1-1-1915

Sarcophagidae of New England: Genus Sarcophaga

Ralph R. Parker
University of Massachusetts Amherst

Follow this and additional works at: https://scholarworks.umass.edu/dissertations_1

Recommended Citation

Parker, Ralph R., "Sarcophagidae of New England: Genus Sarcophaga " (1915). *Doctoral Dissertations 1896 - February 2014*. 8.
<https://doi.org/10.7275/5615770> https://scholarworks.umass.edu/dissertations_1/8

This Open Access Dissertation is brought to you for free and open access by ScholarWorks@UMass Amherst. It has been accepted for inclusion in Doctoral Dissertations 1896 - February 2014 by an authorized administrator of ScholarWorks@UMass Amherst. For more information, please contact scholarworks@library.umass.edu.

SARCOPHAGIDAE OF NEW ENGLAND: GENUS SARCOPHAGA.

By

Ralph R. Parker, M. Sc.

Thesis Submitted for the Degree of Doctor of Philosophy.

Massachusetts Agricultural College

Amherst, Mass.

1915.

LIBRARY
UNIVERSITY OF
MASSACHUSETTS
AMHERST, MASS.

1. This paper is a contribution from the Entomological Laboratory of the Massachusetts Agricultural College and represents a portion of the writer's work for the degree of doctor of philosophy.

By RALPH R. PARKER, M. Sc.

Introduction.

This paper deals with the males and females of the genus Sarcophaga Meigen and is a continuation of one previously published in the Proceedings of the Boston Society of Natural History (Vol. 35, No. 1, Sept. 14, 1914) on the males of the genera Ravinia R.-Desvoidy and Boettcheria R. Parker. It was hoped that descriptions of the females of the last two genera could be given at this time. While this has proved impossible, some reference is made to them in the appendix. Other papers will be published from time to time as opportunity permits.

The same plan of numbering the species consecutively has been followed that was adopted in part one in which seven species were described or redescribed: the first species in this paper is, therefore, number 8. The practice of indicating relationships and species groups in a paragraph preceding any species, or in the case of species groups before the first species concerned, has also been continued, the number or numbers in parentheses before the paragraph indicating the species involved. The species names are also given.

THE UNIVERSITY OF CHICAGO
 
WWW.HA.UCHICAGO.EDU

In the bibliographies, reference to the original description and the description of synonyms, all references noted in American papers, and certain references in European literature not given in the Catalogue of Palearctic Diptera are given. It cannot be positively stated that all references actually refer to the species indicated.

There can be no question that certain species described in this paper as new have been previously described by Walker or others. This cannot be determined without an examination of types. One species previously described from New England, Sarcophaga amblycoryphae Coquillett, was described from the female. As the type is not available for study and the male is unknown, the original description is quoted.

Male and female types have been designated; but if, in any species, the female described should prove to be distinct, the male shall be the type.

In addition to acknowledgements made in part one, expression of thanks for the loan of material or other reasons, is due to C. W. Metz of the Station for Experimental Evolution, Cold Spring Harbor, Long Island, N. Banks of the United States National Museum, Dr. Felt of the New York State Museum, Dr. O. C. Bartlett of Arizona, R. H. Van Zwalenburg of Porto Rico, P. Cardin of the Agricultural Experiment Station, Santiago de las Vegas, Cuba, and many others.

Sarcophaga Meigen.

1830. Sarcophaga Meigen, Syst. Besch. Zweifl. Ins., Vol. 5, p. 14
(pars).

Genotype, Musca carnaria Linnaeus.¹

1. By designation of Westwood, the sixth species, Intro.,
Vol. 2, synops., 1840, p. 140.

The thirty names which appear in Meigen's original section on the genus Sarcophaga are now found scattered among nine genera and subgenera and several of the species concerned have become genotypes. The exact standing of some of these derived genera is still an unsettled question, at least as to the extent to which they will be accepted by North American dipterologists. So far as the writer is concerned, those species which unmistakably belong to them are reserved for a future paper in the belief that the distinctions, for the most part, are well founded. Be that as it may, it is certain that Meigen's Sarcophaga was a heterogeneous group and the writer is of the opinion that this is still the case even in the restricted sense of this paper. Several of the species herein described or redescribed under the name Sarcophaga depart so far from characters of the genotype that it becomes difficult to discuss them under the same generic name. For this reason and also because so many species are unknown to the writer, no attempt is made to accurately define generic limits except that in the table of genera, characters are given which will separate all New England species now recognized from those of

other genera.

There are two characters which it seems safe to consider generic for Sarcophaga, - (1) vestiture of head never entirely black (metacephalon, at least, wholly or in part clothed with whitish or yellowish hair), and (2) the presence of four notopleural bristles. The species of Sarcophaga known to the writer also agree in having a single bristle on the middle line of the posterior face of the anterior tibia distal to the middle except that there are two in S. johnsoni n.sp.; certain other genera may also possess this character but in Wohlfartia there are at least two and sometimes others close to the median dorsal ridge, and the same character is found in S. pachyprocta n. sp., and in certain of our species that have been assigned to the genus Paraphyto which is placed among the Tachinidae. Those species of Sarcophaga having the vestiture of the third ventral plate short, so far as they are found in New England, have longer, though sometimes decumbent hair on the sides; this is in contradistinction to the species of Ravinia which have the vestiture of the same length on all parts of the plate except that hairs on the posterior margin may be longer.

Females.

As it was not feasible at the time the first part of this paper was prepared to deal with females, a comparison of male and female characters of species of this genus is necessary at this

point. The comparison is distinctly a generalization and the writer wishes to emphasize the fact that there are exceptions.

Female characters which essentially differ from the corresponding characters in the males. Breadth of front wider at its narrowest part; frontal vitta commonly broader and its sides more parallel; inner orbits of eye diverge downward from the vertex; third antennal segment not uncommonly slightly shorter and even stouter; vestiture of gena may be stronger or more profuse; vestiture of metanotum usually of short, reclinate bristles which may or may not be replaced wholly or in part by erect hairs on the scutellum; lateral vertical and orbital (usually two) bristles present; vestiture of legs short; tarsal claws shorter; posterior trochanter without "brush"; anterior face of posterior femur with the intermediate row of bristles usually reduced or wanting; posterior face, in most species, with a row of several long, well separated bristles on proximal half or somewhat more; tibiae not bearded; "comb" of middle femur often less distinct; submesotibial bristle¹ always present, longer and stronger; acrostichals and

1. On page 48 of part one it was stated that "the occurrence of a submesotibial bristle is possibly coincident in males and females of the same species." While this is true in the majority of cases it happens that it is absent in the males of some species and furnishes a valuable specific character: I have never found it absent in females.

deracentrals shorter, stouter, and more reclinate in most species; apical bristles absent; number of sternopleurals less constant, supernumeraries often present; abdomen oval or subcircular; abdominal macrochaetae shorter and less erect in most species, marginals of third segment absent in some species; vestiture of abdomen shorter and more reclinate ventrally, usually bristly; ventral plates smaller and except the first, often partly or wholly concealed, vestiture

of short reclinate bristles, at least with posterior marginal bristles; characters of genital segments.

Female characters of specific taxonomic value which are the same as the corresponding character in males of most or all species.

Cheek height compared to that of eye; plumosity of arista; number of rows of black cilia behind^d eyes; vestiture of metacephalon; vestiture of cheeks; point of insertion of vibrissae; color of spiracular hairs; color of epaulets; bristles on wing veins and characters of wing structure in general; presence or absence of anterior acrostichals and dorsocentrals; number and comparative strength of posterior dorsocentrals; presence or absence of prescutellar acrostichals; the absence of scutellar apicals in species in which they are absent in male; and the presence or absence of marginal bristles on the second abdominal segment.

In general the broad front, the presence of laterally vertical and orbital bristles, the shorter or shorter and more reclinate character of the vestiture of the metanotum, the oval or somewhat subcircular shape of the abdomen, and the lack of scutellar apicals may be considered as essential female characteristics.

In most species the character of the genital segments is specific for the female as are the penis and its accessory structures for the male. This is perhaps less true for some of the species with black genital segments. The notum of the first genital segment is commonly of one of two forms; either it is divided into two lateral lips or it is undivided and similar in form to the nota of the abdominal segments, though, of course, greatly reduced in size and altered in other ways. References in the descriptions to the "first genital segment" refer to its notum. This segment seems to represent the sixth abdominal segment (seventh morphological) as in the males and the spiracles of the

fifth segment may be seen in some species. In ^{certain} ~~some~~ species the ventral plates of the genital segments, especially the sixth, offer valuable specific characters and should be figured. In species which are perhaps the more primitive forms the ventral plates decrease in size posteriorly with no differentiation between those of abdomen proper and those of the genital segments. In other species there is a marked differentiation beginning with the fifth plate, which may be larger than those preceeding, and including the sixth, seventh, eight, and ninth; the latter, however, is usually highly modified and retracted. In the species given under the haemorrhoidalis--group the fifth and sixth plates are fused, ordinarily well exposed, and the sixth of characteristic form. The edge of the notum of first genital segment sometimes conceals the ventral plates of the genital segments, habitually in some species; in ^{others} ~~others~~ the fourth notum practically hides the whole genital structure.

In the descriptions of females only those characters are noted which differ essentially from those of the male of the same species and no reference is made to the lateral vertical, orbital bristles ^{or} ~~and~~ other characters which may be considered as distinctly female though occasionally ^{present} ~~they occur~~ in males as useful specific ~~characters~~ distinctions.

Variation.

The writer does not intend to enter upon any extended discussion of variable characters, but wishes merely to bring out the fact that the degree of variation varies within the several species. A character constant in some species may be extremely variable in others. It is impossible, therefore, to select any set of characters as continually constant within species limits in the genus and base all specific description upon them. Wherever possible variations

have been noted. An attempt has been made to render species recognizable by a fairly full description of external characters: it may be, that in seeking this end, an undue number of characters has been introduced but they are merely those which have been found useful.

Groups.

As brought out in ^{part one} (pages 29 to 35) the species of Sarcophaga tend to fall into certain species groups and isolated forms. Some of these species groups within which our New England forms fall have been designated by European writers and the same names have been employed in this paper according to Böttcher's usage of them. It must not be supposed, however, that the summary of like characters presented before the first species of the several groups is meant to define them; it merely gives the like characters for New England species of the group concerned. This plan has been followed because there are other species which will unquestionably come under any of the groups mentioned and an accurate definition of group limits should await more extended investigation of the sarcophagid fauna. Group names, then, are simply used as convenient designations, and in order to make the descriptions of value beyond the prescribed geographical limits group characters have been repeated in specific descriptions.

Generic Tables.

Males.

Due to new species which have come to my attention since the previous portion of this paper was written and to points found in further study it is necessary to present a revised table of genera.

Males of New England genera, the species of which possess any of the following characters or combinations of characters do not

belong to Ravinia, Boettcheria, or Sarcophaga: arista downy; third antennal segment pinkish; front at its narrowest part one fourth eye ^{width} ~~of eye~~ or less; vestiture of head black throughout; less than four notopleurals; first genital segment humpbacked and with two rows of bristles; accessory plates prolonged, appearing as if a division of the forceps, each prong apparently of two parts; front narrow, arista plumose (never shortly so), anterior acrostichals present, three posterior dorsocentrals, vestiture of legs short, posterior face of hind femur with ventral row of bristles, that are inconspicuous on distal third or thereabouts, lower sternopleura with more than a single row of bristles, only third vein bristly, section III of costa practically same as section V, abdomen oval and rather short, vestiture of ventral plates erect, and second genital segment small, almost discoidal (females of males presenting this combination of characters have the seventh ventral plate modified to form a prominent, more or less elongated exerted, grooved, slender or stout, accessory organ (or/guide) for depositing larvae, while the fifth, sixth and seventh ventral plates (sixth, seventh and eight morphological) ^{are} fused.

It should be remembered in using the tables presented that when several characters are given in combination that it is not sufficient to use one alone but that all must exist in the same species to locate it within the genus concerned.

1. Bristles of the intermediate row or rows on anterior face of posterior femur longer and stouter (at least as long and stout) than those of upper and lower rows, and sides of ventral plates, as a whole, diverge posteriorly (each plate wider than the one preceeding)...Boettcheria R. Parker.

Bristles of intermediate row or rows on anterior face of posterior

femur always shorter, usually much shorter, than tibiae of upper and lower legs, sometimes blunt, and sides of ventral plates, as a whole, parallel or converging posteriorly, (second may appear broadest, especially in some species of Ravinia).....2

2. Rows of frontal bristles parallel to sides of vitta, the lower most one or two bristles may be slightly more distant than those above, bases of rows may extend below base of vitta, the rows themselves almost parallel in some species, in others their basal portions slightly divergent, anterior scrotochela present, epaulets brown and light yellow or only yellowish, and lower stern plate clothed with bristles only.....Ravinia R.-Duvoldy.

Lower portions of rows of frontal bristles diverging more or less broadly toward eye orbits and may or may not extend below the base of vitta, epaulets dark, or if the frontal bristles are as in Ravinia the epaulets are dark, if epaulets are as in Ravinia the frontals are as above..Sarcophaga Meigen.

Females.

It has been by no means an easy task to prepare a generic table for females. In order to make it at all exact it has been necessary to run to species in several instances. The writer presents this table with the realization that it may be inconvenient for use, but it is sufficient to run down the species given in this paper and also ^{certain} other undescribed species of Ravinia and Sarcophaga found within New England limits.

Female specimens of New England genera, the species of which possess any of the following characters or combinations of characters do not belong to Ravinia, Psitticharia or Sarcophaga: arista feebly; third abdominal segment pinkish; vestiture of head black throughout; less than four notopleurals; notum and ventral plate

of first genital segment form a ring within which ~~are retracted~~
the remainder of the genital segments; ^{are retracted} fourth abdominal notum
without marginal macrochaetae; sixth ventral plate (seventh
morphological)¹ narrow, elongate, directed diagonally upward,

¹This ventral plate may be the fusion product of the sixth
and seventh rather than the sixth alone.

grooved for larviposition and completely ^{gilling} ~~fitting~~ the opening of
the first genital segment; seventh ventral plate modified to
form a prominent, more or less elongate, exerted, grooved, slender
or stout, accessory organ (or guide) for depositing larvae, ~~which~~ while
the fifth, sixth and seventh ventral plates (sixth, seventh and
eight morphological)^{are} fused.

1. Three almost equally strong posterior dorsocentrals.....3

Four almost equally strong posterior dorsocentrals; two
strong posterior pairs of posterior dorsocentrals with
two, three, or more short, weak, or even vestigial
pairs anterior to them; or a single strong pair of
posterior dorsocentrals with or without several weaker
pairs anterior to them.....2

2. Rows of frontal bristles parallel to sides of vitta, the
lowermost one or two bristles may be slightly more
distant than those above, bases of rows not extending
below base of vitta, the rows themselves practically
parallel; anterior acrostichals present; and epaulets
brown and light yellow or only yellowish...Ravinia R-Desvoidy.

Lower portions of rows of frontal bristles diverging more
or less broadly toward eye orbits and may or may not
extend below base of vitta, or in some species one or
more bristles below base of vitta but these not more
distant from inner edge of genae than those above from

sides of vitta; or if frontal bristles are as in Ravinia
the epaulets are dark, if epaulets are as in Ravinia
frontal bristles are as above; anterior acrostichals
present or absent; and epaulets dark....Sarcophaga Meigen.

3. Ground color of genital segments dull orange.....4

Ground color of genital segments black or blackish.....
Sarcophaga sinuata Meigen.

4. Rows of frontal bristles parallel to sides of vitta, the
lowermost one or two bristles may be slightly more distant
than those above, bases of rows not extending below base
of vitta, the rows themselves practically parallel; and
epaulets brown and light yellow or only yellowish.....
Ravinia peniculata R. Parker.

One or more bristles of frontal rows extending below base
of vitta but these not more distant from inner edges of
genae than those above from sides of vitta; and epaulets
dark.....Sarcophaga helicia Townsend.

Bases of rows of frontal bristles diverging more or less
broadly toward eye orbits, extending below base of vitta
but those bristles below never as close to inner edges
of genae as those above to sides of vitta; and epaulets
dark.....5

5. First genital notum divided into two lateral lips.....
Sarcophaga cramptoni n.sp.

First genital notum not divided into two lateral lips.....6

6. Anterior acrostichals present or absent, if present much
weaker than corresponding pairs of anterior dorsocentrals;
bristly vestiture of scutellum shorter than that of rest
of metanotum and decumbent; and first genital notum broad
not divided into two lateral lips, of similar form to
nota of abdomen proper, but seventh notum not visible within it.
Boettcheria R. Parker.

Anterior acrostichals present and scarcely weaker than corresponding pairs of anterior dorsocentrals; vestiture of scutellum not shorter than that of rest of metanotum, and not decumbent; and first genital notum narrow, not divided into two lateral lips, of similar form to notum of abdomen proper, but seventh notum is visible within it.
Sarcophaga pachyprocta n.sp.

Specific Tables.

Males.

1. Ground color of second genital segment black, blackish, brownish black or sometimes dark brownish.....2.

Ground color of second genital segment dull or brownish orange!.....7.

-
1. Sometimes blackish or even black in S. helicia Townsend. This species is usually less ^{than} 6 mm. long.
-

2. Front very prominent, at its narrowest part nearly equal to eye width; anterior dorsocentrals, anterior acrostichals and scutellar apicals absent.....johnsoni n. sp.

Front prominent, at its narrowest part never greatly exceeding one half eye width, usually less; anterior dorsocentrals present, anterior acrostichals present or absent, scutellar apicals present.....3.

3. Three pairs posterior dorsocentrals; lateral verticals present; second abdominal segment with two marginals; distal portion of anterior face of middle femur with spot of golden, yellowish or whitish reflecting hairs.
sinuata Meigen.

At least four pairs posterior dorsocentrals; marginals of second abdominal segment normally absent, if present weak, hair-like and decumbent (aldrici and uliginosa); middle femur without spot of reflecting hairs.....4.

4. Submesotibial bristle absent; anterior acrostichals absent; ventral row of bristles of anterior face of hind femur, at most, represented by a few bristles distally.. absona n.sp.

Submesotibial bristle present; anterior acrostichals sometimes present, sometimes represented only by presutural pair, sometimes absent, but weak and usually hairlike when present; ventral row of bristles of anterior face of hind femur more or less complete.....5

5. Anterior acrostichals absent; usually a fifth weak pair of ^{posterior} dorsocentrals present; abdominal nota clothed dorsally with short, reclinate bristles that are slightly more erect on the fourth notum.. tuberosa harpax (Pandellé).

At least the presutural pair of anterior acrostichals present; four pairs long, slender, posterior dorsocentrals; abdominal nota clothed dorsally with reclinate hairs that are nearly erect on fourth notum.....6

6. Only presutural pair of anterior acrostichals present; posterior tibia with a row of scarcely long, scattered hairs on distal half of posterior face... uliginosa Kramer ^{aldrichii n.sp.}

Presutural pair of anterior acrostichals present, other pairs usually present but very slender and hairlike; posterior tibia with a beard of close set, but not dense, long hairs on distal two thirds to three fourths of posterior face..... aldrichii n.sp. uliginosa Kramer.

7. Three pairs of posterior dorsocentrals, none weak.....8

Last two pairs of posterior dorsocentrals strong (sometimes only last pair in dalmatina), anterior to these two or more pairs that are always shorter and in many species rudimentary or vestigial.....10

8. Black cilia behind eyes extending practically down to foramen; breadth front at narrowest part distinctly more than one half eye width; lateral verticals present; scutellar apicals absent..... pachyprocta n.sp.

Black cilia behind eyes arranged in not more than three complete rows (may be scattered hairs below these close to epicephalon in cramptoni); breadth of front narrowest part not greater than one half eye width; lateral verticals absent; scutellar apicals present.....9

9. Small species, average length about 5 mm; first and third ~~veins~~ bristly; vestiture of legs short... helicia Townsend.

Larger species, average length about 9mm.; first vein bare; posterior tibiae bearded..... cramptoni n.sp.

10. Species with front not prominent; vestiture of lower, anterior corners of metacephalon black; at most gena with a row of minute hairs near eye orbit; one or more frontal bristles extending below base of vitta, but these not more distant from inner edge of genae than those above from sides of vitta, bases of rows slightly

divergent toward eye orbits; submesotibial bristle
 absent; lower sternopleura with bristles only;
 scutellar apicals absent; genital segments usually
 yellowish pollinose; ground color dull orange or
 somewhat darkened. New England species of residua-group, 11.

Species not having this combination of characters.....12.

11. Typically coxae, trochanters and femora dull to brownish
 orange, but this color may be restricted to femora or
 parts of femora the legs becoming almost entirely dark.
 Forceps usually exposed, distinctive (see figure 21,
 plate 8).....agilis Walker.

Legs dark, forceps rarely exposed, distinctive (see figure
 22, plate 8).....subulcata n.sp.

12. Frontal cristules parallel to sides of vitta, not extending
 below its base; scutellar apical absent...chelonias n.sp.

Bases of rows of frontal bristles diverging toward eye
 orbits, usually extending below base of vitta and away
 from inner edges of genae; scutellar apicals present...13.

13. Lateral verticals strong; vestiture of legs short (posterior
 tibiae not bearded).....utilis Aldrich

Lateral verticals absent; posterior tibiae bearded.....14

14. Vestiture of practically the entire cheek, or in some
 species that of only the posterior portion, white; either
 one or two ^{complete} rows of black cilia behind eyes(.....).....15

Cheek vestiture black throughout; three rows of black
 cilia behind eyes (~~three and sometimes~~ ^{usually} a partial fourth
 in scoparia).....18

15. Anterior and posterior beards of posterior tibiae of
 practically equal strength; tarsi shorter than their
 respective tibiae; only posterior portion of cheek with
 white hair; marginal hairs at fold of calypters dark.....
bullata n. sp.

Posterior beard of posterior tibiae always the stronger;
 Tarsi not shorter than their respective tibiae; marginal
 hairs of calypters white at fold.....16.

16. A single row of black cilia behind eyes...dalmatica Schiner.

Two rows of black cilia behind eyes.....17.

17. Submesotibial bristle absent; prescutellar acrostichals
 present.....falcata (Pendell)

Submesotibial bristle present, rarely absent; prescutellar
 acrostichals normally absent, if present rarely at all
 stout.....haenorrhoidalis Meigen.

permanently in complete and in S. trillata

18. First genital segment with marginal bristles...secaria Pandellé.
First genital segment without marginal bristles.....19.
19. Ground color of first genital segment blackish or brownish,
the segment somewhat grayish pollinose...tuberosa exuberans
(Pandellé)
Ground color of first genital segment dull orange.....20
20. Ventral row of bristles of anterior face of posterior
femur absent except for a single distal bristle; posterior
tibiae heavily bearded their full length; vestiture of
third ventral plate short and erect...divisa n. subsp.
Ventral row of bristles of anterior face of posterior femur
complete; posterior tibiae bearded, but not heavily so and
not for their full length; vestiture of third plate short
and decumbent.....tuberosa harpax (Riley)

Females.

1. Ground color of genital segment black, blackish, brownish
black or sometimes dark brownish.....2
Ground color of genital segments dull or brownish
orange.¹.....5

1. Sometimes blackish or even black in S. helicia Townsoni.
This species is usually less than 6mm. long.

2. Front very prominent; anterior dorsocentrals and anterior
acrostichals absent.....johasoni n. sp.
Front prominent; anterior dorsocentrals present; anterior
acrostichals present or absent.....5.
3. Three pairs posterior dorsocentrals; second abdominal
segment with two marginals; distal portion of anterior
face of middle femur with a spot of golden, yellowish or
whitish reflecting hairs.....sinuata Meigen.
At least four pairs posterior dorsocentrals; marginals of
second abdominal segment normally absent, if present
weak, hairlike and decumbent; middle femur without spot
of reflecting hairs.....4
4. Anterior acrostichals absent...tuberosa harpax (Pandellé).²

2. The female of S. absona is not known but would probably run
to this character.

Anterior acrostichals present, at least a presutural
pair.....aldrichia n. sp.²

²The female of S. uliginosa Kramer will run to this character:

5. Three pairs posterior dorsocentrals, none weak.....6.

Last two pairs posterior dorsocentrals strong (sometimes only last pair in dalmatina), anterior to these two or more pairs that are always shorter and in many species rudimentary or vestigial.....8.

6. Black cilia behind eyes extending practically down to foramen; anterior acrostichals present....pachyprocta n.sp.

Black cilia behind eye arranged in not more than three complete rows (may be scattered hairs below these close to epicephalon in cramptoni); anterior acrostichals present.....7.

7. Small species, average length about 5mm.; first and third veins bristly.....helicia Townsend.

Larger species, ~~average length about 9mm.~~; first vein bare.....cramptoni n.sp.

8. Species with front not prominent; vestiture of lower anterior corners of metacephalon black; at most gena with a row of minute hairs near eye orbit; one or more frontal bristles extending below base of vitta, but these not more distant from inner edges of genae than those above from sides of vitta, bases of rows slightly divergent toward eye orbits; only first genital segment normally visible, notum not divided into two lateral lips, but bent at or slightly anterior to middle of margin dorsally so that edges lateral to this point are approximated medially concealing the ventral plates of this region..
.....New England species of assidua-group..9.

Species ^{not having} ~~have not~~ this combination of characters.....10.

9. Typically coxae, trochanters and femora dull to brownish orange, but this color may be restricted to femora or parts of femora the legs becoming almost entirely dark.....assidua Walker.

Legs dark.....subsulcata n.sp.¹

¹When legs of assidua are dark it is practically impossible to separate these two species.

10. Frontal bristles parallel to side of vitta, not extending below its base.....cheloninae n.sp.

Bases of rows of frontal bristles diverging toward eye orbits, usually extending below base of vitta and away from inner edges of genae.....11.

11. Vestiture of practically the entire cheek, or in some species only the posterior portion, white; either one or two complete rows of black cilia behind eyes (...).12.

Vestiture of cheeks black throughout;.....15.

12. Only posterior portion of cheek vestiture white.....13.

Cheek vestiture almost entirely white, a few black hairs just beneath lower limit of eye or a narrow band of black hair bordering outer portion of transverse impression and lower part of posterior eye orbit.....14.

13. Tarsi shorter than their respective tibiae, prescutellar acrostichals present; sixth ventral plate commonly not visible but if so without a raised portion anteriorly.....bullata n.sp.

Tarsi not shorter than their respective tibiae; prescutellar acrostichals normally absent, if present usually weak; sixth ventral plate visible, its anterior portion raised.....haemorrhoidalis Meigen.

14. One complete row of black cilia behind eye..alutacea Schiner.

Two complete rows of cilia behind eye..fulvipes Pandellé.

15. 1. Lateral lip of notum of first genital segment comparatively

1. Females of S. tuberosa exuberans (Pandellé), and S. fulvipes dissidia n. subs. would run to this point but as they are not known cannot be included in the table. The female of tuberosa exuberans (Pandellé) would probably run out the same as tuberosa narvaenica (Riley)

narrow, their line of division dorsally almost vertical, spiracles central antero-posteriorly..tuberosa narvaenica (Riley)

Lateral lip of notum of first genital segment broad, their line of division dorsally not vertical, spiracles near anterior margin.....16.

16. First genital segment protuberant; sixth ventral plate entirely external and its posterior margin with bristle at least at sides; anterior postsutural dorsocentrals not weaker than anterior dorsocentrals.....acuticollis Pandellé.

First genital segment not protuberant; sides of sixth ventral plate overlapped by lips of first genital segment, its posterior margin bare or with hairs only; anterior postsutural dorsocentrals slightly weaker than anterior dorsocentrals.....eximius n.sp.
utilis Aldrich

leave space here.

at least one row of black cilia behind eye, usually a partial fourth in S. scoparia

(8 to 21) Sarcophaga sinuata Meigen, S. aldrichii n. sp., S. uliginosa Kramer, S. abscondita n.sp., S. johnsoni, n.sp., S. utilis Aldrich, S. tuberosa narpex (Pandellé), S. tuberosa exuberans (Pandellé), S. tuberosa sarreconise (Riley), S. laetipennis Meigen, S. delictina Schiner, S. fulvipes Pandellé, S. pallida n.sp. and S. fulvipes

discidia n.sp. All have the metacephalon complete, covered with whitish, yellowish white, or yellowish hair. Another North American

species mentioned in this paper showing the same character is S. fulvipes

Macquart. The same condition often prevails in S. scaparis Pandellé

but not uncommonly there are black hairs on the lower, anterior corners.

S. chelonise n.sp. closely approaches this condition, so much so, indeed, that it should perhaps be considered as having this character.

8. Sarcophaga sinuata Meigen.

Pl. 1, fig. 1.

1826. Sarcophaga sinuata Meigen, Syst. Besch. Zweifl. Ins., vol. 5, p. 22. Original description.

1826. Sarcophaga arvorum Meigen, Syst. Besch. Zweifl. Ins., vol. 5, p. 24.

1897. Sarcophaga bezzii Corti, Bull. Soc. Entom. Ital., vol. 29, p. 140.

1904. Sarcophaga sinuata Kramer, Zeitschr. Hymen. Dipt., vol. 4, pp. 348-349. Habits, etc.

1911. Sarcophaga sinuata Kramer, Abhandl. d. Natur. Ges. zu G8rlitz, p. 141, Taf 1, fig 1. Characters, habits, figure male genitalia.

1912. Sarcophaga sinuata Bottcher, Deutsch. Ent. Zeitschr. pp. 708-709, fig. 2. Description, occurrence, figure male genitalia.

1912. Sarcophaga sinuata Bottcher, Bull. Soc. entom. Ital., vol. 41, pp. 176, 184. Concerning Rondani's type.

1913. Sarcophaga sinuata Bottcher, Deutsch. Ent. Zeitschr., p. 366. Occurrence.

1914. Sarcophaga sinuata Parker, Proc. Bos. Soc. Nat. Hist., vol. 35, p. 40. Characters.

1914. Sarcophaga sinuata Kell., Jour. Agri. Res., vol. 2, No. 6, p. 441. Habits.

(♂, ♀) The presence of a somewhat elliptical or oval golden or whitish yellow spot of reflecting hairs on the distal third of the anterior

face of the middle femur is distinctive for this species.

Length. 5 to 9 1/2 mm.; average 8 to 8 1/2 mm.

(♂) Head. - Viewed from side parafrontals and genae with dark reflections. Breadth of front at narrowest part about one half eye width; cheek height approximately one third that of eyes. Front prominent; sides of frontal vitta parallel or very slightly converging upward, tending to be irregular. Second antennal segment dark; third less than twice length of second; arista weakly plumose on basal half or less, the upper hairs but slightly longer than those beneath. Back of head somewhat convex, with three rows of black cilia behind eyes, otherwise clothed with yellowish or whitish hair which completely covers the metacephalon. Cheeks clothed with black hair. Genae usually with a single row of hairs near lower eye orbit. Palpi dark.

Chaetotaxy. - Lateral verticals present; vibrissae inserted on line with oral margin.

Thorax. - Vestiture of metanotum consisting of short, slightly reclinate bristles. Hairs covering anterior spiracle dark brown; those of anterior margin of posterior spiracle dark brown; those of spiracular cover brown with narrow yellow border. Epaulets dark.

Wings. - Bend of fourth vein normally a right or slightly obtuse angle; anterior cross-vein usually somewhat more basal than end of first longitudinal, rarely beneath it; third vein bristly; costal spine prominent; section III of costa approximately equal to section V; alulae fringed with hair; calypters whitish or faintly discolored, margins fringed white hairs.

Legs. - Dark. Posterior trochanter with "brush," latter often concealed by coxal fringe of coarse hairs: femur spindle shaped, weakly hairy beneath; anterior face with three rows of bristles, those of intermediate row slightly the shortest, not present

distally; posterior face with ventral row of long, very slender, well separated bristles on proximal half or more: tibia straight, distal half of ventral posterior face with a row of medium long, scattered hairs: comparative length of tibia and tarsus varies, fourth segment of latter at least one half fifth. Middle coxa with a single row of bristles: femur weakly hairy beneath, anterior face with a somewhat elliptical or oval golden or whitish yellow spot of reflecting hairs on distal third, posterior face commonly with a centrally located, similar colored but fainter spot; bristles of anterior ventral row scattered, sometimes only a few near center, those of posterior row^x somewhat longer, but while close set distally do not form a "comb;" submesotibial bristle present. Ventral surface of anterior coxa with an irregular row of bristles at each side only.

Chaetotaxy. - Anterior dorsocentrals but little weaker than post^tutural; acrostichals short, often but little differentiated from bristly vestiture of praescutum, often absent; inner presuturals absent; three pairs well developed posterior dorsocentrals; prescutellar acrostichals; scutellar apicals present: three sternopleurals: lower sternopleura with a single row of bristles posteriorly, otherwise scantily clothed with hair.

Abdomen. - Somewhat conical or oval; clothed above with short, reclinate bristles or bristly hair, beneath with slightly longer hair becoming longest on fourth notum. Ventral plates as a whole with their sides slightly converging posteriorly or nearly parallel; hairy vestiture decreasing in length posteriorly, short and erect on third; all somewhat square but sides and posterior margins of second and third may be somewhat rounded. Fourth ventral plate not visible except "brushes," latter prominent and borne on proximal two thirds or more of inner edges of lamellae.

Chaetotaxy.-- Second segment with two stout marginal bristles; third with several laterals that may extend well up on dorsal margin and two equally strong marginals; fourth with complete marginal row ending ventrally in long hairs.

Genital Segments.-- Prominent, both shining black or deep brown or only one may have brownish tinge; vestiture of second the longest. First, usually well exposed, clothed with short hair, in profile slightly arched, "humps" scarcely if at all differentiated, marginal bristles very weak or even absent: second, rotund, somewhat flattened, vestiture of long hair, upper extremity of small anal area extending slightly beyond middle of posterior surface. Forceps, black or very dark, inner edges of prongs approximated nearly to tips, the latter slightly spread and with a few short hairs; base with upward flap-like extensions that bear short, sparse hairs.

(Q) Females differ from males in the following important characters.

Head.--Breadth of front at narrowest part about equal to eye width. Upper inner orbits of eyes practically parallel or very slightly diverging downward.

Legs.-- Posterior trochanter often with a slender apical spine: bristles of ventral row of posterior face of femur strong. Anterior ventral row of middle femur represented only by a few bristles at center, posterior row present on about proximal half.

Chaetotaxy of thorax.-- Anterior acrostichals occasionally present, rarely at all distinct: three or sometimes four sternopleurals; lower sternopleura with a single row of bristles only.

Abdomen.-- Oval; vestiture^{or} short, reclinate bristles except that those on ventral surface of fourth notum are more erect.

Genital Segments.-- Of same ground color and often with reflections of abdomen. First segment consisting of two lateral lips, their edges lined with bristles at least dorsally, spiracles central.

Redescribed from 48 male and 50 female specimens.

Range.-- New England:- Mass.: New Bedford, Fall River, Forest Hills, Auburndale, Wellesley, Saugus, Westport, Penikese Island, Amherst; R. I. Kingston, Newport; Conn.: New Haven, Chapinville, Hartford, Branford; N. H.: White Mountains.

United States: N. Y., N. J., Pa., Va., Ohio, Ill., Col., Mont., Minn., Calif.

Foreign: Canada (Quebec), Germany, Austria, Hungary, Switzerland, France, Italy, Scandinavia.

This species is rendered quite distinct from other native members of the genus by the presence of the two spots of reflecting hairs on the middle femur. The one on the posterior surface is usually far less noticeable and the reflecting hairs seem to be interspersed with others of the normal color. Frequently it is necessary to get just the right angle of reflection to see either spot. The bristles throughout are very prominent except a few noted in the description. The marginals of the second and third abdominal segments are unusually prominent. The presence of the former and of lateral verticals is useful in the males when the reflecting spots of the middle femur are not plain as often happens if the legs are bent against the thorax. Four sternopleurals sometimes occur in females. Dr. Böttcher (Deut. Ent. Zeitschr. 1912, p. 709) notes that there are sometimes four pairs of posterior dorsocentrals, but this condition has not been noted among the specimens examined.

There are specimens of S. sinuata Meigen in the National Museum at Washington determined as S. albiceps Meigen and S. negra Walker. The presence of the spot of reflecting hair on the posterior side of middle femur was not noted by earlier writers. Ermer calls attention to it in an article in the Zeits. ~~N.~~ Syst. Hymen. ~~X~~ Dipt. 1904 pp. 348-349, and also mentions the species as possibly attacking

certain grasshoppers. Kelly (1914) mentions ^{it} ~~this species~~ as bred from a grasshopper at Columbia Cross Roads, Pa. It is quite commonly captured when sweeping in fields, especially females.

(9 to 16) Sarcophaga aldrichi n.sp., S. uliginosa Kramer, S. absona n.sp., S. johnsoni n.sp., S. utilis Aldrich n.sp., and the subspecies of S. tuberosa Pandellé ~~including S. tuberosa sarracenica~~ of the ~~appendix~~ all lack marginal bristles on the first genital segment. These bristles are sometimes lacking in S. sinuata Meig.

(9 to 16) ^{9 to 16} Sarcophaga aldrichi n.sp., S. uliginosa Kramer, ^{S. absona n.sp.,} S. tuberosa [^] harpax (Pandellé), S. tuberosa exuberans (Pandellé), S. tuberosa sarracenica (Riley), S. haemorrhoidalis Meigen, S. dalmatina Schiner, S. falculata Pandellé. These ^{nine} species are the only ones dealt with by the writer which have a row of long, slender hairs on each side, on the connecting membrane just anterior to the "humps." This is rather an obscure character and interesting to show possible relationship rather than as a convenient specific character. These hairs are always in line with the spiracles on each side; the significance of their presence is not quite clear. S. aldrichi further agrees with the subspecies of S. tuberosa (Pandellé) in having the vestiture of the first genital segment as long as that of the second, and both aldrichi and uliginosa have a few hairs on the sutural ridge behind the last notopleural bristles as do species of both the tuberosa and haemorrhoidalis-groups that are dealt with in this paper. These two species also resemble the subspecies of S. tuberosa Pandellé in the absence of marginal bristles on the first genital segment.

(9,11) S. aldrichia n.sp., S. uliginosa Kramer, S. absona n.sp. The males of these species agree in the following important characters: viewed from side parafrontals and genae with dark reflections; front prominent; cheeks clothed with black hair; metacephalon completely clothed with yellowish or whitish hair; lateral verticals absent; metanotum clothed with fine erect hair that is sometimes quite long; hairs covering anterior spiracle dark basally, lighter toward tips, those of anterior margin of posterior spiracle dark brown, spiracular cover brownish at least centrally; epaulets dark; anterior cross-vein more basal than end of first longitudinal; costal spine vestigial; section III of costa slightly greater than section V; legs dark; bristles of thorax mostly long and slender, at least much longer than vestiture of metanotum; four pairs postsutural dorso-centrals, anterior two pairs not vestigial; prescutellar acrostichals and scutellar apicals present; lower sternopleura with a single row of bristles; vestiture of X abdominal nota hairy, quite long beneath; third segment with two marginals; genital segments black or blackish, sometimes brownish, not conspicuous, normally hardly more of first segment visible than band of membrane between the segments; "humps" not differentiated; first, at least in part, grayish pollinose; second, rotund, anal area flattened; heavily chitinized portion of head of penis black; accessory plates orange brown or brownish, hairy; fourth ventral plates similar.

(9,10) S. aldrichia n.sp., S. uliginosa Kramer. The genitalia are the only means by which these two species may be safely separated. There are certain external differences which will occasionally differentiate them but variation within the species forbids their use in many instances. These are the two species referred to on page 29 of part ^{one} B of this paper as Group ^A 2 and as agreeing closely in all

external characters and separable safely by the penes and forceps only in contradistinction to other groups in which the pen^es were very similar, the principal specific differences being external, etc.

9. Sarcophaga aldrichii ^{n.} sp.

Pl. 1, fig. 2.

Type ♂: Massachusetts Agricultural College.

Paratypes (♂): Massachusetts Agricultural College, one; United States National Museum, two; ^(Mr. 19165) Boston Society of Natural History, one; Gypsy Moth Parasite Laboratory, Melrose Highlands, Mass., three; collection of Dr. J. M. Aldrich, one; collection of author, one.

(♂) Vestiture of both thorax and abdomen hairy throughout; only presutural pair of anterior acrostichals present, weak; anterior femur with but two rows of bristles, on upper and lower, or, if ~~there are~~ present, bristles of intermediate row are very slender and hair-like; posterior face of posterior tibia with a row of scattered long hairs on distal half; second genital segment black or blackish.

Length: 8 1/2 to 11 1/2 mm.

Head.- Viewed from side parafrontals and genae with dark reflections, transverse impression sometimes with a reddish tinge. Breadth of front at narrowest part about one half eye width; cheek height approximately one half that of eye. Front prominent, inner orbits of eyes on its upper part converging downward, sides of front vitta converging backward by straight lines, rarely parallel. Second antennal segment dark; third about twice length of second; arista plumose on basal half or slightly more. Back of head somewhat convex, with three or four rows of black cilia behind eyes, otherwise clothed with yellowish white or whitish hair that completely covers the metacephalon. Cheeks clothes with black hair. Genae clothed with scattered hairs. Palpi dark.

Chaetotaxy.-- Lateral verticals absent; vibrissae sometimes inserted on line of oral margin ^{but} ~~bent~~ usually very slightly above.

Thorax.-- Metanotum clothed with fine, erect hair that is sometimes quite long. Hairs covering anterior spiracle dark basally, lighter toward tips; those of anterior margin of posterior spiracle dark brown; those of spiracular cover brownish with yellowish tips. Epaulete dark.

Wings.-- Bend ~~of~~ fourth vein normally a right angle; anterior cross-vein more basal than end of first longitudinal; third vein bristly; costal spine vestigial; section III of costa slightly greater than section V; alulae fringed with hairs; calypt^{ers}~~ae~~ whitish, margins fringed with whitish or slightly yellowish hairs.

Legs.-- Dark. Posterior trochanter without "brush," or latter so small as not to be distinguishable as such: femur cylindrical or sub-cylindrical, clothed beneath with medium long, scattered hair; anterior face with three rows of bristles, those of intermediate row shortest and not developed distally; posterior face without ventral row of bristles: tibia straight or slightly curved, a row of scattered, long hairs on distal half of lower posterior face; tarsus equal in length to tibia, fourth segment at least one half fifth. Middle coxa with a single row of bristles: femur clothed beneath or posterior, proximal half with fine but rather short hair; anterior ventral row of short bristles complete, posterior row represented by "comb" on distal one third to two fifths; submesotibial bristle present. Anterior coxa with two rows of bristles; femur usually with two rows, but if three are present, intermediate row consists of very fine, hair-like, scarcely distinguishable bristles.

Chaetotaxy.-- Bristles usually long and slender. Anterior dorsocentrals, as a rule, scarcely shorter than posterior; only

presutural pair of acrostichals developed, slender, others rarely present and if so very hair-like; inner presuturals slender, nearly as long as anterior dorsocentrals: four pairs: postsutural dorso-centrals; prescutellar acrostichals present: scutellar apicals present: sternopleurals, sometimes both sides with three or two but very commonly two on one side, three on the other: lower sternopleura with a single row of bristles, otherwise with long hair.

Abdomen. - Somewhat conical or slightly oval; hairy vestiture longer and finer beneath. Ventral plates, as a whole, with their sides slightly converging posteriorly, almost parallel; at sides vestiture long on all three but centrally vestiture of third shortest ~~on third~~ and erect.

Chestotaxy. - Second segment usually without marginal bristles, at rest they are ~~short~~, hair like, and decumbent; third with two and often with weaker, hair like bristles between these and laterals; fourth with complete row ending ventrally in long hairs.

Genital Segments. - Not conspicuous, normally but small part of first showing, often only membranous band joining the segments. First, ground color varies from brownish orange to blackish, grayish pollinose except "humps" which are not differentiated, vestiture about equal in length to that of second, in profile slightly arched, marginal bristles absent: second, rotund, anal area flattened and extending about to upper limit of posterior surface; ~~shining~~ black, often faintly grayish pollinose, sometimes with a brownish tinge. Forceps, normally not visible, blackish brown, or orange brown; prongs flattened, their inner edges meeting ridge-like for more than two thirds their length then separated but tips so bent that edges normally meet just before the extremities of prongs the latter spreading slightly, vestiture increases in length and amount basally; base with upward flap-like

extensions. Connecting membrane just anterior to "humps" with a row of long, slender hairs on each side.

Genitalia.— Heavily chitinized portions of head of penis black or blackish: anterior claspers broad and flattened: accessory plates brownish orange, hairy, and with an almost linear extension that parallels forceps for a way. Inner edges of lamellae of fourth ventral plate fringed with hairs. (~~♀~~) ~~not known~~.

(♀) Not known.

Described from 11 male specimens, 71 others examined.

Range.— New England: Mass.; Wellesley, Westfield, Melrose Highlands, Haverich, Forest Hills, Lunenburg.

United States: N. Y.

Foreign: Canada (Quebec).

This species is named in honor of Dr. J. M. Aldrich.

The bristles are long and slender except on the legs. It is peculiar that the left sternopleura often bears two sternopleurals, the right one three, ^{while} ~~which~~ in none of the specimens examined was the reverse condition found. The rows of cilia should be counted on that portion of the back of the head which is nearest the epicephalon. In exposing the genitalia the forceps are apt to be spread and flattened out so that they do not appear normal.

The external characters which may be used to separate this species from S. uliginosa Kramer are, for the most part, variable in both species. The most constant distinctive character seems to be the presence of a row of long scattered hairs on the distal half of the lower posterior face of the hind tibia; ^{while} ~~which~~ in uliginosa Kramer the hairs are close set and form a distinct beard on the distal three fourths. The number of rows of black cilia behind the eye, commonly distinctive, varies in both these species. In aldrichi there are usually but two rows of bristles

^{on}
~~of~~ the anterior femur but sometimes an intermediate row is very weakly developed; uliginosa Kramer, on the other hand, commonly has three rows though occasionally the intermediate one is so weak as to resemble that condition in aldrichia. The former seems to constantly have three sternopleurals while the number varies in aldrichia. Usually anterior acrostichals are lacking in the latter except the presutural pair, while in uliginosa all are commonly present; but again this character varies in both. The vestiture of the third ventral plate tends to be longer and more erect and the hair on the base of the forceps shorter in aldrichia.

Aldrichia may easily be distinguished from absona by its greater size, broader front and the presence of the submesotibial bristle, of at least a presutural pair of anterior acrostichals, of only a "comb" to represent the posterior ventral row of bristles on the middle femur, and of a ventral row of stout bristles on the anterior face of the third femur.

The penis is characteristic for the species but the fourth ventral lobe is like that of uliginosa Kramer. The forceps of uliginosa and aldrichia are also alike, that of fernaldi specific.

Among my material I have fourteen specimens of S. aldrichia from the Gypsy Moth Laboratory at Melrose Highlands which are recorded as bred from pupae Porthetria dispar (Linnaeus) collected at Melrose, Wakefield, North Saugus, Woburn, North Andover, Beverly, Essex, Topsfield, Gloucester, and Swampscott. Certain of these towns should appear under distribution but I have no means of discriminating. Of Sarcophagids collected at Tannenburg, Massachusetts during the season of 1914 by R. T. Webber of the Gypsy Moth Laboratory, ^{this} ~~their~~ species is by far the most numerous.

10. Sarcophaga uliginosa Kramer.

Pl. 1, fig. 3.

1908. Sarcophaga uliginosa Kramer, Ent. Nachr., vol. 25, pp. 152-153, fig. 27. Original description.
1910. Sarcophaga uliginosa ? , Naturw. Zeitschr. Land- und Forstwirtschaft, p. 162. Habits.
1911. Sarcophaga uliginosa Kramer, Abhandl. d. Natur. Ges. zu Göttingen, p. 141-142, pl. 1, fig. 5. Description and figure male genitalia. Habits.
1912. Sarcophaga uliginosa Böttcher, Deutsch. Ent. Zeitschr., pp. 732-733, fig. 27. Description, figure male genitalia, occurrence. Mention p. 349.
1914. Sarcophaga uliginosa Parker, Proc. Bos. Soc. Nat. Hist., vol. 35, no. 1, p. 29. Characters.

Length: 10 to 12 mm.

Aside from the genitalia this species differs so little from S. aldrichii that a complete redescription seems unnecessary; therefore only those characters which have differential value are given.

(♂) Anterior acrostichals usually all present but only the preantural pair well differentiated, the others sometimes wanting: three sternopleurals. Posterior tibia with a beard of close set, but not dense, long hairs on distal two thirds to three fourths of posterior face. Anterior femur with three rows of bristles, intermediate occasionally weakly developed. Except at sides vestiture of third ventral plate short and sometimes almost decumbent. Base of forceps clothed with long, fine, hair.

Six specimens examined, 3 native, 3 European.

Range.— New England: Mass.: Melrose Highlands.

Foreign: Germany, Roumania, France, Italy.

Unless one has become very familiar with this species and S. aldrichii the genitalia should be used to separate them. See discussion following S. aldrichii. The slender curved membranous

appearing process shown at the extremity of the penis ^pPlate 1, figure 3 is double in fresh specimens.

The presence of presutural acrostichals, of a submesotibial bristle, of a "comb" only on the posterior ventral surface of the middle femur, and of a more or less complete ventral row of bristles on the anterior face of the posterior femur are sufficient to separate this species from S. absona. See discussion following S. tuberosa harpax (Pardollé).

Kramer (Abhandl. d. Naturf. Gesell. z. G8rlitz, 1911, p. 142) mentions S. uliginosa as occurring in certain localities in coincidence with Psilura ronscho (Linnaeus) and Lesiocampa pini (Linnaeus). He also states that adults were bred from cocoons of the former and that it has been proved to be a parasite of the latter. I have three specimens from the Gypsy Moth Laboratory at Melrose Highlands, Mass. which were bred in the larvae and pupae of Porthetria dispar (Linnaeus) imported from Germany (Record numbers 55508 and 55588). The native specimens were collected, not reared.

11. Sarcophaga ^{absona}fernaldii, n.sp.

Pl. 1, fig. 4.

Type ♂: United States National Museum (no. 19166).

Paratypes (♂): Gypsy Moth Parasite Laboratory, Melrose Highlands, Mass., two; collection of author, one.

(♂) Anterior acrostichals absent; ventral row of bristles of anterior face of third femur at most represented by a few bristles distally; posterior ventral row of bristles of middle femur consisting of "comb" and two or three very long bristles proximal (see figure) to it; submesotibial bristle absent; second genital segment black or blackish.

Length: 6 1/2 to 9 mm.

(♂) Head. - Viewed from side parafrontala and genae with dark impressions; those of transverse impression may be brownish or reddish. Breadth of front at narrowest part about one third eye width; cheek height approximately one third that of eyes. Front prominent, inner orbits of eye on its upper part converging downward; sides of frontal vitta converging upward. Second antennal segment dark; third about twice length of second; arista plumose on basal half or somewhat more. Back of head somewhat convex, with three or four irregular rows of black cilia behind eyes, otherwise clothed with whitish or yellowish hair that completely covers the metacephalon. Cheeks clothed with black hair. Gena with at least a line of hairs near lower eye orbita, usually with other shorter ones chiefly on upper portion. Palpi dark.

Chaetotaxy. - Lateral verticals absent; vibrissae inserted on line of oral margin.

Thorax. - Metanotum clothed with fine, erect hair. Hairs covering anterior spiracle dark basally, lighter toward tips; those of anterior margin of posterior spiracle dark brown; those of spiracular cover brownish centrally and basally with yellowish tips. Epaulets dark.

Wings. - Bend of fourth vein normally a right angle; anterior cross-vein more basal than end of first longitudinal; third vein bristly; costal spine vestigial; section III of costa slightly greater than section V; alulae fringed with hair; calypters whitish or faintly discolored, margins fringed with whitish hairs.

Legs. - Dark. Posterior trochanter without "brush"; femur cylindrical or sub-cylindrical, clothed beneath with medium long

or long hair: anterior face with three rows of bristles, those of intermediate row shortest and not developed distally, lower row usually represented by one or more bristles distally though the others may be very slender and scarcely different from the hairs; posterior face with ventral row of long, slender, well separated bristles which may not be distinguishable as such in small specimens: tibia straight, with a weak beard of medium long hairs on distal two thirds to three fourths of lower posterior face and in larger specimens a weaker row on anterior face: tarsus not shorter than tibia, fourth segment at least one half fifth. Middle coxa with a single row of bristles: femur clothed beneath with quite long hairs on proximal, posterior surface; anterior ventral row of short, scattered bristles complete, posterior represented by "comb" of rather slender bristles and two or three very long, much stouter bristles proximal to it: submesotibial bristle absent. Ventral surface of anterior coxa with an irregular row of bristles on each side only: ^{femur} with usual three, though those of intermediate row are sometimes scarcely differentiated.

Chaetotaxy.— Anterior dorsocentrals, as a rule, but little shorter than posterior; acrostichals absent; inner presuturals indistinguishable or scarcely differentiated from hairy vestiture of praescutum: four pairs postutural dorsocentrals; prescutellar acrostichals present: scutellar apicals present: three sternopleurals: lower sternopleura with a single row of bristles, otherwise with long hair.

Abdomen.— Somewhat conical; hairy vestiture longer and finer beneath. Ventral plates, as a whole with their sides converging posteriorly, at sides vestiture equally long on all, but centrally that of third shortest and erect.

Chaetotaxy.— Second segment without marginal bristles or at

most they are short, hair-like and decumbent; third with two and sometimes with weaker, hair like bristles between these and marginals; fourth with complete row ending ventrally at forward turn of the margin.

Genital Segments.-- Not conspicuous, normally but small part of first showing, often only membranous band joining the segments, ground color typically black or blackish, sometimes brownish. First, grayish pollen usually, but not always, present on posterior half or less, "humps" not differentiated, vestiture shorter than that of second, but long on posterior margin, in profile slightly arched, marginal bristles absent: second, rotund, anal area somewhat flattened and extending about to upper limit of posterior surface, sometimes faintly grayish pollinose. Forceps, normally not visible, blackish or orange brown; prongs approximated to beyond the middle their tips blunt, spreading, each with small tooth-like projection, vestiture increases in length basally; base with very short upward flap-like extensions. Connecting membrane, just anterior to humps with a row of long, slender hairs on each side.

Genitalia.-- Heavily chitinized portions of head of penis black or blackish, lower, posterior portion developed into distinctive hump-like projection: viewed from side anterior and posterior claspers seem to end in a knob: accessory plates brownish orange, hairy, triangular. Fourth ventral plate same as that of S. aldrichia.

(♀) Not known.

Described from 4 specimens, three others examined.

Range.-- New England: Mass.; Stoneham.

United States: N.Y.

The character of the posterior ventral row of bristles on the middle femur, of the lower anterior row of the ventral face of the posterior femur, the characters of the forceps, and those of the penes and claspers furnish distinctive features.

See discussions following descriptions of Sarcophaga clarichia and S. uliginosa Kramer.

(paratypes)

Two specimens in the collection of the Gypsy Moth Laboratory at Melrose Highlands, Mass. were bred from the larvae of Porthetria dispar (Linnaeus). A specimen received from Tothill was labelled "parasite of leaf roller."

(12, 20 to 22)

Sarcophaga johnsoni n.sp. S. bullata n.sp., S. fulvipes ^{dissidia} ~~nigra~~, n.subsp., S. scoparia Pandellé. These species at least tend to have bearded middle tibiae. In S. fulvipes dissidia the bearded character is more pronounced.

← (18) Sarcophaga johnsoni, n.sp. It is hard to say with any degree of certainty that this species is at all closely related to any of the other species described. In certain characters the males seem very distinct from other members of the genus; the chaetotaxy and other features are extremely similar to those of certain West Indian and Mexican forms. Of the species herein described it perhaps comes nearest ^{utilis Aldrich} S. ~~erinita~~ n.sp., for, though they seem very distinct superficially, yet there is a general similarity of the genital segments and accessory genital structures, the long, erect vestiture of the ventral plates, and the chaetotaxy of the legs. The females are very distinct and that of S. utilis Aldrich seems closely related to that of S. scoparia Pandellé. Aldrich's figure of the penis of utilis indicates that it is more like that of johnsoni than my own, shown by my own drawing.

12. Sarcophaga johnsoni, n.sp.

Pl. 2, fig. 8¹; pl. 2, fig. 5.

¹

Proc. Bos. Soc. Nat. Hist., vol. 35, no. 1.

1910. Sarcophaga carnaria Smith, N. J. Lib., 1909, p. 785.

1912. Sarcophaga carnaria Johnson, Psyche, vol 19, no. 3, p. 104.
New Jersey, Lib. reference questioned.¹

¹Mr. Johnson has assured me that both these references have to do with the species here described.

Boston Society of Natural History, one ^{male} ♂, one ^{female} ♀.

Paratypes: Massachusetts Agricultural College, one ^{male} ♂; Boston

Society of Natural History, one ^{male} ♂, one ^{female} ♀; collection writer, one

^{male} ♂, one ^{female} ♀.

(♂) Breadth of front at narrowest part nearly equal to eye width; cheek height usually about four seventh that of eye; front very prominent; arista shortly plumose; facial plate roundly carinated, antennal grooves distinct; genae very broad; palpi light colored vibrissae inserted well above mouth margin (about one eighth inch in normal specimens), middle coxa, at least dorsally²⁴, with more than a single row of bristles; ventral row of anterior femur present on distal half only; posterior tarsus shorter than tibia; anterior dorsocentrals, acrostichals and inner presuturals absent and usually ~~only~~ only the posterior two pairs of postsutural dorsocentrals present; scutellar apicals absent; ventral plates with long erect hair; genital segments black or blackish, first without marginal bristles.

(♀) Breadth of front at narrowest part one and one third to one and one half times eye width; cheek height usually about four sevenths that of eye; front very prominent, arista shortly plumose; facial plate roundly carinated; genae very broad; palpi light colored; vibrissae inserted well above mouth margin; middle coxa, at least dorsally²⁴, with more than a single row of bristles; anterior face of posterior femur with two rows of bristles, intermediate absent, lower represented by stout, well separated bristles on proximal half

and a single stout bristle distally; the two broad, lateral lips of first genital segment of same ground color and pollination as abdomen, spiracle nearest anterior margin.

Length: 15 to 17 mm; average 15mm.

(6) Head:- Viewed from side parafrontals and genae with dark reflections, transverse impression sometimes brownish. Breadth of front at narrowest part nearly equal to eye width; cheek height more than one half, usually about four sevenths that of eye. Front very prominent, inner orbits of eyes on its upper part either parallel, or converging slightly forward; sides of frontal vitta usually parallel, sometimes slightly convergent backward. First antennal segment prominent, second unusually long, dark but usually with brownish or dull orange colored tip; third one and one half to one and three fourths times length of second; arista shortly plumose on basal two thirds; facial plate roundly and prominently carinated, the antennal grooves distinct. Back of head strongly convex, with two complete rows of black cilia behind eyes, second row very irregular, a partial third may be present near epicephalon, otherwise clothed with whitish or yellowish hair that completely covers the metacephalon. Cheeks clothed with black hair. Genae very broad, extent of vestiture variable, but usually sparsely clothed with short hairs that often extend over on to transverse impression. Palpi light colored.

Chaetotaxy:- Lateral verticals absent or weakly developed, rarely as strong as last frontal; vibrissae inserted well above oral margin (about one eighth inch in normal specimens).

Thorax:- Metanotum thickly clothed with slender bristles. Hairs covering anterior spiracle dark brown basally, lighter toward tips; those of anterior margin of posterior spiracle dark brown; those of spiracular cover brownish with yellowish tips. Epaulets dark.

Wings.-- Band of fourth vein at right or an acute angle; anterior cross-vein more basal than end of first longitudinal; third vein bristly; costal spine vestigial; section III of costa about one and one half times section V; margin of alulae sometimes naked; sometimes fringed with hair; calypters whitish, margins fringed with whitish or yellowish hair.

Legs.-- Dark. Posterior trochanter without "brush": femur stout, sub-cylindrical, straight beneath or very slightly arched and clothed with long hair becoming longer posteriorly; anterior face with three rows of bristles, those of intermediate row not developed distally; posterior face usually without ventral row of bristles (there may be a few bristles centrally): tibia curved, often but slightly, posterior and anterior faces each with a beard of long, rather coarse, black hairs on distal half or a little more, latter much the stronger: tarsus shorter than tibia, fourth segment at least one half fifth. Middle coxa, at least dorsal, with more than a single row of bristles: femur clothed beneath on proximal half, especially proximally with long hair; anterior and posterior rows of bristles complete (at least on distal two thirds to three fourths), "comb" not differentiated as such: subscutellar bristle strong, often obscured by hair that covers tibia ventrally on distal half or less and anteriorly and posteriorly becomes longer and beard-like. Ventral surface of anterior coxa completely clothed with bristles that form several irregular rows: ventral row of femur present on distal half only: vestiture of tibia longest ventrally, posteriorly, and distally.

Chaetotaxy.-- Anterior dorsocentrals, acrostichals and inner presuturals absent: several pairs posterior dorsocentrals, last two strong and anterior to them one (usually) or more pairs that are scarcely distinct from vestiture of scutum; prescutellar acrostichals

present: scutellar apiculae absent: three sternopleurals: lower sternopleura with a single row of slender bristles, otherwise with hairs that are dense, long and almost bristly.

Abdomen.— Oval somewhat conical; clothed above with short, reclinate bristles, beneath with very long, dense, hairs that become longest on ventral plates. Latter, as a whole, with their sides parallel; vestiture scarcely diminishing in length posteriorly.

Chaetotaxy.— Second segment without marginal bristles; third with two, sometimes with short, decumbent bristles between these and laterals; fourth with a complete row ending ventrally in long coarse hairs.

Genital Segments.— Somewhat prominent, at least posterior half of first exposed. First, ground color deep brown, grayish pollinose, vestiture shorter than that of second, in profile slightly and evenly arched, "humps" with few hairs, marginally bristles absent: second, appears rounded and squat in normal position, anal area large and flattened (when segments are pulled out appears more rotund) its upper extremity reaching to upper limit of posterior surface, black or blackish, densely clothed with quite long hair. Forceps dull or brownish orange, base with upward flap like extensions clothed with fine curls, hairs as long or nearly as long as vestiture of segment; prongs rather short, approximated nearly to tips and where they spread apart each with a tuft (or mat) of dense, short, fine hairs that is very prominent, in profile each tip with a forward tooth like projection.

Genitalia.— Heavily chitinized portion of head of penis not black; claspers blackish; accessory plates very large filling all the space between forceps and ventral edge of second segment, almost bare, with a few hairs anteriorly.

(♀) Females differ from males in the following important characters.

Head.-- Breadth of front at narrowest part one and one third to one and one half times eye width. Upper, inner orbits of eyes diverging downward. Facial plate less strongly carinated.

Thorax.--Metanotum clothed with short, slender, reclinate bristles.

Legs.-- Anterior face of posterior femur with two rows of bristles, intermediate absent, lower represented by stout, well separated bristles on proximal half and a single stout bristle distally; ventral posterior row present on proximal half and consisting of several long, well separated bristles: tarsus not shorter than tibia. Anterior and posterior ventral rows of middle femur present on proximal half only. Ventral row of bristles of anterior femur complete, bristles of intermediate row much stouter than in male.

Abdomen.--Oval; vestiture throughout of short, reclinate bristles.

Genital Segments.-- Not protuberant, only visible from below. The two broad, lateral lips of first genital segment of same ground color and pollination as abdomen, above line of the spiracles at least their edges fringed with hairs and bristles or with bristles alone; spiracles nearest anterior margin. Spiracles of fifth segment usually concealed.

Described from 5 male and 3 female specimens.

Range.-- New England: ~~Massachusetts~~: Chatham, Wollaston, Plum Island; R. I.: Bretton Wood.

United States: N. Y., N. J., N. C., Fla.

This species is named in honor of Mr. C. W. Johnson.

Among our New England species Sarcophaga johnsoni is peculiarly

distinct. The absence of anterior and anterior postsutural dorsocentrals is a character common among certain West Indian, Mexican and probably South American forms, but I have not yet met with it in any other northern species. The strikingly pronounced front and prominent, silvery gray parafrontals and genae are very distinctive. The cheeks are very high and the eyes comparatively small. The vestiture of the ventral plates is unusually long. The apical spine of the posterior trochantal is absent in both males and females. The genital segments are very difficult to pull out apparently because membranous areas are restricted so that there is less give and the notum of the fifth segment (sixth anatomically) is well developed.

S. johnsoni is the S. carnaria of Smith's New Jersey List (1909). This is one instance in which it is possible to clear up the erroneous references to the latter species in North America. Dr. Hough, through his work upon the Sarcophagidae some years ago, was able to show that this species did not occur here. S. carnaria (L.) is certainly very distinct from any of our American species and offers no difficulties in the way of identification.

This species is apparently a sea coast form.

(13) Sarcophaga utilis Aldrich, S. scoparia Pandell. While the males of these species are very distinct, the females, on the other hand, are very close and their genital segments almost identical. Structurally this holds good for both European and American forms of S. scoparia, but this species in Europe has black genital segments, in America dull orange, though the first is sometimes more or less grayish pollinose. It is possible that the female of S. pseudoscoparia Kramer (European) has the same type of genital structure.

13. Sarcophaga utilis, Alarich.

Pl. 2, fig. 6.

1915. Sarcophaga utilis Alarich, Jour. Ec. Ent., vol. 3, p. 151-152.
Original description, figure male genitalia.

Type: United States National Museum (male).

(♂) Breadth of front at narrowest part about two thirds eye width; lateral vertical bristles strong; tibiae not bearded; posterior femur with complete ventral row of bristles only; last two pairs of posterior dorsocentrals strong, several very weak pairs anterior to these; ventral plates with long erect hair; genital segments dull orange, first with out marginal bristles.

(♀) Cheeks clothed black bristly hair; transverse impression usually with several hairs or bristle like hairs; vestiture of scutellum bristly; lips of first genital segment dull orange, but slightly protuberant, not visible from above; sides of sixth ventral plate overlapped by lips of first genital segment, its posterior margin bare or with hairs only; posterior dorsocentrals as in male.

Length: 7 to 14 mm; average 12 to 14mm.

(♂) Head.- Viewed from side parafrontals and genae with dark reflections. Breadth of front at narrowest part fully two thirds eye width; cheek height nearly one half that of eye. Front prominent; inner orbits of eyes on its upper part converging slightly downward; sides of frontal vitta usually parallel. Second antennal segment dark, tip brownish; third two to two and one half times length of second; arista strongly plumose to beyond middle. Cheeks clothed with black hair. Back of head somewhat convex, with three rows of black cilia behind eyes, otherwise clothed with yellowish hair that completely cover the metacephalon. Gena with one to several rows of coarse hair on half nearest eye orbit. Palpi dark.

Chaetotaxy.— Lateral verticals present, strong; vibrissae inserted on or just above line of ^{oral} ~~mouth~~ margin.

Thorax.— Melanotus clothed with quite short, reclinate bristles. Hairs covering anterior spiracle mostly yellowish but shading to dark brown at bases; those of anterior margin of posterior spiracle dark brown; those of spiracular cover mostly yellowish, shaded darker centrally. Epaulots dark.

Wings.— Bend of fourth vein normally a slightly acute angle; anterior cross-vein more basal than end of first longitudinal; third vein bristly; costal spine vestigial; section III of costa one and one half times section V; alulae with fringe of very short hair; calypters whitish, margins fringed with white hair.

Legs.— Dark. Vestiture short and bristly (more hair-like in smaller specimens) except for long hairs on proximal portions of ventral faces of femora. Posterior trochanter with tuft of long hairs, "brush" absent: femur sub-cylindrical; anterior face with three rows of bristles, those of intermediate row shortest and not developed distally; posterior face with complete ventral row: tibia straight or slightly curved: tarsus equal to or shorter than tibia, fourth segment at least one half fifth. Middle coxa at least dorsal, with more than a single row of bristles: femur with complete anterior and posterior ventral rows, "comb" sometimes not well defined: submetastobial bristle present, strong. Ventral surface of anterior coxa completely clothed with bristles that form several irregular rows.

Chaetotaxy.— Anterior dorsocentrals not weaker than anterior postsuturals, short and stout but longer than vestiture of prescutum; areostichals absent or only slightly differentiated anteriorly; inner presuturals very weak and inconspicuous: last two pairs of posterior dorsocentrals strong, several very weak

pairs anterior to these; prescutellar acrostichals present; scutellar apicals present; three sternopleurals; lower sternopleura with bristles only.

Abdomen.- As a rule almost oval but somewhat conical in smaller specimens; clothed above with short reclinate bristles, beneath with longer, more erect hair. Ventral plates, as a whole, with their sides parallel; their vestiture decreasing in length posteriorly but quite long and erect on third plate. Posterior edge (rarely more) of fourth notum, at least dorsally, of same ground color as genital segments.

Chaetotaxy.- Second segment without marginal bristles; third with two; fourth with complete row ending ventrally in long, coarse hairs.

Genital Segments.- Prominent; dull orange, except that first is somewhat darkened at sides just posterior to "humps". First, intensely or faintly yellowish pollinose, vestiture short except a few long hairs on "humps", in profile very slightly arched (almost flattened), marginal bristles absent: second, rotund, not flattened, vestiture longer than that of first, anal area small, its upper extremity not ~~reaching~~ ^{extending} above center of posterior surface. Forceps of same color as segments, base with upward flaps like extensions clothed with fine, curly hair not longer than vestiture of segment; prongs rather short, approximated nearly to tips, each covered with very short hair, in profile with forward tooth like projection.

Genitalia.- Distinctive. Each accessory plate with a short, broad, anteriorly directed, tooth like process.

(♀) Females differ from males in the following important characters.

Head.- Breadth of front at narrowest part about equal to eye width. Upper inner orbits of eyes diverging downward. Cheeks clothed

with black, bristly hair.

Thorax

Legs. - Vestiture throughout of short hair, except that of scutellum which is bristly. Posterior tibiae with slender, distal bristle: bristles of intermediate row on anterior face of femur very short, posterior face with row of long, well separated bristles on proximal half or slightly more. Anterior and posterior ventral rows of middle femur complete but bristles weak and inconspicuous distally. Subtarsal bristle very strong, sometimes a short bristle just above it.

Abdomen. - Oval; vestiture throughout of short, reclinate bristles.

Chaetotaxy. - Second segment sometimes with two or more weak decumbent, marginal bristles.

Genital Segments. - But little protuberant, only visible from below. The two broad, lateral lips of first genital segment dull orange, sometimes yellowish pollinose ventrally; upper edges fringed with hair and bristles, latter mostly above line of spiracles; ^{latter} ~~which are~~ nearest to anterior margin. Spiracles of fifth segment usually concealed. Sixth ventral plate (seventh morphological) without posterior marginal bristles and its sides overlapped by lips of notum.

Redescribed from 11 male and 5 female specimens; others examined

Range: New England: Mass.: Springfield.

United States: N. Y., N. J., Pa., D. C., Va., N. C., La., Fla., Ala., La., Ohio, Ill., Ind., Mich.

Foreign: Mexico.

So distinctive are the strong lateral vertical bristles among our New England species that the males are exceptionally easy to determine. Deformations of the penis are common, apparently due to a sort of gelatinous substance ^{or} consistency and it may

resemble the drawing but roughly. In well developed females the bristles of the lower sternopleura are long and prominent but in smaller specimens are less well marked except the customary single row, but they do not become at all hair like. The same statement will apply to the additional bristles of the middle coxae in both sexes.

This description was written previous to that published by Aldrich under the name utilis. In naming collections I have already sent out specimens of this species under the manuscript name crinita. This name should be changed. The drawing presented with Aldrich's description was made from a boiled specimen, that given here is made from one in the normal condition. The former drawing does not show the process of the accessory plate which is distinctly a specific character and present in all specimens examined by the writer. The following characters are noted in the original description; "vibrissae inserted well above oral margin, almost on level with lower edge of eye,.....fourth tarsal joint very short, less than half the fifth." In my material the vibrissae are but slightly above the line of the oral margin and well below the lower level of the eyes, while the fourth tarsal segment in water is one half or greater than one half the fifth, in females one half or slightly less (more apparent from lower surface).

S. crinita and S. scoparia Pandellé; comparison of females. Though the males of these species are quite distinct the females of medium and small size are very similar. With the exception of a few characters, which seem constant, the condition typical for any external character in each species varies toward that typical for the same character in the other.

Characters which seem constant.

S. utilis Aldrich
S. ~~crinita~~ n. sp.

S. scocaria Pandellé.

Transverse impression with : Bare
several hairs on bristle like :
hairs. :

Sides of sixth ventral plate : Sixth plate entirely external and
overlapped by lips of first : its posterior margin with bristles,
genital segment, its posterior : at least at sides.
margin bare or with hairs only. :

Characters which are strongly indicative,
perhaps even differential.

First genital segment (lips of) : Protuberant, extending beyond
not protuberant and only : edge of fourth notum and visible
visible from beneath. : from above in most specimens.

Typical conditions which vary toward the opposite con-
dition in the other species, useful
collectively rather than singly.

Ventiture of scutellum bristly : Hairy

Bristles of anterior and pos- : Those of anterior row longer.
terior ventral rows of middle :
femur equally strong and long. :

Anterior acrostichals differ- : Scarcely, if at all, discernible.
entiated anteriorly. :

Anterior postsutural dorso- : At least as strong and long.
centrals shorter and usually a :
little weaker than those be- :
fore the suture. :

Ventral surface of abdomen : With short, almost erect hair.
clothed with short, reclinate :
bristles. :

Two lateral bristles that are : Usually four or more of nearly equal
strong on third abdominal : strength.
segment, seem to become smaller :
and more numerous in small spec :
imens. :

It may be that the protuberant character of the first genital segment in S. scoparia is sufficient to differentiate the two species but so few females of S. utilis are available for study at this time that such a statement cannot be made with any degree of certainty.

I have seen specimens of this species from Mexico but have been unable to identify it with any of Van der Wulp's descriptions.

Three females and one male in the National Museum are labelled "bred from mounted beetles." The ^{same} ~~same~~ collection also contains a male and a female labelled as reared from Melanophus differentialis Brunner. A male specimen was taken by the writer at Springfield, Mass., crawling upon human excrement. C. H. Richardson has reared this fly from horse manure at New Brunswick, New Jersey. It has also been reared from Allorhina nitida (see original description).

(14 to 16, 20 to 23) Sarcophaga tuberosa harpax (Pandellé), S. tuberosa exuberans (Pandellé), S. tuberosa sarraceniae (Riley), S. bullata n. sp., S. fulvipes dissidia n. subsp., S. scoparia Pandellé. In these species the second genital segment is rotund and not flattened and the anal area small.

(14,15,16:17,18, 19) Sarcophaga tuberosa harpax (Pandellé), S. tuberosa exuberans (Pandellé), and S. tuberosa sarraceniae (Riley) as a group compared with S. haemorrhoidalis Meigen, S. dalmatina Schiner

and S. falculata Pandellé as a group. The principal characters which are common to all the species of each group are listed on pages and respectively.

(♂) The males of all these species agree in the following more important characters: viewed from side parafrontals and genae with dark reflections; breadth of front at narrowest/part at least one half eye width (if less, it is an individual variation); metacephalon completely clothed with whitish (haemorrhoidalis-group) or whitish or yellowish hair(tuberosa-group); lateral vertical bristles absent; vibrissae inserted just above line of mouth margin; anterior cross-vein ^{more basal than end of first longitudinal; third vein bristly;} ~~bristly~~; section III of costa greater than section V; calypters whitish, margins fringed with white hair; anterior face of posterior femur with three rows of bristles, those of intermediate row shortest and not developed distally, posterior ventral row absent; anterior and posterior faces of tibia each with a beard of coarse hair, latter always the stronger; middle coxa with a single row of bristles; femur clothed beneath on posterior, proximal half or more with long hair, anterior ventral row of short bristles complete, posterior row represented only by "comb" extending back to the long hairs; ventral surface of anterior coxa with an irregular row of bristles at each side only; anterior and anterior postantural dorsocentrals short but longer than vestiture of praescutum; acrotichals absent or at most slightly differentiated anteriorly; only last two pairs of posterior dorsocentrals strong; lower sternopleurals with a single row of bristles; abdomen clothed above with short reclinate bristles; beneath with longer, almost erect hair; vestiture of third ventral plate short and decumbent except at margins; genital segments prominent; connecting membrane on each side just anterior

to "humps," with a row of long hairs.

The principal characters in which the males these two groups disagree are as follows: size; number of rows of black cilia behind eyes; vestiture of cheeks and genae; color of anterior spiracular hairs and those of spiracular cover; size of "brush" of posterior trochanter; presence and absence of inner preantennals; comparative length of vestiture of second ventral plate and of that of first and second genital segments. The characters of the genital segments are quite different and it is interesting to note that the members of the tuberosa group are united, not only by the external characters hereafter listed but the penes of the subspecies of *S. tuberosa* Pandellé differ only in minor details, whereas the members of the hemorrhoidalis-group are united by external characters, the penes, fourth ventral plates and forceps differing for all species herein discussed.

Possibly there is needless repetition in thus enumerating the characters in which these two groups agree but my object is not to indicate absolute and definite groups. I am merely placing together such species as seem closely related naturally and names used to designate them are merely convenient handles. It seems possible that other workers who may be able to deal intensively with a larger territory, may ^{find it possible} ~~be able~~ to enlarge upon the grouping or perhaps to suggest more comprehensive aggregates through study of relationships among a greater number of species, and it is the hope of the writer that to such a worker discussions ^{similar to} ~~such as~~ the above may be of use.

An interesting point common to both these groups is their wide distribution, each having representatives in at least North America, Europe, Asia and Africa. As suggested in the introduction

to part ^{one} $\bar{\chi}$, their extensive distribution may be explainable by habits which do not limit their territorial expansion. The members of the haemorrhoidalis group mentioned are perhaps principally scavengers, while the subspecies of S. tuberosa Pandellé seem to have habits adaptable to very diverse conditions.

(14,15,16) Sarco-lava tuberosa harrax (Pandellé), S. tuberosa exuberans (Pandellé), S. tuberosa harraxenia (Riley). See pages ~~42~~, ~~44~~ and ~~46~~.

The males of these subspecies, together with S. tuberosa (Pandellé) agree in the following important characters: viewed from side para-frontals and genae with dark reflections; breadth of front at narrowest part approximately one half that eyes (may be slightly less in exuberans), metacephalon completely clothed with whitish or faintly yellowish hair; cheeks clothed with black hair; lateral verticils absent; vibrissae inserted just above line of mouth margin; hairs covering anterior spiracle mostly dark brown; epaulets dark; anterior cross-vein more basal than end of first longitudinal; third vein cristally; section III of costa greater than section V; calypters whitish, ^{margins} ~~outerly~~ fringed with white hair; legs dark; posterior trochanter with small, ^{almost} ~~very~~ inconspicuous "brush"; anterior face of posterior femur with three rows of bristles, those of intermediate row shortest and not developed distally, posterior ventral row absent; anterior and posterior faces of tibia each with a beard of coarse hairs, latter always the stronger; middle coxa with a single row of bristles; femur clothed beneath on posterior, proximal half or more with long, fine hair, anterior ventral row of short bristles complete, posterior represented only by "comb" extending back to the long hair; anterior and anterior postutural dorsocentrals considerably longer than vestiture of metanotum; acrostichals absent (sometimes anterior ones

very weakly differentiated in sarraceniae); inner presuturals weak; last two pairs of posterior dorsocentrals strong, anterior to these usually two weak pairs, sometimes three; scutellar apicula present; lower sternopleura with a single row of bristles; abdomen clothed above with short, reclinate bristles, beneath with longer, almost erect hair; vestiture of third ventral late short and decumbent except at margin; genital segments prominent; both with vestiture of equally long hair; first without marginal bristles, second rotund, not flattened; anal area small and not extending above middle of posterior surface of segment; vestiture of base of forceps longer than that of segment; penes similar.

I have seen but a single ^{North American} specimen of S. tuberosa tuberosa (Pondellé), which was recently sent me by Mr. ^{Jottrell} ~~Teckill~~ and was collected in Manitoba, Canada, by Mr. Criddle. The list of characters given above was made out previous to the receipt of this specimen, but it was found to agree in all points. This is the first record of its occurrence in North America. It will probably be found in New England and may easily be identified by its two black genital segments as in harlex, while the forceps were like those of exuberans.

As I have only females of S. tuberosa harlex (Pondellé) and S. tuberosa sarraceniae (Riley) no list of characters common to the females is given, though such a list could probably safely be made from these two subspecies.

The group is based not only on the large number of similar external characters but also on the similar penes; the subspecies are further separated within the group by the characters of the forceps. The figures show that S. tuberosa harrax (Pandellé) and S. tuberosa sarraceniae (Riley) have similar forceps, while those of the other two subspecies are alike. Subspecific differences are found in certain external characters and the shape of the fourth ventral plates. These subspecies are all members of the tuberosa-group as defined by Böttcher (Deutsch. Ent. Zeitschr., 1912, p. 53) in which he also included a species not known in North America. He also states (Deutsch. Ent. Zeitschr. 1913, p. 1) that S. breckeri Villeneuve may be considered as a subspecies of S. tuberosa {Pandellé}.

Pandellé (Rev. Ent., vol. 15, 1893, Orens) described the three species S. tuberosa, S. sarraceniae and S. harrax. According to the present usage of the more prominent workers on this genus in Europe (Böttcher, Villeneuve, and others) these flies are considered as subspecies of S. tuberosa Pandellé and are so dealt with here, though entirely for the reason that it seems best to so treat them. It may be that such designation is a matter of preference or opinion but I am very strongly inclined to believe it well founded and as indication^{ve} of an apparently close, natural relationship which it is well to keep in mind. In most cases the species of the genus have very distinct and unmistakable genitalia but in the case of these forms the resemblance of the penes is so close that differences are in points of minor detail. The preceding list of characters common to all four subspecies herein discussed does not exhaust the similarities but gives only the more prominent. The presence of the two rows of hairs on the connecting membrane is an unusual character, found only in members of this

group, those of the group following and in S. aldrichia, ~~and~~ S. uliginosa, ^{and S. absona} so far as the writer is acquainted with the species of the genus.¹

1. Since the above comparison was written I have received a single male specimen which probably will prove to be another subspecies of S. tuberosa. I agree with S. tuberosa saraceniae in having both genital segments dull orange, but differs in having the forceps of exuberans and tuberosa as well as in several minor features. It agrees with the group characters as above listed.

Like the members of the caemorrhoidalis-group S. tuberosa Pandellé is represented by its subspecies in several continents, -North America, Europe, Asia and Africa, - S. tuberosa saraceniae (Riley) is only known from North America.

14. Sarcophaga tuberosa harpax (Pandellé).

Pl. 3 , fig. 7.

1896. Sarco harpax Pandellé, Rev. Ent. France, vol. 15, p. 189. Original description.
1911. Sarcophaga tuberosa harpax Kramer, Abhandl. d. Natur. Ges. zu Götting, p. 141, pl. 1, fig. 7. Habits.
1912. Sarcophaga tuberosa harpax Böttcher, Deutsch. Ent. Zeitschr., p. 348.
1912. Sarcophaga tuberosa harpax Böttcher, Entomologische Mitteilungen, vol. 1, No. 6, p. 165.
1912. Sarcophaga tuberosa harpax Böttcher, Deutsch. Ent. Zeitschr., p. 735, fig. 29b. Description, figure male genitalia, occurrence.
1914. Sarcophaga tuberosa harpax Parker, Proc. Ent. Soc. Nat. Hist, vol. 35, No. 1, pl. 30, 42. Characters.

(♂) Metanotum clothed with almost erect hair; at least four pair posterior dorsocentrals, last two somewhat the strongest; ground color of genital segments black or blackish; forceps prongs blunt, in profile with a small tooth like projection at tip as in S. tuberosa saraceniae (Riley).

(Q) Metanotum clothed with short, slightly reclinate, bristles except that scutellum bears almost erect hairs anteriorly; the anterior and two (sometimes three) anterior ~~postural~~^{postsutural} dorsocentrals strongly reclinate; anterior acrostichals absent; vestiture of abdomen of short, reclinate bristles except that of ventral surface of fourth notum which is hairy and erect; genital segments not protuberant, usually well concealed by fourth notum; the two narrow, lateral lips of first genital segment brownish or of same ground color as abdomen, usually pollinose ventrally, spiracles usually concealed by fourth notum.

~~(Q)~~ Length: 10 to 12 mm.

(R) Head.— Viewed from side parafrontals and genae with dark reflection; and transverse impression often brownish. Breadth of front at narrowest part about three fifths eye width; cheek height approximately one half that of eye. Front prominent, ~~inner orbits of eyes on its upper part converging downward~~; sides of frontal vitta slightly converging backward. Second antennal segment dark; third usually twice length of second; ~~arist~~^{plumose} to beyond middle. Back of head somewhat convex, usually with three rows of black cilia behind eyes, otherwise clothed with silvery white or faintly yellowish hair that completely covers metacephalon. Cheeks clothed with black hair. Genae with a row of hairs near lower eye orbit and other scattered hairs. Palpi dark.

Chaetotaxy.— Lateral verticals absent; vibrissae inserted just above line of mouth margin.

Thorax.— Metanotum clothed with almost erect hair. Hairs covering anterior spiracle dark basally, lighter toward tips; those of anterior margin of posterior spiracle dark brown; those of spiracular cover brown or sometimes but faintly so with yellow border.

Wings.- Bend of fourth vein normally a right angle or slightly less; anterior cross-vein more basal than end of first longitudinal; third vein bristly; costal spine vestigial; section III of costa about one and one half times section V; alulae fringed with hair; calypters whitish, margins fringed with whitish or sometimes yellowish hair.

Legs.- Dark. Posterior trochanter with small "brush;" femur sub-cylindrical, clothed beneath with long hairs that become still longer and beard like posteriorly; anterior face with three rows of bristles, those of intermediate row shortest and absent distally; posterior face without ventral row of bristles; tibia usually slightly curved, posterior and anterior faces each with a beard of long, coarse hairs on distal three fourths or thereabouts, former a little the stronger; tarsus not shorter than tibia, fourth segment at least one half fifth. Middle coxa with a single row of bristles: femur clothed beneath on posterior proximal half with beard like growth of long, fine hairs; anterior ventral row of short bristles complete, posterior row represented by "comb" only, which extends back to long hair: subacetabial bristle present. Ventral surface of anterior coxa with an irregular row of bristles at each side only.

Chaetotaxy.-Anterior dorsocentrals not weaker than anterior postanturals and longer than vestiture of prescutum; dorsocentrals absent; inner preanturals very weak; four pairs posterior dorsocentrals, last two much the stronger, a weak fifth sometimes present; prescutellar areostichals present: scutellar apicals present: three sternopleurals: lower sternopleura with a single row of bristles, otherwise clothed with hair.

Abdomen.- Somewhat conical or slightly oval, clothed above with short, reclinate bristles, beneath with longer, almost erect hair.

- 6 -

Ventral plates, as a whole, with their sides converging slightly posteriorly; their vestiture decreasing in length posteriorly, that of second short, of third very short and decumbent.

Chaetotaxy.--Second segment without marginal bristles; third with two and sometimes shorter, slender bristles between these and laterals; fourth with a complete row ending ventrally in long hairs.

Genital Segments.--Not prominent, usually only second segment and the membranous band between it and first showing, ground color black or blackish, vestiture of both equally long except that hairs on ventral side of first become much longer. First, sometimes brownish, sometimes faintly grayish pollinose, in profile slightly arched, marginal bristles absent: second, rotund, not flattened, anal area small and not extending above middle of posterior surface. Forceps black, base with upward flap like extensions clothed with fine, curly hairs longer than vestiture of segment; prongs approximated for about half their length, tips bare and in profile with a short, blunt, ^{forth} like projection.

Genitalia.-- Similar to those of S. tuberosa tuberosa (Pannellé) Accessory plates hairy. Base of fourth ventral plate with angular ridge, in profile its posterior extremity not upturned.

(♀) Females differ from males in the following important points.

Head.-- Breadth of front at narrowest part ^{about four fifths} eye width. Upper inner orbits of eyes diverging downward.

Thorax.-- Metanotum clothed with short, reclinate bristles except that vestiture of anterior part of scutellum is more erect and hairy.

Legs.-- Posterior trochanter with slender apical bristle: bristles of intermediate row of anterior face of femur well separated and present on proximal half only, in small specimens

may be but two or three; posterior face with ventral row of several long bristles on proximal half. Posterior ventral row of bristles of middle femur complete, proximally consisting of strong, stout bristles, "c : b" not differentiated.

Chestotaxy.-- Three or four sternopleurals, rarely five.

Abdomen.-- Oval; vestiture throughout of short reclinate bristles except that of ventral surface of fourth notum which is hairy and erect.

Genital Segments.-- Not protuberant, not visible from above. The two narrow, lateral lips of first genital segment brownish or of same ground color as abdomen, usually pollinose ventrally, margins fringed with hairs and bristles, spiracles central but usually concealed by edge of fourth notum.

Redescribed from 32 male and 40 female specimens.

Range.-- Most of my material from which the description was made is in the collection of the Gypsy Moth Laboratory at Melrose Highlands, Mass, and is ^{mainly} ~~mostly~~ European and Japanese. I have, however, three males bearing no locality labels and a few females from Massachusetts which I should consider to be those of harpx if males were positively known to occur here. While the presence of this species in North America may be questioned, it seems best to give the description.

Foreign: Germany, Austria, Hungary, Italy, Japan.

So far as I am able to determine the female of this species has not been previously described unless under some other name as a distinct species.

The males of S. uliginosa Kramer and S. aldrichii resemble this species superficially but the more erect character of the vestiture of their third ventral plates marks them as distinct. The females of aldrichii differ in several characters among

which may be mentioned the more erect character of the anterior and the anterior postantennal dorsocentrals, the presence of at least a preantennal pair of anterior acrostichals, and the fact that ventiture of the ventral surface of all the abdominal nota is erect and hairy. A European species S. schützei¹ Kramer

1. Since writing the above I have provisionally identified a male Sarcophaga from Weston, Mass., as S. schützei.

is very close to S. tuberosa harrax as regards external characters; in the male of the former the front is two fifths the eye width and a preantennal pair of acrostichal bristles is present though often weak; in the latter the front is three fifths the eye width and anterior acrostichals are lacking. The presence of the preantennal pair of acrostichals also differentiates the females.

In material from the Gypsy Moth Laboratory there are specimens of this species reared from "larvae and pupae" of Porthetria dispar (Linnaeus) imported from Germany and others from pupae sent from Japan.

Kramer (Abhand d. Natur. Ges. z. Görlitz, 1911, p. 144) states that "in the economy of nature this "subspecies" plays an important roll in the multiplication of Lepidoptera" and that it has been bred from Psilura monachae (Linnaeus) and Lasiocampa pini (Linnaeus). He also states that in the feeding places of the latter it is more common than any other species and suggests that it is an important agent in its control. It is interesting to note its rearing records from larvae and pupae of the gypsy-moth collected in such widely separated countries.

15. Sarcophaga tuberosa exuberans (Pandellé).

Pl. 3 , fig. 8.

1896. Sarcophaga exuberans Pandellé, Rev. Ent. Franc., vol. 15, p. 186. Original description.

1911. Sarcophaga tuberosa exuberans Kramer, Abhand. d. Natur. Ges. zu G8rlitz, p. 115. Brief mention.
1912. Sarcophaga tuberosa exuberans Böttcher, Deutsch. Ent. Zeitschr., p. 348. Occurrence, etc.
1912. Sarcophaga tuberosa exuberans, Böttcher, Deutsch. Ent. Zeitschr., p. 735, fig. 29 a. Description, figure male genitalia, occurrence.
1914. Sarcophaga tuberosa exuberans Parker, Proc. Bos. Soc. Nat. Hist., vol. 35, Woll, pp. 30, 42. Characters.

(♂) Metanotum clothed with almost erect bristly hair; at least four pairs posterior dorsocentrals, last two much the strongest; ground color of first genital segment brown, of second dull orange; forceps prongs pointed in profile as in S. tuberosa (Pendell).

Length: 8 1/2 - 10 mm.

(♂) Head.- Viewed from side parafrontals and genae with dark reflections. Breadth of front at narrowest part nearly or fully one half eye width; cheek height approximately two fifths that of eye. Front prominent, sides of frontal vitta converging backward. Second antennal segment dark but may be somewhat brownish at tip; third about one and one half times the second; arista plumose on basal half or to slightly beyond. Back of head somewhat convex, with three rows of black cilia behind eyes, otherwise clothed with faintly yellowish or whitish hair that completely covers the metacephalon. Cheeks clothed with black hair. Genae with an irregular row of bristly hairs near lower eye orbit, lowermost much the longest. Palpi dark.

Chaetotaxy.- Lateral verticils absent; vibrissae inserted just above line of mouth margin.

Thorax.- Metanotum clothed with almost erect, bristly hair. Hairs covering anterior spiracle brownish basally, lighter toward tips; those on anterior margin of posterior spiracle dark brown;

those of spiracular cover dark brown with yellowish tips. Epauleta dark

Wings.- Bend of fourth vein normally a right angle; anterior cross-vein more basal than end of first longitudinal; third vein bristly; costal spine short or vestigial; section III of costa about one and one third times section V; alulae fringed with hair; calypters whitish, margins fringed with white hair.

Legs.-Dark. Posterior trochanter with a small ill-defined, inconspicuous "brush": femur sub-cylindrical, clothed beneath with short hair that becomes longer posteriorly and may form a weak beard; anterior face with three rows of bristles, those of intermediate row but little the shortest and absent distally: posterior face without ventral row of bristles: tibia straight or slightly curved, with beard of very ^{long,} but not dense, hairs on distal two thirds to three fourths of posterior face, anterior face with incomplete beard like line of much shorter, scattered hairs; tarsus ^{not shorter than} ~~equal in length to~~ tibia, fourth segment at least one half fifth. Middle coxa with a single row of bristles: femur clothed beneath on posterior, proximal half with beard like growth of long hairs fine hairs; anterior ventral row of short bristles complete, posterior row represented by "comb" only, which extends back to the long hairs: submesotibial bristle present. Ventral surface of anterior coxa with an irregular row of bristles on each side only.

Chestotaxy.- Anterior dorsocentrals not weaker than anterior postscuturals and much longer than vestiture of prescutum; acrostichals absent or indistinguishable from vestiture; inner prescuturals present, rather short: four pairs posterior dorsocentrals, last two much stronger, a weak fifth sometimes present; prescutellar acrostichal present: scutellar apicals present: three sternopleurals: lower sternopleural with a single row of bristles, otherwise clothed with hair.

Abdomen.- Somewhat conical or elliptical, clothed above with short recumbent bristles beneath with almost erect hair. Ventral plates, as a whole, with their sides slightly converging posteriorly; their vestiture decreasing in length posteriorly, that of third short and decumbent.

Chaetotaxy.-Second segment without marginal bristles; third with two and with short, slender, decumbent bristles between these and laterals; fourth with a complete row ending ventrally in long hairs.

Genital Segments.- Prominent, vestiture of both equally long except that those on ventral side of first become much longer. First, ground color brown and except "humps" faintly grayish pollinose, marginal bristles absent, in profile its outline straight or nearly so: second, rotund, not flattened, dull orange, anal area small and not extending above middle of posterior surface. Forceps darkened, base with short, upward, flap like extensions clothed with fine, curly hairs longer than vestiture of segment; prongs approximated ^{for} ~~to~~ about half their length, tips bare. Connecting membrane on each side, just anterior to "humps", with a row of long hairs. Base of fourth ventral plate may show as a rounded darkened ridge the posterior end of which is slightly upturned and prominent in profile.

Genitalia.- Similar to S. tuberosa tuberosa (Pandellé). Accessory plates hairy. (♀) Not known, probably similar to that of S. tuberosa surcoulei (Riley).

Redescribed from 1 specimen.

Range.- New England: ~~Massachusetts~~ ^{Mass.}: New Bedford, ~~United States~~: ~~N. Y.~~ ^{United States}: N.Y.

Foreign: France, Spain, Italy, Hungary, Dalmatia, Greece, South West Africa.

Three specimens of this species collected at New Bedford were very kindly loaned me from the Hough collection by Dr. J. M. Aldrich. The only other specimen examined was from the Cornell collection.

16. Sarcophaga tuberosa sarraaceniæ (Riley)

Pl. 3 , fig. 79.

1874. Sarcophaga sarraaceniæ Riley, Can. Ent., vol. 6, p. 209 - 213, fig. 26. Habits, etc.
1875. Sarcophaga carnaria sarraaceniæ Riley, Trans. Acad. Sci. St. Louis, vol. 3, p. 258. Description, all stages; habits.
1877. Sarcophaga carnaria sarraaceniæ Riley, 9th Rept. Mo., p. 95. Habits, larval and adult.
1878. Sarcophaga carnaria sarraaceniæ Riley, 1st Rept. U. S. Ent. Comm., p. 224, fig. 26.
1879. Sarcophaga carnaria sarraaceniæ Comstock, Rept. on Cotton Insects, U. S. D. A., p. 204 - 207. Description, figures.
1880. Sarcophaga sarraaceniæ Riley, Bull. 3, ^{u.} ~~III~~ S. Ent. Comm., pp. 39 - 41, fig. 25. Habits, etc.¹

1. In a note at the bottom of page 39 Riley mentions that the specimen bred from Alabama argillacea (Hubb.) lacks marginal bristles on the third abdominal segment. I doubt, therefore, if the specimen reared actually belonged to this species. There are at least four species occurring in the United States which lack these bristles, S. cooleyi R. Pkr., S. kelli Ald., and two others which occur in the western and southwestern states. Other references in this article are perhaps to Riley's species.

1880. Sarcophaga sarraaceniæ Riley, American Entomologist, vol. 3 (2d series, vol. 1), p. 94. Doubtful reference.
1880. Sarcophaga sarraaceniæ Riley, American Entomologist, vol. 3 (2d series, vol. 1), p. 203. Reference.
1881. Sarcophaga sarraaceniæ Riley, Gen. Ind. Mo. Repts, p. 60 note.
1885. Sarcophaga sarraaceniæ Riley, p. (110). Descriptions.
1896. Sarcophaga sarraaceniæ Hubbard, Proc. Ent. Soc. Wash., p. 315. Habits.
1900. Sarcophaga sarraaceniæ Howard, Proc. Wash. Acad. Sci., vol. 2, p. 565. Habits, figure, life history.

1901. Sarcophaga sarraceniae Morgan, Bull. 30, U. S. D. A., Div. of Ent., p. 25, fig. 9. Habits.
1904. Sarcophaga sarraceniae Howard, Insect Book, p. 165, fig. 92.
1905. Sarcophaga sarraceniae Washburn, Bull. 93, Minn. Agri. Exp. Sta., pp. 142-143. Habits.
1907. Sarcophaga sarraceniae Jones, Ent. News, vol. 19, p. 155. Habits.¹

1. I have specimens from C. W. Johnson labelled S. sarraceniae Riley which are probably the ones referred to in this article. They are from Summerville, S. C. and were collected by Mr. Jones. These, so far as known, belong to an undescribed species and the above reference I consider doubtful.

1908. Sarcophaga sarraceniae K ilog, American Insects, p. 344. Figures.
1909. Sarcophaga sarraceniae Morse, Biological Survey of Michigan in Report of Geological Survey for 1908, p. 315. Occurrence.
1910. Sarcophaga sarraceniae Smith, New Jersey List, 1909, p. 785. Occurrence.
1910. Sarcophaga sarraceniae Banks, Tech. Bull. 22, U. S. D. A., Bur. Ent., p. 17.
1911. Sarcophaga sarraceniae ^{Howard} ~~Riley~~, House Fly, pp. 255. Habits.
1912. Sarcophaga sarraceniae ~~Shipp~~ ^{Howard}, The Sources and Modes of Infection, p. 428. Habits.
1912. Sarcophaga sarraceniae Sanderson and Jackson, Elementary Entomology, p. 236. Habits.
1912. Sarcophaga sarraceniae Sanderson, Insect Pests of Farm, Garden and Orchard, p. 107. Habits.
1913. Sarcophaga sarraceniae Graham-Smith, Flies and Diseases, pp. 35 and 36. Habits.
1913. Sarcophaga sarraceniae Johnson, Am. Mus. Nat. Hist., vol. 32, p. 75. Occurrence.
1914. Sarcophaga sarraceniae Kelly, Jour. Agri. Res., vol. 2, pp. 441 and 442. Habits.
1914. Sarcophaga tuberosa sarraceniae Parler, Proc. Bos. Soc. Nat. Hist., vol. 35, No. 1, pp. 28, 30, 42, 43, 44. Characters; a subspecies of S. tuberosa Pandellé.

(♂) Metanotum clothed with almost erect slender bristles; ground color of genital segments dull orange; forceps prongs blunt, in profile with small tooth like projection at tip, as in S. tuberosa harpax (Pandellé).

(♀) Vestiture of metanotum of short, reclinate bristles, not differing on scutellum; anterior acrostichals ^{weakly} differentiated anteriorly; vestiture of abdomen of short, reclinate bristles except that of ventral surface of fourth notum which is hairy and erect, ground color of posterior portion or border of fourth notum dull orange; genital segment not protruberant, not visible from above, dull orange, the two rather narrow, lateral lips of the first genital segment, so far as exposed, of practically the same width throughout, somewhat produced down dorsally so that line of junction is nearly vertical, apices central. These characters probably will not serve to separate this species from females of exuberans or subarracenis which are not recognized at the present time.

Length: 7 to 12 1/2 mm., average 10 to 12 mm.

Head.—Viewed from side parafrontals and genae with dark reflections; transverse impression often brownish. Breadth of front at narrowest part one half to three fifths eye width; cheek height two to three sevenths that of eye. Front prominent, sides of frontal vitta converging backward. Second antennal segment dark, usually brownish at tip; third about twice length of second; arista plumose for more than half its length. Back of head somewhat convex^x, with three rows of black cilia behind eyes, otherwise clothed with whitish hair that completely covers metacrophon. Cheeks clothed with black hair. Genae with a row of hairs near lower eye orbit. Palpi dark.

Chaetotaxy.—Lateral verticals absent; vibrissae inserted just above line of mouth margin.

Thorax.-Metanotum clothed with almost erect, slender bristles. Hairs covering anterior spiracle dark basally, lighter toward tips; those anterior margin of posterior spiracle dark brown; those of spiracular cover brown or faintly brownish with yellow border. ~~lips.~~

Wings.- Band of fourth vein normally a right angle or a little less; anterior cross-vein more basal than end of first longitudinal; third vein bristly; costal spine vestigial; section III of costa one and one fourth to one and half times section V, alulae fringed with hairs. Calyptra whitish, margin fringed with white hair.

Legs.- Dark. Posterior trochanters with small, inconspicuous "brush": femur subcylindrical, clothed beneath with long hairs, becoming very long and beard-like posteriorly: anterior face with three rows of bristles, those of intermediate row the shortest and absent distally; posterior face without ventral row of bristles: tibia straight or slightly curved, anterior and posterior faces each with a beard of long, coarse hairs on distal three fourths or there abouts, latter always the stronger: tarsus not shorter than tibia, fourth segment at least one half fifth. Middle coxa with a single row of bristles: femur clothed beneath on distal, proximal half with beard like growth of long, fine hairs; anterior ventral row of short bristles complete, posterior row represented by "comb" only, which extends back to long hairs: submesothibial bristle present, often short and hard to see. Ventral surface of anterior coxa with irregular row of bristles at each side only.

Chestotaxy.- Anterior dorsocentrals not weaker than anterior postsuturals and longer than vestiture of prepectum; acrostichals absent or slightly differentiated anteriorly; inner presuturals weak; four pairs posterior dorsocentrals, last two much the stronger, a weak fifth sometimes present; prescutellar acrostichals

present: scutellar apicals present: three sternopleurals: lower sternopleura with a single row of bristles, otherwise clothed with hair.

Abdomen.- Oval or somewhat conical; clothed above with short reclinate bristles, beneath with longer, most erect hair. Ventral plates, as a whole, with their sides parallel, as a rule square or rectangular and sides nearly straight; their vestiture decreasing in length posteriorly, that of second short, of third very short and decumbent. Posterior half or at least posterior margin of fourth notum usually of same ground color as genital segments but sometimes not thus differentiated.

Chetotaxy.- Second segment without marginal bristles; third with two, occasionally with others between these and laterals; fourth with a complete row ending ventrally in long hairs.

Genital Segments.-Prominent, sometimes only posterior part of first exposed, sometimes segments completely rolled out showing the connecting membrane which bears on each side just anterior to "humps" a row of long hairs, dull orange, vestiture of both equally long except that hairs on ventral side of first become much longer. First, sometimes faintly yellowish pollinose, "humps" not darkened, in profile slight arched, marginal bristles absent: second, round, not flattened, anal area small and not extending above middle of posterior surface. Forceps darkened, base with upward flap like extensions clothed with fine, curly hairs longer than vestiture of segment; prongs approximated for about half their length, tips bare and in profile with a short, blunt, tooth like projection.

Genitalia.- Similar to those of S. tuberosa tuberosa (Pindollé). Accessory plates hairy. Base of fourth ventral plate may show as a rounded ridge the posterior extremity of which is slightly

upturned and shows prominently in profile.

(♀) Females differ from males in the following important characters.

Head.- Breadth of front at narrowest part equal to eye width. Upper inner orbits of eye diverging downward.

Thorax.- Metanotum clothed with short reclinate bristles.

Legs.- Posterior trochanter with slender apical bristle: bristles of intermediate row of anterior face of femur weaker and present on proximal third or half only; posterior face with ventral row of several long bristles on proximal half. Posterior ventral row of bristles of middle femur complete, proximally consisting of strong, stout bristles, "comb" weak.

Abdomen.- Oval; vestiture of short reclinate bristles, except that of ventral surface of fourth notum which is erect.

Genital Segments.- Not protuberant, not visible from above. The two rather narrow, lateral lips of first genital segment as far as exposed ~~off~~ same ^a with, dull orange throughout, their line of junction dorsally practically vertical, at least their upper margins fringed with hair or bristles sometimes both; rarely without bristles, spiracles central and usually visible.

Redescribed from 25 male and 15 female specimens, others examined.

Range.- New England:- Mass.: Penikese Island, Woods Hole, Cohasset, Forest Hills, Hyannis Point, Gloucester; Me.: Orr's Island; N. H.: White Mountains; Conn.: Darien, Meriden.

United States: N. Y., N. J., Md., Va., D. C., Fla., Miss., Tex., N. M., Ariz., Cal., Ohio, Ill., Mich., Minn., Kan., Mont., Wash.

Foreign: Canada (Quebec, British Columbia).

Riley (1874) described this species from larvae and adults reared from the pitcher plant, Sarracenia variolaria. I have examined the specimen labelled as the type in Riley's collection at the United States National Museum. It was at first considered by Riley as a variety of the European species, Sarcophaga carnaria (Linnaeus), which Hough was probably the first to discover is not represented among North American Sarcophagidae. Careful comparison, however, demonstrates its subspecific relationship to Sarcophaga tuberosa Pandellé, a species described by Pandellé (1896) from Europe. Specimens were sent to Dr. Villeneuve of Rambouillet, France and he agrees with me in this regard. It is probably the most widely distributed subspecies of tuberosa on the continent; but four specimens of S. tuberosa exuberans (Pandellé) have been seen, one of S. tuberosa tuberosa (Pandellé) and the occurrence of S. tuberosa harpax (Pandellé) is questionable. I also have but a single record of a new subspecies to be described at a later date.

Females of sarraceniae will probably be confused with those of S. tuberosa exuberans and the undescribed subspecies just mentioned.

Sarcophaga bullata n.sp. and S. tuberosa sarraceniae (Riley)

The males of these two species are apt to be confused, but those of bullata may be distinguished by the broader front, the longer third antennal segment, the presence of two rather than three rows of black cilia behind the eyes, the presence of white hair on the posterior portion of the cheek the scattered vestiture of the genae, the shorter anterior and anterior postscutal dorsocentrals, the tuft of dark hairs at the fold of the calypters, the presence (usually) of dark hairs on the inner, posterior margin of the anterior calypter, the almost equally strong anterior and posterior

boards of hind tibia, the presence of at least two marginal bristles on the first genital segment, the characters of the forceps and genitalia and other characters as mentioned in descriptions.

From the male of the new subspecies, ^{above mentioned,} it is probably separable with difficulty without referring to the character of the forceps. From the other subspecies the color of the genital segments serves as a distinguishing character for the males.

Riley mentioned S. tuberosa sarraceniae several times in connection with grasshoppers but apparently considered it ^{more important} as a scavenger ~~rather~~ ^{as} than a parasite. It is doubtful how many of the references to Riley's accounts given in the bibliography actually refer to sarraceniae. Indeed Aldrich (Jour. Agri. Res. vol. 2, No. 6, p. 444) has shown that Riley's reference to S. carnaria (7th. Mo. Report, p. 180) concerned S. kellyi Aldrich. I have already noted in the bibliography several doubtful references to this subspecies as a parasite of Alabama argillacea (Hübner.). Among my material is one specimen bearing the following label, "From maggots in a crab (Sea Spider), Harpswell, Maine." A male and female received from Dr. O. C. Bartlett, Phoenix, Arizona were labelled, "Bred from dead larvae of Altermia nitida, the Green June bug or fig eater." While engaged on fly investigations for the Montana State Board of Entomology during the summer of 1914, the writer bred this fly from waste fish thrown out in the rear of a meat market. According to results obtained by Kelly (Jour. Agri. Res., vol. 2, ^{no.} ~~no.~~ 6, p. 441) sarraceniae is considered parasitic on grasshoppers and found second in importance to S. kellyi Aldrich in investigations carried on at Wellington, Kansas. Among my notes I have a record of this species, from material examined in the

National Museum at Washington, was reared from Melanophus bivittatus Morse (Washington State). It has also been reared from pig manure (Richardson, N. J.) and Metz has raised it on fish and meat. Banks has captured a male on Castanea pumila.

(17 18, 19). Sarcophaga haemorrhoidalis Meigen, S. dalmanina Schiner,
S. falcipennis Pandellé!

(♂) The males of these species agree in the following more important characters: viewed from side parafrontals and genae with dark reflections: breadth of front the narrowest part about one half that of eye; metacephalon completely clothed with white hair; vestiture of cheeks almost wholly or in part (haemorrhoidalis) of white hair; vestiture of genae confined to that half nearest eyes; lateral verticils absent; vibrissae inserted just above line of oral margin; metanotum clothed with quite dense, almost erect hair; spiracular hairs mostly light colored (variable in haemorrhoidalis); anterior cross-vein more basal than end of first longitudinal; third vein bristly; section III of coxae one and one half to one and two thirds times section V; calypters whitish, ^{margin} ~~externally~~ fringed with white hair; legs dark; posterior trochanter with distinct "brush"; anterior face of posterior femur with three rows of bristles, those of intermediate row shortest and not developed distally, posterior ventral row absent; anterior and posterior faces of tibia each with a bear of coarse hairs, latter always the stronger; middle coxa with a single row of bristles; femur clothed beneath on posterior, proximal half or more with long hair, anterior ventral row of short bristles complete, posterior row represented only by "comb" extending back to the long hairs; ventral surface of anterior coxa with an irregular row of bristles at each side only; anterior dorsocentrals not

weaker than anterior postscutular, short but longer than vestiture of prepectum; acrostichals absent or only very slightly differentiated anteriorly; inner preaurals absent; last two pairs of anterior dorsocentrals strong, anterior to these three or four pairs that are mostly weaker than those before the suture; scutellar spine present; lower sternopleura with a single row of bristles, otherwise clothed with hair; abdomen clothed above with short, reclinate bristles, beneath with longer, almost erect hair; vestiture of third ventral plate short and decumbent except at margins; genital segments prominent, first with marginal bristles, second rotund, flattened, dull orange, anal area large; connecting membrane, on each side just anterior to "humps," with a row of long hairs; vestiture of base of forceps not longer than that of segment usually shorter.

(♀) The females differ in the following more important points:
+ breadth of front at narrowest part approaches base of eyes; ctenotum clothed with quite short, reclinate bristles, not differing on scutellum; anterior face of posterior femur with upper and lower rows of bristles only, posterior face with ventral row of long, well separated bristles on proximal half or slightly more; anterior and posterior ventral rows of middle femur complete but bristles weak and inconspicuous distally; ventral plates of genital segment usually completely exposed, fifth and sixth plates fused, latter of characteristic, specific shape.

According to Eättcher (Deut. Ent. Zeitschr., 1916, pp. 9-16) these species are members of the hemorroidalis-group in which is also included Sarcophaga beckeri Villeneuve and S. cultellata Pandell, which are not known in North America. If the group were less strictly defined other North American species might be included but those which the writer has in mind do not occur in New England, so far as known, and I can see no advantage in so doing, ^{in this paper,} Eättcher,

if I interpret his table correctly, includes S. falculata Pandellé, S. cultellata Pandellé, and S. caliginosa Schinner (securifera Villeneuve) in a subgroup, the falculata-group.

In his introductory remarks to this group Böttcher (Dent. Ent. Zeitschr., 1912, p. 8) states that while up to the present the species included have been exclusively observed with the second genital segment "red," yet this character in itself proves no closer relationship, and further that S. haerorhoidalis Meigen might stand closer to the tuberosa-group (including the subspecies of S. tuberosa Pandellé) than to S. falculata Pandellé. Considering the number and nature of the characters listed in which our New England species of the "tuberosa" and "haerorhoidalis" groups of Böttcher agree, I should be inclined to consider ^{themselves to be} the groups ~~into~~ ^{themselves to be} closely related. Along this line Böttcher states that S. beckeri Villeneuve is considered to be a subspecies of S. tuberosa Pandellé. The peculiar character of the two rows of long, slender hairs, one at each side on the connecting membrane, just anterior to the "humps" of the first genital segment is found in all the species of both groups which are dealt with in this paper and in S. tuberosa Pandellé as well. These facts are presented merely to indicate possible larger relationships within the genus which further study may either prove or disprove.

Another point of interest in connection with these three species is their wide distribution, all three are known from North America, Europe, and Africa, while S. haerorhoidalis Meigen and S. falculata Pandellé are also found in Asia. It might almost be safely suggested that S. caliginosa Schinner will be found there too; S. ruficornis Wiedermann, a very similar species, is ~~found there~~ reported from India

17. Sarcophaga haemorrhoidalis Meigen.

Pl. 4, fig. 10.

1826. Sarcophaga haemorrhoidalis Meigen, Syst. Besch. Zweifl. Ins., vol. 3, p. 28. Original description.
1826. Sarcophaga eruentata Meigen, Syst. Besch. Zweifl. Ins., vol. 5, p. 38. Description.
1830. Sarcophaga georgina Wiedemann, Ausz. Zweifl., vol. 2, p. 357. Description.
1849. Sarcophaga georgina Walker, List IV, p. 829. Occurrence.
1860. Sarcophaga nurus Rondani, Atti. Soc. Ital. Sci. Nat., vol. 3, p. 392, (para). Description.
1862. Sarcophaga georgina Wiedemann, Insecte & Injurious to Vegetation, 3d. edit., p. 615.
1867. Sarcophaga haemorrhoidalis Goursin, Insecte nuisibles, etc. pp. 176, 184. Habits.
1880. Sarcophaga georgina Kilpatrick, Amer. Ent., vol. 3. (2d series, vol. 1), p. 203. Habits.
1881. Sarcophaga nurus Hagen, Can. Ent., vol. 13, p. 147. Concerning N. American Sarcophaga, let. Meigs.¹

The "species" referred to under this name (S. nurus Rondani) contains two pairs of S. haemorrhoidalis Meigen taken in copulation and a single specimen, two females of Ravinia communis R. Parker and a specimen of S. filicula Pandellé labelled S. georgina Wiedemann.

1891. Sarcophaga georgina Brauer and Bergström, Zweifl. 1. Kaiserl. Mus., vol. 5, p. 414. Note.
1896. Sarcophaga nurus Pandellé, Rev. Ent. Franc., vol. 10, p. 185. Redescription of Rondani's nurus, all type specimens are S. haemorrhoidalis Meigen (Böttcher).
1904. Sarcophaga eruentata Kramer, Zeitschr. Hymen. Dipt. Notes relationships.
1907. Sarcophaga georgina Walker, Cir. 84, Bur. of Ent., U. S. Dept. Agri., p. 5. fig. 5¹ Habits.

1. Figure female, prescrotal & scroteral bristles present in drawing, absent in haemorrhoidalis as a rule.

1907. Sarcophaga georgina Webster, Bull. 67, Bur. of Ent., U. S. Dept. Agri. p. 98. Habits.
1908. Sarcophaga georgina Webster, Yrbk. U. S. Dept. Agri., 1907, p. 246.
1911. Sarcophaga haemorrhoidalis Villeneuve, Deutsch. Ent. Zeitschr., p. 187.
1911. Sarcophaga haemorrhoidalis Krüger, Abhandl. d. Natur. Ges. zu Götting, p. 150, Pl. 2, fig. 15.
1912. Sarcophaga haemorrhoidalis Böttcher, Deutsch. Ent. Zeitschr., pl. 315, 378. Synonymy.
1912. Sarcophaga georgina Johnson, Psyche, vol. 39, p. 104. Notes.
1912. Sarcophaga haemorrhoidalis Böttcher, Ann. Soc. Ent. Ital., vol. 44, pp. 191, 193, 195, 197. Concerning Rondani's types.
1913. Sarcophaga haemorrhoidalis Böttcher, Deutsch. Ent. Zeitschr., pp. 12-15, fig. 37. Description, figures male genitalia, occurrence. Pages 369-370, occurrence, synonymy.
1913. Sarcophaga georgina Johnson, Ann. Ent. Soc. Amer., vol. 6, p. 447. Occurrence, identity verified by author.
1914. Sarcophaga haemorrhoidalis Parker, Proc. Bos. Soc. Nat. Hist., vol. 35, No. 1, pp. 30, 31, 36, 38, 39, 40, 41, 44. Characters.
1914. Sarcophaga haemorrhoidalis Parker, Can. Ent., vol. 16, p. 423. Notes.

(♂) Two rows of black cilia behind eyes; anterior portion of cheek clothed with black, posterior with white hair; hairs converging anterior spiracles mostly dark brown (not at all constant); last two pairs posterior dorsocentrals strong; prescutellar acrostichals usually absent (distinctive when absent); anal portion of first genital segment posterior to "horns" grayish pollinose with reflecting colors of abdomen, usually a single marginal bristle on each side of center; second genital segment dull orange; forceps prongs approximated for about half their length, their distal portion wide spread forming an u shaped space, in profile inner edges of prongs ^{are} seen to be notched about midway.

(♀) Two rows of black cilia behind eyes; anterior portion of cheek clothed with black, posterior with white hair; last two pairs posterior dorsocentrals strong, those anterior to them very short and distinguishable; prescutellar acrostichals usually absent (distinctive when absent); anterior face of posterior legs with upper and lower rows of bristles only; ventrals of abdomen of short reclinate bristles except that of ventral surfaces of first and fourth legs which is erect; genital segments slightly protruberant; lateral lips of first genital segment dull to brownish orange; spiracles of fifth segment seem to open through

lips of sixth^{notum} (first genital); fifth and sixth ventral plates
seemed to be fused; sixth united, having swollen appearance but
its posterior corners flattened so that the swelling narrows
posteriorly.

Length. 11 to 15 mm., average 12 to 13 mm.

(♂) Head.—Viewed from side parafrontals and genae with dark
reflections. Breadth of front at narrowest part about one half
eye width; cheek height nearly one half width of eye. Front
prominent, sides of frontal vitta converging backward either by
curve or straight line, if the former vitta may appear bulb like
at base. Second antennal segment dark; united about twice length
of second; arched, rounded to beyond middle. Back of head some-
what convex, with two rows of black silk behind eyes, otherwise
clothed with white hair that completely covers metacapsulae.
Anterior portion of cheeks clothed with black, posterior with
white hair. Front half of genae nearest eye orbit bearing coarse
hair arranged in two or three longitudinal rows. Palpi short.

Chestotaxy.—Lateral verticils absent, vibrissae inserted
just above line of oral margin.

Thorax.—Metanotum clothed with quite dense, erect hair.
Hairs covering anterior spiracles mostly dark brown though more or
less light colored at tips, sometimes light except at base; those
of anterior margin of posterior spiracles dark brown; those of
spiracular cover yellowish or light colored. Epaclet dark.

Wings.—Bend of fourth vein normally at slightly acute angle;
anterior cross-vein more basal than end of first longitudinal;
third vein bristly; costal spine vestigial; section III of costa
one and one half to one and two thirds times section V, blades
fringed with hair; calypters whitish, margins fringed with white
hair.

Legs.-- Dark. Posterior trochanter with distinct "brush" not obscured by hairs; apical bristle present, not at all distinct: femur subcylindrical, clothed beneath with rather short hair of about same length as bristles of lower row of anterior face, but becoming slightly longer anteriorly forming a very weak beard often only present distally; anterior face with three rows of bristles, those of lower row shortest and least developed distally, those of lower row present only on distal two thirds or sometimes three fourths; posterior face without ventral row of bristles: tibia straight or slightly curved, anterior and posterior faces each with a beard of long, coarse, black hairs on distal half thirds or slightly more, latter hairs less numerous: tarsus not shorter than tibia, fourth segment at least one half first. Middle coxa with a single row of bristles; femur clothed beneath on posterior, proximal half covered with long hair; anterior, ventral row of short bristles complete, posterior row represented only by "comb" extending proximally to the long hair: hairy vestiture of lower surface of tibia increasing in length distally, but short and not forming anterior and posterior beards; subscutellar bristles present, often quite weak. Ventral surface of anterior coxa with an irregular row of bristles at each side and .

Chest.-- Anterior prescutum is not wider than anterior postscutum, short and sometimes hair like, but longer than vestiture of prescutum; areolichela absent or only slightly differentiated anteriorly; inner prescutum absent: last two pairs of posterior areolichela strong, anterior to third and to four pairs that are weakly weaker than those before them and are often almost indistinguishable from vestiture of scutum: preapical areolichela usually absent, 9 present very slender, rarely at

at all stout: scutellar apicula present: three sternopleura I: lower sternopleura with a single row of bristles, anterior ones clothed with hair.

Abdomen.- Somewhat conical; clothed above with short, unilinate bristles, beneath with slightly longer, almost erect hairs. Ventral plates as a whole with their sides converging posteriorly; their edges ^{usually} ~~usually~~ quite straight and not curved as in most species; first clothed with erect hair of about same length of that of ventral parts of corresponding notum, for most part second and third with short decumbent hair, that of their margins but little longer.

Chestotaxy.- Second segment without marginal bristles, third with two, sometimes with shorter, slender bristles between these and laterals; fourth with a complete row ending ventrally in long hairs.

Genital Segments.- Prominent, sometimes fully exposed. First; "hump" dull orange or sometimes brownish, bare or with scattered hairs; remainder of segment grayish yellowish with reflecting colors of abdomen, ground color probably brownish, vestiture about half length of that of second segment; in profile somewhat arched; marginal bristles present, usually one on each side of center; second, obtund, flattened, anterior and posterior surfaces of nearly equal size, dull orange, vestiture inclined toward corners, anal area large and central extending apically to limit of posterior surface. Forceps darkened, sometimes visible, prongs approximated for about half their length, distal portions wide apart forming a ^u shaped space that is ~~indented dorsally~~, in profile inner edges of prongs are seen to be notched, base with apical flap like ^{ens} extensions clothed with fine hair that is shorter than vestiture of

second segment. Connecting membrane, on each side just anterior to "humps" with a row of long hairs.

Genitalia.- Head of penis elongate and with distinctive, paired, lateral processes that project forward and then turn upward; accessory plates hairy, of same color as second segment. Fourth ventral plate darkened, lamellae short, with large membranous area between their bases, distally each with an inward rounded projection bearing short bristles, normally these projections are much nearer to each other than shown in figure and may even touch.

(♀) Females differ from males in the following important ^{characters.} ~~points.~~

Head.- Breadth of front at narrowest part varies from four fifths to same as eye width. Upper inner orbits of eyes diverging downward.

Thorax.- Metanotum clothed with quite short, reclinate bristles, not differing on scutellum.

Legs.- Vestiture short throughout. Posterior femur somewhat spindle shaped; anterior face with upper and lower rows of ^{bristles} ~~bristles~~ only, those of former well separated, especially distally; posterior face with ventral row of long well separated bristles on proximal half or slightly more. Anterior and posterior rows of bristles of middle femur complete but bristles weak and inconspicuous distally; submesotibial bristle very strong, sometimes a short bristle just above it.

Chaetotaxy.- Anterior and anterior postsutural dorsocentrals more distinct; projecting above vestiture of metanotum: lower sternopleura with a single row of bristles, hairy vestiture anterior to these not nearly so conspicuous.

Abdomen.- Oval; vestiture practically throughout of short reclinate bristles, hairy and almost erect on ventral parts of first and fourth nota.

Genital Segments.- Slightly protuberant; bristles of first segment usually visible from above. The two lateral lips of first genital segment dull to brownish orange, of medium width, narrowed and distinctly separated dorsally, their margin fringed with bristles that decrease in length ventrally, spiracles central. Fifth segment not discernible as such, its spiracles rarely visible and apparently open through lips of first genital segment (~~first genital~~). Fifth and sixth ventral plates (sixth and seventh morphological) seem to be fused, at least anterior margin of fifth of same color as sixth, the remainder grayish pollinose or colored as those anterior to it, sixth raised having a swollen appearance but its posterior corners flattened so that swelling narrows posteriorly.

Redescribed from several hundred specimens, male and females.

Range.- New England: Mass.: Cohasset, Edgartown, Nantucket, Forest Hills, Boston, Rockland, North Abington, Melrose, Westfield Springfield, Amherst; Conn.: Branford, New Haven.

United States: N. Y., N. J., Pa., Va., Ga., Ariz., Ohio, Ill., Mich., W. Va., Mont.

Foreign: Bermuda, England, Germany, Austria, Hungary, France, Spain, Italy, Dalmatia, Greece, Sardinia, Tunis, Algeria, other parts of Africa, India.

^{see (x1/2)} → The lack of prescutellar scrotothoracic bristles is very distinctive when it holds good but their occasional presence is sometimes ~~confusingly~~ especially since the subscutellar bristle is sometimes absent as in S. falcularia. The anterior portion of the cheek is clothed with black hair, the posterior with white, as in Sarcophaga bullata. The transverse impressions often bear a few hairs similar to those on the genae. The two rows of long, slender hairs, one at each side, just anterior to the "humps"

of the ^rfirst genital segment are sometimes very much reduced and even vestigial. Böttcher (Deut. Ent. Zeitschr., 1913, p. 369) states that the characters of this species are quite constant in Europe but rather variable in Africa.

To separate this species from S. dalmatina Schiner, S. falculata Pandellé, and S. tuberosa sarraceniae (Riley) see table on page

The habits of haemorrhoidalis are probably somewhat varied. Webster (1907) discusses a species under the name of S. georgina Wiedermann in its relation to grasshoppers. As this is a synonym of S. haemorrhoidalis, it is possible that the latter is the species referred to. Meade (1876) mentions ^{it} (S. cruentata Meigen) as bred from pupae found in pigeons dung in which were the remains of dead pigeons. Metz during the summer of 1914 reared a specimen on meat. In the collection of the National Museum at Washington a specimen was noted, apparently of this species, from India, labelled, "S. taenionota Wiedermann, apple and pear fruit pest." During July and ^{August} ~~August~~, 1914, while engaged on certain investigations for the Montana State Board of Entomology, the writer frequently had occasion to deal with this species. It was bred extensively from human excrement; a total of 1405 adults were secured from 7 experiments, 624 in one instance. It was captured in privies, on garbage, on human excrement, and occasionally in houses. Its habits do not elevate it above the level of suspicion as a possible carrier of intestinal diseases. Records from three experiments placed the combined larval and pupal stages at from 17 to 20 days. European records indicate S. haemorrhoidalis as the causative agent in some cases of intestinal myiasis, the larvae probably being infested with tainted meat. Adults have also been reared from horse manure (Richardson, New Jersey 1914), and taken

feeding on honey dew on a tulip tree (Banks)^l.

^{space}
me- (18,19) Sarcophaga dalmatina Schiner, S. falculata Pandellé. The fact has previously been mentioned that Böttcher (Deutsch. Ent. Zeitschr., 1913, p. 14) places these^x flies together with another European species, under the falculata-group, apparently a sub-grouping under the haemorrhoidalis-group. Both males and females are strikingly alike. It is not necessary to enumerate further characters in which these species agree but the unusual distinctness of the dark spots of the abdomen, especially in the male is worth mentioning. The females also have the sixth abdominal notum undivided in distinction from that of S. haemorrhoidalis Meig., On page 45 of the first² part of this paper it was stated that the accessory plates of these two species were bare: this is only true of these plates as they appear if examined before the genital segments are pulled out, the hair on the anterior portion cannot then be seen.

18. Sarcophaga dalmatina Schiner,

Pl. I, fig. 11.

1862. Sarcophaga dalmatina Schiner, Fauna Aust., vol. 1, pp. 570-571, (pars).
1908. Sarcophaga securifera Villeneuve, Mitt. Zool. Mus., Berlin, vol. 4, p. 113. Description. (Is synonym of S. dalmatina Schiner, pars).
1912. Sarcophaga securifera Böttcher, Deutsch. Ent. Zeitschr., p. 349. Mentions synonymy with S. dalmatina Schiner.
1913. Sarcophaga securifera Böttcher, Deutsch. Entl. Zeitschr., pp. 15-16, fig. 41. Description, figure male genitalia, occurrence. Equals S. dalmatina Schiner, pars. Page 370, relationships.
1913. Sarcophaga securifera Böttcher, Ann. Mus. Nat. Hungariae, vol. 2, p. 378. Relationship to S. ruficornis Wiedemann.
1914. Sarcophaga dalmatina Parker, Proc. Bos. Soc. Nat. Hist., vol. 35, No. 1, pp. 30, 36, 43, 45. Characters.

(♂) One row of black cilia behind eyes; cheek clothed with white hair, but usually some black hairs just beneath lowest limit of eye; hairs covering anterior spiracle grayish with dark tinge at base only; sometimes only last pair, sometimes last two pairs of posterior dorsocentrals; strong, those anterior ^{to these} scarcely distinguishable; prescutellar acrostichals present; genital segments dull or brownish orange except that first has a dark band posteriorly, often only dorsally and sometimes ^{only} ~~just~~ posterior margin ^{is} darkened; first genital segment with several stout marginals each side of center.

(♀) One row of black cilia behind eyes; cheek clothed with white hair, but usually some black hairs just beneath lowest limit of eye; hairs covering anterior spiracle grayish with dark tinge at base only; only last pair of posterior dorsocentrals strong, other pairs ~~if~~ present, immediately anterior to them and very weak; prescutellar acrostichals present; anterior face of posterior femur with upper and lower rows of bristles only; vestiture of abdomen throughout of short, reclinate bristles; first genital segment not divided into two lips, somewhat protuberant and generally visible from above, dull or brownish orange; fifth and sixth ventral plates seem to be fused; sixth of characteristic shape, divisible into an anterior indented portion with a bristle on each side of center posteriorly and a posterior part divided into two rounded or irregularly rounded lobes that extend backward, one on each side of center.

Length. 9 to 17 mm., average about 14 mm. x

Head.- Viewed from side parafrontals and genae with dark reflections. Breadth of front at its narrowest part about one half eye width; cheek height about three eighths that of eye. Front prominent; frontal vitta narrow, at narrowest part of front the

darkened band normally not as wide as each parafrontal, its sides converging backward. Second antennal segment dark; third about twice length of second; arista plumose to beyond middle. Back of head somewhat convex, with one row of black cilia behind eyes, otherwise clothed with white hair that completely covers the metaclypeus. Cheek clothed with white hair but usually some black hairs just beneath lowest limit of eye. Gena with scattered hairs near the lower eye orbit. Palpi dark.

Chaetotaxy.-- Lateral verticals absent; vibrissae inserted just above line of oral margin.

Thorax.-- Metanotum clothed with quite dense, erect hair. Hairs covering anterior spiracle grayish with dark tinge basally; those of anterior margin of posterior spiracle dark only at very base; those of spiracular cover yellowish or yellowish white. Epaulata dark.

Wings.-- Bend of fourth vein normally a right angle or very nearly such; anterior cross-vein more basal than end of first longitudinal; costal spine vestigial; third vein bristly; section III of costa at least one and one half times section V; alulae fringed with hair; calypters whitish, margins fringed with white hair.

Legs.-- Dark. Posterior trochanter with distinct "brush"; apical bristle present, not always distinct: femur spindle or somewhat spindle shaped, clothed beneath with long hair that become longer posteriorly forming a beard; anterior face with three rows of bristles, those of intermediate row shortest and not developed distally, sometimes only centrally, lower row usually present on distal three fourths at least; posterior face without ventral row of bristles: tibia straight or slightly curved, anterior and

posterior faces each with a beard of long, coarse hairs on about distal three fourths, latter always the stronger: tarsus not shorter than tibia, fourth segment at least one half fifth.

Middle coxa with a single row of bristles: femur clothed beneath on posterior, proximal half of more with long hair; anterior ventral row of short bristles complete, posterior row represented only by "comb" extending proximally to the long hair: subscutellar bristle present. Ventral surface of anterior coxa with an irregular row of bristles at each side only.

Chaetotaxy.— Anterior dorsocentrals not weaker than anterior postanturals, short, but longer than vestiture of praescutum; acrostichals absent; inner preanturals absent: last one or two pairs of posterior dorsocentrals strong, anterior to these two to four pairs that are mostly weaker than those before the suture and often almost or entirely indistinguishable from vestiture of scutum; prepectellar acrostichals present: scutellar apicals present: three sternopleurals: lower sternopleura with a single row of bristles, other two clothed with hair.

Abdomen.— Somewhat conical; clothed above with short, reclinate bristles, beneath with slightly longer, almost erect hair. Ventral plates, as a whole, with their sides almost parallel or slightly converging posteriorly, vestiture decreasing in length posteriorly, that of ^{first} ~~first~~ long, that of second short and erect, that of third short and decumbent though longer at margins.

Chaetotaxy.— Second segment without marginal bristles; third with two; fourth with complete row ending ventrally in longer hairs.

Genital Segments.— Prominent; dull or brownish orange except that first has a dark brown band posteriorly often only dorsally, sometimes just posterior margin darkened. First, usually exposed

only to darkened posterior portion, vestiture, including that of "humps," slightly shorter than that of second segment; in profile flatly curved; several short, stout, marginal bristles each side of center: second, rotund, flattened, anterior and posterior surfaces of nearly equal size, vestiture not coarse, small ones large and central extending upward to or nearly to limit of posterior surface. Forceps darkened, short, prongs approximated nearly their full length, in profile appear^{ing} broad and so a bit flattened, base with short, upward, flag like extensions densely clothed with fine hair that is not longer than vestiture of second segment. Connecting membrane, on each side, just anterior to "humps," with a row of long hairs.

Genitalia.-- Accessory plates darkened, sometimes almost black, polished, only their anterior portions hairy. Base of fourth ventral plate dull orange, lamellae darkened and each with a "brush" on its upper surface bordering the inner margin.

(♀) Females differ from males in the following important ^{characters.} ~~points.~~

Head.-- Breadth of front at its narrowest part nearly equal to eye width. Upper inner orbits of eyes diverging downward.

Thorax.-- Metanotum clothed with quite short, reclinate bristles. Epauls sometimes as in males, sometimes quite distinctly yellowish outwardly.

Legs.-- Vestiture short throughout. Posterior femur with upper and lower rows of bristles only, those of latter well separated, especially distally; posterior tibia with ventral row of long well separated bristles on proximal half or slightly more. Anterior and posterior rows of bristles of middle femur complete but bristles small and short on distal half or more: subscutibial bristle very strong, sometimes a short bristle just above it.

Chaetotaxy.- Anterior dorsocentrals very strongly reclinate, longer than but projecting but little above vestiture of proescutum: only last pair of posterior dorsocentrals strong (in all specimens examined), other pairs, if present, just anterior to them, and very weak: usually three, sometimes four sternopleurals: lower sternopleura with a single row of bristles, a few bristles sometimes mixed with hairy vestiture anterior to it.

Abdomen.- Oval, vestiture throughout of short reclinate bristles. Ventral plates mostly concealed, their posterior margins with bristles.

Genital Segments.- ^{First genital segment} ~~Sixth notum~~ (notum of sixth taxonomic segment, seventh morphological) not divided into two lips, somewhat protuberant and generally visible from above, dull or brownish orange, margin fringed with bristles (sometimes weak) that decrease in length ventrally, spiracles central. No visible evidence of fifth notum. Fifth and sixth ventral plates seem to be fused; fifth ~~the~~ same color ^{as} remainder of genital segments, sometimes partially ^{grayish} ~~grayish~~ pollinose; sixth of characteristic shape divisible into an anterior indented portion with a bristle on each side of center posteriorly, and a posterior part divided into two rounded or angularly rounded lobes that extend backward, one on each side of center.

Redescribed from 10 male and 17 female specimens, others examined.

Range.- New England: Mass.: Woods Hole, Nahant, Forest Hills, Springfield.

United States: N. Y., N. J., Pa., Md., D. C., Va.

Foreign. Hungary, Italy, Dalmatia, Algeria, Tenerife, Roumania, and coast countries of the Mediterranean.

Males and females of this species are usually very easily separated from other New England members of the genus by the single row of black cilia behind the eyes. Additional important characters in the female are the presence of but a single pair of strong posterior dorsocentrals, the vestiture of short reclinate bristles on the ventral portions of all the abdominal nota, and the two rounded or angularly rounded backward projections of the posterior part of the sixth ventral plate (often not clearly defined due to excrement~~ous~~ matter or distortion of genital parts). On the middle and anterior tibiae of the male the vestiture of the ventral surface sometimes tends to become longer distally but never to the extent to form beards. According to Böttcher (Deutsch. Ent. Zeitschr., 1915. p. 15) the males sometimes have been one strongly developed posterior dorsocentral.

To separate this species from males and females of closely related or similar species see page .

Metz has reared an adult from broken pigeon eggs collected in New York City and the writer has collected specimens on human excrement at Springfield, Mass. Richardson of New Jersey reared a female from material taken from a brooder house.

Sarcophaga dalmanina was described by Schiner in 1862. Böttcher (Deutsch. Ent. Zeitschr., 1914. p. 116) has examined Schiner's material at the K. K. Hof. Mus. Wien. and found that the specimens from which the original description was made consist of two species since described as S. aurifera Villeneuve and S. exuberans Pandellé. According to the international code the name dalmanina must be retained, ~~in such cases~~, for one of ^{these two} ~~the~~ resultant species. As no particular specimen was designated by Schiner as the type the species to bear the original name must be arbitrarily selected;

therefore either securifera or exuberans must fall into the synonymy. Since it is unwise to cause more confusion than absolutely necessary, it seems best to make securifera the synonym, rather than exuberans as a change in the name of the latter would involve the other subspecies of S. tuberosa Pandellé as well as exuberans. The type of S. dalmanina is, therefore, here designated as being the species until now known as S. securifera Villeneuve. The writer has corresponded with Böttcher concerning this point and he fully agrees that the above designation should be adopted, though at the time he published the paper above referred to he deferred to the wishes of Villeneuve who thought it best to retain the name securifera for the time being.

19. Sarcophaga falculata Pandellé.

Pl. 5, fig. 12.

1881. Sarcophaga cruentata (spelled crustata) Hagen, Can. Ent., vol. 15, p. 147.¹

1. I have found the male and female referred to by Hagen in his article to be specimens of S. falculata Pandellé.

1896. Sarcophaga falculata Pandellé, Rev. Ent. Franc., vol. 15, p. 185. Original description.

1911. Sarcophaga falculata Kramer, Abhandl. d. Natur. Ges. zu Götting, p. 150, pl. 2, fig. 16. Habits, figures/ male genitalia.

1912. Sarcophaga falculata Böttcher, Ann. Soc. Entom. Ital., vol. 44, p. 193, equals S. nurus Rondani, *pass*; also p. 195, 198.

1913. Sarcophaga falculata Böttcher, Deutsch. Ent. Zeitschr., p. 13. Description, figures male genitalia, occurrence, equals S. nurus Rondani, *pass*.

1914. Sarcophaga falculata Parker, Proc. Bos. Soc. Nat. Hist., vol. 55, No. 1, pp. 30, 36, 39, 40, 45. Characters.

(♂) Two rows of black cilia behind eyes; cheek clothed with white hair except that vestiture of that part bordering outer portion of transverse impression and lower portion of posterior orbit is black; hairs covering anterior spiracle grayish with or without dark tinge at base only; submesothoracic bristle absent; last two pairs of posterior dorsocentrals strong; prescutellar acrostichals present; first genital segment brownish, sometimes faintly grayish pollinose dorsally and posteriorly.

(♀) Two rows of black cilia behind eyes; cheeks clothed with white hair except that vestiture of that part bordering outer part of transverse impression and lower portions of posterior eye orbits is black; hair covering anterior spiracle grayish with or without a dark tinge at base only; anterior face of posterior femur with upper and lower rows of bristles only; last two pairs posterior dorsocentrals strong; prescutellar acrostichals present; vestiture of abdomen of short, declinate bristles except that on ventral surfaces of first and fourth note it is more erect and sometimes hair like, first genital segment not divided into two lateral lips, somewhat protuberant but not visible from above, dull or brownish orange; fifth and sixth ventral plates seem to be fused, sixth of characteristic shape, roughly divisible into an anterior portion that usually has a distinct knob like elevation centrally and anteriorly and a posterior part consisting of two semi-circularly rounded lobes that extend backward, one ^{or} occasionally two bristles at the base of each lobe.

Length.— 9 to 17 mm., average about 14 mm.

Head.— Viewed from side parafrontals and genae with dark reflections. Breadth of front at its narrowest part from three

fifths to two thirds eye width; cheek height approximately three eighths that of eye. Front prominent, upper inner orbits of eyes converging downward; at narrowest part of front vitta as wide or wider than each parafrontal, its sides converging backward. Second antennal segment dark; third about twice length of second; arista plumose to beyond middle. Back of head somewhat convex, with two rows of black cilia behind eyes, otherwise clothed with white hair that completely covers the metacephalon, ^{cheek} with white hair except that vestiture of that part bordering outer part of transverse impression and lower part of posterior eye orbit is black. Genae with scattered red hairs near the lower eye orbits.

Chestotaxy.- Lateral verticals slant; vibrissae inserted just above line of oral margin.

Thorax.- Metanotum clothed with quite dense, erect hairs. Hairs covering anterior spiracle grayish with dark tinge basally; those of anterior margin of posterior spiracle dark on basal half; those of spiracular cover yellowish or yellowish white. Epaulate dark.

Wings.- Band of fourth vein normally a right angle; anterior cross-vein more basal than end of first longitudinal; costal spine vestigial; third vein bristly; section III of co to at least one and one half times section V; alulae fringed with hair; calypters whitish, margins fringed with white hair.

Legs.- Dark. Posterior trochanter with distinct "brush;" apical bristle present, not always distinct: femur spindle or somewhat spindle shaped, clothed beneath with long hair that becomes longer posteriorly forming a beard; anterior face with three rows of bristles, those of intermediate row shortest and not developed distally, often but three or four at center,

lower row present at least on distal half or slightly more; posterior face without ventral row of bristles: tibia straight or slightly curved, anterior and posterior faces each with a beard of long, coarse hairs for nearly the entire length (at least posteriorly), latter always the stronger: tarsus not shorter than tibia, 4th segment at least one half fifth. Middle coxa with a single row of bristles: femur clothed beneath on posterior, proximal half or more with long hair; anterior ventral row of short bristles complete, posterior row represented only by "comb" extending proximally to the long hair: acrostichal bristle absent: ventral surface of anterior coxa with an irregular row of bristles at each side only.

Chaetotaxy.- Anterior dorsocentrals not weaker than anterior postscutellars; short, but longer than vestiture of praescutum; acrostichals absent; innerpraescutellars absent; last two pairs of posterior dorsocentrals strong, anterior to these two to four pairs that are mostly weaker than those before the suture and often almost indistinguishable from vestiture of notum; praescutellar acrostichals present: scutellar apicals present: three sternopleurals, sometimes four on one side: lower sternopleura with a single row of bristles only, otherwise clothed with hair.

Abdomen.- Somewhat conical; clothed above with short, reclinate bristles, beneath with slightly longer, almost erect hair. Ventral plates, as a whole, with their sides almost parallel or slightly converging posteriorly; vestiture of first slightly longer than that of ventral surface of first notum; that of second ~~longer than that of first~~ and third short and decumbent, that on 4th margin longer and on the third decumbent.

Chaetotaxy.- Second segment without marginal bristles; third with two; fourth with a complete row ending ventrally in long hairs.

Genital Segments.- Prominent. First, usually only posterior portion exposed, brownish, sometimes faintly grayish pollinose dorsally and posteriorly, "humps" sometimes less darkened, vestiture shorter than that of second segment, in profile somewhat arched, marginal bristles very short and slender when present (scarcely if at all longer than vestiture, sometimes one, sometimes two or three each side of center: second, rotund, flattened anterior and posterior surfaces of nearly equal size, dull orange, ~~and anal~~ anal area large and central extending dorsally nearly to limit of posterior surface. Forceps darkened, except distally, short, prongs approximated for a little more than half their length, in profile broad and somewhat flattened, base with short, upward, flap like extensions, densely clothed with fine hair that is shorter than vestiture of second segment. Connecting membrane, on each side, just anterior to "humps", with a row of long hairs.

Genitalia.- Accessory plates darkened at least posteriorly, only anterior portion hairy.

(♀) Females differ from males in the following important characters.

Head.- Breadth of front at ~~anterior~~ ~~anterior~~ part about equal to eye width. Upper inner orbits of eyes diverging downward.

Thorax.- Metanotum clothed with quite short, distinct bristles.

Legs.- Anterior face of posterior femur with upper and lower rows of bristles only, those of latter row distal; posterior face with ventral row of long, well separated bristles proximally, usually but two bristles present. Anterior and posterior rows of bristles of middle femur complete, but bristles short, and often weak on distal half or more: subgenital bristle very

strong, sometimes a short bristle just above it.

Chaetotaxy.- Anterior and anterior postural dorsocentrals more distinct, projecting above vestiture of metanotum: lower sternopleura with a single row of bristles, hairy vestiture anterior to these not nearly so conspicuous.

Abdo en.- Oval; vestiture practically throughout of short, reclinate bristles, erect and sometimes hair like only on sides and ventral surfaces of first and fourth notum, sometimes only on latter.

Genital Segments.- ^{First genital segment} ~~Sixth~~ notum (seventh morphological) not divided into two lateral lips, somewhat protuberant but not visible from above, dull or brownish orange, margin fringed with bristles (sometimes weak) that decrease in length ventrally, spiracles central but often concealed beneath edge of fourth notum. No visible evidence of fifth notum Fifth and sixth ventral plates seemed to be fused; fifth sometimes grayish pollinose, sometimes same color as remainder of genital segments, the marginal bristles mark its posterior limit; sixth of characteristic shape, roughly divisible into an anterior portion usually with a distinct knob like elevation centrally and anteriorly and a posterior part consisting of two semi-circularly rounded lobes that extend backward, one or occasionally two bristles at base of each lobe.

Redescribed from 14 males and 9 female specimens, others examined.

Range.- New England: Mass.: Cohasset, Boston, Nahant, Cambridge, Forest Hills, Woods Hole, Amherst,

United States: N. Y., N. J., Pa., Fla., Ill., Minn.

Foreign: Bermuda, Germany, France, Spain, Italy, Dalmatia, Tunis, India.

The vestiture of the ventral surface of the middle and anterior tibiae of the male often becomes perceptibly longer distally and, on the middle tibiae, may show a tendency to become beard like posteriorly. The sixth notum of the female is somewhat similar to that of S. dalmatina Schiner; it is often bent out of shape forming a median ridge dorsally: the characters of the sixth ventral plate are useful when discernible.

Specimens of this species taken in Bermuda have been received from C. W. Johnson of Boston.

Kramer (1911) reports a male as captured on an umbellate and others as bred from Lepidoptera. Specimens received from Metz were reared on meat.

insert pages
95, 96 & 96a

(20) Sarcophaga bullata n.sp. This species agrees with members of the haemorrhoidalis-group (p.) in several characters and in others with the species of the tuberosa-group (p.): with S. fulvipes ^{disidia} ~~nigra~~, the next species, it agrees in having the ^{of the male} tarsi shorter than their respective tibiae and the genital segments are essentially the same except as regards the comparative length of the vestiture of the two segments. (See page).

20. Sarcophaga bullata n.sp.

Pl. 5, fig. 13.

1913. Sarcophaga georgina* Felt, N. Y. State Museum, Bull. 165,

* Provisionally determined.

Rept. State Entomologist for 1912, pp. 80-82, pl. 7, figs. 1, 2, and 3*.

* Figure 4, labelled as the genitalia of this species, ^{is} of Phormia regina (Meigen).

Habits; description of larval stages and pupa.

Table of External Characters for Separating Males and Females
of the haemorrhoidalis and tuberosa Groups.

Characters	<u>S. haemorrhoidalis</u> <u>Meigen</u>	<u>S. dalmatina</u> <u>Schiner</u>	<u>S. falculata</u> <u>Pandellé</u>	<u>S. tuberosa</u> subsp.
Number of rows of black cilia behind eyes. (♂ & ♀)	Two	One	Two	Three
Relation of cheek height to height of eye. (♂ & ♀)	About one-half.	About three-eighths.	About three-eighths.	About three-sevenths.
Frontal vitta at narrowest part of front. (♂)		Narrower than each parafrontal.	Wider than each parafrontal.	
Vestiture of cheek. (♂ & ♀)	Anterior portion clothed with black, posterior with white hair.	Clothed with white hairs except for a few just beneath the eye that are black.	Clothed with white hair except for small part bordering outer portion of transverse impression and lower portion of posterior eye orbit.	Clothed with black hair.
Hairs covering anterior spiracles. (♂ & ♀)	Mostly dark, lighter at tips (not constant and often as in next two species).	Grayish with dark tinge basally.	Grayish with dark tinge basally.	Light colored toward tips only.
Submesotibial bristle. (♂)	Present, sometimes weak or vestigial.	Present.	Absent.	Present, often weak.
Prescutellar acrostichals. (♂ & ♀)	Usually absent; if present weak, as a rule.	Present.	Present.	Present.

Characters	<u>S. haemorrhoidalis</u> Meigen	<u>S. dalmatina</u> Schiner	<u>S. falculata</u> Pandelé	<u>S. tuberosa</u> subsp.
------------	-------------------------------------	-----------------------------	--------------------------------	---------------------------

Ventral plates. (♂)	Usually, sides as a whole, converge posteriorly; edges often noticeably straight; vestiture of second and third short and decumbent, but longer on margins.	Sides as a whole almost parallel or slightly converging posteriorly; vestiture of second (at least centrally) short and erect; that of third short and decumbent, except that it is but longer on margins.	Sides, as a whole almost parallel, or very slightly converging posteriorly; vestiture of second (except near margin) and third short and decumbent, that on their margins but longer on margins.	Vestiture of second erect; that of third short and decumbent except that it is longer on margins.
------------------------	---	---	---	---

Genital segments
(♂)

First, color.

Grayish pollinose except "humps."

Dull or brownish orange except that it has a dark brown band posteriorly, often only dorsally.

Dark brown, sometimes faintly grayish pollinose dorsally and posteriorly.

First, marginal bristles.

Usually one on each side of center; others, if present, much weaker.

Usually several stout bristles each side of center.

Usually several bristles each side of center, but rarely longer than vestiture of segment.

Absent.

Forceps, vestiture of base.

Shorter than vestiture of second genital segment.

Shorter than vestiture of second genital segment.

Shorter than vestiture of second genital segment.

Longer than vestiture of second genital segment.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

Characters.	<u>S. haemorrhoidalis</u> Meigen.	<u>S. dalmatina</u> Schiner. <u>Pandelle</u>	<u>S. tuberosa</u> subsp.
-------------	--------------------------------------	---	---------------------------

Additional ♀
characters.

Posterior dorso- centrals	Last two pairs strong.	Only last pair strong.	Last two pairs strong.
<u>Genital segments.</u>			
Sixth notum.	Divided into two lateral lips.	Not divided into two lips.	Divided into two lateral lips.

1914. Sarcophaga sp., Parker, Can. Ent., vol. 47, p. 422. Related to S. cooley R. Parker.

Types: Massachusetts Agricultural College, one male, one female.

Paratypes: Massachusetts Agricultural College, one male, one female; (nr. 19167)

United States National Museum, one male, one female;

American Museum of Natural History, two males, three females;

Boston Society of Natural History, two males; Cornell University,

one male, one female; collection of J. M. Alrich, one male, one

female; collection of writer, six males, five females.

(♂) Third antennal segment two and one half to three and one half times length of second; anterior portion of cheek clothed with black, posterior with whitish hair; hairs fringing calypters dark at fold, otherwise whitish except that those on inner portion of margin of upper (anterior) calypter are often dark; all tarsi shorter than their respective tibiae; anterior and posterior faces of posterior tibia each with an equally strong beard, of long, coarse, black hairs; hairy vestiture of lower surface of middle tibia increasing in length distally, short and not forming anterior and posterior beards; ventral surface of anterior coxa completely clothed with bristles that may be divisible into three irregular rows: only last two pairs of posterior dorsocentrals strong; except at sides second and third ventral plates clothed with short, decumbent hair; genital segments dull orange, first either with hair like or seek marginal bristles.

(♀) Third antennal segment two to three times length of second; anterior portion of cheek clothed with black, posterior with whitish hair; hairs fringing calypters dark at fold, otherwise whitish except that those on inner portion of margin of upper (anterior) calypter are often dark; ventral surface of anterior coxa with other bristles than those of the irregular rows at each side, sometimes more or less distinct row between them;

only last two pairs of posterior dorsocentrals strong; abdomen clothed with short, reclinate bristles; genital segments slightly protuberant; the two broad, lateral lips of the first genital segment dull orange, near their edges usually turned abruptly backward (more protuberant), spiracles nearest to anterior margin: fifth segment not discernible, its spiracles when visible seem to open through lips of sixth notum (first genital segment); ventral plates of genital segments usually concealed.

Length: 9 to 15 mm., average 12 ^{to} ~~to~~ 14 mm.

(♂) Head.- Viewed from side parafrontal and genae with dark reflections. Breadth of front at narrowest part from one half to four sevenths eye width; cheek height varies from one third to one half that of eye. Front rather prominent, sides of frontal vitta usually parallel but often slightly convergent backward or the sides effaced just below ocellar triangle especially in large specimens. Second antennal segment brownish at tip, rarely blackish throughout; third two and one half to three and one half times length of second, its inner, basal portion often pinkish or salmon colored; arista/ plumose to beyond the middle. Back of head somewhat convex, typically, with two complete rows of black cilia behind eyes, sometimes with a partial third especially dorsally, otherwise clothed with whitish hair that completely covers metacephalon. Anterior portion of cheek clothed with black, posterior with white hair. Gena sparsely clothed with short hair or sometimes with about three irregular rows on that half nearest eye orbit.

Chaetotaxy.- Lateral verticals absent; vibrissae inserted just above line of oral margin.

Thorax.- Metanotum clothed with short, quite erect, ^{close set} ~~dense~~ bristles. Hairs covering anterior spiracle dark brown basally, at least their outer halves yellowish; those of anterior margins of posterior spiracle either entirely dark brown or with yellowish tips; those of spiracular cover vary from brown with yellow tips to almost wholly yellowish. Epaulets dark.

Wings.- Bend of fourth veing normally a strongly acute angle; anterior cross-vein more basal than end of first longitudinal; third vein bristly; costal spine vestigial; section III of costa equals approximately one and two thirds time section V; posterior margin of alulae with or without fringe of hair; calypters whitish, fringe of hairs dark, otherwise whitish but those on inner portion of margin of upper (anterior) calypter often dark.

Legs.- Dark; all tarsi shorter than their respective tibiae. Posterior trochanter with well defined "brush," especially in large specimens: femur sub-cylindrical, clothed beneath with long hair that often becomes beard like posteriorly; anterior face with three rows of bristles, those of intermediate row shortest and not developed distally; posterior face without ventral row of bristles: tibia sometimes slightly curved, anterior and posterior faces each with an equally strong beard of long, coarse, black hair: fourth segment of tarsus at least one half fifth. Middle coxa with a single row of bristles: femur clothed beneath on posterior proximal half or more with long hair; anterior, ventral ~~ventral~~ row of short bristles complete, posterior row represented only by "comb" extending proximally to the long hair: hairy vestiture of lower surface of tibia increasing in length distally but short and not forming anterior and posterior beards; sub-mesotibial bristle present. Ventral surface of anterior coxa

completely clothed with bristles that are sometimes separable into three irregular rows, one at each side and an intermediate ~~that~~ that is usually less complete and sometimes indistinct.

Chaetotaxy.- Anterior dorsocentrals short, slightly longer than vestiture of prescutum but slightly reclinate and not projecting above it; acrostichals absent; inner presuturals, if present, very weak: last two pairs postsutural dorsocentrals strong, anterior to these three or four pairs that are weaker than those before the suture; prescutellar acrostichals present: scutellar apicals present: usually three sternopleurals, sometimes two but generally only on one side: lower sternopleurals with a single row of bristles.

Abdomen.- Oval or somewhat conical; not clothed above with short reclinate bristles, beneath with slightly longer, almost erect hair. Ventral plates, as a whole, with their sides converging posteriorly; vestiture of first long and erect, that of second and third short and decumbent except at sides. Posterior margin of fourth notum dorsally, also sometimes ventrally, usually of same color as genital segment, sometimes not so colored.

Chaetotaxy.- Second segment without marginal bristles; third with two, often very stout; fourth with complete row ending ventrally in long hairs.

Genital Segments.- Prominent, often completely exposed, dull orange. First, large, often partially yellowish pollinose, vestiture slightly shorter than that of second, "humps" almost bare, in profile weakly curved, marginal bristle: well or hair like; second, rotund, not flattened, anal area small and not extending above middle of posterior surface. Forceps darkened at least on

distal half, in profile the fine, hairy vestiture is seen extending almost to tips of prongs, which are strongly curved forward and approximated almost to tips but latter slightly spread; base with upward flap like extensions clothed with fine hair that is slightly shorter than vestiture of second segment. Base of fourth ventral plate usually shows as a rounded ridge the posterior extremity of which is slightly upturned or knobbed showing prominently in profile, inner portions of innellae at base thickly set with short, stubby bristles forming a "brush."

Genitalia.- Distinctive. Accessory plates hairy; anterior claspers scarcely longer than posterior.

(♀) Females differ from males in the following important ^{characters} ~~points~~.

Head.- Breadth of front at narrowest part varies from about five sixths to same as eye width. Upper, inner orbits of eyes diverging downward.

Thorax.- Bristly vestiture shorter.

Legs.- All tarsi equal in length to tibiae. Posterior trochanter with slender apical bristle; femur spindle shaped; anterior face essentially with but two rows of bristles, those of lower row few and well separated, intermediate row as, be represented by two or three bristles proximally; posterior face with ventral row of long, well separated bristles on proximal half or slightly more. Anterior and posterior ventral rows of middle femur complete but bristles weak, and inconspicuous distally; submesotibial bristle/ very strong, sometimes a short bristle just above it.

Chaetotaxy.- Anterior and anterior, postautural dorsocentrals shorter: usually three sternopleural, sometimes four on one or both sides: lower sternopleura with a single row of bristles, often with several others just anterior to its lower part, otherwise

clothed with hair.

Abdomen.— Oval; vestiture practically throughout of short, reclinate bristles.

Genital Segments.— Slightly protuberant, visible only from beneath or sometimes bristles of first segment may be seen from above. The two broad, lateral lips of the first genital segment distinctly separated dorsally, their edges ~~usually~~ ^{usually} abruptly turned backward and fringed with bristles that decrease in length and size ventrally, dull orange, often yellowish pollinose, spiracles nearer to anterior than posterior margin. Fifth segment not discernible as such, its spiracles rarely visible and apparently open through lips of sixth segment (first genital). Ventral plates of genital segments concealed.

Described from 15 male and 12 female specimens, 62 others examined.

Range.— New England: Mass.: Woods Hole, Cohasset, Gloucester, Rockland, North Abington, Andover, Forest Hills, Wellesley, Amherst, Springfield; Me.: Fryeburg, Capens; Conn.: New Haven.

United States.— N. Y., N. J., N. C., Ga., Fla., ^{La.} ~~Ohio~~, Ohio, Ind.

The fact that the vestiture of the anterior portion of the cheeks is black and that of the posterior white together with the two beards of equivalent value on the posterior tibiae is sufficient to distinguish males of this species from others known in New England at least. Sarcophaga haemorrhoidalis Meigen and S. dalmatina Schiner, while very distinct might possibly be confused with it by one not familiar with the group; the above characters will immediately differentiate them. Females of both these species are separated from S. ballista by the character

of the cheek vestiture and the notum of the first genital segment which is composed of one piece as are the abdominal notum and not divided into two tips. In addition the family of S. dalmatins has one complete row of cilia behind the eyes instead of two.

Sarcophaga bullata and S. tuberosa subgenus (Riley)

While these species belong ^{to} distinct groups within the genus, yet as a beginner, I found them hard to separate and hence submit the following table as first effort, with the most striking characters, that may be used without pulling out the genitalia.

S. bullata n. sp.

S. tuberosa subgenus (Riley).

Comparison of parts.

Constant characters.

Anterior portion of ciliae Cheek vestiture black.
clothed with black posterior
with hair.

Anterior and posterior beards Anterior beard considerably weaker
of hind femur of equivalent than posterior.
value.

Less distinct or variable characters.

Only two complete rows of Three complete rows.
black cilia behind eyes.

Anterior apophysis absent. Slightly differentiated anteriorly.

Vestiture of lower surface of Not increasing in length distally.
middle tibiae short but in-
creasing in length distally.

First genital segment with Marginal bristles absent.
weak hair like marginal bris-
tles.

Comparison of females.

The character of the cheek vestiture and the number of rows of black cilia behind the eyes may be used as in the males. The genital segments are also distinctive, the edge of the fourth notum much wider spread and the lips broad, and fully exposed, whereas in S. tuberosa saracenicus the fourth notum tends to close over the genital segments and the lips of the first segment are narrow.

When making use of the number of rows of black cilia behind the eyes it must be borne in mind that there is apt to be an incomplete third row in S. bullata. The fourth ventral plates in males of both species under discussion show the posterior extremity of the fourth ventral plate upturned in profile.

S. haenorrhoidalis Meigen also has black hairs on the anterior part of the cheeks. There should be no difficulty in separating it from S. bullata. In case of doubt, however, refer to table on page .

In a discussion following the description of Sarcophaga cooleyi R. ^{Parker} (Can. Ent., vol. 46, pp. 417-423, Dec. 1911), at present known only from Montana, Wyoming and Utah, it was suggested that this species and S. bullata were close relatives. The genital segments of the females are very similar; those of cooleyi are interesting in that they show (at the sides) parts of a distinct fifth abdominal (sixth morphological) segment with its spiracles.

Among my material are several reared specimens of S. bullata which have light rather than dark colored palpi. The parts of the penis may be less compact and separated to a greater extent than figured in the drawing.

Felt (1913, see bibliography) described the larval and the pupal stages from specimens raised on the head of a calf. From larviposition to adult was found to take from thirty four to thirty six ^{days} (Aug. 15 to Oct. 15 to 17). Dr. Felt very kindly sent me six females from the specimens reared, which are unquestionably a form of S. bulata. ^{Mets} (Station for Experimental Evolution, Cold Spring Harbor, Long Island), during the summer of 1913 reared this species on meat in several experiments. Undoubtedly it breeds in carrion. I also have records of it captured on cow dung, and at Springfield, Mass., captured it on human excrement. One specimen in the Massachusetts Agricultural College collection is labelled as caught flying around the "burrows of Cryptorhynchus lapathi (Linnaeus)." A female received from C. H. Richardson was reared from cow manure. Specimens have also been reared from eggs.

21. Sarcophaga fulvipes dissimilis n. sp.

1914. Sarcophaga fulvipes dissimilis n. sp., Proc. Ent. Soc. N. Y. Hist., vol. 30, ^{Pl. 6, fig. 15.} pp. 38, 40, 41. Characters.

1. S. fulvipes dissimilis was referred to in part as S. fulvipes nigra, but since it has since been found to be preoccupied; therefore, the subspecies is referred to under the name dissimilis.

Type ♂: Collection of C. W. Johnson, Boston, Mass.

(♂) Posterior trochanter without "brush;" femur arched, anterior face without ventral row of bristles (only a single distal bristle present); anterior and posterior face of tibia each with a very thick band of very long, coarse hairs extending full length of tibia; middle femur clothed beneath nearly to distal extremity with long hair, anterior ventral row of bristles represented only by a few short bristles on about distal fifth; tibia clothed beneath on about its distal half with long dense hair that anteriorly

and posteriorly, becomes coarser and beaded like, subocular bristle absent; vestiture of third ventral plate short and erect; genital segments dull orange, vestiture of both equally long, first 2 rings without marginal bristles (possibly vestigial).

Head.- Viewed from side parafrostale and genae ^{with} ~~and~~ reflections. Breadth of front at narrowest part about three fifths eye width; cheek height approximately one third that of eye. Front prominent, sides of frontal vitta slightly converging backward. Second antennal segment dark; third about twice length of second; bristles present on basal two thirds. Back of head somewhat convex, with three rows of black cilia behind eyes, otherwise clothed with yellowish white hair that completely covers the metacephalon. Cheeks clothed with black hair. Genae with a single row of bristle like hair near lower eye orbit.

Palpi dark.

Chestotaxy.- Lateral verticals absent; sternal line of just above line of oval areolae.

Thorax.- Metanotum clothed with short, brown bristle like hair. Hairs covering anterior and posterior margins of notum becoming lighter toward tips; those of anterior margin of posterior spiracle dark brown, those of anterior margin of lower right yellowish brown with yellowish tips. Epandrium dark.

Wings.- Basal of fourth vein at right angle; anterior cross-vein more basal than end of first longitudinal; costal and first longitudinal; third vein bristly; section III of costal about one and one fourth times section V; subcostal folded into a loop; callosal section, margin folded with black hair.

Legs.- Dark; all tarsi distinctly coarser than coxae respective tibiae. Posterior trochantal ligament "brush:" femur cylindrical, arched, clothed beneath with long hair that forms a

in length posteriorly, that of third var. short and erect. Posterior margin of fourth segment of same color as genital segments.

Chaetotaxy.— Second segment without marginal bristles, third with two; fourth with one; fifth with three, ventrally, in the center.

Genital Segments.— Prominent; dull orange; vestiture of both small, long. First, large, in profile slightly arched, marginal bristles absent: second, not at all, not flattened; anal ring small, its upper ^{limit} ~~and~~ extending to middle of posterior surface. Forceps flattened, tip very strongly bent forward, in profile vestiture extends to forward bend, process approximated to bend; base of forceps with short, upward, flag-like extensions, these vestitures shorter than that of second segment.

Genitalia.— Head of penis large and its structure complicated. Tips of posterior claspers bent forward, flattened dorso-ventrally. Accessory plates hairy.

(♀) Not known.

Described from 1 male specimen.

Range.— Type specimen taken at Niagara Falls, N. Y.

Aside from the ^{striking} ~~striking~~ differences between this subspecies and Sarcophaga fulvipes fulvipes (Macquart), the point of greatest interest is the extremely heavy border of the middle clasp, which is the most striking of any species known to the writer. The heaviness of the middle clasp is also unusually long and prominent. Considering the extreme weakness of the middle sternopleural bristle probably specimens will be found with this lacking, in fact, of the two specimens of S. fulvipes fulvipes examined one has two sternopleurals on each side, the second two on one side, three on the other. Comparatively the posterior or lower calypter is very large.

The single specimen described belongs to the collection of C. W. Johnson of Boston as does one of the two specimens of S. fulvipes fulvipes examined. The latter were taken at St. Augustine, Florida. The genitalia of both subspecies are identical in all respects. The advisability of giving this specimen subspecific ranking may perhaps be questioned, but it seemed to me wiser to err in so doing than that such an extreme variation should be lost sight of. It may be a case of melanism.

Macquart described a S. fulvipes from Cuba in 1843 (Dipt. Exot. vol. 2,3, p. 106), Walker a fulvipes from the United States between 1850 and 1856 (Dipt. Saund., p. 328). The Florida specimens in Johnson's collection were determined by him as S. fulvipes Macquart and certainly agree more nearly with Macquart's rather vague description than with Walker's which apparently deals with a different species. (If this be correct) Walker's name fulvipes must be dropped as preoccupied. Although it cannot be positively stated that the subspecies here described is unquestionably a subspecies of what Macquart has described as fulvipes, the resemblance of the species herein considered as fulvipes to Macquart's description is close enough to warrant its being so considered. In case the identification should prove to be incorrect, and the species represented by the specimen here described should be new to science, it should be known as S. dissidia and the southern form as S. dissidia waltoni, the specimen in Johnson's collection now labelled S. fulvipes fulvipes (Macquart) becoming the type of S. dissidia waltoni and a specimen in my own collection similarly labelled becoming a paratype. Johnson's type of S. fulvipes dissidia would be the type of S. dissidia.

S. fulvipes fulvipes (Macquart) differs from the subspecies just described in the following characters; sides of frontal vitta parallel or slightly converging backward (should probably be same variation in nigra); second antennal segment dull orange; palpi light (dull orange); hairs covering anterior spiracle mostly grayish, bases dark; those of anterior margin of posterior spiracle dark at base only; those of spiracular cover yellowish, perhaps faintly darkened basally; epaulets dull orange, brownish basally; ^(Rasminia-like) coxae, trochanters, femora and tibiae of all legs dull orange, tarsi brown or brownish orange; anterior dorsocentrals not differentiated except that one or two show anteriorly; anterior postsutural dorsocentrals not differentiated; two or three sternopleurals, middle one weak if three are present; first genital segment with or without marginal bristles, if present very slender and hair like, several each side of center; forceps only darkened distally.

The most striking of the differences above noted is the dull orange color of the second antennal segments, palpi, epaulets and first four segments of the legs. Though all the anterior dorsocentrals are differentiated in the subspecies nigra this may be a variable character; the presence of marginal bristles on the first genital segment may perhaps be variable. In the ^{of the two} smaller specimens of fulvipes the bearded character of the middle tibiae is far less distinct, the anterior tibia lacks a beard like line of short hairs distally, the posterior beard of the hind tibia is much stronger than the anterior, and the ventral surface of the anterior coxa has an irregular row of bristles at each side only.

← (22) Sarcophaga scoparia Pand. See page 45.

22. Sarcophaga scoparia Pandellé.

1860. Sarcophaga matertera Rondani, ^{Pl. 6, fig. 16.} Atti. Soc. Ital. Sci. Nat., vol. 3, p. 387 (pars).
1868. Sarcophaga matertera Rondani, Dipt. Ital. Prodr., vol. 5, p. 108.
1896. Sarcophaga scoparia Pandellé, Rev. Ent. Franc., vol. 15, p. 189. Description.
1905. Sarcophaga neglecta Kramer, Zeitschr. Hymen. Dipt. vol. 5, pp. 13, 14, 15, fig. 5. Description, figure male genitalia. Page 15, S. matertera Rondani. Pages 329, 330, 331, S. neglecta Kramer.
1906. Sarcophaga scoparia Kramer, Zeitschr. Hymen. Dipt. vol. 6, p. 216. Synonym of S. neglecta Kramer.
1911. Sarcophaga scoparia Kramer, Abhandl. d. Natur. Ges. zu Götting, p. 142, pl. 1, fig. 3. Characters, habits, figure male genitalia.
1912. Sarcophaga scoparia Büttcher, Ann. Soc. Ent. Ital., vol. 44, p. 178. Shows that S. scoparia Pandellé is really a synonym of S. matertera Rondani.
1913. Sarcophaga scoparia Büttcher, Deutsch. Ent. Zeitschr., pp. 3-5, fig. 32. Description, figure male genitalia, occurrence. Page 369, occurrence.
1914. Sarcophaga scoparia Parker, Proc. Bos. Soc. Nat. Hist., vol. 35, No. 1, pp. 37, 38, 39. Characters.

(♂) Posterior trochanter without "brush," with long hairs only; femur usually arched, posterior face without ventral row of bristles; tibia more or less curved, with an anterior and a posterior beard, latter much the stronger; middle coxa, at least dorsal^{ly}, with more than a single row of bristles; tibia on about distal half with short, weak, anterior and posterior beards; ventral surface of anterior coxa clothed completely with bristles; anterior postsutural dorsocentrals weak but at least as long as those before the suture only last two pairs strong; vestiture of

third ventral plate erect and not short; ^{both} genital segments usually ~~both~~ dull orange but first may be in part or wholly grayish pollinose; first segment in profile with a slight depression just anterior to marginal bristle, latter usually weak and often hair like.

(♀) Vestiture of metanotum of short, reclinate bristles or of short nearly erect bristly hair except that vestiture of scutellum is hairy and erect throughout or at least anteriorly; anterior postantennal dorsocentrals weak but at least as long as those before the suture, only last two pair strong; notae of abdomen clothed with short, reclinate bristles above, beneath with more erect hairs or bristles; genital segments protuberant, somewhat cone shaped, visible from above; the two broad, lateral lobes of the first genital segment dull orange, sometimes slightly darkened, spiracles close to anterior margins; fifth and sixth ventral plates fused; sixth fully exposed, not overlapped by lip of first segment, narrowed posteriorly, its posterior margin with bristles on each side of center.

average

Length: 8 1/2 to 15 mm., 12 to 14 mm.

(♂) Head.- Viewed from side parafontals and gena with dark reflections. Breadth of front varies from slightly less to slightly greater than one half eye width; cheek height approximately one third or three sevenths that of eye. Front prominent, sides of frontal vitta parallel or slightly convergent backward. Second antennal segment dark; third about twice length of second; arista plumose to beyond the middle. Back of head somewhat convex, usually with four sometimes three irregular rows of black cilia behind eyes, otherwise clothed with whitish or yellowish hair that completely covers the metacephalon except that occasionally there are black hairs in lower, anterior corners.

Cheeks clothed with black hair. Gena with short row of long, sometimes bristly hairs near lower eye orbit, other shorter ones may continue upwards. Palpi dark.

Chaetotaxy.— Lateral verticals absent, rarely weakly developed; vibrissae inserted slightly above mouth margin.

Thorax.— Metanotum clothed with slender, reclinate bristles or with bristle like hair. Hairs covering anterior spiracle dark brown basally, lighter toward tips; those of anterior margin of posterior spiracle dark brown; those of spiracular cover dark brown or brownish, tips yellowish. Epaulots dark.

Wings.— Bend of fourth vein either an acute, right, or slightly obtuse angle; anterior cross-vein more basal than end of first longitudinal; third vein bristly; costal spine vestigial; section III of costa about one and one half times section V or even longer; anterior margin of alulae either bare or fringed with hair; calypters whitish, fringe of hairs dark at fold, otherwise whitish.

Legs.— Dark. Posterior trochanter without "brush:" femur cylindrical or somewhat spindle shaped, often more or less arched, clothed beneath with long, fine hairs that become longer and coarser posteriorly forming a sort of beard; anterior face with three rows of bristles, those of intermediate row shortest, and not developed distally; posterior face without ventral row of bristles: tibia more or less curved; anterior and posterior faces each with a beard of long, coarse, black hairs on about distal three fourths, latter much the stronger: tarsus usually somewhat shorter than tibia, fourth segment at least one half fifth. Middle coxa, at least dorsad, with more than a single row of bristles, through the additional bristles may be rather slender: femur clothed beneath on posterior proximal half, or more with long hairs;

anterior ventral row of short, scattered bristles complete, posterior row represented only by "comb" extending proximally to the long hair: subscutellum present, often obscured by coarse vestiture that covers tibia ventrally on distal half ^{or} thereof and becomes beard-like anteriorly and posteriorly. Ventral surface of anterior coxae clothed completely with bristles which are often separable into three irregular rows, one at each side and one intermediate that is usually less complete: vestiture of tibia longest ventrally, posteriorly, and distally.

Chaetotaxy.- Anterior dorsocentrals short and usually stout but longer than vestitures of praescutum; acrostichals absent or but slightly differentiated anteriorly; inner presuturals short and slender: last two pairs postutural dorsocentrals strong, anterior to these several weak pairs that ^{vary} vary greatly in length; prescutellar acrostichals present: scutellar apicals present: three sternopleurals: lower sternopleura with a single row of bristles, otherwise clothed with long hair which, in large specimens, becomes quite coarse.

Abdomen.- Somewhat conical or oval; clothed above with short, reclinate bristles, beneath with longer, more erect hair. Ventral plates, as a whole, with their sides converging posteriorly, their shape and size variable; vestiture decreasing in length posteriorly, that of third plate shortest and erect. Posterior margin at fourth notum, especially dorsally, may be dull orange.

Chaetotaxy.- Second segment without marginal bristles; third with two and usually with slender, decumbent ones between these and laterals; fourth with a complete row ending ventrally in long hairs.

Genital Segments.— Prominent, usually the greater part of first exposed; ground color dull orange or yellowish; first sometimes brownish, usually without pollen, sometimes partly grayish pollinose and occasionally entirely so except lateral posterior portions. First, vestiture shorter than that of second, "humps" almost bare, in profile with a slight depression anterior to marginal bristles, latter rarely strong, usually hair-like or even so weak as to be scarcely distinguishable. Membrane joining first and second segments dorsally often blackish. Second, rotund, not flattened, anal area rather small and not extending above middle of posterior surface. Forceps darkened, usually blackish, at least distally, hairy to beyond middle; base with upward flap like extensions clothed with fine hair shorter than vestiture of second segment; tips of process spread and bent forward.

Genitalia.— Distinctive.

(♀) Females differ from males in the following important ^{characters.} ~~features~~

Head.— Breadth of front at narrowest part slightly less than eye width. Upper inner orbits of eyes diverging downward.

Thorax.— Vestiture of notonotum of short, reclinate bristles or nearly erect bristly hair except that vestiture of scutellum is hairy and erect throughout or at least anteriorly.

Legs.— Posterior trochanter with slender, apical bristle: femur somewhat spindle shaped, not arched, bristles of intermediate row on anterior face restricted to proximal half and sometimes only a few present; posterior face with ventral row of long well separated bristles on proximal half or slightly more. Anterior and posterior ventral rows of middle femur complete but bristles weak and inconspicuous distally: submesotibial bristles very strong, sometimes a short bristle just above it.

Chestotaxy.-- Lower sternopleura with bristles only, or at most but a few long hairs anteriorly.

Abdomen.-- Oval; vestiture short throughout, clothed above with reclinate bristles, beneath either with more erect hair or bristles.

Genital Segments.-- Protuberant, visible from above. The two broad lateral lips of first genital segment distinctly separate dorsally; dull orange, sometimes slightly darkened, occasionally yellowish pollinose ventrally; upper edges fringed with hair and bristles, latter mostly above line of spiracles which are close to anterior margin. ~~Fifth segment wide dorsally~~, Spiracles ^{of sixth segment} usually concealed. Sixth ventral plate (seventh anatomical) with posterior marginal bristles at each side ^{of center} and not overlapped by lips of first genital notum.

Redescribed from 40 male and 14 female specimens.

Range.-- New England: Mass.: Woods Hole, Boston, Lowell, Cohasset, Gloucester, Cambridge, No. Bedford, Wellesley, Melrose, Chester, Amherst; Me.: E. Edgington, Orr's Island, Buckfield; Conn.: New Haven.

United States.-- N. Y., N. H., Pa., Ohio, Ill., Wyo.

Foreign.-- Germany, Switzerland, France, Italy, Great Britain, Turkestan.

Böttner (1912) has shown that this species should properly be called Sarcoptera nortona Rondani. It is one of the most variable species with which we have to deal in New England; the description gives ample evidence. The characters of the penis are as much so as the external character. In the figure of the genitalia a lateral distal process may be noted ending anteriorly in two sharp projections. Sometimes the lower projection is lacking while in other specimens the two processes are united anteriorly forming a sort of distal ring.

THE HISTORY OF THE
CITY OF LONDON
FROM THE FOUNDATION
TO THE PRESENT
TIME

1677

1677

Among my material are one female and two males European specimens of this species. These differ considerably from the American form. The genital segments and genitalia are black or blackish, the bristles of the thorax are longer and more slender, and its vestiture more hairy. Some of our specimens approach the European as regards chaetotaxy and vestiture but I have seen none with any tendency toward black genital segments though the first is sometimes brownish. It is possible that our North American form might justifiably be designated as a subspecies.

To separate females of S. scoparia Pandellé and S. utilis Aldrich see discussion following the latter.

Kramer (Abhandl. d. Natur. Gesell. z. Götting, 1911, p. 14) suggests that this species may be a parasite of Pailura monachae (Linnaeus). Specimens captured by Meitz larviposited on dung and refuse. A female received from Richardson (N.J.) was reared from cow manure.

(23) Sarcophaga cromptoni n. sp. This species shows no apparent relationship to other species or species groups discussed in this paper.

23. Sarcophaga cromptoni n. sp.

Pl. 7, fig. 17.

(19170)

Type: United States National Museum, male and female.

Paratypes: Massachusetts Agricultural College, one male, one female; Gypsy Moth Parasite Laboratory at Melrose Highlands, Mass., one male, one female; collection of author, one male, one female.

(♂) Back of head strongly convex and below the rows of cilia clothed with yellowish white hair except that vestiture of lower anterior portions of metacephalon is black; vestiture of cheeks

black, bristle-like anteriorly; marginal hairs at fold of calypters dark; vestiture of legs short except for beards of hind tibiae and ventral, proximal surfaces of middle femora; posterior face of hind femur with complete ventral row of slender bristles; posterior ventral row of middle femur complete, not distinct proximally; anterior dorsocentrals strong; inner presuturals bent; three pairs strong posterior dorsocentrals, vestiture of third ventral plate short and erect (except on margins); genital segments dull orange, except that first is darkened just posterior to "humps" (usually only dull orange portion exposed).

(♀) Back of head very strongly convex and below the roots of cilia clothed with yellowish white hair except that vestiture of lower, anterior portions of metacephalon is black; vestiture of cheeks black, bristly; vestiture of scutellum erect; marginal hairs at fold of calypters dark; costal spine short and prominent; fourth segments of tarsi about same length as their respective fifth segments; anterior dorsocentrals strong; three pairs strong posterior dorsocentrals; posterior margin of fourth notum may be dull orange and is angularly bent at middle so that sides are turned inward; the two lateral lips of first genital segment dull to brownish orange, edges fringed with bristles and tend to become approximated or overlap; ventral plates decreased in size posteriorly.

Length: 9 to 12 mm., females tend to be the larger.

(♂) Head.— Viewed from side parafrontals and genae with dark reflections. Breadth of front at narrowest part slightly less than one half eye width; cheek height a little less than one third that of eye. Front prominent, sides of frontal vitta slightly converging backward. Second antennal segment dark;

third about twice length of second; ariste plumose to beyond middle. Back of head strongly convex, with three complete rows of black cilia behind eyes, otherwise clothed with yellowish white hairs except that vestiture of lower, anterior portions of the metacephalon is black. Vestiture of cheeks black, becoming bristle like anteriorly. Gena with a short, sometimes irregular row of several prominent bristles between lower eye orbit, and transverse impression in line above these a few hairs extending up on to parafrontals. Palpi dark.

Cheetotaxy.— Lateral verticals absent; vibrissae inserted just above line of mouth margin.

Thorax.— Metanotum clothed with erect, bristle like hair. Hairs covering anterior spiracle dark brown, usually lighter toward tips; those of anterior margin of posterior spiracle dark brown; those of spiracular cover brownish with yellowish tips. Epaulets dark.

Wings.—Bend of fourth vein at right or slightly acute angle; anterior cross-vein more basal than end of first longitudinal; costal spine vestigial; third vein bristly; section III of costa one and one fourth to one and one half times section V; alulae fringed with hairs; calypters whitish, margins fringed with white hair except that those at fold are dark.

Legs. Dark; vestiture short except as herein noted. Posterior trochanter without "brush"; femur cylindrical or sub-cylindrical, slender, sometimes slightly arched; anterior face with three rows of bristles, those of intermediate row shortest and not developed distally; posterior face with a complete ventral row of slender bristles: tibia straight or slightly curved, anterior and posterior faces each with a beard of long, coarse hairs on

distal two thirds to three fourths; latter always the stronger: tarsus equal in length to tibia, fourth segment at least one half fifth. Middle coxa with a single row of bristles; femur clothed beneath posteriorly and proximally with scattered, long hairs; anterior and posterior ventral rows of bristles complete but latter not distinct proximally: submesotibial bristle present: ventral surface of anterior coxa with an irregular row of bristles at each side only.

Chaetotaxy.-- Anterior dorsocentrals strong, at least the two largest pairs about as strong as the anterior pair of postenturals, much longer than vestiture of praescutum; scrotochials absent, inner praenturals absent: three pairs posterior dorsocentrals, all strong; prescutellar scrotochials present scutellar apicals present: three, sometimes four sternopleurals: lower sternopleura either with a single row of bristles and long, coarse hairs anterior to it or with bristles only.

Abdomen.-- Somewhat conical; clothed above with short, reclinate bristles, beneath with slightly longer, more erect hair. Ventral plates as a whole, with their sides slightly converging posteriorly; their vestiture decreasing in length posteriorly, that of third short and erect (except on margins). Dorsally the posterior margin, of fourth notum same color as genital segments.

Chaetotaxy.-- Second segment without marginal bristles; third with two; fourth with a complete row ending ventrally on forward turn of margin.

Genital Segments.-- Prominent, dull orange except first is darkened just posterior to "humps" (darkened portion does not usually show unless segments are pulled out). First, vestiture shorter than that of second, may be faintly yellowish pollinose dorsally

and posteriorly, in profile with slight depression just anterior to margin^a bristles, several of latter on each side of center: second, rotund, not flattened; anal area rather small, its upper limit not extending above middle of posterior surface. Forceps, darkened, flattened; prongs approximated nearly to tips, vestiture very short, longest near ends of upward flag like extensions.

Genitalia.- Distinctive.

(♀) Females differ from males in the following important characters.

Head.- Breadth of front at its narrowest part slightly less than eye width. Upper, inner orbits of eyes diverging downward. Back of head very strongly convex. Cheek vestiture bristly.

Thorax.- Metanotum clothed with short, slightly reclinate bristles.

Wings.- Costal spine usually short and prominent.

Legs.- Ventral row of bristles of posterior face of hind femur usually consisting of long bristles on proximal half, sometimes a few others distally. Anterior ventral row of middle femur complete, bristles short and weak on distal half posterior ventral row complete or present on proximal half and distally represented by a few short "comb" like bristles at every end.

Chestotaxy.- Lower sternopleura with bristles other than those in the posterior row but with hairs also.

Abdomen.- Somewhat oval; vestiture of short reclinate bristles that become more erect on ventral surface of fourth notum. Ventral plate mostly concealed. Posterior margin or portion of fourth notum may or may not be dull orange, margin bent at middle.

Chestotaxy.- Marginals of third segments sometimes form a complete row.

Genital Segments.- The two lateral lips of first genital segment dull or brownish orange, not wide, margin fringed with bristles, spiracles about central. Ventral plates not modified except in size and color.

Described from 4 males and 4 female specimens; several others examined.

Range.- New England: Mass.: Cohasset, Melrose Highlands, Lunenburg, North Abington, North Adams.

United States: N. H., Ohio.

This species is named in honor of Dr. G. E. Crampton who kindly assisted me in the preparation of the morphological section of the first part of this paper.

→ (24) Sarcophaga cheloniae n. sp. In several respects this is a very interesting species.

In the male the presence of a fifth abdominal notum separate from and overlapping the first genital segment must be considered a primitive character. In some species there is no visible evidence of this sclerite except the spiracles, in other the spiracles open through the first genital segment (apparent fusion). In the females the ^{but} slightly modified characters (vestiture, color, size) of the fifth, sixth and seventh ventral plates also seem to be primitive: in many species their shape differs conspicuously from the plates of the abdomen proper.

The males have the following significant characters in common with the genus Ravinia R.-Desvoidy: frontal bristles parallel to sides of frontal vitta and not extending below its base; vestiture of metanotum of short, reclinate bristles; vestiture of legs short; scutellar apicals absent; lower sternopleura bearing bristles only; forceps somewhat similar and base lacking upward flap like extensions.

They disagree, however in several important points, namely: epaulets dark; anterior cross vein much more basal than end of first longitudinal; anterior scrothichale black; abdomen oval; ventral plates of different character. Aside from these differences the genital segments are of a distinctly different type as are also the gonitellae. The character of the frontal bristles in the females also agrees with Ravinia. I have indicated these resemblances and differences not only to call attention to them but also because they illustrate admirably the points I strove to bring out in the last paragraph of page 38 of part one concerning the relationship between specific characters in a parent genus and generic characters in derived genera. The comparison also serves to show how easily a person relying on a single prominent character, such as that of the frontal bristles, could err and place this species in the genus Ravinia, whereas a glance at the genital segments or other characters would at once indicate the error. Or, to put it differently it brings out the importance of groups or combinations of characters as generic designations.

The strong plumosity of the aristae nearly to their tips is an unusual character, and differs ^{to one extreme} from the usual family character given in American works as much as species of some genera go to the other.

24. Sarcophaga chelonise n.sp. e

Pl. 5, fig. 14.

Psyche,

1911. Sarcophaga sp., Patterson, vol. 18, pp. 173-174.

(no. 19169)

Types: United States National Museum, male and female.

Paratypes: Gypsy Moth Parasite Laboratory at Melrose Highlands,

Mass., two males, one female; collection of author, one male.

(♂) Third antennal segment about one and one half times length of second; arista very strongly plumose to tip; vertical bristles inserted behind the vertex; frontal bristles parallel to sides of frontal vitta (Ravinia-like); vestiture of legs short; anterior face of posterior femur with upper and lower rows of bristles only, posterior face with complete ventral row; middle femur with complete anterior and posterior rows of bristles; submesotibial bristle absent; scutellar apicals absent; lower sternopleura with bristles only; abdomen oval; first ventral plate somewhat triangular, sides converging strongly posteriorly, "apex" rounded; vestiture of ventral plates of about equal length and nearly erect; fourth notum of same ground color as genital segments though it may be darkened posteriorly, genital segments neither prominent nor protuberant, first much larger than second, both dull orange, their vestiture short, second almost discoidal; fifth notum shows dorsally overlapping first genital segment; base of forceps without upward flap-like extensions, vestiture short.

(♀) Third antennal segment but little longer than second; vertical bristles inserted behind ~~the~~ vertex; lateral verticals short and directed outward laterally; frontal bristles parallel to sides of frontal vitta (Ravinia-like); posterior trochanter without distal spine; posterior face of femur with complete ventral row of bristles, latter weak distally; anterior femur with a weakly developed fourth row of bristles (indistinct); genital segments dull orange; sixth notum not divided into lateral lips; fifth sixth and seventh ventral plate not modified in shape.

Length: 7 to 9 mm.

Head - Viewed from side parafrontals and genae with dark

reflections. Breadth of front ^{to} narrowest part about three-fourths eye width; cheek height approximately one third that of eye. Front very prominent, sides of frontal vitta slightly converging backward. Second antennal segment dark; third about one and one half times length of second; arista very strongly plumose to tip. Back of head slightly convex, with three rows of irregularly placed (except first row) black cilia behind eyes, otherwise clothed with yellowish white hairs that completely covers metacephalon though the row of bristles along lower edge of cheeks may extend slightly beyond on to the posterior mouth margin at each side. Cheeks clothed with black hair. Gena with an irregular line of short, fine hairs that originate on transverse impression and become shorter and minute as they approach the frontal bristles. Palpi dark.

Chaetotaxy.— Vertical bristles inserted behind vertex; lateral verticals short, stouter than nearest cilia but little longer, directed laterally, perhaps occasionally absent; frontals paralleling sides of vitta throughout (as in Ravinia); vibrissae inserted just above line of mouth margin.

Thorax.— Metanotum clothed with short, slightly reclinate bristles. Hairs covering anterior spiracles entirely yellowish or a little brown at bases; those of anterior margin of posterior spiracle dark brown basally, lighter toward tips; those of spiracular cover yellowish or light colored. Epaulets dark.

Wings.— Bend of fourth vein a slightly obtuse angle; anterior cross-vein more basal than end of first longitudinal; third vein bristly; costal spine vestigial; section III of costa about one and one fourth times section V; alulae fringed with hair; calypters whitish, margins fringed with white hair.

Legs.- Dark; vestiture short. Posterior trochanter without "brush"; femur ^{spindle} ~~spindle~~ shaped, anterior face with upper and lower rows of bristles only, posterior face with complete ventral row: tibia practically straight or may be strongly curved: tarsus not shorter than tibia, fourth segment at least one half fifth. Middle coxa with a single row of bristles but a few other anteriorly to it dorsally: femur with complete anterior and posterior rows of bristles, "comb" bristles stout and stubby: submesotibial bristle absent. Ventral surface of anterior coxa with an irregular row of bristles at each side only.

Chaetotaxy.- Anterior dorsocentrals short, not weaker (usually stronger) than anterior postauturals, projecting slightly above vestiture of praescutum; acrostichals absent; inner preauturals weak: last two pairs of posterior dorsocentrals strong, anterior to these three or four pairs that are mostly quite weak; prescutellar acrostichals present: scutellar apicals absent: usually three, sometimes four sternopleurals: lower sternopleura with bristles only.

Abdomen.- Oval, clothed above with short reclinate bristles, beneath with slightly longer, more erect hair. First ventral plate somewhat triangular, posterior extremity or "apex" rounded, sides strongly converging posteriorly; second and third plates narrower than base of first, practically of equal size, distinctly elliptical in outline; vestiture of plates of about equal length and nearly erect tending to be slightly bristle-like posteriorly. Ground color of fourth notum of same color as genital segments (dull orange) except that it may become darker dorsally and anteriorly, pollinose reflecting spots of light^{er} color.

Chaetotaxy.- Second segment without marginal bristles; third either with two at center or with complete row between laterals; fourth with a complete row ending ventrally near posterior limit of fourth ventral plate (does not give way to long hairs).

Genital Segments.- Neither prominent nor protuberant, fourth notum extends beyond them dorsally, first much larger than second, both dull orange. Fifth notum shows very distinctly dorsally and is separate from but overlaps first genital segment (it may have a few bristles on its margins but probably bare as a rule). First segment, faintly whitish yellow pollinose dorsally, vestiture short and scattered, in profile practically straight or slightly depressed before ^{marginal} bristles, ~~several of latter on each side of center; latter instead of being marginal are~~ bowed, ~~rows one on each side of center, bending forward and toward each other;~~ second, very small, almost discoidal, appears flattened unless segments are pulled out, vestiture short; anal area comparatively large, its dorsal limit extending upward to limit of posterior surface. Forceps slightly if at all darkened, short; slightly separated beyond middle, tips bare and pointed; base without upward flap-like extensions, vestiture short, that of basal margin about as long as vestiture of second segment.

Genitalia.- Distinctive. Anterior claspers of peculiar shape, first bent inwardly and nearly approximated then turned forward and terminating in a sharp point. Fourth ventral plate of same color as genital segment, posteriorly divided by central cleft for only a very short way so that lamellae are scarcely indicated.

Females differ from males in the following important characters.

Head.- Breadth of front at its narrowest part equal to or slightly greater than eye width; cheek height two fifths to one half

that of eye. Inner orbits of eyes on upper part of front first practically parallel then diverging downward. More cilia on back of head.

Chaetotaxy.— Lateral verticals short and directed outward laterally (about same as in male).

Wings.— Bend of fourth vein more obtuse.

Legs.— Submesotibial bristle present. Anterior femur with a weakly developed fourth row of bristles.

Chaetotaxy.— Number of sternopleurals variable, at least three.

Abdomen.— Vestiture throughout of short, reclinate bristles.

Genital Segments.— Not protuberant, not visible from above. Sixth notum not divided into two lips, margin with bristles, dull orange, (spiracles not seen). Fifth, sixth and seventh ventral plates not modified in structure, about same general shape as fourth,

Described from 4 male and 2 female specimens.

Range.— New England: Conn.: New Haven.

The two male and the female paratypes at the Gypsy Moth Laboratory at Melrose Highlands are deformed. Each has the vertical bristle on the right push back and two superfluous, shorter bristles occupy the normal point of its insertion. In two female paratype and one of the males the lateral verticals are not developed probably due to the deformation.

The specimens from which this description was made were among material received from the Gypsy Moth Laboratory and bore the following label, "Mag ^{Par} ~~Peer~~ ex Axilla of Turtle Apr. 26 -'11. Begun to emerge May 22-- all had emerged May 24, all dead May-28 and pinned." This original label is now on the types in the

United States National Museum at Washington. The label, dates and number of adults correspond with the account given in Payche (vol. 18, pp. 173-174, 1911) by T. L. Patterson of the Yale Sheffield Scientific School concerning Sarcophids reared from the axilla of a turtle and there can be no question ~~but~~ what these were the flies reared by him.

(25) Sarcophaga pachyprocta n.sp. There has been considerable doubt in my mind into which niche in the family this species could be side-tracked^K. Both its genital and external characters differ decidedly from those found in the genus Sarcophaga. Some time ago I submitted a specimen to Böttcher for his opinion. He replied in part that it "represents a type which I do not know from Europe or palaearctic countries, but it has much the same features characteristic for several South American species," and also states that he had thought of making a new subgenus on the characters involved. This seems inadvisable for me to attempt on the basis of the single species represented among my material, so, for the present, it seems best to accept the genus Sarcophaga as a useful dumping ground. The more important characters which harmonize ^elast with Sarcophaga ~~one~~ the vestiture of the back of the head, the broad front in the male, the stout nature of the chaetotaxy throughout, the shape and vestiture of the abdomen in the male, and the genital segments and genitalia. There are other characters which would assume importance if they were duplicated in related forms.

25. Sarcophaga pachyprocta n.sp.

Pl. 7, fig. 20.

1881. Sarcophaga pachyprocta Hagen, Can. Ent. vol. 13, pp. 148-149.
Occurrence.

Types: Massachusetts Agricultural College, male and female.

Paratypes: United States ^{National Museum} ~~Natural History~~, one male, ~~one~~
^(nr. 19168) females; Boston Society of ^{Natural} ~~Natural~~ History, one male, ² three

females; Gypay Moth Parasite Laboratory at Melrose Highlands,
Mass., one male, one female; collection of C. W. Johnson, one
male, two females; collection of author, two males, one female.

(♂) Breadth of front at its narrowest part from five sevenths
to five sixths eye width; arista shortly plumose on basal half,
vestiture of back of head black except for a narrow band of
yellow hair just above foramen and similarly colored hairs on a
small portion of the metacephalon just beneath; cheeks clothed
with black bristles and bristle like hairs; lateral verticals
present; greater ocellars nearly as strong or sometimes stronger
than uppermost pair of frontals, first and third veins prominently
bristly; costal spine short but distinct; section III of costa
practically equal to section V; vestiture of legs short except
for scattered, long, hairs on ventral surfaces of middle and
hind femora; middle femur without posterior ventral row of
bristles; bristles of thorax stout and prominent, hinder two
pairs of anterior dorsocentrals almost as strong as postsuturals;
acrostichals present; three pairs posterior dorsocentrals of
about equal size; scutellar apicals absent; lower sternopleura
with bristles only; abdomen short, stout, its outline more
elliptical than oval; nota clothed dorsally and ventrally with short,

reclinate bristles; vestiture of third plate erect; second segment usually with two stouter marginals at center; genital segments completely filling cavity of fourth notum (see figure); second segment discoidal, rounded, dull orange, first much larger, and ~~completely pollinose~~^{or} ~~on~~ its posterior part dull orange.

(♀) Vestiture of back of head black except for a narrow band of yellow hair just above foramen and similarly colored hairs on a small portion of the metacephalon just beneath; cheeks clothed with black bristles and bristle like hairs; greater ocellars nearly as strong or sometimes stronger than uppermost pair of frontals; hairs covering anterior spiracles mostly grayish; first and third veins prominently bristly; costal spine short but distinct; section III of costa practically equal to section V; bristles of thorax stout and prominent; hinder two pairs of anterior dorsocentrals almost as strong as postsaturals; acrostichals present; three pairs posterior dorsocentrals of about equal size; bristles of lower sternopleura in three distinct rows; distinctly larger and more erect bristles mixed with vestiture of lateral and ventral surfaces of fourth notum; second segment usually with two stouter marginals at center; genital segments dull orange, sixth notum not divided into lateral lips, seventh similar in shape and visible just beneath it, but much smaller (almost vestigial),

~~to~~ Length: 5 to 11 mm., average 8 to 10 mm.

(♂) Head.-- Viewed from side parafrontals and genae with dark reflections. Breadth of front at its narrowest part varies from five-sevenths to five-sixths eye width; cheek height one-third or slightly greater than one third that of eye. Front prominent, sides of frontal vitta parallel anteriorly but its margins effaced below ocellar triangle. Second antennal segment dark, sometimes brownish especially at tip; third about twice length of second;

arista shortly plumose on basal half. Back of head somewhat convex, its vestiture black except for a narrow band of yellow hair just above foramen and similarly colored hairs on a small portion of the metaccephalon just beneath. Cheeks clothed with black bristles and bristle-like hairs. Gena with a row of minute hairs near lower eye orbit and a few others that are scattered. Palpi dark.

Chaetotaxy.— Lateral verticals present; vibrissae inserted just above line of oral margin; greater ocellars nearly as strong, sometimes stronger than uppermost pair of frontals.

Thorax.— Metanotum clothed with short scattered reclinate bristles. Hairs covering anterior spiracle dark basally, lighter toward tips; those of anterior margin of posterior spiracle dark brown, those of spiracular cover brownish only basally, mostly yellowish. Ep^aulets dark.

Wings.— Bend of fourth vein varies from an acute to a right angle; anterior cross-vein slightly more basal than end of first longitudinal; first and third ^{veins} ~~veins~~ prominently bristly; costal spine distinct; section III of costa practically equal to section V; alulae fringed with hair; calypters whitish, their margins fringed with white hair.

Legs.— Dark; tarsi without ^{ventral} bands of reflecting hairs; vestiture short except for a few scattered, long hairs on ventral surfaces of middle and hind femora. Posterior trochanter without "brush": femur spindle shaped; anterior face with three rows of bristles, those of intermediate row shortest and not developed distally, those of lower row well separated and present on distal two thirds or thereabout; posterior face with ventral row of long, slender, hair-like bristles: tibia straight or slightly curved:

re

tarsus not shorter than tibia; fourth segment at least one half fifth. Middle coxa with a single row of bristles, but there may be a few others anterior to it dorsally: femur with a complete anterior ventral row of bristles, posterior ventral row lacking or represented by long, well separated hairs: submesotibial bristle very strong: Ventral face of anterior coxa with an irregular row of bristles at each side only.

Chaetotaxy.- Bristles stout and prominent. The hinder two pairs of anterior dorsocentrals almost as strong as postsuturals; two pairs of acrostichals, presutural pair absent; inner presuturals absent or very weak: three pairs posterior dorsocentrals of about equal size; prescutellar acrostichals present but weak as compared to other bristles: acutellar apicals absent: three sternopleurals: lower sternopleura with bristles only.

Abdomen.- Rather short; depth almost equal to width so that it appears somewhat cylindrical, outline more elliptical than oval; not clothed dorsally and ventrally with short, reclinate bristles. Ventral plates, as a whole with their sides converging posteriorly, sides of second and third distinctly rounded; vestiture hairy, that of first and second long, that of third shorter but erect.

Chaetotaxy.- Second segment usually with a row of weak, slender, decumbent marginals, sometimes two at center may be stronger and more erect; third with a complete marginal row dorsally and laterally or dorsally with only two marginals at center; fourth with a complete row ending ventrally at third notum.

Genital Segments.- Prominent; large, abruptly terminating the abdomen and occupying to its fullest extent ~~the~~ cavity of

fourth notum (see figure) ^{first} pollinose varying to extent, sometimes entirely so with reflecting colors of abdomen but usually the posterior portion dull orange, posteriorly its vestiture longer than that of second segment, viewed from behind it presents a very large, slight convex surface abruptly rounded forward dorsally (the segments being in their normal position), marginal bristles absent. The second segment (examined in similar position) appears like a slightly raised dull orange disk, anal area small. Forceps short, base without upward flap-like extensions, its vestiture not longer than that of second segment; beyond base prongs become abruptly slender and very small, thence attenuated to tips, both together looking like the end of a large blunt needle, their outline in profile is sinuate, the anterior edges hairy. Lamellae of fourth ventral plate may show beyond edges of fourth notum as dull orange colored plates.

Genitalia.- Penis and claspers peculiarly modified, head of penis prominently spiny anteriorly as seen in profile. Accessory plates short but as segments are pulled out they show from behind as two erect plates parallel to, but much shorter than forceps.

(♀) Females differ from males in the following important characters.

Head.- Breadth of front at its narrowest part practically equal to eye width, inner eye orbits diverging downward. Vestiture of genae may be longer and more scattered.

Thorax.- Hairs covering anterior spiracle more distinctly grayish, entirely so or dark only basally.

Legs.- Lower row of bristles on anterior face of third femur more nearly complete than in male, ventral row of posterior face consisting of long, well separated bristles (usually four or five)

on proximal half or slightly more. Anterior and posterior rows of bristles of middle femur complete, very weak on distal half, "comb" absent.

Chaetotaxy.- Bristles of lower sternopleura arranged in three distinct rows.

Abdomen.- Depth much less than width, outline oval. Vestiture of short, reclinate bristles except that bristles become longer and more erect laterally on second and third notum and laterally and ventrally on fourth notum. Ventral plates concealed in part, first and second plates, sometimes also third and fourth with one or more pairs of surface bristles besides those of posterior margin.

Genital Segments.- Dull orange, grayish or yellowish pollinose. Sixth notum not divided into lateral lips, narrow, visible only from behind, margin fringed with bristles, spiracles below center, often concealed by edge of fourth notum: seventh notum much smaller than sixth, but similar and visible just beneath it.

Described from 7 male and 9 female specimens; several others examined.

Range.- New England: Mass.: Provincetown, Truro, Harseneck Beach, Nantucket, Cambridge, Saxonville, Lunenburg.

United States: N. Y., N. J., Pa., Ohio.

Foreign: Canada (Manitoba?), Cuba(?), Hayti(?).

→ This species is peculiarly distinct from all others herein described. The character of the genital segments is distinctive for each sex, ~~respectively~~. The parafrontals and genae are silvery gray, and particularly striking in the male because of the unusually wide front for that sex.

Hagen, when listing North American Sarcophagidae as determined by Meade (see bibliography), uses the name under which this species is described in discussing nine specimens determined as such by Loew. Due to the kindness of Mr. Henshaw I was able to examine the material with which Meade worked (Museum of Comparative Anatomy, Cambridge, Mass.) and found the specimens so labelled. To the best of my knowledge this is a manuscript name ^{and} ~~but it~~ is retained to avoid any possible confusion. Small specimens from Hayti and New York were labelled "S. pachyprocta var. minor." Another specimen was from Cuba. I have questioned Hayti and Cuba in the list of reported occurrences because the material was not examined closely enough at the time to be certain that the specimens from these islands might not represent a distinct species.

Not long ago I received what was possibly a female of this species reared from Lachnosterna dubia by Criddle. (Manitoba, Canada).

→ (26) Sarcophaga helicis Townsend. This species was made the genotype of the genus Helicobia Coquillett. As previously discussed (part one, p. 33), this genus does not seem justified on the basis of the description given. The species is not like Sarcophaga in several respects; there are southern and tropical species close to it that may perhaps form the basis of a group within the genus if a proper combination of characters is selected. In several respects the species resembles the group next discussed, particularly ~~in respect to~~ the genital characters of the female and certain of those of the head in both sexes.

26. Sarcophaga helicia Townsend.

Pl. 7, fig. 18.

1892. Sarcophaga helicia Townsend, Payche, vol. 6, p. 220.
Original description. Reared from Helix thyroidea Say.
1893. Sarcophaga helicia Townsend, Payche, vol. 6, p. 468.
Habits.
1894. Sarcophaga helicia Howard, Insect Life, vol. 6, p. 372.
Habits.
1895. Helicobia helicia Coquillett, Proc. Phil. Acad. Nat. Sci.,
1895, p. 317. Helicobia, n. gen., S. helicia, genotype.
1900. Helicobia helicia Coquillett, Proc. U. S. Nat. Mus., vol. 22,
p. 255. Porto Rico.
1901. Helicobia helicia Morgan, Bull. 30, n. s., Div. of Ent.,
U. S. Dept. Agri., p. 25. Habits.
1904. Helicobia helicia Baker, Invertebrata Pacific, vol. 1,
Occurrence.
1905. Sarcophaga helicia Washburn, Minn. Agri. Exp. Sta., Bull.
93, pp. 142-143. Habits.
1910. Helicobia helicia Coquillett, Proc. U. S. Nat. Mus., vol. 37,
p. 550.
1910. Helicobia helicia Smith, Report New Jersey State Museum,
1909, p. 785. Occurrence.
1912. Helicobia helicia Banks, Ent. News, vol. 23, p. 110. Habits.
1912. Sarcophaga helicia Pratt, Can. Ent., vol. 44, p. 181. Habits.
1913. Helicobia helicia Johnson, Am. Mus. Nat. Hist., vol. 32,
p. 75. Occurrence.
1913. Helicobia helicia Johnson, Ann. Ent. Soc. Amer., vol. 6,
p. 447. Bermuda.
1914. Sarcophaga helicia Parker, Proc. Bos. Soc. Nat. Hist., vol.
35, No. 1, pp. 33. 34. Characters.
1914. Sarcophaga helicia Kelly, Jour. Agri. Research, vol. 2,
No. 6, p. 441. Habits.

Type: University of Kansas, Lawrence, Kansas, female.

Massachusetts Agricultural College, male.

Paratypes: Massachusetts Agricultural College, four males;

collection of author, three males.

(♂). Small species, average length about 5 mm. Front not prominent; cheek height one sixth to one fifth that of eye; cheeks clothed with bristles and bristle-like hairs; vibrissae inserted on line with ^{oral} ~~vent~~ margin; first and third veins bristly; section III of coxae about equal to section V; vestiture of legs short; fourth segment of posterior tarsus nearly if not fully as long as fifth; "comb" of posterior ventral row of middle femur absent; hind pair of anterior dorsocentrals farther from suture than anterior postscutal pair; three pairs posterior dorsocentrals of about equal size; vestiture of all three ventral plates erect and of about same length; first genital segment dark, second with bristles; base of forceps without upward flap-like extensions.

(♀) The above characters of head and thorax equally good for female. Additional characters;- normally only first ventral plate visible, its vestiture hairy, nota of other segments meet medially; sixth notum the only visible part of genital structure, ventral plates, if they exist as such concealed within it; edges of the unseparated lateral halves of sixth notum meet medially and protrude slightly as a median ridge.

Length: $3\frac{1}{2}$ to 6 mm., average about 5mm.

Head.- Viewed from side parafrontale and genae slightly darkened. Breadth of front at its narrowest part nearly one half eye width; cheek height varies from about one sixth to one fifth that of eye. Front not prominent, sides of frontal vitta slightly converging backward. Second antennal segment dark; third about twice length of second; arista plumose to beyond middle. Back of head varies from rather flat to slightly convex, with three rows of black cilia behind eyes, otherwise clothed with whitish

except
hair, that vestiture of lower anterior corners of metacephalon is black. Cheeks clothed with bristles and bristle-like hairs. Below eyes transverse impressions reduced to mere lines. Genae narrow, a few bristles on lower part near eye orbit, short, fine hairs continuing upward along lower eye orbit. Palpi dark.

Chaetotaxy.— Lateral verticals absent; vibrissae inserted on line with oral margin; bases of rows of frontal bristles but slightly divergent.

Thorax.— Metanotum clothed with short, scattered, reclinate bristles. Hairs covering spiracles dark except that those of spiracular cover may be light colored toward tips. Epaullets dark.

Wings.— Bend of fourth vein varies from a right to a quite strongly obtuse angle; anterior cross-vein more basal than end of first longitudinal; first and third veins bristly; costal spine very short and inconspicuous; section III of costa approximately equal to section V; alulae fringed with hair; calyters whitish; margins fringed with white hairs.

Legs.— Dark; vestiture short. Posterior trochanter without "brush"; femur spiracle shaped; anterior face with three rows of bristles, those of intermediate row not developed distally, its bristles sometimes scarcely shorter than those of upper row; posterior face with ventral row of several long, well separated bristles on distal half or more; tibia straight; tarsus not shorter than tibia, fourth segment practically as long as fifth. Middle coxa with a single row of bristles: anterior and posterior ventral rows of femur complete, but inconspicuous distally, "comb" absent: submesotibial bristle present. Ventral surface of anterior coxa with an ^{irregular} row of bristles at each side only.

Chaetotaxy.- For most part bristles strong and conspicuous.

Hind pair of anterior dorsocentrals of about equal size to post-suturals and more distant from suture than first pair of latter; acrostichals absent or vestigial; inner presuturals very weak; three pairs postsutural dorsocentrals of about equal size; prescutellar acrostichals short and weak; scutellar apicals present; three sternopleurals: lower sternopleura with bristles only, a few bristles anterior to the posterior complete row.

Abdomen.- Conical; not clothed dorsally with short, reclinate bristles, ventrally with slightly longer, more erect bristles except that vestiture becomes hairy and longer near sides of ventral plates. Latter, as a whole, with their sides slightly converging posteriorly; vestiture of all about equally long, hairy and erect; second and third plates somewhat elliptical.

Chaetotaxy.- Second segment without marginals; third with two; fourth with a complete row ending ventrally in long hairs.

Genital Segments.- Small, prominent. First, dark, brownish or blackish, often faintly ~~by~~ greyish pollinose, vestiture short and scattered, marginal bristles present but weak, one or two on each side of center: second, dull orange to almost blackish, distinctly flattened (appears less so if segments are pulled out), surface bears several prominent bristles and a few scattered hairs. Forceps short, darkened, base with fine hairs and without upward flap-like extensions; prongs approximated their entire length, attenuated.

Genitalia.- Distinctive.

(♀) Females differ from males in the following important characters.

Head.- Breadth of front at its narrowest part nearly or fully equal to eye width. Upper, inner orbits of eye very slightly diverging downward.

Abdomen.- Oval; nota clothed throughout with short reclinate bristles. Usually nota meets ventrally leaving only first ventral plate exposed, vestiture of latter hairy, short and erect.

Chaetotaxy.- Second segment with a dorsal marginal row of short, decumbent bristles.

Genital Segments.- Sixth notum the only visible part of genital structure, ventral plates, if they exist as such, concealed within it; the notum dull to brownish orange or even darker, sometimes pollinose, not divided into separate lateral lips but edges to the lateral halves approximated medially and pushed out so that edges, which are fringed with bristles, appear as a median ridge, at least dorsally.

Male described from 8 specimens, females redescribed from 20 specimens; several hundred examined.

Range.- New England: Mass.: Edgartown, Penikese Island, Woods Hole, Melrose, Forest Hills, Lowell, Lunenburg, Wellesley, Mt. Tom, Amherst; N. H.: White Mts.; Conn.: New Haven, Branford, Sachem Head, Colebrook, Rowayton, Darien.

United States: N. Y., N. J., Pa., Va., Md., D. C., La., Fla., Miss., Ala., Tex., Ohio, Ind., Ill., Col., Ariz., Mich., Kans., Minn., Calif.

Foreign: Bermuda, Bahamas, Jamaica, Porto Rico.

The original description of this species ^{was} only for the female and though the male must be well known it ^{has} ~~seems~~ ^{ed} advisable to furnish an adequate description.

The parafrontals and genae are usually ~~a~~ silvery gray ~~color~~, sometimes with a faint brassy tinge. Two marginal s are rarely developed on the second abdominal segment. There is a southern, closely related species which possesses these bristles. The

lateral bristles of the third abdominal segment in both sexes extends well on to the ventral surface. Among northern forms, at least, the genital segments of the females are quite distinctive. The second genital segment of the male usually bears four very distinct bristles paired laterally, the most anterior pair is the stronger: no specimens examined showed the spiracles of the first segment. While four notopleurals are present, the first and third are often extremely weak, especially in males.

This species was described by Townsend (1892) from a single adult ^{female} ~~specimen~~ bred from Helix thyroidea Say. In this regard it is interesting to note that there is species in the collection of the K. K. Hofmuseum, Wien, labelled Sarcophaga helicovora Schin. "litt" which Böttcher has assured me is identical with the above. He further states in correspondence that "the three specimens have the shells of small snails on their ~~tribeles~~ ^{tribeles}". Besides the above S. helicia has been reported as reared from Lachnosterna sp., Pieris rapae, Leucania unipunctata (Forbes; publ. Townsend, 1893), Loxostege sticticalis (Howard, 1894), Melanoplus differentialis (Morgan, 1901) and Melanoplus atlantis (Washburn, 1905). Banks (1912) reported it as captured on Ceanothus. Prett (1912) reported a single specimen bred from cow manure at Victoria, Texas, considering its occurrence accidental. Personally I have never seen it either on human or animal excrement. It is very common in hay fields about ~~Minherst~~ ^{Miner} and can be captured by sweeping.

(27,28) Sarcophaga assida Walker, S. subsulcata n. sp. Assidua-group.

Characters common to both males and females :- Viewed from

side or front parafrontal and genae of same color, cheek height not greater than one third that of eye, usually less; front not prominent; arista strongly plumose; facialia darker than facial plate; back of head slightly convex, metacephalon clothed with whitish or yellowish hair except that vestiture of lower, anterior portion is black; cheeks clothed with black hair; transverse impression and genae of same color, not distinctly differentiated; gena, close to eye orbit, usually with a row of minute hairs that extend up on to parafrontal plate, but practically indistinguishable in small specimens; one or two (probably rarely more or none) frontal bristles extending below base of vitta but these not more distant from inner edges of genae than those above from sides of vitta (or from inner edges of parafrontals), bases of rows somewhat divergent; vibrissae inserted on line with oral margin; metanotum clothed with short, bristles, slightly reclinate in males, more strongly so in females; anterior spiracular hairs dark those of anterior margins of posterior spiracle very dark, those of spiracular cover lighter; epaulets dark; third vein bristly; section III offcoats approximately equal to section V; calypters whitish, lower faintly discolored; vestiture of legs short; posterior trochanter without "brush"; intermediate row of bristles of anterior face of posterior femur usually absent or if present very weak and on proximal part only; fourth segment of posterior tarsus at least one half fifth; middle coxa with a single row of bristles; anterior and posterior ventral rows of bristles of middle femur present on proximal half only or at least their distal portion inconspicuous; ventral surface of anterior coxa with an irregular row of bristles at each side only; anterior

Faint, illegible text covering the page, possibly bleed-through from the reverse side.

dorsocentrals present, distinct, more strongly reclinate in females;
anterior acrostichals absent or inconspicuous in males, absent in
females; inner presuturals present; last two pairs posterior
dorsocentrals strong, anterior to these several pairs that are
weaker than the larger ones before the suture; prescutellar
acrostichals present; three sternopleurals; lower sternopleura
with bristles only, most distinct in females; second abdominal
segment without marginal bristles.

Characters common to males only: third antennal segment
usually three times length of second, sometimes a little more or
less; lateral verticals absent; posterior face of hind femur with-
out ventral row of bristles; posterior and middle tarsi slightly
shorter than their respective tibiae; "comb" of middle femur
present, consisting of several short, stubby, close set spines
at very distal end; submesotibial bristles absent; abdomen short,
somewhat conical, about as deep as wide; fourth notum more or
less yellowish pollinose; third abdominal segment with two
marginals and other short, slender, decumbent bristles between
these and laterals; genital segments prominent, usually yellowish
pollinose, ground color mostly dull orange; first segment, vestitute
shorter than that of second, in profile usually with a slight
depression anterior to marginal bristles; forceps usually completely
exposed, base without upward flap-like extensions, vestitute short.

Characters common to females only:- third antennal segment
usually two to two and one half time length of second; posterior
face of hind femur with ventral row of several long bristles on
proximal half; "comb" of middle femur absent; submesotibial bristle
present; abdomen sub-circular; normally only first ventral plate
visible, nota of remaining segments meeting over their respective

plates; third segment dorsally with complete row of short, slender, decumbent marginals, two stronger ones at center not differentiated.

Of genital segments only first is normally visible, notum not divided into two lateral lips, but bent at middle of margin dorsally so that edges ~~of~~ lateral to this point are approximated medially concealing ventral plates of this region.

The penes of the males agree closely in their general structure as may be seen from the figures.

I have referred to the species concerned as the assiduus-group merely as a matter of convenience and not in an attempt to assign a name. It is my opinion, however, that these species with others, present characters of sub-generic, if not generic value. At one time I had expected to include S. incerta Walker¹ in this paper, and as

1. The species here referred to as S. incerta Walker was so determined, I believe, by Coquillett. There are representatives of this species from Florida, Cuba, Jamaica, and the Bahamas in the collection of C. W. Johnson of Boston. Specimens were also received from R. H. Van Zwalenburg from Porto Rico.

Walker's original description was given in the Dipt. Saund., p. 324, 1852. The more I read this description the more it seems to refer to the species in hand but there is a reasonable doubt. Other references to S. incerta are as follows: Howard, (1901), Can. Ent., vol. 33, p. 43, breeds in cow manure; Smith (1910) Report New Jersey State Museum 1909, p. 785, occurrence in New Jersey; Banks (1912), Bull. 22, Tech. Ser., Bur. of Ent., U. S. Dept. Agri., p. 16, pl. 4, fig. 75, description of larva; Johnson (1913), Am. Mus. Nat. Hist., vol. 32, p. 75, occurrence in Florida. Aldrich lists Cuba and Bermuda occurrences reported by Bigot and Johnson

تاریخ بنیاد می

respectively. Johnson's reference to the occurrence of a S. incerta in Florida I know refers to some species here described, Smith's New Jersey reference I believe was intended to refer to this species but the actual occurrence in New Jersey seems doubtful; whether the other references are to this same species or not it is impossible to suggest.

Pratt (Can. Ent., vol. 44, p. 180, 1912) mentions S. incerta as bred abundantly from cow manure. I have examined specimens of his material and find that the species concerned belongs to the genus Ravinia.

the figure of the penis has been prepared it is presented for comparison^{(Pl. 8, fig. 23).} Other species which would fall into this group are S. turbata Van der Wulp,* S. trivialis Van der Wulp,* S. obtusifrons Thomson* and certain undetermined southern and tropical species.

*As determined from labelled specimens in the United States National Museum.

Of the characters listed above, those which seem of possible importance as of subgeneric or generic value have been italicized, though they would not be applicable without changes in expression. S. incerta Walker agrees with the characters as given practically throughout, but the fourth abdominal notum is unusually long and is used to cover the genitalia in the same manner as the first genital segment in assidua and subsulcata. The male of a Bahamas species has short, hair-like apical bristles scarcely worthy the name, the frontals do not extend below the base of the vitta, and the third abdominal segment has no prominent marginals at the center their character corresponding to that described for the females; the first genital segment of the females is very similar.

An Arizona species has a more prominent front and the vibrissae are inserted slightly above the mouth margin. The penis have been examined in assidua, subsulcata, incerta and in the Bahama and Arizona species. All are essentially similar. Each, except the last has the small, forward projecting, paired, lateral processes on the basal posterior or posterior plate of the penis as shown in the species figured. The forceps and claspers are distinctive for each species, the former is strikingly modified. If it were not for the fact that I have had no opportunity to put sufficient study on the species concerned I should separate this group as a distinct sub-genus at the present^{time}, but it is better that this should wait until it is possible for someone to examine in detail all available species concerned. Aldrich has referred

S. trivialis to the genus Ravinia, but ~~it is certainly erroneous~~ ^{this is an error} ~~forming~~

Ravinia resembles these species in several respects such as the ~~misidentification of the species in the collection in the National Museum~~ lack of scutellar apicals in the males, the character of the vestiture of the lower sternopleura, and in a way the arrangement of the frontal bristles though these do not extend below the base of the vitta as in the assidua-group while in the latter the basal portions of the rows are as broadly divergent as in some species of Sarcophaga, especially in the females. The characters of the genitalia and genital segments are absolutely distinct from Ravinia in both sexes. Sarcophaga helicia Townsend greatly resembles the species of this group and the genital segments of the female correspond fundamentally to those of assidua and subsulcata.

References have been made above to the character of the frontal bristles. The frontal vitta in these species is very slightly depressed so that the inner edges of the parafrontals are sharply defined and in profile the bright colored edge of the

parafrontal can be seen, scarcely but perceptibly raised. The base of the vitta is not narrowed as is so often the case with other species of Sarcophaga and the inner edge of the gena seems to be simply a continuation of the inner margin of the corresponding parafrontal. Or to express it differently the distinction^{ion} between parafrontal and gena is so slight that there is no demarking limit, the two areas seeming as one with an unbroken inner margin. The frontal bristles are parallel to this margin. The fact that the color of the parafrontals and genae is the same whether viewed from side or front and does not have the dark reflections of so many species is possibly due to some slight structural difference; in most of the previously described species the parafrontals are somewhat swollen basally.

(27) Sarcophaga assidua Walker See group discussion immediately preceding.

27. Sarcophaga assidua Walker.

1852. Sarcophaga assidua Walker, Dipt. Scand., p. 328. Original description. ^{Pl. 8, fig. 21.}
1900. Sarcophaga assidua Howard, Proc. Wash. Acad. Sci., vol. 2, p. 566. Figures, habits, occurrence.
1901. Sarcophaga assidua Morgan, Bull. 30, n. s., Div. of Ent., U. S. Dept. Agri., p. 25. Figures, habits.
1905. Sarcophaga assidua Washburn, Minn. Agri. Exp. Station, Bull. 93, pp. 141 & 142. Habits.
1907. Sarcophaga assidua Herms, Jour. Exp. Zool., vol. 4, p. 48, Life history, habits.
1911. Sarcophaga assidua Howard, The House Fly, pp. 254-255. Figure, habits.
1912. Sarcophaga assidua Pratt, Can. Ent., vol. 44, p. 180. Habits.
1913. Sarcophaga assidua Johnson, Am. Mus. Nat. Hist., vol. 32, p. 75. Occurrence.
1913. Sarcophaga assidua Graham-Smith, Flies and Disease (1st edition), p. 35. Habits.

1913. Sarcophaga assidua Johnson, Ann. Ent. Soc. Am., vol. 6, p. 417. Occurrence.

1914. Sarcophaga assidua Parker, Proc. Bos. Soc. Nat. Hist., vol. 35, No. 1, pp. 35, 37, 41. Characters.

(♂ and ♀) Coxae trochanters and especially femora usually dull brownish orange, tibiae commonly darker, sometimes the segments of anterior legs are all dark, rarely all legs are dark; forceps of male distinctive.

Length: 7 1/2 to 8 1/2 mm.

(♂) Head.- Viewed from side or front parafrontals and genae of same color. Breadth of front at its narrowest part one half that of eye; cheek ^{height} _n one fourth to one third that of eye. Front not prominent, sides of frontal vitta slightly converging backward, sometimes parallel. Second antennal segment dark; third usually about three times length of second but may be more or less; arista strongly plumose to beyond middle. Facialia dark. Back of head slightly convex, with three rows of black cilia behind eyes, otherwise clothed with whitish hair except that vestiture of lower, anterior portions of metacephalon is black. Cheeks clothed with black hair. Transverse impression and gena rarely with differentiating limit; latter, close to lower eye orbit, with a row of minute hairs that extends ^{upward} _u on to parafrontal plate. Palpi dark.

Chaetotaxy.- Lateral verticals absent; one or two frontal bristles extending below base of vitta but these not more distant from inner edge of genae than those above from sides of frontal vitta (or from inner edges of parafrontals), bases of rows but slightly divergent; vibrissae inserted on line with oral margin.

Thorax.- Metanotum clothed with short, slightly reclinate bristles. Hairs covering anterior spiracle dark brown, yellowish or grayish toward tips; those of anterior margin of posterior spiracle dark brown or blackish; those of spiracular cover brownish with lighter colored tips. Epaulets dark.

Wings.- Bend of fourth vein either a right or slightly obtuse angle; anterior cross-vein more basal than end of first longitudinal; third vein bristly; costal spine vestigial; section III of costa equal to or slightly less than section V; alulae fringed with hair; calyters whitish, lower somewhat discolored, margins fringed with white hair.

Legs.- Vestiture short. Tarsus darker than other segments of legs, tibia piceous or with other segments varies from dull to brownish orange especially, on the middle and hind legs, anterior femur not uncommonly grayish occasionally all femora are grayish or only brownish distally. Posterior trochanter without "brush"; femur somewhat spindle shaped; anterior face typically with three rows of bristles, intermediate row rarely lacking its bristles shortest and not developed distally; posterior face without ventral row of bristles: tibia practically straight. ~~At least middle and hind tarsi practically straight.~~ At least middle and hind tarsi shorter than their respective tibiae. Middle coxa with a single row of bristles: anterior and posterior ventral rows of femur present on proximal half only or at least their distal portions inconspicuous except that latter has "comb" of probably not over six very short, stubby spines at its very end; submesotibial bristle absent. Ventral surface of anterior coxa with an irregular row of bristles at each side only.

Chaetotaxy.- Anterior dorsocentrals stout, not short, the largest intermediate in size between anterior two pairs and posterior two pairs of postscuturals, much longer than vestiture of praescutum; acrostichals absent or scarcely differentiated; inner praescuturals weak: last two pair posterior dorsocentrals long and strong, anterior to these two other pairs that are short and weak; praescutellar acrostichals present: scutellar apicals absent; three sternopleurals: lower sternopleura with bristles only.

Abdomen.- Somewhat conical; about as deep as wide; not clothed above with short, reclinate bristles, beneath with somewhat longer, erect hair. Ventral plates, as a whole, with their sides slightly converging posteriorly; vestiture of long hair that scarcely becomes shorter on second and third, erect on latter; usually brownish orange with a dark central band. Ground color of fourth notum either that of genital segments with the dark reflecting colors of the abdomen anteriorly or just the posterior margin is dull orange.

Chaetotaxy.- Second segment without marginal bristles; third with two and other a cluster, slender, decumbent bristles between these and laterals; fourth with a complete row extending well on to ventral surface.

Genital Segments.- Prominent; both dull orange, usually yellowish pollinose. First, short (anterior-posteriorly), with short, scattered hairs on sides, in profile with a shallow depression anterior to marginal bristles, latter prominent, usually four on each side of center; second, shallow, slightly rotund, vestiture scattered, longer than that of first, a pair of cruciate, slender bristles near upper limit of anal area, latter small but prolonged

 

upward about to limit of posterior surface. Forceps usually completely exposed, only tips darkened; prongs attenuated and approximated nearly to tips, then slightly spread apart and the ends flattened, broadened and darkened; base clothed with short hair, without upward flap-like extensions, each prong base bluntly pointed.

Genitalia.- Penis, forceps and claspers distinctive.

(♀) Females differ from males in the following important characters.

Head.- Breadth of front at its narrowest part varies from three fourths to scarcely less than eye width. Upper, inner orbits of eyes parallel or very slightly diverging downward. Sides of frontal vitta parallel.

Legs.- Anterior face of posterior femur typically with upper and lower rows of bristles only, an intermediate row rarely present; posterior face with a few bristles on ventral proximal half only. "Comb" of middle femur absent: submesotibial bristle present.

Abdomen.- Sub-circular; vestiture throughout of short, reclinate bristles except that those of ventral surface of fourth notum are more erect and hair-like. Normally probably only first ventral plate is exposed, nota of remaining segments meeting over their respective plates; other plates sometimes visible, their posterior margins with bristles; dark central band not differentiated. Part of fourth segment may be dull orange.

Chaetotaxy.- Third segment dorsally with complete row of short, slender, decumbent marginals, ^{rarely} two stronger ones at center.

~~para.~~ Strong lateral marginals not developed on first or second segments.

Genital Segments.- Externally apparently identical with those of S. subulcata n. sp. Dull orange, more or less yellowish pollinose. Normally only sixth notum visible, this not divided into two lips, but bent at middle of dorsal margin so that edges of its lateral halves are approximated medially concealing ventral plates of this region; margin fringed with bristles.

Redescribed from 20 male and 21 female specimens.

Range.- Not reported from New England.

United States: N. Y., N. J., Pa., Va., Md., D. C., E. C., Ga., Fla., Miss., Tex., Ohio., Nebr., Minn.

Foreign: Bermuda, Cuba, Jamaica, Bahamas, Porto Rico.

Walker described a species S. assidua from the "United States." I do not know that the species here described are the same, but is the species to which this name has been applied by Coquillett and others and is retained for obvious reasons.

The prefrontals, genae and transverse impressions are usually brassy, the posterior eye orbits grayish. New Jersey specimens have the fourth notum dull orange only posteriorly while in southern specimens the whole segment is usually so colored though with dark reflecting colors anteriorly. It will probably be "turned up" in New England.

This species has been reported as reared from human excrement (Howard, 1900), from Melanophus differentialis (Morgan, 1901), from dead fish (Herns, 1907), from cow manure (Pratt, 1912) and from dead insects. Howard has also reported it as sometimes occurring in houses.

→ 28. Sarcophaga subulcata n. sp. See group discussion on page .

28. Sarcophaga subulcata n.sp.

Pl. 8, fig. 22.

Type: Massachusetts Agricultural College, male and female (taken in copulation)

Paratypes: Boston Society of Natural History, two males; Cornell University, one male, one female (taken in copulation); collection of author, two males, two females.

(♂ and ♀) Sarcophaga lasidus Walker is the only species recognized in the northern United States with which there is any danger of confusing subulcata. The shape of the foreleg is distinctive for males, the color of the legs for both sexes and is the only significant character noted for females though the front tends to be narrower in subulcata. It is very probable that when females of lasidus have their legs dark, as occasionally happens, it will be hard to separate the two species.

Length: 7 to 8 1/2 mm.

(♂) Head.— Viewed from side or front parafrontals and genae of same color. Breadth of front at its narrowest part one third to two fifths eye width, rarely nearly one half; cheek height between one fourth and one third that of eye. Front not prominent, sides of frontal vitta slightly converging backward. Second antennal segment dark; third usually about three times length of second but may be more or less; arista strongly plumose to beyond middle. Facialia dark. Back of head slightly convex, with three rows of black cilia behind eyes, otherwise clothed with whitish or yellowish hair except that vestiture of lower, anterior portions of metacephalon is black. Cheeks clothed with black hair. Transverse impression and genae rarely with

differentiating limit; latter, close to lower eye orbit, with a row of minute hairs that extends ^{upward} ~~up~~ on to parafrontal plate.

Palpi dark.

Chaetotaxy.- Lateral verticals absent; usually, two frontal bristles extending below base of vitta but these not more distant from inner edge of genae than those above from sides of vitta (or from inner edges of parafrontals), bases of rows but slightly divergent, vibrissae inserted on line with oral margin.

Thorax.- Metanotum clothed with short, slightly reclinate bristles. Hairs covering anterior spiracle dark brown, yellowish or grayish toward tips; those of anterior margin of posterior spiracle dark brown; those of spiracular cover brownish with lighter colored tips. Epaulets dark.

Wings.- Bend of fourth vein normally a right angle; anterior cross-vein sometimes under, but usually slightly more basal than end of first longitudinal; third vein bristly; costal spine vestigial; section III of costa equal to or slightly less than section V; alulae fringed with hair; calypters whitish, lower slightly discolored, margins fringed with white hair.

Legs.- Dark; vestiture short. Posterior trochanter without "brush": femur slender, cylindrical or sub-cylindrical; anterior face probably in most cases with upper and lower rows of bristles only, but often an intermediate row of very weak bristles present on proximal half; posterior face without ventral row of bristles; tibia straight or slightly curved; fourth tarsal segment at least one half fifth. Middle and hind tarsi slightly shorter than their respective tibiae. Middle coxa with a single row of bristles: anterior and posterior ventral rows of femur present on proximal

half only or at least their distal portion inconspicuous except that latter has comb of several short, stubby, spines at its very end: submesotibial bristle absent. Ventral surface of anterior coxa with an irregular row of bristles at each side only.

Chaetotaxy.- Anterior dorsocentrals stout, not short, the largest intermediate in size between anterior two pairs and posterior two pairs of postaurals, each longer than vestiture of prescutum; acrostichals weak or scarcely differentiated; inner presuturals usually same size as anterior postaural dorsocentrals: last two pairs posterior dorsocentrals long and strong, anterior to these two other pairs that are short and weak; prescutellar acrostichals present: scutellar apicals absent: three sternopleurals: lower sternopleura with bristles only.

Abdomen.- Somewhat conical; short; about as deep as wide; nota clothed above with short, reclinate bristles, beneath with somewhat longer, erect hair. Ventral plates, as a whole, with their sides slightly converging posteriorly but second and third of about same width; vestiture of long hair that scarcely becomes shorter on second and third, erect on latter; usually of some grayish color as corresponding nota, rarely brownish orange with a dark central band. Ground color of fourth notum may be dull orange with dark reflecting colors only anteriorly (southern forms usually) or only ~~on~~ posterior half or only ^{on} margin may be ~~dull~~ ^{colored} ~~orange~~; always with more or less yellow pollen.

Chaetotaxy.- Second segment rarely with two marginals at center; third with two and with other short slender, decumbent bristles between these and laterals; fourth with a complete row extending well on to ventral surface.

Genital Segments.- Prominent; both dull orange, usually

yellowish pollinose. First, short (anterior-posteriorly), with short, scattered hair on sides, in profile its outline straight or with slight depression anterior of marginal bristles, latter prominent, usually ^{four} each side of center: second, somewhat rotund but flattened diagonally upward and forward, vestiture scattered, longer than that of first, a pair of cruciate, slender bristles near upper limit of anal area, latter small but prolonged upward about to limit of posterior surface. Forceps usually completely exposed, darkened beyond base or only tips of prongs; latter slightly ~~attenuate~~ beyond base, approximated to end, tips flattened and broadened so that both together resemble ^{shape of an} ~~an~~ arrow head ~~in shape~~; base clothed with short hair, without upward flap-like extension, each prong base rounded or bluntly pointed.

Genitalia.— Penis, forceps and claspers distinctive.

(♀) Females differ from males in the following important characters.

Head.— Breadth of front at narrowest part varies from about three fifths to three fourths eye width. Upper, inner orbits of eyes parallel or very slightly diverging downward. Sides of frontal vitta parallel.

Legs.— Anterior face of posterior femur typically with upper and lower rows of bristles only, intermediate row sometimes weakly developed on proximal half; posterior face with a few bristles on ventral proximal half only. "Comb" of middle femur absent: subacetibial bristle present.

Abdomen.— Sub-circular; vestiture throughout of short, red plate bristles except that those of ventral surface of fourth notum are more erect and hair-like. Normally only first ventral plate exposed, note of remaining segments meeting over their respective plates; other plates sometimes visible, their posterior

margins with bristles. Fourth notum may be same color as preceding segments throughout, may or may not be partially yellowish pollinose, and posterior margin may or may not be dull orange.

Chestotaxy.- Third segment dorsally with complete row of short, slender, decumbent marginals, two stronger ones at center not differentiated. Strong lateral marginals not developed on first and second segments.

Genital Segments.- Externally apparently identical with those of S. resius Walker. Dull to brownish orange, more or less yellowish pollinose, sometimes with darker reflections. Normally only sixth notum visible, this not divided into two lips, but bent on middle of dorsal margin so that edges of lateral halves are approximated medially concealing ventral plates of this region; margin fringed with bristles.

Described from 5 male and 4 female specimens, several others examined.

Range.- New England: Mass.: Cohasset, Woods Hole, Stoneman, Amherst; R. I.: Newport; Conn.: Danbury.

United States: N. Y., N. J., Va., Fla., Ohio.

The parafrontals, genae, and transverse impressions are usually brassy, the posterior eye orbits grayish.

29. Sarcophaga emblycoryphae Coquillett.

1904. Sarcophaga emblycoryphae Coquillett, Proc. Ent. Soc. Wash., vol. 6, p. 187-188. Original description.

(4)
Type.- United States National Museum (no. 7965).

As the male of the species is unknown and the type female not available for study Coquillett's description is quoted.

The first part of the paper is devoted to a general discussion of the problem. It is shown that the problem is of great importance in the theory of the structure of the universe. The second part is devoted to a detailed study of the problem. It is shown that the problem is of great importance in the theory of the structure of the universe. The third part is devoted to a detailed study of the problem. It is shown that the problem is of great importance in the theory of the structure of the universe. The fourth part is devoted to a detailed study of the problem. It is shown that the problem is of great importance in the theory of the structure of the universe. The fifth part is devoted to a detailed study of the problem. It is shown that the problem is of great importance in the theory of the structure of the universe. The sixth part is devoted to a detailed study of the problem. It is shown that the problem is of great importance in the theory of the structure of the universe. The seventh part is devoted to a detailed study of the problem. It is shown that the problem is of great importance in the theory of the structure of the universe. The eighth part is devoted to a detailed study of the problem. It is shown that the problem is of great importance in the theory of the structure of the universe. The ninth part is devoted to a detailed study of the problem. It is shown that the problem is of great importance in the theory of the structure of the universe. The tenth part is devoted to a detailed study of the problem. It is shown that the problem is of great importance in the theory of the structure of the universe.

"Black, the fourth abdominal segment and the genitalia yellow. Head gray pruinose, on the face and lower part of sides of front grayish yellow, vertex three-fifths as wide as either eye, frontal vitta deep brown, on the upper portion nearly twice as wide as either side of the front at the same point, two pairs of orbital bristles, frontals descending almost to base of third antennal joint, antennae three-fourths as long as the face, the third joint, antennae three-fourths as long as the face, the third joint less than three times as long as the second, longest hairs of arista about four times as long as its greatest diameter. Body gray pruinose, abdomen with darker reflecting spots, mesonotum marked with three black vittae, only three pairs of postutural dorsocentral bristles, these are large and of nearly an equal length, three sternopleurals in a curved row; middle of dorsum of abdomen bearing only bristly hairs on the first two segments, the third and fourth segments each with a marginal row of stout bristles, basal segment of genitalia not cleft dorsally, bearing a marginal row of rather short bristles. Legs devoid of long hairs, hind tibiae bearing two bristles the anterior-inner, anterior-outer and posterior-outer sides besides those of the apex. Wings hyaline, third vein bristly two-thirds of distance from base to the small cross vein. Calypterous whitish. Length 7 mm.

Springfield, Mass. A female specimen bred by Dr. George Dimmock from a larva that issued from a living adult of Amblycorypha oblongifolia."

Appendix.

Under this heading is given data concerning the genera Ravinia

and Boettcheria which has come to writers attention since the completion of part ^{one}, a few additional facts concerning the genus Sarcophaga, and a few notes on other New England genera. At least two species of Ravinia occur in New England besides those previously described but it is not possible to describe these at present. Revised generic descriptions of Ravinia and Boettcheria are presented giving the female characters. The importance of dealing with the generic characters in toto cannot be too strongly emphasized. No sarcophagid genus dealt with is definable on the basis of a few characters. However, for the sake of convenience, those characters of the ^{genera} ~~genus~~ Ravinia ^{and Boettcheria} which, in combination, have always proved sufficient to separate its species from those of all other genera known in the United States are printed in italics.

It is necessary also to enlarge somewhat upon the discussion given in part one on the validity of Ravinia and Boettcheria as genera. To indicate the difference of opinion on this point let me note that when I first submitted specimens of Boettcheria to Dr. Böttcher suggesting that generic characters were involved, he favored either a new genus or a subgenus of Sarcophaga. Ravinia was treated in his paper as a subgenus. It has been impossible to communicate with him since part one was published. Villeneuve holds Ravinia and Boettcheria as "good subgenera." Aldrich considers Ravinia a genus, Boettcheria a subgenus, while I have employed both names as generic. This position I still hold, not only because I believe it justified but also because it seems distinctly advantageous when dealing with sharply defined groups in such a heterogeneous collection of species as the genus Sarcophaga has proved to be, to deal with them as genera as far

as possible. In part one several pages were given over to a discussion of "generic and specific characters" for the purpose of demonstrating the validity of generic standing for the genera under consideration. It was shown, however, that combinations of characters were necessary as generic conceptions and that in closely related genera, presumably derived from a common ancestral stock, the combinations of characters required to define the genera would be different combinations (sets) of the generic and specific characters of the ancestral genus, ^{to which new characters might be added,} Granted that this is theoretical, yet, as evolutionists, is there a serious and valid objection to offer. Aldrich has referred to Boettcheria as a subgenus and in conversation stated he took this position for the reason that certain characters given as generic for the males are not present in females. But, if we admit conclusions stated in part one and briefly restated above is this only to be expected. For instance, let us consider Sarcophaga. Here we find a large number of species and specific characters. Because we find females of two species difficult or impossible to separate, is there any reason for considering them conspecific when the males are as different as a and b? Such species actually occur. This statement is significant for this reason; it indicates that characters of specific value may be present in one sex and absent in the other. If in due course of time, a group of such species becomes differentiated as a genus, is there any reason why, in contradistinction to the defining characters of some other group, such characters ^(those of one sex) may not become of generic value? It is certainly impossible to eliminate secondary sexual characters else we would have ^{few} ~~no~~ defining characters left (this may be of more general application but I restrict it to the

taxonomic limits under consideration. And as stated in part one, if we admit the premises, this argument holds good whether we consider that Ravinia and Boettcheria are genera derived from Saccophaga, ~~and~~ that all three had a common ancestral origin, or that each or any combination of them are derivatives of derived ancestors. It may well be -- indeed, it is a fact -- that many of our generic and subgeneric conceptions are expressions of the narrowness or broadness of individual perceptions, but the writer believes that from the standpoint of a natural taxonomic classification, he is correct in the generic designations as given. Viewpoint is the determining factor.

Ravinia R.-Devoidy.

Generic characters common to males and females. Medium to small sized species. Front prominent, its narrowest part not less than one half eye width; cheek vestiture black; black cilia behind eye never extending as far down as foramen (but at least three rows in all species examined); metacephalon practically completely clothed with yellowish or whitish hairs or there may be black hairs on its lower, anterior corners; vibrissae inserted just above line of mouth margin, usually but slightly; rows of frontal bristles parallel to sides of vitta, the lowermost one or two bristles may be slightly more distant than those above, bases of rows not extending below base of vitta, the rows themselves almost parallel in some species, in others their basal portions slightly divergent. Vestiture of notonotum of short, scattered reclinate bristles except that it may become more erect and even hair-like on scutellum of male; epaulets brown and light yellow or only yellowish; vestiture of legs short, four notopleurals,

second and fourth strongest (first always vestigial in one species; anterior dorsocentrals and acrostichals always present; smaller apicals absent; lower sternopleura with bristles only).

Generic characters found in males only. Anterior face of posterior femur with several rows of bristles, an upper one or always present, one or more intermediate rows present or absent, if present short and often vestigial; posterior face of posterior femur without ventral row or with a few bristles proximally; middle femur with complete anterior and posterior ventral rows of bristles. Abdomen somewhat conical, not clothed above with short, reclinate bristles, beneath with longer, more erect hairs; sides of ventral plates as a whole, a proximally parallel (second may appear the broadest), their vestiture shiny, shortest and never decumbent on third plate, latter without longer hairs on sides. Genital segments prominent, first with marginal bristles, second always dull orange, at least as large as first, more or less rotund; anal area small, extending but a short distance above base of forceps; latter without upward flap-like extensions, its vestiture short, prongs wide spread (never approximated along median plane of body), tips darkened and either directed straight forward or more or less convergent.

Generic characters found in females only. Anterior face of posterior femur with several rows of bristles, an upper and lower always present, an intermediate row of short, vestigial bristles present or absent; posterior face of posterior femur with or without a few ventral proximal bristles (~~never~~ ^{rarely} a row on proximal half); ventral rows of middle femur prominent only on proximal half. Abdomen subcircular or sometimes somewhat oval. Genital

structure large but little or not at all overlapped by fourth notum (never concealed); for most part dull orange but notum of first genital segment may be yellowish or grayish pollinose or same color as abdomen; notum of first genital segment not divided into two lateral lips; fifth and sixth ventral plate in most species are broader than those preceding and the latter may be of specific shape.

The above redescription of this genus has been made from the following species, Ravinia haematodes Meigen (type species), R. communis R. Parker, R. cuniculata R. Parker, R. quadricolor (Coquillett), R. latistoma R. Parker, R. xanthopyga (Van der Wulp), two new and very distinct species that occur in New England, and several other new or unrecognized species from various parts of the United States and West Indies. These species all agree in all the characters above listed, except that it was not possible to examine a female of the type species, haematodes.

In general all the above mentioned species of Ravinia have light colored hairs covering the anterior spiracle; in most species these are practically entirely grayish but in others more yellowish or the hairs may be brownish at their very bases. The spiracular cover is light colored, usually yellowish or whitish. Section V of the costa is approximately equal to section III, rarely slightly longer. The subscutibial is present in all females but absent in the males of most species. All species do not have two marginals on the third abdominal segment, but in some there are several comparatively weak, even decumbent bristles between the laterals. The character of the sixth ventral plate (seventh morphological) in the females is usually of specific value^(?) and it would be well if these could be figured for each species, though

unfortunately it is often concealed by the first genital notum. Morphologically, females show eight ventral plates; the fifth and sixth seemed to be fused in most species but the line of division is very distinct and the marginal bristles of the fifth are present; in S. zanthopyga Van der Wulp, however, there is no visible line of division and marginal bristles are absent. This female shows other odd characters. In the males the writer has noticed three distinct types of ^{fourth} ventral plates, the two previously figured in part one and another represented in S. zanthopyga Van der Wulp of which I have specimens from Texas. Tarsal claws are shorter in females than in males.

The species of this genus are probably primarily breeders in excrementous matter, both human and animal. This statement is made largely as the result of personal experience and there are a few references in the literature to corroborate this impression. Pratt (Can. Ent., vol. 44, p. 131, 1912) mentions several species of Ravinia as reared in greatest or less abundance from cow manure, R. quadristoma (Coquillett) (Sarcophaga [Halicobia] quadristoma) he records as one of the most abundant. Ravinia sp. (Sarcophaga incerta Walker) was also reared, and another species is given under Coquillett's manuscript name, Sarcophaga varicosa. I have examined Pratt's material at Washington and hence am able to make the above changes in the names of the species concerned, though Pratt's species were to some extent composite. Specimens of R. zanthopyga (Van der Wulp) in the United States National Museum are labelled as reared from horse manure. Howard (Proc. WASH. Acad. Sci., vol. 2, p. 502, 1900) notes R. quadristoma (Coquillett) as one of "the most abundant" breeders in human excrement of the species studied by him. When the writer first began his study of the family it was noted that species of Ravinia

and certain species of Sarcophaga were among the first visitors to human excrement deposited in the open and at that time first conceived the idea the former genus was coprophagous. The first real opportunity to test its validity came during the summer while the writer was engaged on investigation work for the Montana State Board of Entomology in the Yellowstone Valley. Two species of Havimia were encountered, communis R. Parker and peniculata R. Parker. Both were bred from human excrement in great abundance, less abundantly from cow manure. Of the latter species, in one instance, 94 adults were reared from a single stool exposed one day. R. communis R. Parker was also reared from horse and cow manure. Reference to both these species occurs in the summary to my report to the State Board (Montana State Board of Entomology, First Biennial Report, Dec. 1914). Richardson of New Jersey, has reared R. communis R. Parker and R. latistoma R. Parker from horse, pig and cow manure. Metz Station for Experimental Evolution, Cold Spring Harbor, 1914) reared R. communis R. Parker and R. peniculata R. Parker from human excrement, and R. latistoma R. Parker from horse manure and on meat. The writer has taken specimens of R. communis and R. peniculata in houses, and especially in his laboratory at Laurel, Montana, before screen doors were put on. Pratt (l.c.) mentions the species recorded by Mr. Fennell as occurring in stables and milk houses. Both in Montana and in various places in Massachusetts I have found males of R. communis quite frequent on the leaves of growing corn. Specimens of the same species received from Banks were labelled as captured on sumach, chinquapin, and wild carrot. Titus (Utah) has taken it on sugar beets. R. communis and R. peniculata also

frequent garbage to some extent and are found in privies. The presence of species of Ravinia in houses and about human foods should probably be viewed with suspicion. The larvae of these species will travel some distance to find a proper place to pupate, so that, it was possible to trace the larvae of R. communis migrating to hundreds of feet from a cow dropping on the banks of the Yellowstone River. This was on hard, compact soil. In another case, larvae were found migrating from a dropping on sandy soil, but pupation took place in the soil within a few inches of the dropping.

Data was also collected in Montana which tended to show that the species of Ravinia and the coprophagous species of Sarcophaga mainly frequent excrement in the open or in privies. They ~~also~~ seem to prevent the breeding of oviparous species in any abundance either because they are better adapted to the food supply or it is possible that they prey upon the other larvae.

In connection with R. communis it should be noted that the females of males which can be identified with my original descriptions present several distinct types of sixth ventral plates (seventh morphological). ^{Two types are figured (pl. 7, fig. 19).} There is also a certain amount of variation among the males such as the presence or absence of the submesothoracic bristles, the extent of pollination of the first genital segment, the number of marginal aculeolar bristles, etc. I have not had an opportunity of sufficient material to analyze this problem carefully and am present in doubt as to whether these variations indicate distinct species, subspecies or individual variations. ~~The submesothoracic bristles of male~~
~~of R. communis which fall under R. communis is more~~
~~commonly present in New England and northern material and more~~
~~often absent in southern specimens though it occurs to some extent.~~

Identification made by the writer include the various forms under the one species, communis. The subgenital plate of males which fall under communis is commonly present in northern material, but seems to be more or less absent in specimens from farther south though by no means in every instance.

The female of R. communis (in New England) is recognizable by the four posterior dorsocentrals and ^{bare} ~~bristly~~ first vein. These characters also occur in another New England species, but the latter is small. R. pallidus is always separable by the three posterior dorsocentrals. The females of R. latistoma and R. quadristoma have both the first and third veins bristly. Their females are very easy to separate ^{if} the ventral plates of the genital segments are exposed. What seems to be the fused product of the fifth and sixth plates in quadristoma is large and swollen with lateral, posterior, rounded projections, often with a small depression between the latter. In latistoma, on the other hand, the fifth and sixth plates are distinct and by no means greatly, if at all, enlarged. In R. communis and similar species the notum of the second genital segment ^(especially morphologically) is visible as two lateral lips that are connected dorsally by a narrow band and overlap the sides of the sixth or fifth and sixth ventral plates. The latter is very large in some forms of communis. In R. latistoma and R. quadristoma the lateral lips of this segment are not visible and ^{rarely} a dorsal connecting band. ~~is present~~.

Additional localities records to those previously given are noted as follows.

Revine communis F. Parker--New England: Mass.: Foceland, North Abington, Lunenburg, Westport, Dorchmouth, Groton; R. I., Newport; Conn.: Westville.

United States: N. C., Va., Ohio, Ill., Tex., Ariz.

Foreign: Canada (Ontario)

Ravinia paniculata R. Parker -- New England: Mass.: North Adams, Lunenburg; N. H.: White Mountains.

United States: N. J., Ohio, Mont.

Foreign: Canada (British Columbia).

Ravinia quadriseta (Cresson) -- United States: Ohio

Ravinia latistola R. Parker -- New England: Mass.: North Adams, Ashcroft.

United States: Va., Ohio, Calif.

Boettcheria R. Parker.

Generic characters common to males and females. Normally medium sized to large flies. Front prominent, of narrow or medium width in males; cheek vestiture black; black cilia around eyes extending practically down to foreman; vestiture of lower, anterior portions of metacephalon black, otherwise whitish or yellowish; vibrissae inserted on line with oral margin; bases of rows of frontal bristles extending below base of vitta and broadly divergent toward eye orbits. Eyelets dark; four metoplaureals, second and fourth strongest; anterior dorsocentrals present, acrostichals present or absent; inner pre-metapleural absent; three pairs posterior dorsocentrals of about equal strength.

Generic characters found in males only. Metanotum clothed with scattered, erect hair; fourth thoracic segment less than one half length of fifth; ^(?) anterior face of posterior femur with several rows of bristles, base of intermediate row or rows usually considerably longer and stouter (at least as long and stout as) than those of upper and lower rows, posterior face without ventral row

of bristles; posterior tibiae divided; middle femur with a
posterior ventral row of bristles; anterior ventral row represented
 at best by a few bristles centrally; scutellum apically prominent.
 Abdomen somewhat elliptical; not clothed above with short,
 recumbent bristles, beneath with somewhat longer or long, erect
 hair; ventral plates very broad, as a whole, with their sides
diverging posteriorly (part one, Pl. B, fig. 21), ventiture of
third segment, especially at anterior, short and decumbent and longer
 hairs not present on sides. Genital segments prominent, rounded
 the smaller; forelegs short, tarsi spread out slightly, if at all
 basally with a row, apically, flag-like setaceous clothed with
 long, fine, curly hair (at least as long as ventiture of second
 segment).

Generic characters found in females only. Melanoma clothed
 with short, recumbent bristles that on scutellum are anterior and
 practically decumbent; fourth tarsal segment at least one half
 length of fifth. Anterior face of anterior femur with two
 rows of bristles on upper and ^alower, posterior face with a few
 bristles ventrally and proximally (rarely on proximal half);
 Abdomen subcircular or somewhat oval; not clothed with short,
 recumbent bristles throughout. Genital segment dull to brownish
 orange; antrum of first not divided into the lateral line, rather
 broad and concentric with those of black species.

This description has been made from four species, - Boettcheria
latisternum R. Parker (type specimens), B. bicolor R. F. F. B.,
cimbicis (Townsend)¹ and an undescribed or unrecognized Jamaican

1. The type of Sarcolemma cimbicis Townsend has been examined
 by Aldrich and found to be the same as my Boettcheria fernaldi. It is
 probable that most references to cimbicis in the literature are un-
 reliable.

species. These species also agree in the following characters some of which may be generic, - subscutellar bristle present in both sexes; "brush" of posterior trochantal present in males; tibiae tend to be shorter than their respective tibiae, especially in males; anterior scrotochials hair-like in males, short in females (in those species which have them); scutellar spines very slender and hair-like. In the females seven ventral plates are visible (eight morphologically).

The species of this genus are perhaps in part scavengers, in part parasites. The type specimens of B. cisticola (Townsend) were reared from greenish pupae and I have a female reared from horse manure. A specimen of this species received from Britton is labelled as captured on Pyrus malus (B. H. Walton), another received from G. W. Johnson (probably cisticola) bears the label "On bark of Archidona vulgaris" (G. A. Frost, Paris, Me.). At Laurel, Montana, the writer took cisticola occasionally in privies and rarely on garbage. Dead specimens were frequently found in one locality in a large mass of green wool.

The female of B. hirsuta R. Parker is at once distinguishable by the presence of long stout pre-scutellar scrotochials, the absence of pre-scutellar scrotochials and the presence of but two sternopleurals (a weak third is occasionally present). The sixth ventral plate is of characteristic shape but it is unnecessary to use it. The females of B. cisticola and B. latitarsis are often indistinguishable. The shape of the sixth ventral plate is different for each but these are often misshapen or partially concealed. Both species have three sternopleurals, short, rather stout anterior scrotochials and the pre-scutellar scrotochials are either absent or very short and not hair-like as in the males.

The species of Boettcheria have been taken in the following localities not mentioned in part one.

Boettcheria latisterna R. Parker. New England: Mass.: Melrose Highlands, Blue Hills, Glastonbury, Westport, Gloucester, North Abington, Chester, Lunenburg; Vt.: St. Albans; N. H.: Center Harbor.

United States: Ill., Va., Ohio.

Foreign: Canada (Quebec).

Boettcheria discolor R. Parker. New England: Mass.: Blue Hills, Williamstown.

United States: Ohio, N. J.

Boettcheria cincta (Townsend). New England: Mass.: Gloucester, Nantucket; Me.: Orrs Island, Paris (?); Conn.: Stonington.

United States: N. H., Ohio, N. C.

Foreign: Canada (Ontario).

Sarcophaga Meigen.

Among Sarcophagid material received from the Montana Agricultural Experiment Station are specimens bearing the record number 558.

The notes state that the flies "were seen to fly rapidly at grasshoppers and it is supposed that they deposit larvae under the hopper wings, the maggots later killing the grasshopper." "The above record was made August 18, 1910 by J. R. Parker of the station staff concerning observations made on the Huntley Bench about six miles south of Billings. Concerning the same he has written as follows, 'I remember distinctly the incident that led to making this note. I was sent out to investigate reported grasshopper injuries near Billings and found one field where Diabrotica was particularly abundant. As I walked

through the alfalfa, they rose in a cloud above of me, and I noticed that some were barely able to raise themselves from the ground and many were in a dying condition. Seeking for the cause, I noticed *Sarcophaga* darting at the hoppers just after they left the ground."

The species concerned in the above were *Sarcophaga kellyi* Aldrich, *S. grayi* Meigen and species of *Blaesoxipha*. Though, at the time these notes were made, they were based to some extent on assumption, that the flies were really justified has been shown by Kelly in his paper dealing with *S. kellyi* and other parasitic or supposedly parasitic species (Jour. Appl. Res. vol. 2, no. 6, 405-412). The species referred to by Kelly as *Sarcophaga californica* Townsend (l.c., p. 409) is probably a species of the genus ^{*Blaesoxipha*} of European origin. The writer has also taken *S. kellyi* at Laurel, Montana.

Other New England Genera.

A few notes on other genera occurring in New England are put out of place. The writer ~~had~~ hopes to be able to deal with these ^{more} in detail in subsequent additions to the papers already published but ~~as this possibility is not likely to be realized,~~ some mention of them ^{maybe} ~~is~~ made at this time.

Agria R.-Devoids.

So far as determined we have but a single representative of this genus, *Agria affinis* (Fallen). It has been bred from pupae of *Porthebra dispar* (Linnaeus) collected at Melrose, Wakefield, North Saugus, Woburn, North Andover, Beverly, Essex, Topsfield, Gloucester and Swampscott, Mass., in connection with the work of Gypsy Moth Laboratory at Melrose Highlands, and from the same moth in Russia, Austria, Italy and other European countries. I also have specimens of what are perhaps the same species from

North Mountain, Pa., and Bristol Columbia.

Blasoxipha Loeb.

To just what extent this genus will be recognized by American dipterologists is questionable at present. The females, and the most part are well served by the venation (1. and 2. of the 1st and 2nd segments which are fused or altered to form an organ for larviposition). Böttcher and Villeneuve have both determined a New England species submitted to them as B. ~~canadensis~~ ^{hunteri} and also consider Hough's Sarcophaga ~~immaculata~~ ^{hunteri} as a member of this genus as well as other undescribed or unclassified species. Concerning one of the latter Böttcher writes that it could be considered a Blasoxipha s. lat. or might be placed in the genus Gemerioidea Villeneuve. It seems to stand between Blasoxipha (Gemerioidea) and Blasoxipha (Tachrognia) Brauer and Bergenstamm; Villeneuve designs it to his genus Gemerella. Sarcophaga ovifera Coquillett is a similar species. The present tendency seems to be to consider Gemerioidea as Tachrognia as subgenus of Blasoxipha.

Wohlfartia Brauer and Bergenstamm.

The only American species assigned to this genus is Coquillett's ovifera, which occurs in the Rocky Mountains. It is possible, however, that certain species of the tachinid genus Paraphysa, perhaps even the type species chittendeni, should be placed in this genus. ^{and not} It made a distinct genus as Townsend suggests. It is probable that other tachinid genera will eventually be placed under the Sarcophagidae but it is inexpedient to offer this except as a suggestion.

Aside from the genera above noted I have a Sarcophaga combining characters of Sarcophaga, Raynia and Wohlfartia which I shall later describe, probably as a new genus.

Conclusion.

My papers on the Sarcophagidae of New England have not been presented with the idea that they are at all exhaustive or that they approach perfection in any way, but merely with hope that something of value may have been presented as a basis for increasing our knowledge of the North American members of this family or group. With a few exceptions the characters used were the result of personal study before consulting the literature. Wherever expedient, however, terms previously used were adopted to avoid unnecessary confusion. A few new characters have been introduced and it is probable that still others will be revealed by further comparative study, especially of leg characters. In regard to the tibiae in the three genera already discussed a few suggestions may be offered as concerning their chaetotaxy exclusive of apical bristles. Each tibia has a median dorsal ridge; approximated to it anteriorly and posteriorly are rows of bristles (one on each side). On the anterior tibia, however, the row posterior to the ridge is lacking except that in the species described as Sarcophaga tachyprocta there is a single bristle which is about on a level ~~on a line~~ with another on the posterior surface. On the same tibia, the row anterior to the ridge, consists of short bristles that are usually confined to the proximal half, ^{(less in most species),} On the other tibiae these rows, for the most part, consist of two, three, or more well developed bristles often with other shorter, less conspicuous bristles between them. Besides these rows of bristles near the dorsal ridge there are others on the posterior face of the anterior tibia, the posterior face of the middle tibia and the anterior face of the hind ^{tibia} ~~tibia~~. In all species of Sarcophaga,

The first part of the paper is devoted to a general
discussion of the problem. It is shown that the
problem is of great importance in the theory of
the differential equations of the second order.
The second part of the paper is devoted to a
detailed study of the problem. It is shown that
the problem is of great importance in the theory
of the differential equations of the second order.
The third part of the paper is devoted to a
detailed study of the problem. It is shown that
the problem is of great importance in the theory
of the differential equations of the second order.
The fourth part of the paper is devoted to a
detailed study of the problem. It is shown that
the problem is of great importance in the theory
of the differential equations of the second order.
The fifth part of the paper is devoted to a
detailed study of the problem. It is shown that
the problem is of great importance in the theory
of the differential equations of the second order.
The sixth part of the paper is devoted to a
detailed study of the problem. It is shown that
the problem is of great importance in the theory
of the differential equations of the second order.
The seventh part of the paper is devoted to a
detailed study of the problem. It is shown that
the problem is of great importance in the theory
of the differential equations of the second order.
The eighth part of the paper is devoted to a
detailed study of the problem. It is shown that
the problem is of great importance in the theory
of the differential equations of the second order.
The ninth part of the paper is devoted to a
detailed study of the problem. It is shown that
the problem is of great importance in the theory
of the differential equations of the second order.
The tenth part of the paper is devoted to a
detailed study of the problem. It is shown that
the problem is of great importance in the theory
of the differential equations of the second order.

Bosticheria, Revinia, Blasodonta, and Apia R.-Duvoy, as well as to the anterior face of the posterior face of the anterior tibia complete of a single cristic duct to the center except that in Sargocentron Johnstoni there are usually two (best developed in females). In Walleria this tibia has both the posterior row approximated to the median ridge and the surface row as well, each consisting of one or two bristles in all species examined. In this case the arrangement is probably generic. In the same genus males of two species were noted to have but the row on the middle tibia, those approximated to the median ridge, while in females the row on the posterior face is also present. This row is commonly present in the males of other genera. The row on the anterior surface of the posterior tibia will undoubtedly offer good characters, as Sargocentron triviale Michael it is absent, in S. whitei Aldrich and S. campbelli (tibia not carried) it is represented by three bristles, but in some species with this tibia beveled the number is often reduced to one. The middle tibia is the only one which has bristles on the lower surface. Usually only one is present (the subretrolateral bristle) but two are not uncommon, especially in females. This bristle is sometimes placed slightly to one side of the middle or may be represented by two, one on each side of the middle line. In descriptions hereafter published whenever necessary to discuss these rows I shall refer to those approximated to the median ridge as the anterior or posterior row of the pro-, meso-, or retrolateral ridge and to the surface bristles as anterior or posterior surface row of the pro-, meso-, or retrolateral. The term "row" has been here used as expressive of what may be considered, for taxonomic purposes,

a typical condition; in some cases a "row" will be represented by only a single bristle.

Plate 1.

Fig. 1. Fourth ventral plate and genital segments of male of Sarcophaga sinuata Meigen.

Fig. 2. Fourth ventral plate and genital segments of male of Sarcophaga aldrichia n. sp.

Fig. 3. Penis of Sarcophaga uliginosa Kramer; forceps and fourth ventral plate as under Fig. 2.

Fig. 4. Sarcophaga absona n. sp., male. a. View of posterior face of middle femur to show ventral posterior row of bristles; b. Genital segments.

Plate 2.

Fig. 5. Fourth ventral plate and genital segments of male of Sarcophaga johnsoni n. sp.

Fig. 6. Fourth ventral plate and genital segments of male of Sarcophaga utilis Aldrich.

Plate 3.

Fig. 7. Fourth ventral plate, profile view of base of same and genital segments of male of Sarcophaga tuberosa harpax (Pandellé).

Fig. 8. Fourth ventral plate, profile view of base of same and genital segments of male of Sarcophaga tuberosa exuberans (Pandellé).

Fig. 9. Fourth ventral plate, profile view of base of same and genital segments of male of Sarcophaga tuberosa sarraceniae (Riley).

Plate 4.

Fig. 10. Fourth ventral plate and genital segments of males of Sarcophaga haemorrhoidalis Meigen.

to the same effect, it is not necessary to state that the same is the case.

Section 1

The first section of the Act, which is the subject of the present Bill, is the

section which relates to the

section which relates to the

section which relates to the

section which relates to the

section which relates to the

section which relates to the

section which relates to the

section which relates to the

Section 2

The second section of the Act, which is the subject of the present Bill, is the

section which relates to the

section which relates to the

section which relates to the

Section 3

The third section of the Act, which is the subject of the present Bill, is the

section which relates to the

section which relates to the

section which relates to the

section which relates to the

section which relates to the

Section 4

The fourth section of the Act, which is the subject of the present Bill, is the

section which relates to the

Fig. 11. Fourth ventral plate and genital segments of male of Sarcophaga dalmatiana Schiner.

Plate 5.

Fig. 12. Fourth ventral plate and genital segments of male of Sarcophaga fuscicollis Pandell.

Fig. 13. Fourth ventral plate and genital segments of male of Sarcophaga bullata n. sp.

Fig. 14. Fourth ventral plate and genital segments of male of Sarcophaga chelonae n. sp.

Plate 6.

Fig. 15. Fourth ventral plate and genital segments of male of Sarcophaga fulvipes ^{dissidia} ~~n. subsp.~~ n. subsp. (those of S. fulvipes Macquart the same).

Fig. 16. Fourth ventral plate and genital segments of male of Sarcophaga scoparia Pandell.

Plate 7.

Fig. 17. Fourth ventral plate and genital segments of male of Sarcophaga crinita n. sp.

Fig. 18. Fourth ventral plate and genital segments of male of Sarcophaga helioides Townsend.

Fig. 19. Showing two types of sixth ventral plate (seventh morphological) found in females the roles of which are identified with the original description of Evania communis R. P. n. sp.

Fig. 20. Sarcophaga rachyprocta n. sp., male. Lateral view of genital segments.

Fig. 21. Fourth ventral plate and genital segments of male of Sarcophaga areolaris Walker.

Fig. 22. Fourth ventral plate and genital segments of male of Sarcophaga subulicollis n. sp.

Fig. 23. Fourth ventral plate and genital segments of male of Sarcophaga insignis Walker.

Explanation of Plates.

The drawings of Sarcophaga areolaris Meigen (fig. 1) are fully labelled; corresponding parts in the other species may be determined by comparison. The abbreviations used are the same as in part one, but a list is given in order that reference to the latter may not be necessary. All drawings of genitalia have been made with a camera lucida.

Abbreviations.

ac.	Anterior clasper.
ap.	Accessory plates.
bf.	Base of forceps.
bff.	Upward flap-like extensions of base of forceps.
lv. IV.	"Brush" of fourth ventral plate.
d.	Dorsal limit of anal area.
f.	Forceps.
fp.	Forceps prong.
g. 1.	First genital segment.
g. 2.	Second genital segment.
l.	Label of fourth ventral plate.
p.	Penis.
pc.	Posterior clasper.
vp. III.	Third ventral plate.
vp. IV.	Fourth ventral plate.

Plate 9.

Copy of Böttcher's figures showing parts of the genitalia of Sarcophaga canina (Linnaeus); Deutsch. Ent. Zeitschr., 1912, p. 533.