ♀, Assam, Jarman, Khasi Hills, April 13, 1960, 2,800 ft; 1 ♀, N. E. Frontier Division, Bhairabkhunda, 700-1,000 ft, May 21, 1961 (all Schmid). (CBP, USNM)

Female.—Length 6-8.5 mm; wing 6.5-9 mm; antenna 1.5-2.1 mm. Frons brownish gray, paler just below paired spots; mid-frontal spot large, triangular; paired spots large, subquadrate, touching eyes, nearly touching callus; callus black or dark reddish, about four times as wide as high, upper margin straight, usually with small middorsal point, lower margin concave above antennae; subcallar area yellow with large black interantennal spot; face and parafacials gray, upper parafacial with triangular dark streak from eye and brownish mottling above; beard sparse, pale. Antenna nearly black; scape shiny, swollen, cylindrical, slightly more than twice as long as thick with black hair; pedicel with scarcely any dorsal extension; flagellum slightly expanded dorsoventrally near base, first flagellomere shorter than scape. Palpus grayish brown, rather slender, with long dark hair. Scutum dark brown; humerus and three slender stripes, fading out posteriorly, paler; center of scutellum posteriorly grayish; pleuron gray with brownish spot on lower anepisternum. Wings brown with pale spots in usual pattern; subapical band irregular

and usually broken, curved inward, crossing wing; spotting on hind margin of wing variable from almost no trace to triangles in most posterior cells. Halter with brown knob. Legs mostly dark reddish brown; fore coxa pale basally; rather narrow pale subbasal band on fore tibia; midtibia and hind tibia each with two yellowish bands; midtarsus and hind tarsus narrowly pale basally. Abdomen dark brown with slender but strong yellowish incisures; at most barest trace of middorsal stripe; venter slightly grayed laterally.

Distribution.—India (Assam).

This species bears some resemblance to *pisinna*, in which, however, the scape is distinctly smaller and the hind tibia has only one pale band.

We named this species in honor of the collector, Fernand Schmid.

Haematopota sikkimensis, new species

(Figs. 70, 198)

Holotype, female, Mangang, Sikkim, 3,600 ft, August 11, 1959, Schmid (CBP).

Female.—Length 10 mm; wing 9.5 mm; antenna 2.2 mm. Frons grayish brown, paler at lower corners, width at vertex about 0.7 of height, slightly wider below; midfrontal spot small; paired spots triangular, one angle touching eye, other nearly touching callus; callus yellowish brown, slightly rugose centrally, three times as wide as high, touching eyes below, upper margin straight centrally with small median projection, and sides oblique; lower margin nearly straight; subcallar area with strong interantennal dark spot; face grayish brown; parafacials gray with broken darkened area above. Scape yellowish brown, cylindrical, slightly expanded distally, about twice as long as distal thickness; pedicel with distinct dorsal projection; flagellum dusky, rather long and slender. Palpus dark brown with long dark hair. Notum dark brown with humeri, pair of triangular spots on transverse suture, and pair of crescentic spots anterior to scutellum, paler; pleuron gray. Wing brown, flecked with small spots in usual pattern; subapical band slender, just crossing vein R₁; no pale spots on posterior margin of wing. Fore coxae pale on basal half, brown beyond; rest of fore leg dark except for pale basal third of tibia; midlegs beyond femur missing; midfemur dark brown, paler at extreme base; hind legs brown, basal two-fifths of tibia white. Abdomen dark brown above with narrow paler incisures; venter yellowish brown, slightly paler laterally.

Distribution.—India (Sikkim).

This species is near *pudleburyi*, *irrorata*, and *paucipunctata* but differs as shown in the key.

Haematopota singarensis, new species

(Figs. 65, 191)

Holotype, female, Singara, Nilgiri Hills, India, 3,400 ft, P. S. Nathan (CU). Paratypes, 6 ♀, 2 ♂, same data (BM, CU, USNM).

Female.—Length 7.5–10 mm; wing 7–8 mm; antenna 1.6–1.8 mm. Frons gray or brownish gray, width at vertex slightly greater than height, distinctly widened below; midfrontal spot strong, round; paired spots large, round, touching eyes and callus or only narrowly detached; callus dark reddish brown, about 3.5 times as wide as eye, broadly touching eyes, upper margin broadly convex or weakly biconcave, lower margin concave centrally; subcallar area with large velvety black interantennal spot and small, usually yellow shiny area laterad of antenna; face gray with pair of transverse darker spots above; parafacials gray, rather sparsely dotted with black, concentrated on lower margin of upper half; beard rather long, white. Scape dull yellow with black hair, cylindrical, about three times as long as thick; pedicel without distinct dorsal projection; flagellum darkened beyond base, slender, first flagellomere subequal in length to scape. Palpus gray with mixed black and pale hairs. Notum brown with indistinct slender paler stripes; pair of fused crescentic gray marks on posterior margin; prescutellar sclerite gray; pleuron gray. Wing dark brown with strong pale pattern: subapical band complete, usually curved outward; hind margin with elongate, usually contiguous triangles. Halter with knob brown. Coxae gray, fore coxa with apex sometimes brown; femora dark, partially or completely clothed with gray hair; fore tibia with about basal third pale; midtibia with two pale bands; hind tibia with abundant yellowish hair basally but not sharply defined band; midtarsus and hind tarsus pale basally. Abdomen brown with narrow pale incisures, indistinct median stripe, and rather developed sublateral spots on most terga; venter mostly brown with pale incisures and gray on sides anteriorly.

Male.—Large and small facets of eye sharply differentiated, lower margin of large facets below interantennal dark spot; very narrow indistinct shiny area above this dark spot; antenna much shorter and yellower than in female; scape with long hair; flagellum orange except at tip; upper parafacial speckled with dark

gray; beard with some dark hairs. Rest of coloration essentially as in female but basal part of abdomen more reddish yellow.

Distribution.—India (Madras).

This species is rather similar to *biharensis*, which is, however, distinctly smaller, with very slender palpus, no distinct median spot on frons, and broader subapical band and posterior pale spots on wing.

***Haematopota singularis* Ricardo**

(Figs. 9, 131)

Haematopota singularis Ricardo, 1928, p. 58; 1911, p. 339.

Haematopota singularis vietnamensis Philip, 1963, p. 530 (new synonymy).

Types.—*singularis*, Nhatrang, Annam (BM); *s. vietnamensis*, BanMeThout, 500 m. Vietnam (BBM).

Female.—Length 8–11.5 mm; wing 8–10.5 mm; antenna 2–2.75 mm. Frons gray, vertex with brown area divided by gray line up from small to minute midfrontal spot; width at vertex slightly less than height, wider below; paired spots black, ovoid, or irregularly round, separated from eyes and callus; callus yellow brown to black, shiny, narrowly separated from eyes, about three times as wide as median height; upper margin usually concave below each paired spot, convex in middle; lower margin with triangular median emargination; entire subcallar area between antennae velvety black; upper half of face and parafacials entirely velvety black, rest white; beard heavy, white. Scape shiny yellow orange, rarely darker, apex dorsally usually darkened, stout, cylindrical, slightly less than three times as long as thick; pedicel short with dorsal and ventral projections; flagellum orange brown, slightly longer than scape; first flagellomere compressed, in profile scarcely tapering distally and about three-fifths as high as long; style short, compressed. Palpus pale, tapering, with mostly long white hair. Notum dark brown except for yellowish gray as follows: Slender median stripe anterior to transverse suture, sometimes lacking; broad submedian stripe ending in sharp point behind transverse suture; humerus and posterior to it to cover antealare except lower margin; broad prescutellar band, quadrilobed anteriorly; scutellum except for hind margin; pleuron gray except for broad diagonal brown stripe from behind fore coxa nearly to wing base. Wing dark brown without distinct rosettes of spots but with broad, oblique white mark from behind stigma to axillary cell, abruptly tapered beyond cubital cell; irregular band of slender, transverse spots near wing margin, usually including marginal triangles in posterior cells 1, 3, and 5; subapical band usually

composed of three irregular spots, sometimes giving effect of incomplete double band. Halter with brown knob. Fore leg entirely brown, femur and tibia with heavy black hair, tibia swollen; mid-femur yellowish with pale hair; midtibia slightly swollen, dark, with two often indistinct pale bands; hind femur with long hairs dorsally on distal half, basal ones white, and long dark hairs ventrally; hind tibia swollen, heavily clothed with long hairs, with two partial pale bands. Abdomen dark brown; terga II-VI broadly pale laterally and posteriorly; sometimes indication of pale sub-lateral spots on posterior terga; venter gray, slightly darkened near apex medially.

Distribution.—Cambodia, Laos, Thailand, Vietnam.

The head color, wing pattern, antenna, and hind legs will distinguish this species. Its closest relative is *rubida*, which may be distinguished by the characters given in the key. The type and paratype of *vietnamensis* do not support a differentiation from the typical form in view of the variation seen in additional material.

Haematopota sparsa, new species

(Figs. 104, 232)

Holotype, female, Bhairabkunda Kameng, Assam, India, 700-1,000 ft, May 21, 1961, Schmid (CBP).

Female.—Length 11.5 mm; wing 10 mm; antenna 2.1 mm. Frons grayish yellow, partially discolored, height and width at vertex subequal; midfrontal spot small, reddish brown; paired spots rather small, touching eyes, widely separated from callus; callus yellowish, slightly brownish laterally, about four times as wide as high, touching eyes, upper margin nearly straight, lower margin weakly concave with rounded emargination in center; subcallar area yellowish, cleft, margin of cleft slightly brownish; face and parafacials gray, upper parafacial with brownish dotting, these merged laterally. Antenna yellowish brown, style slightly infuscated; scape about twice as long as thick, cylindrical, subshiny; pedicel with distinct dorsal projection; first flagellomere rather slender, longer than scape, and more than twice as long as high. Palpus pale, slender, with mostly white hair. Scutum brownish, with paler stripes, particularly laterally; area before scutellum narrowly and indistinctly paler; scutellum grayish posteriorly; pleuron gray. Wing pale grayish with paler marks in usual pattern; subapical band slender, sinuous, tapering posteriorly and reaching hind margin; no pale marks on posterior border, but posterior cells with oblique submarginal bands. Legs yellowish brown, femora all pale, tarsi darkened; fore coxa not darkened

distally; fore tibia with basal two-fifths pale; midtibia and hind tibia with two pale bands, basal band broadest. Abdomen brown with broad middorsal stripe and sides gray; venter gray, darkened midventrally.

Distribution.—India (Assam).

This species resembles *bicolor*, which, however, has a strong black interantennal spot, a solid black spot on the upper parafacial, and a less distinctly striped scutum.

***Haematopota spenceri*, new species**

(Figs. 117, 244)

Holotype, female, Dalat, 6 km south, 1400–1500 m, Vietnam, June 9 to July 7, 1961, N. R. Spencer (BBM). Paratypes: 20 ♀, same data as holotype; 1 ♀, DiLinh, 1200 m, April 22–28, 1960, Quate; 1 ♀, 40 km north of DiLinh (Djiring), 540 m, April 27, 1960, Leech; 1 ♀, Dalat, 1500 m, April 28–May 4, 1960, Quate and Quate; 1 ♀, Mt. Lang Biam, 1500–2000 m, May 9–June 8, 1961, Spencer; 4 ♀, Fyan, 900–1000 m, July 11–August 9, 1961, Spencer; 3 ♀, Dalat, Vassal. (BBM, BM, CBP, PIP, USNM)

Female.—Length 9.5–11.5 mm; wing 8.5–11 mm; antenna 2.5 mm. Frons yellow gray, about three-fourths as wide at vertex as high, widened below; midfrontal spot minute or absent; paired spots dark brown, subtriangular, one angle touching eye; callus orange brown, shiny, touching eyes 2.25–3 times as wide as high, upper margin broadly convex or with median point, lower margin nearly straight; subcallar area with only very narrow shiny lobes; rather large interantennal dark spot; face and parafacials white except for variable brown markings on upper parafacial, extent depending on light angle; beard white. Scape orange brown, cylindrical, 2.5–3 times as long as thick; pedicel short and stout with small dorsal projection; flagellum slender, about 1.3 times as long as scape, darkened distally; style rather stout. Palpus yellowish, slender, tapering with mixed black and white hair. Scutum brown with three slender pale stripes, sublateral ones expanded at transverse suture, and broader lateral stripe; narrow pale band in front of scutellum; scutellum uniformly brown; pleuron gray. Wing brown with usual pattern of pale spots in rosettes; subapical band slender, irregular, usually crossing wing, curved inward; hind margin of wing usually with pale spots but some, including holotype, without these. Halter with brownish knob. Legs: Coxae gray; femora yellowish gray, fore pair often darker, and all slightly darkened distally; fore tibia white on basal half, rest dark brown; midtibia and hind tibia each with two ill-defined pale

bands; tarsi dark. Dorsum of abdomen brown; terga II-VI with median yellowish triangles; incisures yellow; venter yellowish gray, slightly darkened medially.

Distribution.—Vietnam.

This species resembles *hindostani*, which is, however, smaller, has less evident abdominal triangles, a scape that is thinner distally, and less white on the fore tibia. It also resembles *helvi-venter*, which has, however, a proportionately narrower frontal callus, with a more convex upper margin. One paratype was determined by the junior author as *pungens*, which has, however, denuded triangles below the callus and a partially doubled subapical wing band.

We are pleased to name this species in honor of N. R. Spencer, collector of most of the specimens.

Haematopota splendens Schuurmans Stekhoven

(Figs. 48, 171)

Haematopota splendens Schuurmans Stekhoven, 1926, p. 95; Philip, 1963, p. 531.

Haematopota truncata Schuurmans Stekhoven, 1926, p. 126.

Chrysozona splendens (Schuurmans Stekhoven): Philip, 1960b, p. 76.

Types.—♀, *splendens*. Bukit Kutu, Malaya (BM); ♀, *truncata*, Pasar Sibahoean, Djandi Lobi, Sumatra (NE).

Female.—Length 7.5–9 mm; wing 6.25–7.5 mm; antenna 1.75–2.25 mm. Frons dark grayish brown, width at vertex three-fifths of height, distinctly wider below; midfrontal spot a small triangle; paired spots usually round, touching eyes; callus shiny black, protuberant, about two-fifths as high as wide, touching eyes, upper part a broad flattened lobe, lower margin incised in middle; subcallar area with short shiny triangle on either side of black interantennal spot and shiny lower margin below callus laterally; upper parafacial with solid dark-brown area and often some darkening on upper face; rest of lower head white with white hair. Scape shiny black, cylindrical, about twice as long as thick; pedicel short with dorsal projection; flagellum black, moderately slender, about 1.5 times length of scape. Palpus yellowish with mostly black hair. Notum uniformly dark brown except for pair of indistinct, slender stripes and distinct, quadri-lobed, gray area before scutellum, including prealar sclerite; pleuron gray. Wing dark brown with pattern of small white spots; subapical band usually complete, curved inward; marginal spots in posterior cells except usually in cell 4. Halter with yellowish-brown knob. Legs dark; fore tibia about two-fifths white basally;

midtibia with two strong white bands; hind tibia with strong basal band and slightly indistinct subapical spot on anterior surface. Abdomen dark brown with narrow incisures on terga, small triangle on tergum II, and broad gray bands on venter.

Male.—Essentially agreeing with female except for usual differences in eyes. Frontal triangle shiny, protuberant; scape slightly stouter than in female; subapical band of wing and posterior marginal spots larger.

Distribution.—Borneo, Malaya, Sumatra, Thailand.

This species is close to *atomaria*, which has, however, the dark of the upper parafacial distinctly broken into spots and a distinctly coarser wing pattern (figs. 171, 179).

Haematopota striata, new species

Holotype, female, Naduvattam, Nilgiri Hills, India, 1958, P. S. Nathan (CU).

Female.—Length 10 mm; wing 10 mm; antenna 2.3 mm. Frons grayish brown, paler around frontal spots and eye margin; width at vertex about 0.85 of height, distinctly widened below; spot small, round; paired spots subtriangular, just touching eyes, well separated from callus; callus black, about four times as wide as high, broadly touching eyes, upper margin nearly straight, lower margin concave centrally; subcallar area with black median spot without cleft, on either side of which is low rounded shiny area but not distinct triangular projection; face and lower parafacials gray, upper parafacial mottled with brown spots; beard white. Antenna black; scape shiny with abundant black hair, nearly 2.5 times as long as thick, cylindrical, slightly tapered distally; pedicel with short dorsal projection; flagellum rather slender, first flagellomere shorter than scape, tapered to style. Palpus gray with mixed dark and pale hair, rather slender. Scutum brown with five rather distinct stripes, midstripe very slender, submedian and lateral stripes broader; no distinct pale band on posterior margin but prescutellar sclerite pale; scutellum brown, hind margin and center paler; pleuron mostly gray. Wing brown with pale marks, particularly anteriorly basad of stigma; subapical band slender, curved inward, broken in cell R₁; hind margin of wing almost continuously pale. Halter knob mostly brown. Coxae gray, fore coxa brown distally; fore femur dark brown, midfemur and hind femur yellowish brown, blackened near tip; fore tibia with basal third yellowish; midtibiae mostly yellowish but with three dark and two pale bands indicated; hind tibia yellowish brown with two rather indistinct pale bands; midtarsus

and hind tarsus pale basally. Abdomen brown dorsally with narrow yellowish incisures, rather broad gray middorsal stripe, and broad gray lateral margins; small oblique gray sublateral spots faintly indicated; venter nearly uniformly gray with yellowish hairs and slender yellow incisures.

Distribution.—India (Madras).

This species bears some resemblance to *schmiedti* but differs in the distinct striping of the abdomen (for which it is named) and continuous pale hind margin of the wing.

Haematopota takensis, new species

(Fig. 153)

Holotype, female, about 5 km east of Mae Sot, 16° 43' N, 98° 37' E, Tak Province, Thailand, about cattle, July 10, 1969, J. J. S. Burton (CU). Paratypes, 25 ♀, same data, some about man (BM, CBP, CU, USNM).

Female.—Length 8–10 mm; wing 7.5–8.5 mm; antenna 1.5–1.8 mm. Frons brownish gray, subshiny at vertex to either side of central gray stripe above small midfrontal spot; width at vertex about 0.84 of height, slightly widened below; paired spot rather small, nearly round, well separated from eyes and callus; callus yellow to nearly black, usually latter, protuberant, touching eyes below, about three times as wide as high; upper margin concave beneath each paired spot; lower margin shallowly concave; subcallar area with large black interantennal spot and small yellow band above each antenna; face gray, slightly brownish above; parafacial gray with large solid black area above; beard sparse, white. Antenna uniformly yellow; scape cylindrical, distinctly expanded distally, about twice as long as distal thickness, shorter than first flagellomere; pedicel with short dorsal projection; first flagellomere compressed, its greatest height nearly half of length and as great as or greater than length of stout style. Palpus slender, grayish brown with mixed dark and pale hair. Scutum yellowish brown, humerus, three stripes, pair of strong triangles at transverse suture, and pair of strong, transverse crescentic spots in front of scutellum, pale; scutellum grayish yellow basally, darker posteriorly; pleuron yellowish gray with brown spots on lower anepisternum. Wing rather pale brown with paler spots in usual pattern; subapical band oblique, narrowed, and often broken posteriorly, ending in vein R_5 , often with additional spot on wing margin in middle of cell R_1 ; marginal triangles in posterior cells 3 and 5, sometimes also in cells 1 and 2. Halter knob dark brown. Legs mostly yellow, tibiae darker distally and tarsi

dark except for base of midtarsus and hind tarsus; fore coxa completely yellow; fore tibia with narrow basal pale band; midtibia and hind tibia each with two indistinct pale bands. Abdomen yellow brown above with paler incisures, faint pale middorsal stripe from triangle on tergum II to middle of VI; very faint pale sublateral spots sometimes present on posterior terga; venter pale, darkened medioposteriorly.

Distribution.—Thailand.

This species is very close to *javana* but is a little smaller and paler and differs from *javana* as keyed.

***Haematopota taunggyiensis*, new species**

(Fig. 225)

Holotype, female, Mt. Victoria, Chinhills, 1400 m, Burma, March and April 1938, G. Heinrich (BM). Paratypes: 4 ♀, Taunggyi (as Taungyi on label), Burma, May 1934, F. J. Meggitt; 1 ♀, Chiangmai Fang, northwest Thailand, 500 m, April 12-19, 1958, T. C. Maa. (BBM, BM, USNM)

Female.—Length 8-9.5 mm; wing 8-10 mm; antenna 2-2.4 mm. Frons yellowish gray, about 0.66 to 0.75 as wide at vertex as height, slightly widened below; rather large midfrontal black spot; paired spots rather large, ovoid, usually touching eyes; callus orange brown to dark reddish brown, nearly three times as wide as high, rugose, upper and lower margins nearly straight; distinct dark interantennal spot present; face and parafacials pale yellowish gray, upper parafacial with two dark marks separated by transverse pale area; beard pale. Scape orange, 2-2.5 times as long as thick, cylindrical; pedicel short with distinct dorsal projection; flagellum orange brown, darkened distally, about 1.3 times as long as scape, slender, tapering. Palpus yellowish brown with long pale hair and shorter dark hair. Scutum brown with slender median stripe, slightly broader submedian stripe, expanded at transverse suture, and wider lateral stripe; scutellum with pale spot on disk; pleuron yellowish gray. Wing with usual pattern of pale spots on brown background; subapical band irregular, usually crossing wing; small marginal triangles in most or all posterior cells. Halter with knob brown laterally. Legs: Coxae gray; femora yellow brown, fore femur darkest; fore tibia dark brown, basal two-fifths white; midtibia and hind tibia each with two pale bands; midtarsus and hind tarsus pale basally. Abdomen rather light brown with pale incisures and trace of mid-dorsal pale stripe; venter yellowish brown, sometimes darker medially.

Distribution.—Burma, ? India, Thailand.

There is also a specimen in the British Museum labeled "Po-choka, 24.5.10 R. Lister" and "Probably Pachora, Khandesh, Bombay." Because of the uncertainty of the locality and possible remoteness from the other localities we do not include this as a paratype.

The Thailand specimen had first been determined as *latifascia* and later as *montana*. The former, however, has a heavy black area across the head below the eyes, whereas the latter has a longer scape, which is slightly constricted at the distal third.

Haematopota tenasserimi Szilady

(Figs. 75, 204)

Haematopota tenasserimi Szilady, 1926, p. 7.

Chrysozona cordigera (Bigot): Philip, 1960b, p. 61 (misidentification).

Haematopota cordigera Bigot: Philip, 1963, p. 525 (misidentification).

Type.—Tenasserim, Burma (NMW).

Female.—Length 8.5–10 mm; wing 8–9.5 mm; antenna 1.8–2.1 mm. Frons gray, densely clothed with black hairs at vertex and usually with whole central part blackened engulfing midfrontal and paired spots; if latter are visible, they lie close to eye and dorsal lobe of callus; callus black or rarely dark reddish, protuberant, slightly wrinkled centrally, with broad middorsal lobe that is also slightly protuberant; below subcallus, mesally a pair of yellowish-brown to black, shiny triangles, narrow cleft between slightly darkened; face and parafacials gray, latter slightly darkened at upper corner; beard white. Antenna yellow to brownish, flagellum usually darkened; scape cylindrical, shiny; flagellum long and slender. Palpus gray with black hair and some white hair ventrally. Scutum dark brownish with yellow hair and almost no pattern of gray pollinosity; pleuron gray. Wing with several rosettes of pale spots; subapical band extending across wing, sometimes narrowly broken into two spots of variable width; usually all posterior cells with pale marginal triangles. Halter yellow. Coxae gray; fore femur dark; midfemur and hind femur dark to reddish gray; fore tibia white, distal fourth black; midtibia and hind tibia with two rather broad white bands, intervening dark area sometimes weak. Abdomen black, terga with strong gray posterior margins; no sublateral spots; venter gray, sterna VI–VIII darkened with pale posterior margins.

Distribution.—Burma, Cambodia, Laos, Malaya, Thailand, Vietnam.

We have seen 48 specimens of this species including two syn-

types. These are both labeled "Tenasserim. Fruhstorfer" and with Szilady's determination and type label. We have selected the better of the two as lectotype. Szilady's var. *tonkiniana* is certainly a distinct species. Collection dates are from January to July and at altitudes of from 370 to 1,200 meters.

We first identified this species as *cordigera*, but an examination of the type of *cordigera* showed that it was a different species. These differences are noted under *cordigera*. *H. tenasserimi* is a slightly variable species, principally in the intensity and extent of the blackened area on the frons, the width of the subapical wing band, and the amount of black between the pale bands of the hind tibia.

Haematopota tessellata Ricardo

(Figs. 90, 218)

Haematopota tessellata Ricardo, 1906, p. 120; 1911, p. 348; Senior-White, 1927, p. 17.

Type.—Hot Wells, Trincomalee, Ceylon (BM).

Female.—Length 8.5–9 mm; wing 7–8 mm; antenna 1.8–2 mm. Frons dark brownish gray, paler margining eye and in center of vertex; width at vertex subequal to height, slightly widened below; no midfrontal spot; paired spots large, nearly round, well separated from eyes, less so from callus; callus nearly black, about three times as wide as high, just touching eyes below, upper margin subtriangular or with middorsal point, lower margin concave above antennae; subcallar area broadly black centrally, yellowish gray above antennae; face and parafacials gray, upper parafacial with black area broken transversely; beard sparse, white. Antenna yellowish brown, flagellum beyond base dusky to black; scape shiny, cylindrical, slightly constricted at distal third; pedicel with short dorsal projection; first flagellomere subequal in length to scape, slender. Palpus dark grayish brown with mixed dark and pale hairs. Notum dark brown, humerus pale, pattern on scutum indistinct but with some gray before scutellum; pleuron dark gray. Wing brown with many rather coarse spots in usual pattern; subapical band irregularly doubled; all posterior cells with pale marks at wing margin. Halter yellow with dark lateral mark at base of knob. Legs mostly brown; fore coxa gray on basal half; fore tibia with narrow subbasal pale band; midtibia and hind tibia with two pale bands; midtarsus and hind tarsus pale basally. Abdomen dark brown dorsally with gray forming narrow median stripe, rather large spots on terga IV–VI, well-developed incisures,

and sides rather broad; venter dark brown centrally, gray laterally.

Distribution.—Ceylon.

This description is based on two females collected by P. B. Karumaratne, Polonnaruwa, Polonnaruwa District, Ceylon, December 27, 1969. The female and male types in the British Museum are in very poor condition, but the female agrees well with one of these recent specimens. The pattern of frons, wing and abdomen, narrow fore tibial band, and shape and color of scape combine to make the species rather distinctive.

***Haematopota thurmanorum*, new species**

(Figs. 113, 240)

Holotype, female, Doi Sutep, Chiangmai, Thailand, June 12, 1952, D. C. and E. B. Thurman 809B (CBP). Paratypes: THAILAND: 1 ♀, Loei Dansai, Nao Haeo, May 16, 1955, R. E. Elbel; 1 ♀, Chiang Mai Province, Huai Kaeo, June 10, 1969, K. Somporn; 2 ♀, Fang (Agr. Expt. Sta.) 600 m, June 14, 1965, P. D. Ashlock; 2 ♀, Chiangmai, July 2, 1952, Thurmans 891B; LAOS: 1 ♀, Mg Phang, Sayaboury Province, 400 m, June 12, 1967, F. G. Howarth; 1 ♀, Sayaboury, Sayaboury Province, September 30, 1966; 13 ♀, Ban Van Eue, Vientiane Province, May 15–31, 1965, May 31, 1966, June 30, 1966, May 31, 1967, and September 30, 1967. (BBM, BM, CBP, CU, USNM)

Female.—Length 6.5–8.5 mm; wing 7–8.5 mm; antenna 1.7–2 mm. Frons gray, slightly higher than wide, sides nearly parallel; midfrontal spot present, sometimes very small; paired spots round or ovoid, usually touching eyes, separated from callus; callus dark reddish brown to black, about twice as wide as high, touching eyes, upper margin usually convex and weakly angulate, lower margin nearly straight; interantennal spot black; face gray with pair of rather distinct dark spots; parafacials gray with brownish speckling above; beard white. Scape dull yellow orange with black hair, cylindrical, about 3.5 times as long as thick; pedicel short without dorsal projection; flagellum long and slender, first flagellomere orange brown, subequal to scape in length, style black. Palpus gray with mixed black and pale hair. Scutum brown with faint grayish stripes anteriorly and distinct gray band on posterior border covering prescutellar sclerite; scutellum dark brown; pleuron gray. Wings pale grayish brown with usual pattern of pale spots; subapical band usually complete, straight, but with irregular margins; all, or all but posterior cell 4, with elongate marginal triangles. Halter knob dark. Fore coxa gray; fore

femur grayish; fore tibia dark with about basal third white; mid-femur reddish gray; hind femur yellowish brown, darkened on distal third; midtibia and hind tibia each with two pale bands; tarsi dark, midpair and hind pair sometimes very narrowly paler basally. Dorsum of abdomen brown with pale incisures; faint elongate gray triangle on tergum II, sometimes followed by faint middorsal pale stripe; sometimes very small sublateral gray spots on posterior terga; venter gray, brownish centrally posteriorly.

Distribution.—Laos, Thailand.

This small species can be recognized by the characters given in the key. We take pleasure in naming the species in honor of the collectors.

Haematopota tiomanensis, new species

(Figs. 45, 249)

Holotype, female, Sedagong, Tioman Island, Malaya, 900 ft, May 1927, N. Smedley (BBM). Paratypes, 5 ♀, same data as holotype (BBM, USNM).

Female.—Length 7 mm; wing 6 mm; antenna 1.8 mm. Frons brownish gray; width at vertex 0.75 of height, widened below; midfrontal spot small, indistinct; paired spots large, touching eyes, nearly touching callus; callus reddish brown, four times as wide as high, broadly touching eyes, upper and lower margins nearly straight; subcallar area a shiny yellowish brown, weakly cleft triangle above black interantennal spot; face gray, narrowly brownish at top; parafacial gray with solid black area above, tapered laterally; beard sparse, white. Antenna reddish brown; scape shiny, cylindrical, weakly constricted near middle, about four times as long as thick; pedicel with small dorsal projection; flagellum rather slender, subequal in length to scape. Palpus rather stout, dark gray, with mostly black hair. Notum dark brown with yellowish hair, pattern indistinct; pleuron dark grayish. Wing brown, slightly darker anteriorly beyond stigma; pale markings of small spots in usual pattern; subapical band broken into three slender spots; posterior cells with marginal triangles in all but cell 4. Halter yellowish brown including stem. Legs dark brown except for white on basal two-fifths of fore tibia, four-fifths of midtibia, and two-thirds of hind tibia; fore tibia slightly swollen. Abdomen dark brown with dark hair above; some pale hairs ventrally.

Distribution.—Malaya.

This small dark species can be recognized by the solidly black

upper parafacial, shiny subcallar area, single-banded tibiae, and dark fore coxae.

Haematopota tonkiniana Szilady, new status

(Figs. 80, 209)

Haematopota tenasserini var. *tonkiniana* Szilady, 1926, p. 8.

Type.—Chiem-Hoa, central Tonkin (NMW).

Female.—Length 7.5 mm; wing 7.75 mm; antenna 1.9 mm. Frons gray, in certain lights with darkened triangle at vertex; no distinct midfrontal spot; paired spots rather small, oblique, touching eyes but well separated from callus; callus chestnut brown, not strongly protuberant, upper margin convex with flattened median projection; central part slightly wrinkled; width at vertex 1.5 of height; subcallar area with two yellowish triangular projections separated by cleft but without black inter-antennal spot; face and parafacials clear gray; beard sparse, white. Antenna yellow, distal half of flagellum darkened; scape slender, about 2.5 times as long as thick, slightly curved; flagellum long and slender. Palpus pale brown with dark hair. Notum yellow brown with mostly yellow hair; paler grayish stripe from humeral callus back to just above wing base and slender median stripe that widens before scutellum and covers disk of scutellum; pleuron mostly grayish. Wing with pattern of rather large pale spots including three distinct circles; subapical band curved inward, ending posteriorly in enlarged spot at wing margin; pale triangle in hind margins of all posterior cells except cell 4; broad pale band across discal cell. Halter yellow, knob slightly darkened. Fore coxa clear yellow brown with pale hair; fore femur darker brown with dark hair; fore tibia nearly half white basally, apical part dark with black hair; midfemur clear yellow; midtibia dark with narrow subbasal and subapical pale bands; hind femur yellow brown, slightly darkened distally; hind tibia dark brown, with subbasal white band occupying about one-third and narrow, incomplete band at distal third; tarsi dark, midtarsus and hind tarsus slightly paler at base. Abdomen brown with narrow pale incisures and faint median triangle on tergum II; no sublateral spots; venter mixed yellowish and gray.

Distribution.—Northern Vietnam.

This description is based on two female syntypes seen on loan from the Vienna Museum labeled "Central-Tonkin, Chiem-Hoa, Aug.-Sept. H. Fruhstorfer." We selected the better specimen as a lectotype and raised the variety to a full species status. Three

additional specimens have been seen from the Pasteur Institute labeled "Tonkin 1910, Mathis et Léger."

Haematopota torrevillasii, new species

(Figs. 87, 215)

Holotype, female, 60 km south of Bontoc, Abatan, Buguais, Mountain Province, Philippines, 1800-2000 m, June 9-15, 1964, H. M. Torrevillas (BBM). Paratypes: 5 ♀, 1 ♂, same data as holotype; 18 ♀, 6 ♂, same locality but April 1, May 10-14, 28-29, 31, 31-June 1, June 1, 1-4, 2, 2-4, 16; 1 ♀, Ifugao Province, Jaemal Bunhian, 24 km east of Mayoyao, 800-1000 m, May 9-10, 1967 (all Torrevillas). (BBM, BM, CBP, USNM)

Female.—Length 9-11 mm; wing 8.5-10.5 mm; antenna 2-2.5 mm. Frons brownish gray, width at vertex about 0.6 of height; midfrontal spot distinct; paired spots large, separated by about width of one, broadly touching eyes and nearly or quite touching callus; callus smooth, nearly black, protuberant, about twice as wide as high, broadly touching eyes, broadly convex above, bi-concave below, median, weakly cleft triangle projecting between antennae; face and parafacials gray, sometimes without any dark speckling, sometimes with some speckling on upper parafacial, and two paratypes with speckling over face and near eyes even to back of head. Antenna dark reddish brown; scape shiny, with black hair, cylindrical, nearly three times as long as thick; pedicel with short dorsal projection; flagellum moderately slender, first flagellomere subequal to scape in length. Palpus gray or reddish with mixed black and pale hair. Notum dark brown with striping indistinct; usually pair of spots behind transverse suture and pair of triangles with posterolateral lobes anterior to scutellum; pleuron gray. Wings brown with rather narrow markings in usual pattern; subapical band slender, curved, usually broken into three spots, rarely partially doubled; posterior margin with spotting variable, sometimes nearly absent, sometimes with well-developed triangles. Halter knob yellowish brown. Fore coxa pale except near apex; legs mostly reddish brown, fore legs darkest; fore tibia with about basal two-fifths white; midtibia and hind tibia each with two rather broad pale bands; base of midtarsus and hind tarsus faintly paler. Dorsum of abdomen dark with pale incisures and occasionally with pale-gray sublateral spots on posterior terga; venter gray, darkened medially.

Male.—Large and small facets of eye distinctly differentiated; distinct black spot on frontal triangle. Generally more reddish brown than female, particularly abdomen basally.

Distribution.—Philippines (Luzon).

This species is similar to *abbreviata* and *holtmanni*. It is larger than both, has larger paired frontal spots and stronger gray spots anterior to scutellum. In *holtmanni* the subcallar projection is strongly split and the frontal triangle of the male does not bear a black spot; in *abbreviata* the antenna is longer and more slender.

We dedicate this species to the collector of all the specimens of the type-series.

Haematopota tosta, new species

(Figs. 19, 142)

Holotype, male. Sayabour, Laos, 1,000 ft. July 6, 1967, F. G. Howarth (CU). Paratype, 1 ♂, same locality as holotype, May 30, 1967, Howarth (CU).

Male.—Length 9–10.5 mm; wing 9–9.5 mm; antenna 1.8–2 mm. Eye facets large except for narrow band of small facets laterally and lateroventrally; frontal triangle gray with small subshining bilobed frontal callus; subcallar area with black spot; face and parafacials nearly white, upper parafacial with large oval solid black spot; beard white. Antenna yellow, scape shiny with dorsal black spot on distal half; scape about twice as long as wide, swollen, with long hair; first flagellomere compressed with distinct angle near middle above, about as high as length of style. Palpus rather stout, tapered, pale yellow with long pale hair. Scutum yellowish gray with five rather broad but faint paler stripes, submedian pair ending in triangles before scutellum; pleuron gray with pale hair. Wing pale gray brown with usual pattern; subapical band sinuous, ending posteriorly in faint triangle on posterior margin. Halter with pale stem, dark knob. Coxae and femora yellowish with long pale hair, hind femur with black distal tuft of coarse hairs; fore tibia dark with basal third pale; midtibia with two pale bands; hind tibia brownish with long black hairs and two yellowish bands, subbasal one slightly narrower than subapical one; tarsi dark, midtarsus and hind tarsus pale basally. Abdomen yellowish basally, darker apically, with broad pale incisions and pale median triangles on terga II and III.

Distribution.—Laos.

The name is the Latin adjective referring to the scorched appearance of the upper distal part of the scape. We have been unable to associate this male with any known female.

Haematopota tuberculata Meijere

Haematopota tuberculata Meijere, 1911, p. 284; Schuurmans Stekhoven, 1926, p. 81.

Type.—Gunong Pantjar, near Buitenzorg, Java (AM).

Female.—Length 7 mm; wing 7 mm; antenna 1.2 mm. Frons yellowish gray, width at vertex about 0.57 of height, with parallel sides; no midfrontal spot; paired spots of medium size, oval, vertical, separated from eyes, lower margin below top of callus; callus dark brown, consisting of arch about half width of frons and vertical oval spot separated from arch; subcallar area reddish, upper margin subshiny; no central cleft or dark spot; face and parafacials uniformly gray; beard grayish; upper part of eye near inner margin with strong swelling. Antenna yellow; scape about twice as long as greatest thickness, narrower basally; pedicel short, black haired, with no dorsal projection; flagellum apparently rather slender, first flagellomere subequal in length to scape and pedicel combined. Palpus rather slender with mostly dark hair. Scutum brown; pale grayish-yellow pattern consisting of humerus, slender median stripe slightly widened posteriorly, submedian stripe anterior to transverse suture ending in oblique yellowish spot behind it, and lateral margin broadly; scutellum with broad central yellowish stripe, brown on sides; pleuron gray. Wing pale gray with weakly contrasting paler spots in usual pattern; subapical band curved inward from anterior margin, just crossing vein R_1 ; small marginal triangles in all posterior cells. Halter with knob yellow brown. Legs rather pale brown, paler bands rather indistinct; all tibiae with narrow subbasal pale band; midtibia and hind tibia each with subapical band; midtarsus and hind tarsus paler basally. Abdomen dorsally brown with median yellow-gray stripe, broad on first tergum, tapering to posterior end; incisures narrowly pale, forming weak triangles on anterior terga; venter gray, slightly brownish centrally and posteriorly.

Distribution.—Java.

We have seen one female in the British Museum labeled "N JAVA: Moeria, 2-4,000 ft, XII 1935." The flagellum is missing and it is slightly smaller and perhaps paler than the type. Schuurmans Stekhoven's figure of the frons and antenna is probably more accurate than that of Meijere. The head of the type is missing. The peculiar swelling on the eye and the unusual frontal callus are different from those of any known species of the genus.

Haematopota u-nigrum, new species

(Figs. 11, 133)

Holotype, female, LAOS, Vientiane Province, Muong Kaw, Muong Tourakom, 180 m, May 22, 1968, F. G. Howarth (CU). Paratype, 1 ♀, Vientiane Province, Bam Na Pheng, 11 km west of Bankeun, 190 m, May 19, 1968, Howarth (USNM).

Female.—Length 9–9.5 mm; wing 9–9.5 mm; antenna 1.8 mm. Frons pale yellowish gray, paler around paired spots and eye margin; scattered dark hairs particularly at vertex and fringe of long white hairs below each paired spot; width at vertex about 0.70 of height, vertex slightly concave, sides of frons distinctly divergent below; midfrontal spot faint, small, brown; paired spots large, black, subquadrate, oblique, well separated from eyes, nearly touching callus; callus smooth, yellow brown, touching eyes, about four times as wide as high, upper margin concave below each paired spot, lower margin deeply concave in center, weakly convex laterally; interantennal spot unusually large, black; most of face and parafacials solid velvety black, only lower margin of each white with abundant long white hair. Scape shiny yellow brown, about twice as long as thick, with mostly black hair, longest ventrally and at apex dorsally; pedicel strongly crescentic; flagellum yellow brown, subequal in length to scape; first flagellomere strongly compressed, nearly 0.8 times as high as long; style short, much narrower than, and seated in concave apex of, first flagellomere. Palpus stout, white, with long white hair and few black hairs distally. Scutum black except for narrow pale margins, including humerus, broad central pale yellowish-brown stripe from anterior margin nearly three-fourths of distance to hind margin, and slender middorsal stripe to scutellum; scutellum entirely pale; pleuron white with longitudinal brown stripe and long dense white hair. Wing gray with white markings in usual pattern, but these sparse on basal third, and small and disconnected on distal third; subapical band irregularly doubled, fading out posteriorly; marginal spots of posterior cells small, faint. Halter with brownish knob. Fore coxa white except narrowly black distally; fore femur dark with very long black hair; fore tibia narrowly white basally, rest black with long black hair; midfemur pale; midtibia pale with three black bands, one basal, one subbasal, and one apical, subbasal pale area much narrower than more distal pale band; hind femur grayish brown, slender, with mostly long pale hair dorsally, long black hair ventrally; hind tibia much enlarged and compressed, brown with two rather in-

distinct yellowish bands, long white hairs ventrally near middle, long black hairs dorsally; all tarsi dark. Abdomen dark brown above with middorsal row of broad triangles resting on narrow pale incisures on most terga; sides of abdomen with abundant white hair; venter reddish gray, slightly darkened posteriorly with narrow paler incisures.

Distribution.—Laos.

This is one of the most distinctive of the Oriental species. The striking thoracic pattern separates it from all the others with enlarged, heavily haired hind tibiae.

The name is a noun in apposition and refers to the black, U-shaped scutal pattern.

***Haematopota unizonata* Ricardo**

(Figs. 69, 197)

Haematopota unizonata Ricardo, 1906, p. 118; 1911, p. 332; Schuurmans Stekhoven, 1926, p. 94; Senior-White, 1927, p. 25.

Types.—♀, ♂, Hakgala, Ceylon (BM).

Female.—Length 9 mm; wing 8–8.5 mm; antenna 2.2 mm. Frons brown with gray bordering eye, around and above median spot, and around paired spots; width at vertex about 0.68 of height, widened below; midfrontal spot small; paired spots large, rounded, slightly higher than wide, touching eye, narrowly separated from callus; callus orange brown to dark reddish, about three times as broad as high, touching eyes, sometimes with rather broad middorsal extension; lower margin concave above antennae; interantennal spot large, black; face and parafacials gray, upper parafacial with irregular brown markings; beard white. Scape reddish brown with black hair, cylindrical, about four times as long as thick; pedicel with distinct dorsal projection; flagellum nearly black, long and slender, first flagellomere and scape subequal. Palpus slender and tapering with mixed black and white hairs. Scutum reddish brown with five distinct grayish stripes, midstripe slender, submedian stripe broken near posterior fourth; strong quadrilobed pale-gray area on posterior margin including prescutellar sclerite; scutellum uniformly brown; pleuron gray. Wings brown with usual pale pattern; subapical band complete or nearly so, of variable width; marginal triangles large in posterior cells 3 and 5, small or absent in others. Halter knob brownish laterally. Fore coxa gray basally, brown apically; femora brown, midfemur with considerable grayish basally; all tibiae about one-third white basally; midtibia with subapical

band; basal two-thirds of midbasitarsus and hind basitarsus pale. Abdomen brown with narrow incisures and small sublateral spots on terga III-VI; venter mostly brown with broad pale incisures.

Male.—Large and small facets of eye distinctly differentiated; frons with bilobed shiny callus above interantennal spot; upper parafacial almost entirely dark with only flecks of paler brown; scape shorter and stouter than in female; subapical band of wing broad as shown in Ricardo (1911, fig. 12); faint subapical spot on hind tibia.

Distribution.—Ceylon, ? Malaya, ? Sumatra.

We have seen specimens from the hills of central Ceylon only. The records from Malaya and Sumatra are extremely doubtful. The female may have the subapical band of the wing fully as broad as in the male, and there may be a very small pale spot on the hind tibia subapically. This species bears some resemblance to *kaulbacki* of Burma, in which, however, the paired frontal spots are smaller and triangular and the abdomen lacks sublateral spots.

Haematopota varifrons, new species

(Figs. 82, 210)

Holotype, female, Huai Keao, 18° 48' N, 98° 57' E, Chiang Mai Province, Thailand, May 9, 1969, J. J. S. Burton (CU). Paratypes, 74 ♀, same locality, following dates in May 1969: 2 (15), 8 (4), 9 (26), 10 (3), 10-15 (17), 15 (1), 21 (6), 28 (1), 29 (1), (BM, CBP, CU, USNM). More than 1,500 additional specimens, including males, not designated as paratypes have been seen from the following localities: CAMBODIA: 50 km west southwest of Khong; Domphey Phong; LAOS: Muong Sing, northwest of Luang Prabang; Vientiane; Provinces of Wapikhamthong; Savannakhet; Sedone; MALAYA: Perlis-Bukit Ternets; THAILAND: Provinces of Loey; Ubon Ratchathani; Rat Buri; Nakhon Si Thammarat; Trang; Songkhla; VIETNAM: Dahan, Annam; Trang Bom, 30 miles northwest of Saigon.

Female.—Length 6.5-10 mm; wing 6.5-8.5 mm; antenna 1.5-2 mm. Frons gray with usually diffuse dark-brown pattern, often with strong dark triangle at vertex above small midfrontal spot; width at vertex 0.63-0.75 of height, scarcely widened below; paired spots small, triangular, touching eyes, widely separated from callus; callus dark reddish brown to black, protuberant, with median depression, about 2.5 times as wide as high, touching eyes broadly, upper margin nearly straight, except for small

TE 1489 (1974) USDA TECHNICAL BULLETINS N UPDATA
THE ORIENTAL SPECIES OF THE TRIBE HAEMATOPOTINI (DIPTERA: TABANIDAE)
STONE, A. PHILIP C. B. 3 OF 3

flattened median lobe, lower margin biconvex with pair of bare wrinkled triangles extending onto subcallar area separated by wide cleft; no dark interantennal spot; face and parafacials gray, upper parafacial in certain lights irregularly brownish; beard white. Antenna yellowish brown to dark reddish brown, palest at base of first flagellomere, style slightly darkened; scape shiny, slightly swollen, about twice as long as thick; pedicel grayish with short dorsal projection; first flagellomere subequal to scape in length, about twice as long as basal height and length of style. Palpus grayish brown with rather long, pale, and some intermixed dark hair. Scutum brown with rather distinct pattern of paler gray-brown stripes; midstripe slender anteriorly, ending posteriorly in inverted elongate triangle; submedian stripes either broad or doubled, terminating behind transverse suture in distinct spot; sublateral stripes broad; pair of crescentic transverse spots on posterior margin; scutellum gray centrally, posterior margin reddish; pleuron mostly gray. Wing dark brown with usual pattern of gray marks; subapical band complete, irregular, usually with inner partial band attached anteriorly, at both ends, or completely fused to form single broad band; all or all but posterior cell 4 with white marginal triangles. Halter pale yellow. Coxae all gray with white hair; fore femur dark brown; mid-femur grayish; hind femur reddish brown; fore tibia with basal two-fifths to three-fourths white; midtibia and hind tibia each with two pale bands; midtarsus and hind tarsus faintly paler basally. Abdomen dark brown with dorsal gray pattern of broad incisures, median stripe widened to form triangles on tergum II, lateral margins, and inverted sublateral triangles on terga III-VI; venter mostly gray, darkened basally on posterior sterna.

Male.—Similar to female but distinctly yellower; frontal triangle yellow usually with brownish central spot; antenna entirely yellow; scape shorter, scarcely shiny; pale area of fore tibia less well defined; abdomen yellower and without sublateral spots.

Distribution.—Cambodia, Laos, Malaya, Thailand, Vietnam.

This species has been confused with *pungens* of Indonesia, but in *pungens* the frontal callus is more convex with a curved upper margin whereas in *varifrons* the upper margin is straight except for a small middorsal projection and the surface is more rugose, usually with a median depression. The species is rather variable in the distinctness of the paired spots of the frons, shape and color of the scape, extent of white on the fore tibia, and width of the gray incisures on the abdomen, but attempts to segregate two taxa were finally abandoned.

Haematopota vassali, new species

Holotype, female, Dalat, Annam, August 1905, Dr. Vassal (PIP).

Female.—Length 8.5 mm; wing 8 mm; antenna 1.3 mm. Frons gray, darker at vertex and with paler gray in narrow central stripe above small black midfrontal spot and bordering eyes and paired spots; paired spots black, rather small, ovoid, vertical narrowly separated from eyes, well separated from callus; callus reddish brown, twice as wide as high, badly touching eyes, convex above, weakly concave below; interantennal spot narrow, black, cleft below; crescentic yellow spot above bases of each antenna; face and parafacials yellowish gray, latter with only very faint speckling above. Antenna yellow orange; scape pollinose, distinctly expanded distally, length about 1.5 times height at apex and about 0.55 of length of first flagellomere; pedicel with distinct dorsal projection; first flagellomere stout, greatest height five-ninths of length; style stout, its length about 0.8 of height of first flagellomere. Palpus yellowish, rather slender with mostly dark hair. Scutum with humerus, slender median stripe broken on disk gray; pair of partial sublateral pale-brown stripes forming narrow triangles behind transverse suture; posterior margin grayish; scutellum gray centrally; pleuron yellowish gray with concolorous hair. Wing brown with paler yellowish marks in usual pattern; subapical band slender, sinuous, broken; posterior cells with subapical oblique bars but no triangles at margin. Halter yellow with brown knob. Legs mostly yellow, fore femur darkened anteriorly; fore tibia darker, with basal fourth pale; midtibia and hind tibia each with two pale bands; midtarsi missing; hind tarsus broadly yellowish basally. Dorsum of abdomen yellow brown with narrow incisures, narrow central stripe, narrow lateral margin, and triangular sublateral spots on terga III–VI paler yellow; venter mostly yellow.

Distribution.—Vietnam.

This is very close to *kuekidis* but differs as noted in the key.

We named the species in honor of the collector, J. J. Vassal.

Haematopota volneri (Philip), new combination

(Figs. 79, 208)

Chrysozona volneri Philip, 1959, p. 613.

Haematopota lunulata Macquart: Osten Sacken, 1882, p. 97 (misidentification).

Chrysozona lunulata (Macquart): Kroeber, 1924, p. 9 (misidentification).

Type.—Samar, Philippine Islands (USNM).

Female.—Length 10 mm; wing 9 mm; antenna 2.3 mm. Frons yellowish gray, width at vertex about 0.57 of height, distinctly widened below; midfrontal spot rather large, dark brown; paired spots large, oval, broadly touching eyes and callus, frons between spots darkened; callus chestnut brown, large, protuberant, touching eyes, occupying about half of frons, upper margin coming to point, lower margin with pair of triangular projections, slightly paler but not otherwise demarcated; no distinct interantennal dark spot; face yellowish gray with pair of orange-brown spots opposite facial pits; parafacials yellowish gray with small dark punctations above; beard pale. Antenna very long and slender; scape yellow, flagellum darker; scape subequal in length to first flagellomere. Palpus gray brown with black hair. Scutum dark brown with yellowish hair, humerus paler; area before scutellum with irregular pale band; pale spot on disk of brown scutellum; pleuron brownish gray, lower anepisternum darker. Wing brown with pattern of small spots; subapical band slender, crescentic, complete, widened posteriorly; cell R darkened before stigma; no pale spots at margin in posterior cells. Halter pale yellow. Legs mostly brown; fore coxa pale anteriorly at base; fore tibia nearly half white; midtibia with two broad pale bands; hind legs missing but described as in *monticola* with two pale bands on hind tibia. Abdomen dark brown; both terga and sterna with pale incisures.

Distribution.—Philippine Islands (Samar).

The species that Osten Sacken and Kroeber identified as *lunulata* from the Philippines is probably this species. It differs from *lunulata* in lacking a solid black spot on the upper parafacial, in having a distinctly longer flagellum, and in having the midtibia with two pale bands rather than being entirely white except darkened at the tip.

***Haematopota whartoni*, new species**

(Figs. 26, 151)

Holotype, female, 40 km west southwest of Khong, Cambodia, June 10, 1952, C. Wharton (USNM No. 72027). Paratypes, 1 ♀, same data as holotype; THAILAND: 2 ♀, Ubon Ratchathani Province, Phibum Mangsahan District, July 24, 25, 1969, Pie Chaemmanee. (CU, USNM)

Female.—Length 6–6.5 mm; wing 6–6.5 mm; antenna 1.4 mm. Frons gray, slightly brownish centrally, width at vertex about 0.8

of height, slightly widened below; midfrontal spot slightly raised, brown to nearly black; paired spots rather small, triangular, one corner touching eye, widely separated from callus; callus small, widely separated from eyes, about three times as wide as high, upper margin broadly convex, lower margin straight except for small midventral notch; subcallar area pale yellowish gray with diamond-shaped interantennal black spot; face and parafacials uniformly gray, upper parafacial with minute sparse stippling. Antenna yellow orange, scarcely darkened distally; scape cylindrical, about 2.5 times as long as thick; pedicel without dorsal projection; first flagellomere longer than scape, about twice as long as greatest height; style stout. Palpus yellowish gray, slender, with mixed dark and pale hair. Scutum brown with gray as follows: Very slender median stripe; submedian stripe to distinct spot behind transverse suture; humerus and sublateral stripe; pair of crescentic spots on posterior margin; scutellum brown basally, gray posteriorly; pleuron gray. Wing rather dark brown, heavily marked with pale gray in usual pattern; costal cell pale; subapical band complete and doubled centrally; heavily marginal triangles in posterior cells except cell 4, small one there in holotype only. Halter knob with only trace of brownish near base. Coxae entirely gray; femora grayish, hind pair slightly reddish; fore tibia with basal half pale, apical half dark; midtibia and hind tibia each with two broad pale bands. Dorsum of abdomen brown with broad gray incisures; venter gray.

Distribution.—Cambodia, Thailand.

This small fly is one of the few Oriental *Haematopota* with the frontal callus widely separated from the eyes. This character, the yellow antenna, and partially doubled subapical band readily distinguish the species.

We dedicate this species to the collector of the topotypic material.

***Haematopota yungani*, new species**

(Figs. 114, 241)

Holotype, female, Yungan City, Fukien, South China, May 12, 1961, T. C. Maa (BBM).

Female.—Length 10.5 mm; wing 9 mm; antenna 2.4 mm. Frons gray, narrowly paler bordering eyes and paired spots, slightly darker, brownish at vertex; midfrontal spot strong, round; paired spots round, broadly touching eyes, narrowly separated from callus; callus dark reddish brown, slightly rugose, slightly more than three times as wide as high, not quite touching eyes, convex

above, weakly concave below; subcallar area blackened centrally, cleft; face and parafacials gray; face with small transverse brownish mark on each side above; upper parafacial with short triangular dark spot from eye and sparse spotting above; beard white. Antenna orange brown, style dark; scape cylindrical, about three times as long as thick, scarcely expanded distally; pedicel with weak dorsal point; flagellum long, scape about three-fourths length of flagellum. Palpus yellowish brown with mixed pale and dark hair, rather slender. Scutum brown with three slender pale stripes anteriorly, rather faint pair of spots at transverse suture, and heavy crescentic spots on hind margin; scutellum nearly uniformly brown; pleuron pale brownish gray. Wing brown with rather heavy gray marks in usual pattern; subapical band broad, crossing wing, margins slightly irregular; heavy pale spots in all but posterior cell 4, that in cell 1 rectangular with small notch in distal margin, in other cells triangular. Halter knob brown. Fore coxa yellowish, darker on distal half; fore femur dark brown; fore tibia brown, basal third white; midlegs missing; hind femur pale on basal two-thirds; hind tibia with two yellow bands; hind tarsus slightly paler basally. Abdomen dark brown, discolored, but with pale incisures and faintly visible pale sub-lateral spots.

Distribution.—China (Fukien).

This is closest to *chekiangensis* among the Chinese species, but the scape is distinctly longer, upper parafacial less heavily marked, and scutellum not grayish centrally in *yungani*.

***Haematopota yunnanensis*, new species**

Holotype, female, southwest China, Yunnan, Shuan-fan-tsing-Lan chou, 7–8,000 ft, June 5, 1922, J. W. Gregory (BM). Paratype, 1 ♀, southwest China, Yunnan, west of Yangtsien, 8,000 ft, June 8, 1922, Gregory (BM).

Female.—Length 9 mm; wing 8.5 mm; antenna 2 mm. Frons rather dark gray with pale margins around black frontal spots; height and width subequal, sides nearly parallel; midfrontal spot strong; paired spots subtriangular, one angle touching eye, narrowly separated from callus; callus slightly more than four times as wide as high, broadly touching eyes, rather wrinkled, upper and lower margins subparallel, rather irregular; interantennal black spot large; face gray with three brownish spots above; parafacials gray with irregular brown spots above. Antenna yellow brown to base of flagellum, blackish beyond; scape subshiny, cylindrical, about three times as long as thick; pedicel with strong

dorsal projection; first flagellomere slightly shorter than scape, slender, scarcely tapered; style rather stout. Palpus yellowish gray, rather slender with mixed black and pale hair. Notum discolored but apparently grayish brown; humerus, spots at transverse suture, and small prescutellar spots grayish; pleuron gray brown. Wings brown with pale spots in usual pattern; subapical band slender, reaching from anterior margin to just beyond vein R₁; distinct marginal triangles in all but posterior cell 4. Halter with brown knob. Fore coxa long, yellowish gray, tip brown; femora yellowish brown, tips darkened; fore tibia brown, basal fourth to third pale; midtibia and hind tibia each with two pale bands, subapical one on hind tibia narrow; tarsi scarcely paler basally. Abdomen brown with narrow yellowish incisures dorsally; some yellow laterally on anterior terga and faint narrow middorsal triangles; venter yellowish brown.

Distribution.—China (Yunnan), ? India.

A specimen in the junior author's collection from Sikkim may be this species, but this is uncertain. It was badly damaged in transit, but what remains leaves some doubts as to its identity.

This species falls within the group containing *taunggyiensis*, *echma*, *bitineata*, and *schmidi*. The combination of rather uniformly yellow-orange scape, single subapical band broken into spots, and broad nearly parallel-sided frons will probably serve to distinguish it from all these species.

Haematopota zophera, new species

(Figs. 103, 231)

Holotype, female, Bombay, July 1909 (BM). Paratypes: 1 ♀, same as holotype but June; 1 ♀, Nagpur, 1922, G. P.; 1 ♀, Kanara, Bombay, August 1907, P. G. Patel. (BM, USNM)

Female.—Length 9–10 mm; wing 7–8 mm; antenna 1.5–1.7 mm. Frons dusky gray, height and width subequal, slightly widened below; midfrontal spot very small; paired spots rather small, slightly transverse, touching eyes, separated from callus, black; callus dark reddish, about 3.5 times as wide as high, broadly touching eyes, upper margin nearly straight except for rather broad median projection, lower margin shallowly concave centrally; subcallar area clear gray with slender median cleft; face and parafacials gray; upper parafacial with rather sparse black spotting; beard white. Antenna rather dull orange yellow, style dark; scape cylindrical, about twice as long as thick, slightly expanded distally; pedicel with no dorsal extension; first flagellomere slender, tapering, slightly longer than scape. Palpus rather

slender, yellowish gray, with mixed black and pale hair. Thorax blackish, faintly patterned with gray; humerus reddish; pleuron dark gray. Wing rather pale grayish brown with pale markings in usual pattern; subapical band usually complete, sinuous; posterior cells usually with marginal triangles joined to oblique submarginal spots. Halter knob brown. Legs rather pale brownish except for dark fore tibia and tarsus; fore coxa nearly uniformly dark gray; basal half of fore tibia white; midtibia and hind tibia with two pale bands, basal band distinctly broader than subapical band; midtarsus and hind tarsus pale basally. Dorsum of abdomen dark brown, sides broadly gray, and middorsal row of slender triangles; venter mostly gray.

Distribution.—India (Maharashtra).

This species bears a resemblance to *antennata* (Shiraki) of Korea, but the scape of *zophera* is longer and the first flagellomere more slender; it differs from *melloi* in lacking a subcallar black spot, having more slender palpi, and in being generally a larger, more slender species. Austen's labels on two of the specimens suggested that they were near *immaculata*, but in *immaculata* the fore tibia is more uniformly colored, the basal half is only slightly paler than the apical half, the wing spots are fainter, and there are no marginal spots in the posterior cells. Four *immaculata* specimens bear the same data as the first two paratypes of *zophera*.

The name is the Latinized form of the Greek adjective *zopheros*, dusky.

Nomina Dubia

Haematopota aquilina (Seguy), new combination

Chrysozona aquilina Seguy, 1934, p. 3; Liu, 1958, p. 152.

Type.—♀, China, Kou-Ling. Presumably Kuling, Kiangsi Province (NE).

The original description of this species is inadequate for keying and the type appears to be lost. It belongs in the group with a double pale band on the hind tibia. Seguy compares it with *Chrysozona aquila* Surcouf, which appears to be a nomen nudum.

Haematopota borneana Rondani

Haematopota borneana Rondani, 1875, p. 461; Bigot, 1891, p. 78; Ricardo, 1906, p. 115; 1911, p. 329; Schuurmans Stekhoven, 1926, p. 94; Guiglia, 1957, p. 195; Philip, 1963, p. 524.

Type.—♀, Sarawak, Borneo (MCG).

Although this species has been keyed three times and the type studied by Ricardo, the descriptions are not sufficiently detailed to be certain of its identity. It is possible that this is a prior name for *angustisegmentata*, but this is uncertain and until the type can be critically examined and compared with other related species the name had better not be applied. It is probable that the dark middorsal stripe on the thorax as described is the result of discoloration or abrasion. Synonymizing this species under *lunulata* is very doubtful, as noted under *lunulata*.

***Haematopota flavicornis* Szilady**

Haematopota flavicornis Szilady, 1926, p. 6.

Type.—♀, India (Major Hill) (NE).

The original description of this species is not sufficiently detailed to permit certain keying and the type specimen is lost. It appears to be very close to *assamensis*, and the characters Szilady used to distinguish it from that species are either not different or only slightly so.

***Haematopota intermedia* Schuurmans Stekhoven**

Haematopota intermedia Schuurmans Stekhoven, 1926, p. 83.

Type.—♂, Wai Lai, Lampong District, Sumatra (LU).

We have not recognized this species, although we have seen a male from Sumatra, with no further locality, dated October 22, 1966, determined by Moucha. There is so much discrepancy between the original description and the original figures of wing and leg coloration that it is impossible to be sure of the species or to run it in our key. It is probably close to *limbata*.

***Haematopota unizonata* var. *matherani* Szilady**

Haematopota unizonata var. *matherani* Szilady, 1926, p. 6.

Type.—Matheran, near Bombay (NE).

The description of this variety is so brief that its identity cannot be established. It is probably not a variety of *unizonata*. The original description is as follows: "Differing from *H. unizonata* by its abdomen being unicolorous dark brown with a broad ashy gray longitudinal middle stripe. One female measuring 7 mm in length."

Nomina Nuda

Haematopota macrocera Bigot, 1890, p. 207.

Haematopota mirabilis Schuurmans Stekhoven, 1932, p. 93.

Literature Cited

ANNANDALE, N.

1913. ADAPTATION IN THE HABITS OF A TABANID FLY. *Indian Mus. Rec.* 9: 245-246.

ANTHONY, D. W.

1962. TABANIDAE AS DISEASE VECTORS. In Maramorosch, K., *Biological Transmission of Disease Agents*, pp. 93-107. Academic Press, New York.

AUSTEN, E. E.

1908. NEW AFRICAN PHLEBOTOMIC DIPTERA IN THE BRITISH MUSEUM (NATURAL HISTORY). PT. II. TABANIDAE (CONTINUED). *Ann. and Mag. Nat. Hist. (ser. 8)* 1: 401-428.

-
1922. SOME SIAMESE TABANIDAE. *Bul. Ent. Res.* 12 (4): 431-455.

BEESON, C. F. C.

1941. THE ECOLOGY AND CONTROL OF THE FOREST INSECTS OF INDIA AND THE NEIGHBORING COUNTRIES. 1007 pp. Dehra Dun, India. (Published by the author.)

BIGOT, J. M. F.

1890. DIPTERES. In Pavie, A., *Insects Recueillis Dans l'Indo Chine*. Diptères. *Paris Mus. d'Hist. Nat. Nouvelle Arch.* (3) 2: 203-208.

-
1891. DIPTERES NOUVEAUX OU PEU CONNUS. *Soc. Zool. de France Bul.* 16: 74-79.

-
1892. DESCRIPTIONS DE DIPTERES NOUVEAUX. *Soc. Zool. de France Mém.* 5: 602-691.

BRUNETTI, E.

1912. NEW ORIENTAL DIPTERA, I. *Indian Mus. Rec.* 7 (5): 445-513.

-
1924. DIPTERA OF THE SIJU CAVE, GARO HILLS, ASSAM. *Indian Mus. Rec.* 25 (1): 99-106.

CHVALA, M.

1969. EINIGE NEUE ODER WENIG BEKANNTE BREMSEN (DIPTERA, TABANIDAE) VON NEPAL. *Acta Ent. Bohemoslovaca* 66 (1): 39-54.

COQUILLETT, D. W.

1910. THE TYPE-SPECIES OF THE NORTH AMERICAN GENERA OF DIPTERA. *U.S. Nat. Mus. Proc.* 37: 499-647.

DOLESCHALL, C. L.

1856. ERSTE BIJDRAGE TOT DE KENNIS DER DIPTEROLOGISCHE FAUNA VAN NEDERLANDSCH INDIE. *Naturk. Tijdschr. v. Nederland. Indië* 10: 403-414.

EDWARDS, F. W.

1919. RESULTS OF AN EXPEDITION TO KORINCHI PEAK, SUMATRA. DIPTERA. *Fed. Malay States Mus. Jour.* 8: 7-59.

FABRICIUS, J. C.

1805. *SYSTEMA ANTLIATORUM*. 372 pp. Brunsvigae.

FLETCHER, T. B.

1921. REPORT OF THE IMPERIAL ENTOMOLOGIST. *Pusa Agr. Res. Inst. Sci. Rpts.* 1920-21, pp. 41-59.

GUIGLIA, D.

1957. I TIPI DI DITTERI DI CAMILLO RONDANI E DI ALTRI AUTORI APPARTENENTI ALLE COLLEZIONI DEL MUSEO CIVICO DI STORIA NATURALE DI GENOVA. Genova Mus. Civico di Storia Nat. Ann. 69: 193-207.
INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE.

1963. OPINION 678. THE SUPPRESSION UNDER THE PLENARY POWERS OF THE PAMPHLET PUBLISHED BY MEIGEN, 1800. Zool. Nomenclature Bul. 20: 339-342.

ISAAC, P. V.

1932. PAPERS ON INDIAN TABANIDAE. IX. LIFE HISTORY OF HAEMATOPOTA RORALIS FB. Indian Jour. Vet. Sci. and Anim. Husb. 2 (3): 278-280.

KARSCH, F.

1887. BERICHT UBER DIE DURCH HERRN LIEUTENANT DR. CARL WILHELM SCHMIDT IN OST-AFRICA GESAMMELTEN UND VON DER ZOOLOGISCHEN ABTHEILUNG DES KONIGLICHEN MUSEUMS FUR NATURKUNDE IN BERLIN ERWORBENEN DIPTEREN. Berlin. Ent. Ztschr. 31: 367-382.

KROEBER, O.

1922. BEITRAGE ZUR KENNTNIS PALAARKTISCHER TABANIDEN (TEIL I: SURCOUFIA, HEPTATOMA, SILVIUS UND CHRYSOZONA). Arch. f. Naturgesch. 88 (A, 8): 114-164.

1924. DIE TABANIDEN DER PHILIPPINEN. Arch. f. Naturgesch. 90 (A, 1): 1-27.

LECLERCQ, M.

1966. REVISION SYSTEMATIQUE ET BIOGEOGRAPHIQUE DES TABANIDAE (DIPTERA) PALAEARCTIQUE, V. II. TABANINAE. Inst. Roy. des Sci. Nat. de Belgique Mem., ser. 2, fasc. 80, 237 pp.

LIU, WI-TEH.

1958. UBER DIE CHRYSOZONA BREMSEN AUS CHINA. Acta Zool. Sinica 10 (2): 151-160.

1962. ON THE TABANID FLIES FROM THE DISTRICTS OF YANGTZE VALLEY. Acta Zool. Sinica 14 (1): 119-129.

MACKERRAS, I. M.

1964. THE TABANIDAE (DIPTERA) OF NEW GUINEA. Pacific Insects 6 (1): 69-210.

MACQUART, J.

1838. DIPTERES EXOTIQUES NOUVEAUX OU PEU CONNUS. Lille Soc. Roy. des Sci. de l'Agr. des Arts Mem. (2), pp. 9-225.

1848. DIPTERES EXOTIQUES NOUVEAUX OU PEU CONNUS. SUITE DE 2ME SUPPLEMENT. Lille Soc. Roy. des Sci. de l'Agr. des Arts Mem. 1847 (2), pp. 161-237.

MEIGEN, J. W.

1800. NOUVELLE CLASSIFICATION DES MOUCHES A DEUX AILES (DIPTERA L.) D'APRES UN PLAN TOUT NOUVEAU. 40 pp. Paris.

1803. VERSUCH EINER NEUEN GATTUNGS-EINTHEILUNG DER EUROPAISCHEN ZWEIFLUGELIGEN INSEKTEN. Illiger's Mag. f. Insektenkunde 2: 259-281.

MEIJERE, J. C. H. DE.

1911. STUDIEN UBER SUDOSTASIATISCHE DIPTEREN. VI. Tijdschr. v. Ent. 54: 258-432.

NIESCHULZ, C.

1926. OVERBRENNINGSPROEVEN MET HAEMATOPOTA CINGULATA (WIED.). Nederland. Indië Bl. v. Diergeneesk. en Dieren. 38 (5): 385-394.

1927. ENKELE PROEVEN MET HAEMATOPOTA TRUNCATA SCHUURM. STEKH., H. IRRORATA MACQ. EN TABANUS BRUNNIPES SCH. STEKH. Nederland. Indië Bl. v. Diergeneesk. en Dieren. 39 (3): 226-238.

and PONTO, S. A. S.

1927. OVERBRENNINGSPROEVEN MET TABANUS FLAVIVITTATUS SCHUURM. STEKH., EN HAEMATOPOTA PUNGENS DOL. Nederland. Indië Bl. v. Diergeneesk. en Dieren. 39 (2): 139-149.

OLDROYD, H.

1952. THE HORSE-FLIES OF THE ETHIOPIAN REGION. V. I. HAEMATOPOTA AND HIPPOCENTRUM. 226 pp. British Museum (Natural History), London.

OSTEN SACKEN, C. R.

1881. ENUMERATION OF THE DIPTERA OF THE MALAY ARCHIPELAGO. Genova Mus. Civico di Storia Nat. Ann. 16: 393-492.

1882. DIPTERA FROM THE PHILIPPINE ISLANDS BROUGHT HOME BY DR. CARL SEMPER. Berlin. Ent. Ztschr. 26 (1): 83-120.

OUCHI, Y.

1940. DIPTERA SINICA, TABANIDAE II. NOTE ON SOME HORSEFLIES BELONGS TO GENUS HAEMATOPOTA WITH NEW DESCRIPTIONS FROM CHINA AND MANCHOUKOU. Shanghai Sci. Inst. Jour., sect. III, 4: 253-263.

PHILIP, C. B.

1959. PHILIPPINE ZOOLOGICAL EXPEDITION 1946-1947. TABANIDAE (DIPTERA). Chicago, Ill., Nat. Hist. Mus. Fieldiana, Zool. 33 (6): 543-625.

- 1960a. DESCRIPTION OF SOME TABANIDAE (DIPTERA) FROM THE FAR EAST. MALAYSIAN PARASITES xxxv. Fed. Malaya Inst. Med. Res. Studies 29, pp. 1-32.

- 1960b. A SUMMARY REVIEW AND RECORDS OF TABANIDAE FROM MALAYA, BORNEO AND THAILAND. MALAYSIAN PARASITES xxxvi. Fed. Malaya Inst. Med. Res. Studies 29, pp. 33-78.

1961. THREE NEW TABANINE FLIES (TABANIDAE, DIPTERA) FROM THE ORIENT. Indian Jour. Ent. 21 (2): 82-88.

1963. FURTHER NOTES ON FAR EASTERN TABANIDAE III. RECORDS AND NEW SPECIES OF HAEMATOPOTA AND A NEW CHRYSOPS FROM MALAYSIA. Pacific Insects 5 (3): 519-534.

-
1965. THE IDENTITY AND RELATIONSHIPS OF TABANUS (NEOTABANUS) VITTIGER AND NOTES ON TWO CASES OF TERATOLOGY IN TABANIDAE (DIPTERA). *Ent. Soc. Amer. Ann.* 58 (6): 875-880.
-
1969. SUPPLEMENTAL NOTES ON THE FAR EASTERN BIANNULARIS GROUP OF TABANUS. *Jour. Med. Ent.* 6 (2): 197-198.
- PRATT, H. C.
1909. DISTRIBUTION OF CERTAIN SPECIES OF BITING FLIES IN THE FEDERATED MALAY STATES. *Jour. Trop. Vet. Sci.* 4: 390-394.
- RICARDO, G.
1906. NOTES ON THE GENUS HAEMATOPOTA OF THE FAMILY TABANIDAE IN THE BRITISH MUSEUM COLLECTION. *Ann. and Mag. Nat. Hist.* (ser. 7) 18: 94-127.
-
1908. DESCRIPTIONS OF SOME NEW SPECIES OF TABANIDAE, WITH NOTES ON SOME HAEMATOPOTA. *Ann. and Mag. Nat. Hist.* (ser. 8) 1: 54-60.
-
1911. A REVISION OF THE ORIENTAL SPECIES OF THE GENERA OF THE FAMILY TABANIDAE OTHER THAN TABANUS. *Indian Mus. Rec.* 4 (9): 321-397, 401.
-
1913. NEW SPECIES OF TABANIDAE FROM THE ORIENTAL REGION. *Ann. and Mag. Nat. Hist.* (ser. 8) 11: 546.
-
1916. TWO NEW SPECIES OF HAEMATOPOTA FROM THE FEDERATED MALAY STATES. *Bul. Ent. Res.* 6 (4): 403-404.
-
1917. NEW SPECIES OF HAEMATOPOTA FROM INDIA. *Ann. and Mag. Nat. Hist.* (ser. 8) 19: 225-226.
- RONDANI, C.
1875. MUSCARIA EXOTICA, FRAGMENTUM III. SPECIE IN INSULA BONAE FORTUNAE (BORNEO) PROVINCIA SARAWAK, ANNIS 1865-68, LECTAE A MARCH. J. DORIA ET DOCT. O. BECCARI. *Genova Mus. Civico di Storia Nat.* 7: 421-464.
- SCHUURMANS STEKHOVEN, J. H., JR.
1926. THE BLOODSUCKING ARTHROPODS OF THE DUTCH EAST INDIAN ARCHIPELAGO VII. TABANIDAE. *Treubia* 6 (sup.): 1-151.
-
1928. THE BLOODSUCKING ARTHROPODS OF THE DUTCH EAST INDIAN ARCHIPELAGO. IX. RECENT COLLECTIONS OF TABANIDS FROM SUMATRA, MIDDLE EAST BORNEO, SOEMBA, ETC. *Zool. Jahrb.* 54: 425-448.
-
1929. OUR PRESENT KNOWLEDGE ABOUT THE PUPIPARA AND TABANIDAE OF CHINA. *Lingnan Sci. Jour.* 7: 497-510.
-
1932. BLOODSUCKING ARTHROPODS OF THE DUTCH EAST INDIAN ARCHIPELAGO. X. FURTHER NOTES ON THE TABANIDS OF INDIA, SUMATRA, JAVA, BORNEO, CELEBES AND SOME OF THE MOLUCCAS. *Arch. f. Naturgesch.* (B, 1) 1: 57-94.

SEGUY, E.

1934. DIPTERES DE CHINE DE LA COLLECTION DE M. J. HERVE-BASIN. Encyc. Ent. (B II), Diptera, 7: 1-28.

SENIOR-WHITE, R. A.

1921. NEW CEYLON DIPTERA. Spolia Zeylanica 11: 381-395.

- 1922a. NOTES ON INDIAN DIPTERA, 2. NOTES ON THE TABANIDAE IN THE COLLECTION OF THE FOREST ZOOLOGIST. India Dept. Agr. Mem., Ent. Ser. 7 (9), pp. 103-107.

- 1922b. NOTES ON INDIAN DIPTERA. 3. NEW SPECIES OF DIPTERA FROM THE INDIAN REGION. India Dept. Agr., Ent. Ser. 7 (9), pp. 107-169.

1925. NEW CEYLON DIPTERA. Spolia Zeylanica 13 (2): 209-212.

1927. CATALOGUE OF INDIAN INSECTS. PT. 12, TABANIDAE. 70 pp. Government of India, Calcutta.

SHIRAKI, T.

1918. BLOOD-SUCKING INSECTS OF FORMOSA. PT. I. TABANIDAE. Taihoku Agr. Expt. Sta., Formosa, pp. 1-442.

1932. SOME DIPTERA IN THE JAPANESE EMPIRE, WITH DESCRIPTIONS OF NEW SPECIES. Formosa Soc. Nat. Hist. Trans. 22 (121): 259-280.

SURCOUF, J.

1909. NOTE PRELIMINAIRE SUR LA SYSTEMATIQUE DU GENRE CHRYSOZONA. DESCRIPTION DE DEUX GENRES NOUVEAUX. Paris Mus. Natl. Hist. Nat. Bul. 15 (7): 453-458.

SZILADY, Z.

1926. NEW AND OLD WORLD HORSEFLIES. Biol. Hungarica 1 (7): 1-30.

WALKER, F.

1848. LIST OF THE SPECIMENS OF DIPTEROUS INSECTS IN THE COLLECTION OF THE BRITISH MUSEUM. V. 1, 229 pp. London.

1857. CATALOGUE OF THE DIPTEROUS INSECTS COLLECTED AT SARAWAK, BORNEO, BY MR. A. R. WALLACE, WITH DESCRIPTIONS OF NEW SPECIES. Linn. Soc. London, Jour. Proc., Zool. 1: 105-136.

WIEDEMANN, C. R. W.

1821. DIPTERA EXOTICA. 244 pp. Kiliae, Germany.

1828. AUSSEREUROPAISCHE ZWEIFLUGELIGE INSEKTEN. 608 pp. Hamm.

WULF, F. M. VAN DER.

1882. DIPTERA. In Veth, P. J., Aardrijkskundig Genootschap Midden-Sumatra Expeditie. Nat. Hist. 4 (9), pp. 1-63.

ZIMSEN, E.

1954. THE INSECT TYPES OF C. R. W. WIEDEMANN IN THE ZOOLOGICAL MUSEUM IN COPENHAGEN. Spolia Zool. Mus. Hauniensis XIV: 1-43.

Index to Names

Valid names are in roman and synonyms in italic. Boldface numbers refer to main treatment, roman numbers to key, and italic numbers to synonyms and misidentifications.

	Page		Page
abacis (Philip) -----	17, 25, 30	brunnipes, n. sp -----	14, 66
abatrata Philip -----	10, 32	burmanica Senior-White -----	15, 67
abbreviata (Philip) -----	23, 33	burtoni, n. sp -----	27, 68
achlys, n. sp -----	18, 34	cana Walker -----	14, 69
adusta, n. sp -----	27, 35	casca, n. sp -----	11, 70
<i>aequitibia</i> (emend.) -----	92	chekiangensis Ouchi -----	26, 71
albihalter, n. sp -----	10, 36	chinensis Ouchi -----	16, 72
albimanica, n. sp -----	17, 37	<i>Chrysozona</i> Meigen -----	30
albimedia, n. sp -----	18, 39	chvalai, n. sp -----	24, 73
albiocrea, n. sp -----	17, 40	cilipes Bigot -----	10, 74
albofasciatipennis Brunetti	19, 27, 41	cingalensis Ricardo -----	25, 75
alticola (Philip) -----	17, 42	cingulata Wiedemann -----	9, 77
alyta, n. sp -----	27, 43	circina Philip -----	9, 78
amala, n. sp -----	18, 44	clarkeana, n. sp -----	25, 78
ampla, n. sp -----	21, 45	<i>confuens</i> Schuurmans Stekhoven	82
angustisegmentata Schuurmans		contracta, n. sp -----	23, 79
Stekhoven -----	17, 37, 40, 46	cordigera Bigot -----	21, 80, 183
annandalei Ricardo -----	11, 47	corrigata, n. name -----	10, 13, 82
annulipes Schuurmans		crassitibia, n. sp -----	19, 82
Stekhoven -----	19, 48	cristata	
aquilina (Seguy) -----	200	Schuurmans Stekhoven -----	26, 83
areei, n. sp -----	15, 49	crossi, n. sp -----	11, 12, 84
<i>asiatica</i> Rondani -----	112	demeilloni, n. sp -----	13, 85
assamensis Ricardo -----	11, 13, 50	demellonis Senior-White -----	13, 86
atomaria Walker -----	17, 52	desmotes Philip -----	9, 28
<i>atrata</i> Philip -----	32	dissimilis Ricardo -----	18, 87
atrata Szilady -----	9, 53	echma, n. sp -----	24, 88
atriventer		elegans	
Schuurmans Stekhoven -----	16, 54	Schuurmans Stekhoven -----	22, 89
badia Philip -----	26, 55	ensifer	
barri, n. sp -----	15, 56	Schuurmans Stekhoven -----	20, 90
<i>beesoni</i> Senior-White -----	123	equina, n. sp -----	14, 91
bicolor, n. sp -----	15, 57	equitibiata	
biguttata, n. sp -----	22, 58	Schuurmans Stekhoven -----	17, 92
biharensis, n. sp -----	19, 59	famicis, n. sp -----	11, 92
bilineata Ricardo -----	12, 24, 60	fasciata Ricardo -----	19, 27, 93
biorbis, n. sp -----	9, 61	flavicornis Szilady -----	201
biroi Szilady -----	14, 62	flavipuncta, n. sp -----	16, 24, 94
bizonata		fletcheri, n. sp -----	12, 24, 95
Schuurmans Stekhoven -----	27, 63	formosana Shiraki -----	18, 97
borneana Rondani -----	200	fukienensis, n. sp -----	17, 98
brevis Ricardo -----	20, 64	fulvipes, n. sp -----	15, 99

	Page		Page
<i>fumigata</i>		<i>matherani</i> Szilady	201
Schuermans Stekhoven	22, 99	<i>mediatifrons</i>	
<i>fuscifrons</i> Auten	81	Schuermans Stekhoven	140
<i>glenni</i> Philip	10, 100	<i>melloi</i> , n. sp	26, 144
<i>gracilicornis</i> , n. sp	22, 101	<i>mirabilis</i>	
<i>gregoryi</i> , n. sp	23, 103	Schuermans Stekhoven	201
<i>gressitti</i> Philip	18, 104	<i>mokanshanensis</i> Ouchi	25, 144
<i>Haematopota</i> Meigen	8, 30	<i>montana</i> Ricardo	23, 145
<i>Haematopotini</i>	27	<i>monticola</i> (Philip)	21, 147
<i>hainani</i> , n. sp	9, 105	<i>montium</i> Szilady	69
<i>hardyi</i> , n. sp	26, 106	<i>mouchai</i> , n. sp	13, 148
<i>helviverter</i> , n. sp	26, 27, 107	<i>nathani</i> , n. sp	12, 149
<i>hindostani</i> Ricardo	23, 26, 108	<i>nepalensis</i> , n. sp	24, 151
<i>Hippocentroides</i> Philip	8, 28	<i>nigra</i> Wiedemann	119
<i>holtmanni</i> , n. sp	22, 109	<i>nigricans</i>	
<i>howarthi</i> , n. sp	9, 111	Schuermans Stekhoven	16, 151
<i>immaculata</i> Ricardo	25, 112	<i>nigrita</i>	
<i>inconspicua</i> Ricardo	27, 114	Schuermans Stekhoven	152
<i>indiana</i> Bigot	19, 114	<i>obscurata</i> Philip	30
<i>intermedia</i>		<i>oporina</i> , n. sp	18, 153
Schuermans Stekhoven	201	<i>orba</i> , n. sp	17, 154
<i>irregularis</i>		<i>ornata</i> Kroeber	97
Schuermans Stekhoven	18, 115	<i>pachycera</i> Bigot	12, 155
<i>irrorata</i> Macquart	20, 25, 117	<i>pallida</i> , n. sp	15, 156
<i>jacobsoni</i>		<i>pattoni</i> , n. sp	23, 157
Schuermans Stekhoven	19, 118	<i>paucipunctata</i>	
<i>javana</i> Wiedemann	11, 13, 119	Schuermans Stekhoven	20, 24, 158
<i>jellisoni</i> (Philip)	16, 121	<i>pechumani</i> , n. sp	21, 159
<i>jiri</i> Chvala	17, 122	<i>pendleburyi</i> , n. sp	20, 161
<i>kashmirensis</i> , n. sp	23, 122	<i>personata</i> Philip	11, 162
<i>kaulbacki</i> , n. sp	19, 123	<i>philipi</i> Chvala	26, 163
<i>kerri</i> , n. sp	18, 124	<i>picea</i> , n. sp	12, 164
<i>knekidis</i> , n. sp	14, 125	<i>pisinna</i> , n. sp	17, 165
<i>krombeini</i> , n. sp	19, 126	<i>Potisa</i> Surcouf	30
<i>lata</i> Ricardo	13, 22, 127	<i>procyon</i> , n. sp	10, 166
<i>latifascia</i> Ricardo	11, 15, 129	<i>prolixa</i> , n. sp	14, 166
<i>libera</i> , n. sp	14, 25, 130	<i>punctifera</i> Bigot	13, 167
<i>limbata</i> Bigot	14, 131	<i>pungens</i> Doleschall	22, 169
<i>lineata</i> Philip	9, 132	<i>quatei</i> Philip	52
<i>lineola</i> (Philip)	15, 133	<i>rhizophorae</i> Senior-White	134
<i>litoralis</i> Ricardo	11, 134	<i>ricardonis</i> Senior-White	64
<i>longipennis</i> , n. sp	21, 135	<i>roralis</i> Fabricius	15, 170
<i>lunulata</i> Macquart	16, 136, 135	<i>rubida</i> Ricardo	10, 171
<i>macrocera</i> Bigot	201	<i>scanloni</i> , n. sp	10, 172
<i>maculata</i> Meijere	27, 138	<i>schmidi</i> , n. sp	24, 173
<i>malabarica</i> , n. sp	14, 138	<i>segmentata</i> (lapsus)	47
<i>malayensis</i> Ricardo	18, 140	<i>sikkimensis</i> , n. sp	20, 174
<i>marceli</i> , n. sp	23, 141	<i>singarensis</i> , n. sp	19, 175
<i>marginata</i> Ricardo	20, 142	<i>singularis</i> Ricardo	10, 176

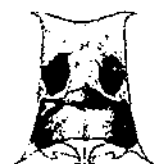
	Page		Page
<i>sparsa</i> , n. sp	25, 177	<i>tosta</i> , n. sp	11, 189
<i>spenceri</i> , n. sp	27, 178	<i>truncata</i>	
<i>splendens</i>		Schuurmans Stekhoven	179
Schuurmans Stekhoven ...	16, 179	<i>tuberculata</i> Meijere	12, 190
<i>stantoni</i> Ricardo	186	<i>u-nigrum</i> , n. sp	10, 191
<i>striata</i> , n. sp	24, 180	<i>unizonata</i> Ricardo	19, 192
<i>striatipennis</i> (Brunetti)	9, 29	<i>validicornis</i> Ricardo	155
<i>takensis</i> , n. sp	13, 181	<i>varifrons</i> , n. sp	21, 22, 193
<i>taunggyiensis</i> , n. sp	24, 182	<i>vassali</i> , n. sp	14, 195
<i>tenasserimi</i> Szilady	21, 183	<i>vietnamensis</i> Philip	176
<i>tessellata</i> Ricardo	23, 184	<i>volneri</i> (Philip)	21, 195
<i>thurmanorum</i> , n. sp	26, 185	<i>whartoni</i> , n. sp	12, 196
<i>tiomanensis</i> , n. sp	16, 186	<i>yungani</i> , n. sp	26, 197
<i>tonkiniana</i> Szilady	21, 187	<i>yunnanensis</i> , n. sp	198
<i>torrevillasi</i> , n. sp	23, 188	<i>zophera</i> , n. sp	25, 199



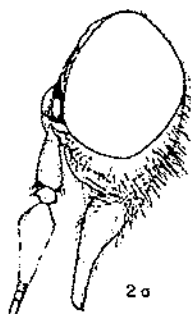
1 *desmola*



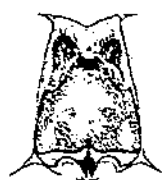
1a



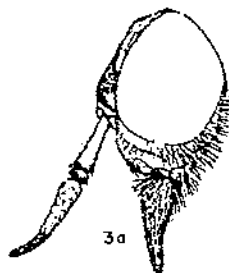
2 *atrata*



2a



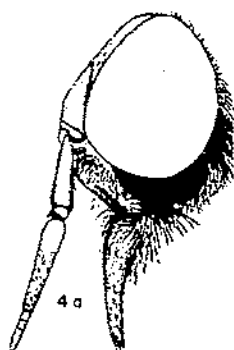
3 *cingulata*



3a



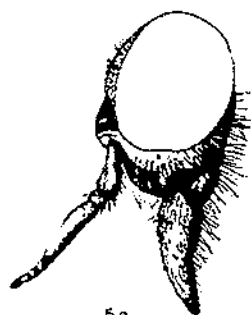
4 *howarthi*



4a



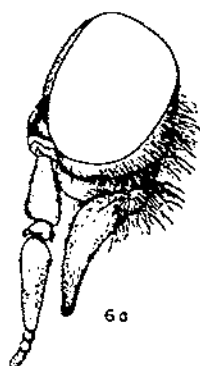
5 *biarbis*



5a



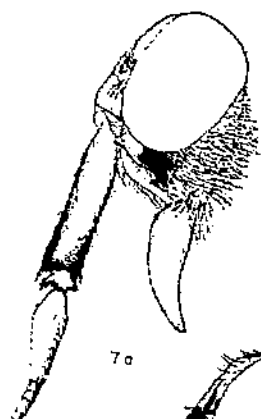
6 *hainani*



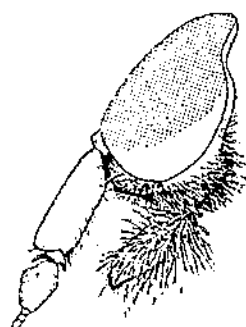
6a



7 *cilipes*



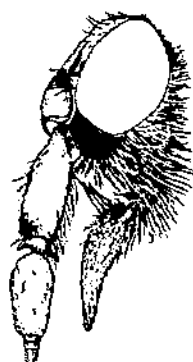
7a



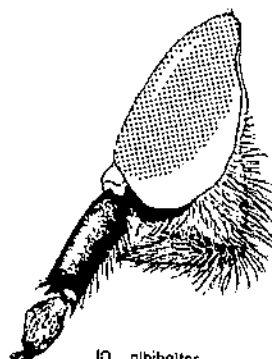
8 *scanloni*



9 *singularis*



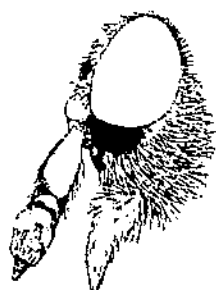
9a



10 *albihalter*



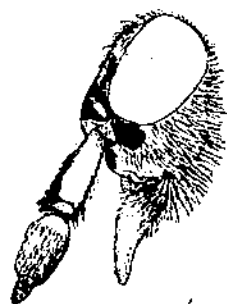
11 *v-nigrum*



11a



12 *glenni*

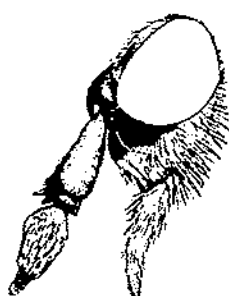


12a

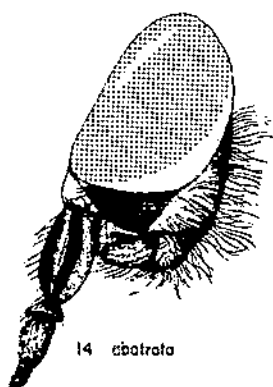
44



13 *procyen*



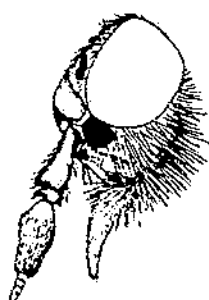
13 a



14 *ebatrola*



15 *javana*



15 a



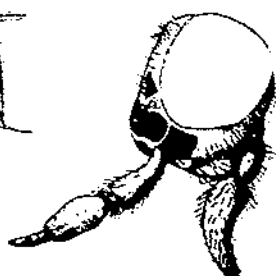
16 *crossi*



16 a



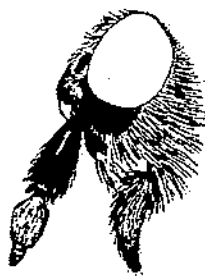
17 *assamensis*



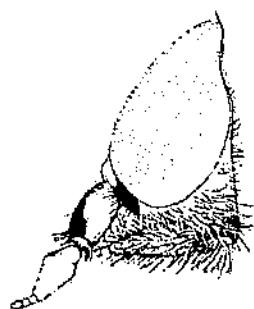
17 a



18 *personata*



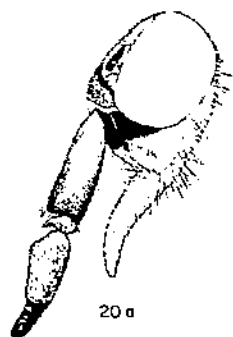
18 a



19 *tosta*



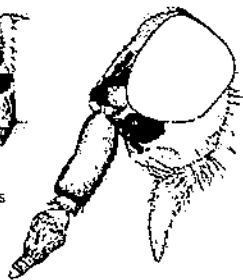
20 *lotifascia*



20 a



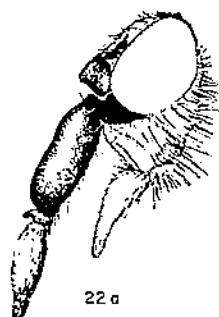
21 *litoralis*



21 a



22 *annandalei*



22 a



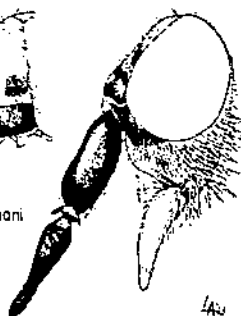
23 *pachycera*



23 a



24 *nathani*

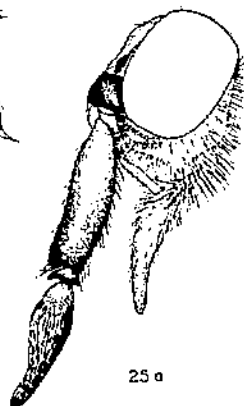


24 a

LAW



25 picea



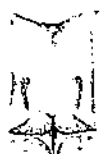
25 a



26 whartoni



26 a



27 fletcheri



27 a



28 punctiferu



28 a



29 mauchai



29 a



30 lata



30 a

44



31 *demeilloni*



31a



32 *proluxa*



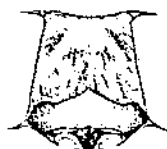
32a



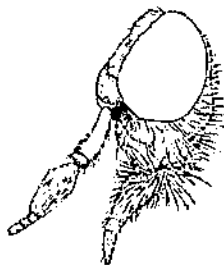
33 *malabarica*



33a



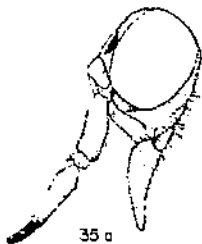
34 *limbata*



34a



35 *brunneipes*



35a



36 *birai*



36a



37 *cano*

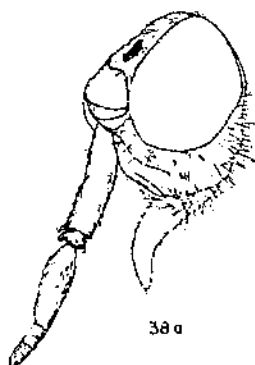


37a

492



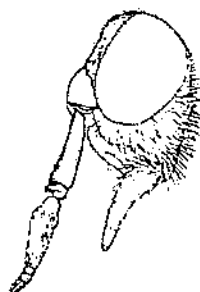
38 roralis



38 a



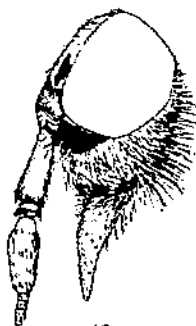
39 fulvipes



39 a



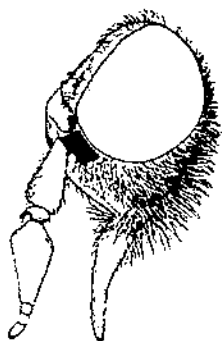
40 burmanica



40 a



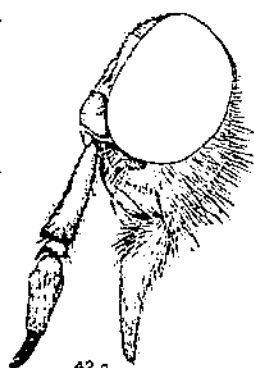
41 bicolor



41 a



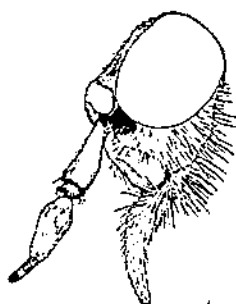
42 lineola



42 a



43 pallida

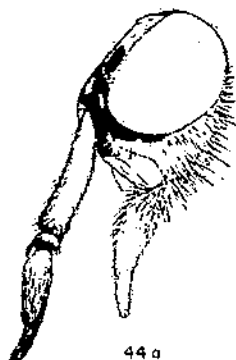


43 a

44



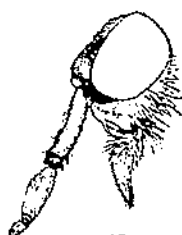
44 *creelii*



44 a



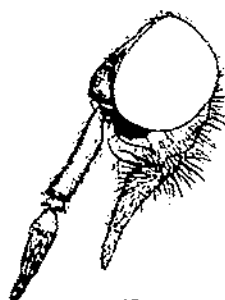
45 *tionianensis*



45 a



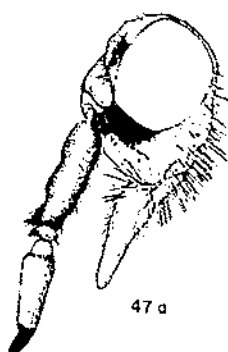
46 *lunulata*



46 a



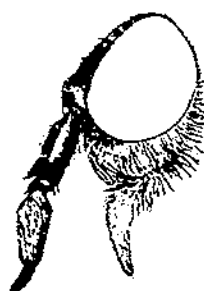
47 *chinensis*



47 a



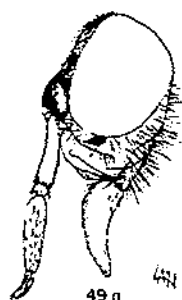
48 *splendens*



48 a



49 *jellisoni*



49 a



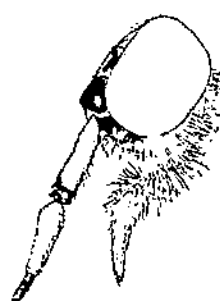
50 abactis



50 a



51 albimanica



51 a



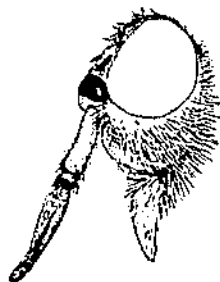
52 albiocrea



52 a



53 alticola



53 a



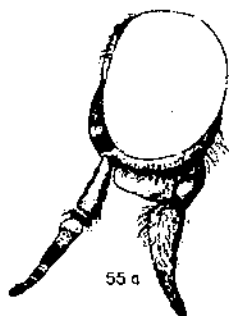
54 atomaria



54 a



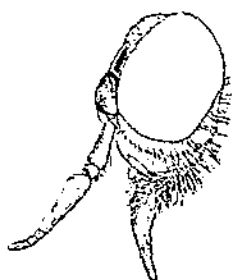
55 achlys



55 a



56 *malayensis*



56 a



57 *albimedia*



57 a



58 *irregularis*



58 a



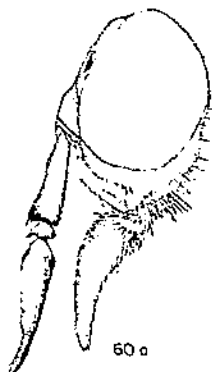
59 *amala*



59 a



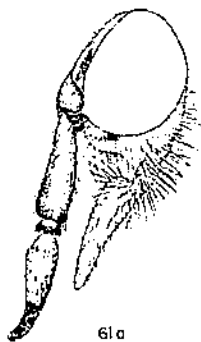
60 *gressitti*



60 a



61 *formosana*



61 a



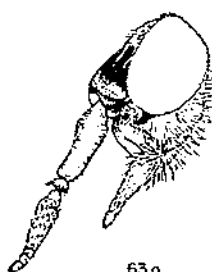
62 *oporina*



62 a



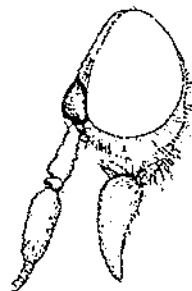
63 *krombeini*



63 a



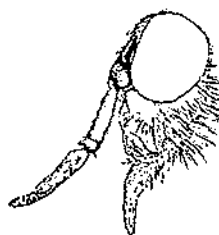
64 *jacobsoni*



64 a



65 *singarensis*



65 a



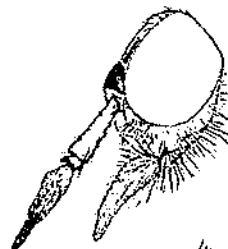
66 *biharensis*



66 a



67 *indiana*

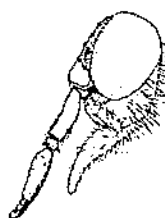


67 a

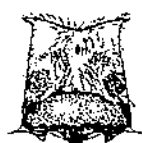
4/44



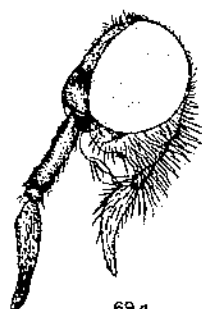
68 *albofasciata*



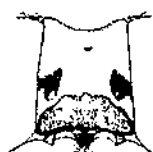
68 a



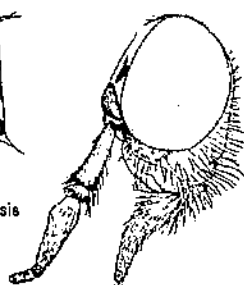
69 *unizonata*



69 a



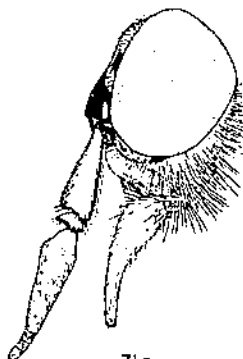
70 *sikkimensis*



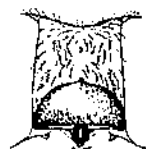
70 a



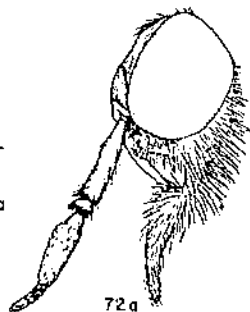
71 *pendleburyi*



71 a



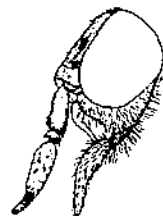
72 *paucipunctata*



72 a

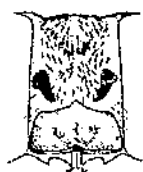


73 *marginata*

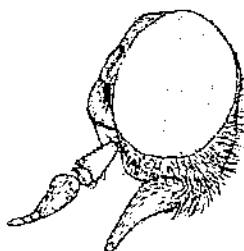


73 a

444



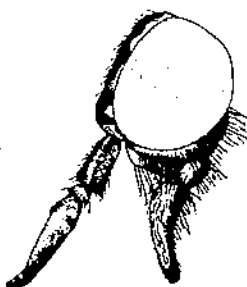
74 *brevis*



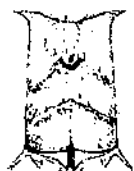
74 a



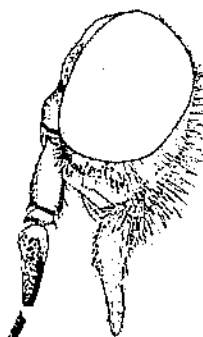
75 *tenasserimi*



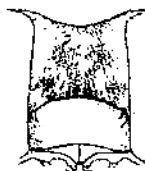
75 a



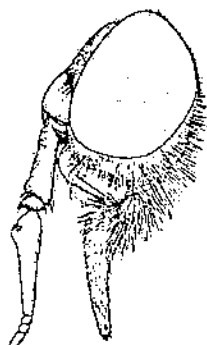
76 *pechumani*



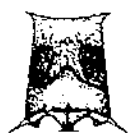
76 a



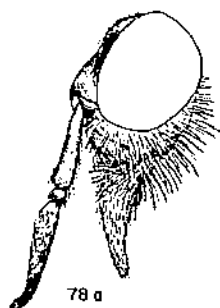
77 *longipennis*



77 a



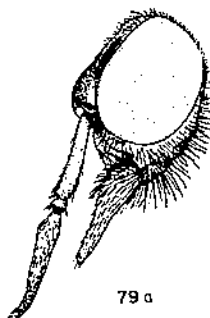
78 *monticola*



78 a



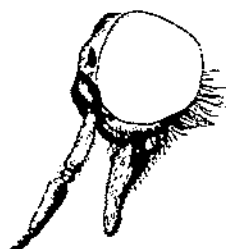
79 *volneri*



79 a



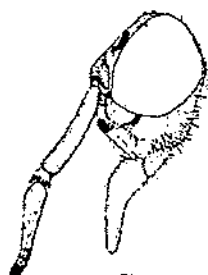
80 *tonkiniana*



80 a



81 *biguttata*



81 a



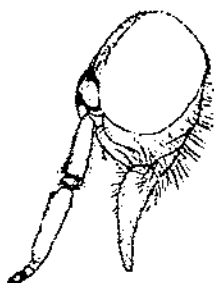
82 *varifrons*



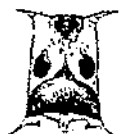
82 a



83 *holtmanni*



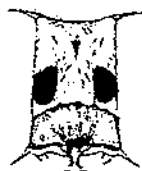
83 a



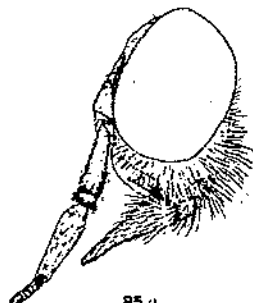
84 *gracilicornis*



84 a



85 *pungens*



85 a



86 abbreviata



86 a



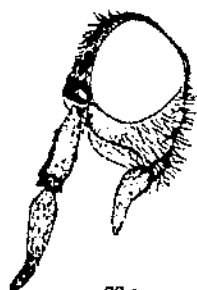
87 torrevillaei



87 a



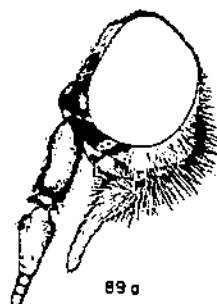
88 kashmirensis



88 a



89 marceli



89 a



90 tessellata



90 a



91 contracta

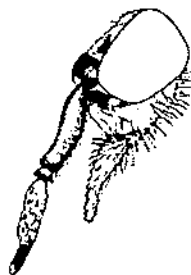


91 a

L.H.



92 *montana*



92a



93 *hindostani*



93a



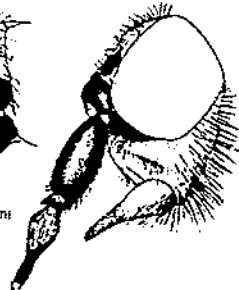
94 *gregoryi*



94a



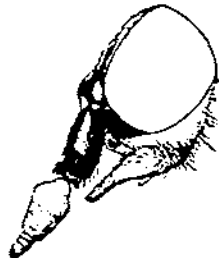
95 *pattoni*



95a



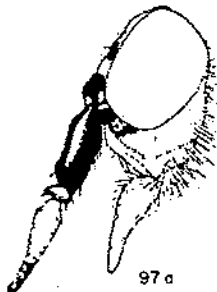
96 *flavipuncta*



96a



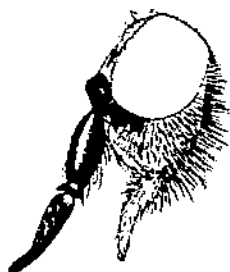
97 *schma*



97a



98 nepalensis



98 a



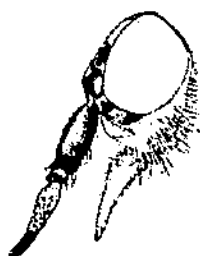
99 bilineata



99 a



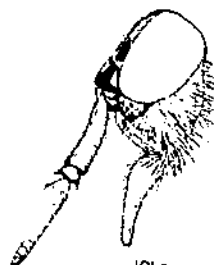
100 schmidt



100 a



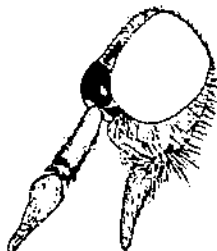
101 cingalensis



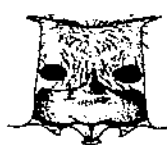
101 a



102 clarkeana



102 a



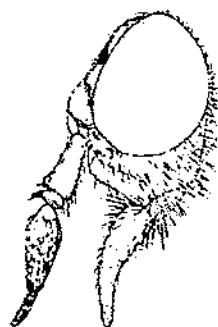
103 zaphera



103 a



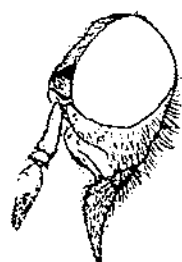
104 *sparsa*



104 a



105 *immaculata*



105 a



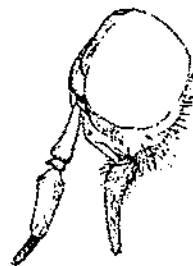
106 *fibrosa*



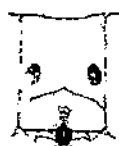
106 a



107 *irrorata*



107 a



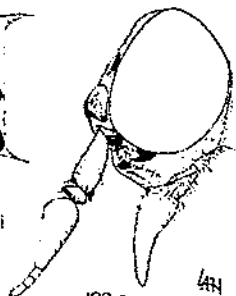
108 *basia*



108 a



109 *hardyi*

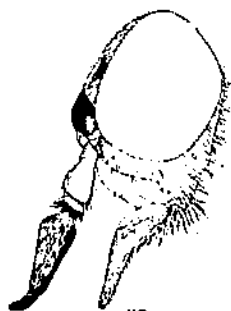


109 a

4/14



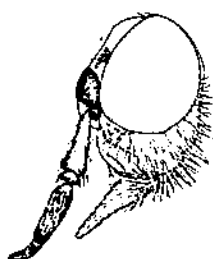
110 *cristata*



110 a



111 *philipi*



111 a



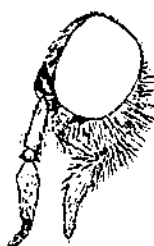
112 *chekiangensis*



112 a



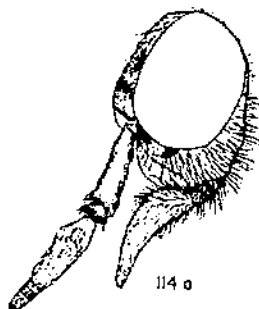
113 *thurmanorum*



113 a



114 *yungani*



114 a

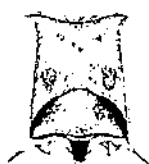


115 *inconspicua*

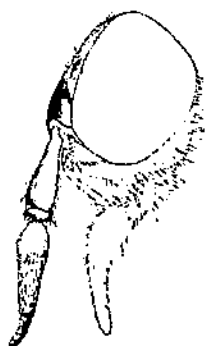


115 a

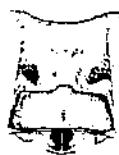
44



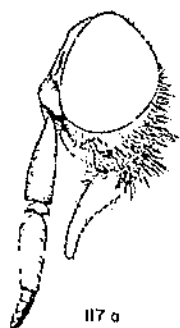
116 *helviventris*



116 a



117 *spenceri*



117 a



118 *adusta*



118 a



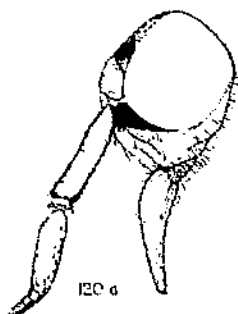
119 *burtoni*



119 a



120 *bizonata*



120 a



121 *alyta*



121 a



122 *desmotes*



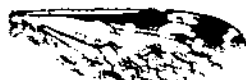
123 *atrata*



124 *cingulata*



125 *howarthi*



126 *biorbis*



127 *hainani*



128 *cilipes*



129 *scanloni*



130 *corrigata*



131 *singularis*



132 *albipaltes*



133 *u-nigrum*



134 *glenni*



135 *procyon*



136 *abatrata*



137 *crossi*



138 *assamensis*



139 *personata*



140 *javana*



141 *casca*



142 *tosta*



143 *famicis*



144 *latifascia*



145 *litoralis*



146 annandalei



147 pachycera



148 nathani



149 picea



150 bilineata



151 whartoni



152 fletcheri



153 takensis



154 punctifera



155 mouchai



156 lata



157 demelloni



158 *proluxa*



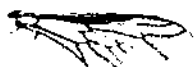
159 *malabarica*



160 *limbata*



161 *biroi*



162 *cana*



163 *roralis*



164 *barri*



165 *bicolor*



166 *lineola*



167 *pallida*



168 *areei*



169 *burmanica*



170 chinensis



171 splendens



172 jellisoni



173 abacis



174 abacis



175 albimanica



176 fukienensis



177 angustisegmentata



178 alticola



179 otomaria



180 achlys



181 kerri



182 malayensis



183 albimedia



184 albiocrea



185 irregularis



186 amala



187 gressitti



188 formosana



189 oporina



190 jacobsoni



191 singarensis



192 biharensis



193 indiana



194 albofasciatipennis



195 krombeini



196 kaulbacki



197 unizonata



198 sikkimensis



199 pendleburyi



200 irrorata



201 paucipunctata



202 marginata



203 brevis



204 tenasserimi



205 pechumani



206 *longipennis*



207 *monticola*



208 *volneri*



209 *tonkiniana*



210 *varifrons*



211 *haltmanni*



212 *gracilicornis*



213 *pungens*



214 *abbreviata*



215 *torrevillasii*



216 *kashmirensis*



217 *marceli*



218 tessellata



219 contracta



220 montana



221 hindostani



222 gregoryi



223 pattoni



224 flavipuncta



225 taunggyiensis



226 echma



227 schmidi



228 chvalat



229 cingalensis



230 clarkana



231 zophera



232 sparsa



233 immaculata



234 libera



235 badia



236 hardyi



237 cristata



238 philipi



239 chekiangensis



240 thurmanorum



241 yungani



242 *inconspicua*



243 *helviventer*



244 *spenceri*



245 *adusta*



246 *burtoni*



247 *bizonata*



248 *alyta*



249 *tiomanensis*

END