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SARCOPHAGA AND ALLIES

IN NORTH AMERICA

by

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Genitalium disquisitio abominabilis displicet.—A maxim
of Linnaeus, quoted by Fabricius in Illiger's Magazin
für Insektenkunde, ii, p. 5, 1803.

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INTRODUCTION

The genus *Sarcophaga* was established by Meigen in 1826; he described thirty species, but in the manner of his time did not single out one of these as type of the genus. Westwood in 1840 designated or mentioned the *Musca carnaria* of Linnaeus (included by Meigen) as the type species. Some objection to Westwood's designations in general has been raised by Hopkins, on the ground that he limited himself to British species. However, the same designation in *Sarcophaga* was made twice more within a few years, by Zetterstedt and Rondani. *Carnaria* has been universally accepted as type since that period.*

Although Meigen in founding the genus gave a fairly full and accurate account of the genitalia of the male, these were little studied or entirely ignored for many years afterward. The numerous European species were never clearly differentiated until Pandellé published his remarkable revision in 1896; in this he identified 63 species and varieties and recognizably described them, including the genitalic characters of each. Even then, the lack of illustrations in his work prevented immediate recognition of the brilliant success of the method, and it was a decade before it made an appreciable impression. Since that time, however, the group has been thoroughly studied in the same manner by other European dipterists, and its classification for that fauna is on a far more satis-

*References for this paragraph:

Meigen, Systematische Beschreibung europ. Zweifl. Ins., vol. v, 14, 1826.

Westwood, Introduction to the Modern Classification of Insects, ii, Appendix, 140, 1840.

Hopkins, Proceedings U. S. National Museum, vol. 48, 115, 1914.

Zetterstedt, Diptera Scandinaviae, iv, p. 1281, 1845.

Rondani, Dipterologiae italicae Prodomus, i, 86, 1856.

factory basis than that of any other Muscoid group. Böttcher in particular has given a beautiful condensed synopsis of the European species, with diagrams of the male genitalia; he made out about 80 species and varieties. Through his efforts and those of Villeneuve and Kramer, most of the old collections have been re-examined and the types of the early descriptions elucidated.*

In the United States since the beginning of any indigenous dipterology about 1880 there has been a virtual blockade in this group, due to the vast number of unrecognizable old descriptions, of which the types were scattered in European museums or lost. On account of this condition, Williston and Coquillett described new species only under some special stress of circumstances. Dr. Hough, with characteristic energy, gathered up all the available material in collections, added to it largely himself, and projected a revision; but before he had made much progress, in 1903, he decided that his medical practice required his undivided attention. So he sold his collection, including the Sarcophagidæ, to the University of Chicago. Van der Wulp had in the meantime added a list of Mexican and Central American forms. The writer's Catalogue of North American Diptera, published in 1905, shows 106 nominal species of Sarcophaga from North America, of which it is safe to say that hardly more than half a dozen were ever recognizably described. In the absence of any clear understanding of the specific characters, this looked like the most hopeless field imaginable.

The first American worker to attack the group by the new genitalic method was Dr. Ralph R. Parker; he began in the winter of 1912-13 a study of the New England representatives. His first paper† contains a thorough and admirable discussion of the

*References for this paragraph:

Pandelle, *Revue entomologique*, xv, 173-207, 1897.

Boettcher, *Deutsche ent. Zeitschrift*, 1912, 525-544 and 705-736; and 1913, 1-16, 115-130, 239-254, 351-377.

†Proceedings Boston Soc. Nat. Hist., 35, 1-77, 8 plates, 1914.

morphology, together with full descriptions of the males of seven species in the genera (or subgenera) *Ravinia* and *Böttcheria*.

At the request of the late F. M. Webster, then in charge of the section of Cereal and Forage Insect Investigations of the United States Bureau of Entomology, the writer undertook, in December, 1913, the project of a revision of the North American Sarcophagidæ. The necessity for this arose from frequent rearings of Sarcophagas as important parasites of grasshoppers, and the desire to get these parasites named and classified so that they might be properly studied.

LIMITS OF THE GROUP.

No distinct limits to the family Sarcophagidæ have appeared in recent literature. On the one hand, and most commonly, they have been lumped with Tachinidæ; on the other the family is extended to include *Metopia* and *Senotainia*, which from the bare or nearly bare arista have been usually included in Tachinidæ.

In the present work, I have endeavored to include all Muscoid species which agree in having general gray or silvery, tessellated or changeable pollinose coloration, the fourth vein ending considerably before the apex of the wing and with an almost angular bend, the parafacials hairy, the arista plumose above and below for half its length or a little more. None of the species have discal macrochaetæ on the abdominal segments, hairy eyes, long proboscis, rudimentary palpi, or more than a single pair of discal scutellar bristles. Species ordinarily considered Tachinid are excluded by the bare arista; most Dexiids by the greater extent of the plumosity of the arista and by discal abdominal or scutellar bristles, or combinations of these characters; Muscidæ (sens. str.) by the arista being plumose to the tip, the color often metallic, the abdomen less bristly, the fourth vein often with rounded bend, or combinations of these; Calliphora and *Cynomyia*, which have an arista like Sarcophaga,

are sufficiently distinguished by the metallic abdomen, although there are other differences.

Among the species included in the present paper, all have been assigned to *Sarcophaga* except a few aberrant forms with arista short-plumose, or with vibrissæ high up and approximated, or with a few other analogous characters. See table of genera for these. Characters of one sex are not used for ultimate separation of genera, though they are often of much practical value.

The genus *Sarcophaga* is undoubtedly a large and rather homogeneous group, a natural large genus, as much so as *Tabanus*, *Rhamphomyia*, *Culex*, *Bembidium*, *Formica*, etc. Even granting the separation of some of its components in accordance with the views of recent writers, there remains a mass of several hundred species, scattered all over the world.

After much consideration, I have decided not to attempt the separation of the genera *Blæsoxipha*, *Ravinia*, and *Böttcheria*, but to regard them as subgenera or merely groups having some common characters.

Blæsoxipha (Loew, Wiener Ent. Monatsch., v, 384, 1861) was established on a single female specimen (European) described as *grylloctona* n. sp. in the same place. The only character differing from *Sarcophaga* as announced at the time was the presence of a long larvipositor curved downward and forward. The group of species possessing more or less of this character is very complex and closely related in Europe as well as in North America; it has not yet been well worked out in Europe. Species numbered from about 52 to 66, of the present paper, and a few others, are more or less of this type in the female; but the amount of development of the sternites is often slight, usually so. Figures 61b and 61c show the extreme form, from which a series might be made of species showing less and less development of larvipositor, down to an ordinary *Sarcophaga*. Furthermore, the species are so similar in the middle part of

this series that they can be separated only by the male genitalia, and probably a dozen of them can scarcely be separated at all in the female. It would seem like an over refinement of classification if we could determine the genus only by the female genitalia, and the species only by those of the male; still more so as in this group it is almost impossible to tell which male goes with which female. We must take the species as nature makes them, but fortunately nature rarely makes genera, leaving that usually to the convenience of the taxonomist. I am not aware of any diagnostic characters for *Blæsoxipha* in the male sex.

Ravinia (Desvoidy, Dipt. Env. Paris, ii, 434, 1863; Parker, Proc. Bost. Soc. Nat. Hist., 35, 52, 1914) has for its principal character the course of the frontal bristles, which diverge anteriorly but little, or not at all in the females of some species. The type is *hamatodes* of Europe, and the nearest allies in the present paper are Nos 49, 117-121, 143-145. The character of the frontal rows is less developed in males, and there are many species of *Sarcophaga* outside the group which show it; however, with some other rather minute characters, it marks off a good subgenus.

Böttcheria (Parker, Proc. Bost. Soc. Nat. Hist., 35, 65, 1914) has for its principal character the presence of a third (middle) series of long bristles on the outer side of the hind femur; the ventral plates also do not become successively narrower. Mr. Parker excluded the females from consideration in his paper, hence did not develop the fact that these are male characters. I do not find any tangible characters which can be applied to both sexes. The type of the genus is *latisterna*, and the other related forms are *cimbicis*, *bisetosa*, *taurus*, and *parkeri*. The femoral bristles are variable in *cimbicis* males. While the five species are undoubtedly allied, I doubt if the fact is best expressed by raising them to generic rank.

Helicobia was proposed by Coquillett (Proc. Acad. Nat. Sci. Phil., 1895, 317) for the species with

hairy first vein, taking *helicis* as type. While I have found no case of inconstancy of this character in the North American species, such are said to exist in Europe; and at the best this character cuts across the others which seem to have subgeneric or even group value, in such a way that it is clearly unavailable for generic separation in *Sarcophaga*. This has been recognized by several dipterists.

A survey of the present status of the Muscoid Diptera indicates unmistakably that our great need is not more genera, but a more complete knowledge of species. The tendency of extreme generic specialization is to erect about itself impenetrable barriers of names, as is well illustrated by Desvoidy and Brauer. Genera conceived in this mental atmosphere are likely to be almost wholly subjective creations, which make no impression on the minds of others. The argument that the classification must express the relations has its dangers, partly from the subjective elements involved, and partly from the fact that the classification has also another important function,—to provide us with names for our species, which should be as stable as possible if they are to have any usefulness. Furthermore, to separate a species from the genus in which it has been located expresses one relation, that of difference; but it obscures another, that of resemblance, which may be more important. One of the main objects of the present work is to make the identification of species as simple and certain as possible, and thus to attract biological and economic workers into the group. This object would inevitably be defeated by the erection of a considerable number of indistinctly separated genera. These are the governing considerations which have prompted the preservation as nearly as practicable of the old genus *Sarcophaga*.

SPECIAL TAXONOMIC CHARACTERS.

It is assumed that entomologists using the present paper will be tolerably familiar with terms used in describing Diptera; the papers of Parker and Böttcher, and Williston's widely used Manual of

North American Diptera, seem to render a lengthy discussion unnecessary here. But a few special terms, or special limitations of terms, are explained.

Head.—The width of the front is a character of some importance, though subject to a moderate amount of variation. The width is expressed in a decimal, obtained by dividing the number of micrometer units in the narrowest width of the front by the number in the entire width of the head. Both of these distances are susceptible of rather exact measurement, hence the decimal is significant at least to two places, and has regularly been carried to three, though the variations in different specimens make the third figure of little importance. Where there were specimens enough, five males and five females were regularly measured, and all the separate measurements are given for each sex, as well as their average.

The term *bucca* is applied in Dr. Hough's sense (Proc. Acad. Nat. Sci. Phil., 1898, 168) to the lateral edge of the mouth cavity, except that I extend the region up to the lower edge of the eye, including the narrow and in this part generally very indistinct transverse impression, which was excluded by Hough. Thus the height of the *bucca* can be roughly expressed as a fraction of the height of the compound eye, although on account of its slanting position it is impracticable to measure this relation with any precision.

On the back of the head, a very distinct suture extends outward and downward from the central foramen, marking off the lowest part, which is the *metacephalon*; the suture continues as a perceptible groove or line to the edge of the mouth, cutting off the back part of the *bucca*. This line often separates the black and pale hairs of the *bucca*, the pale being behind the metacephalic suture. A careful study of this detail often aids in distinguishing the females of species. An even more useful aid for the purpose is the number of rows of black hairs behind the eye on the outer part of the back of the head. The meta-

cephalon is strikingly developed backward in the genus *Sarothromyia* (Fig. 7a).

Thorax.—The chaetotaxy is explained, for convenience of reference, in connection with figure 146, in the explanation of the plates.

The expression "3-5 black stripes" means that there are three principal, distinct stripes, and outside of these one shorter, less distinct, on each side.

Abdomen.—The genitalic characters are explained in the next section.

Legs.—A male character of some importance is the frequent presence of a *comb* on the lower hind side of the middle femur near its tip; this consists typically of a row of short, flattened, blunt bristles, close together; there may be only five or six bristles of this character. It diminishes through a series of species so gradually that it is hard to say where it ceases to exist. None of the females possess it.

Wings.—At the extreme base of the costa are found two scales, one so close to the thorax as to be somewhat difficult to see in many specimens. These are *epaulet* and *subepaulet*. The latter, which is the outer, is easily seen, and is always pale; the former is usually quite black, but in the *Ravinia* group it is reddish-yellow, a minute but seemingly good character.

The costal segments are numbered, following Böttcher, so that the first segment is before the humeral crossvein, the sixth and last measures the opening of the first posterior (or apical) cell.

The costal spine, when present, is at the tip of the auxiliary vein.

THE GENITALIC CHARACTERS.

One could hardly believe without experience how easy and how positive the identification of species becomes in the *Sarcophagidæ* by the aid of the male genitalia. The prime object of the present paper is to impress this fact and open a new field for taxonomic workers. There is no reason why in the course of a few years there may not be dozens of correctly

identified local collections of Sarcophagidæ in the United States, and dozens of workers who are competent to identify material and describe new species.

Since the genitalia have this supreme importance for taxonomy in this group, it is necessary to describe their structure before passing to the analytical tables.

The abdomen in *Sarcophaga* has four main segments, beyond which in males are two smaller segments of different appearance, called the hypopygium, or genital segments; the first of these may be somewhat retracted into the fourth segment. The anus is located at the end of the second hypopygial segment. On the two sides of the anus or just below it are attached the *forceps*, two well chitinized organs lying side by side and usually curving somewhat forward below; they are generally visible in large part without special preparation. They do not have lateral motion, hence are not like true forceps. Their shape is highly characteristic for each species, and in many of them is very striking (compare figures No. 21, 24, 36, 45, 68, 75). They are the hindmost of the series of organs to be described. Assuming now that the genitalia have been spread (a process to be described a little farther on), the next important part is the *accessory plate*, a more or less triangular sclerite lying just in front of the outer side of the forceps where the free part joins the segment. It offers fewer characters than the forceps, but is often peculiarly modified. The typical form is shown in figures 21, 22 and 23; in Fig. 26 it is developed into a fingerlike process, and in 27 it is long and large, with hooks on the posterior side; compare also 9 and 52.

Next in front of the accessory plates, and lying nearer the median line, we come to two hooklike organs, the *posterior* and *anterior claspers*, well shown in figure 23. Each of these occurs in various forms, long and short, straight and curved, as an inspection of the figures will show.

The forceps, accessory plates and claspers are all paired organs, but the remaining one is unpaired,—

the *penis*, lying in the middle line in front of the forceps and between the claspers. It is the most complex organ of all, and is of prime importance. A complete homology of its various forms would occupy a volume and require years of study. It is usually two-jointed, the basal joint being a simple support. The distal segment is in most cases fairly well chitinized, and is essentially a swollen tube bearing various flat plates and slender processes, a further account of which will be found in the specific descriptions.

The two segments of the hypopygium are deeply grooved beneath to receive these organs when they are in repose. The penis and claspers are supported on a firm mass of tissue which is attached on each side well forward, at the front lower corner of the second segment. This enables the penis and claspers to move up and down, as a consequence of which they seem sometimes to be longer in comparison with the forceps than they seem at other times, or in other specimens,—a point to be remembered in comparing specimens with each other or with figures. The penis bends forward and back freely, and is figured either way.

On the ventral side of the abdomen, anterior to the genitalia, is another structure of importance, the fifth abdominal sternite. It will be apparent on inspection that there is at the base of the abdomen a short sternite before the one that matches the first visible tergite (indicating that the apparent first tergite is a combination of the first and second); counting from this basal sternite, the fifth lies partly concealed within the ends of the (apparent) fourth tergite. It is deeply forked behind in the shape of a V or U, and often shows characters of specific importance, either brushes of very short spines, or blunt processes, sinuosities of outline, etc.

SPREADING THE GENITALIA.

This indispensable operation involves just about as much effort as spreading the wings of Lepidoptera, and like it, may be performed either upon fresh specimens or upon dried ones that have been relaxed in a moist chamber. With fresh material the custom of the writer is to take a dissecting needle with a minute hook or right angle at the tip, hold the specimen under the low power of the binocular dissecting microscope between the thumb and finger, and draw the forceps and inner organs as far back as they will go without tearing the tissues; stretching the muscles and ligaments in this way a few times, they do not retract the organs so strongly. After this is done, lay the pinned fly with its side against the surface of a piece of cork, by sticking its pin into the edge of a second piece of cork that has been attached to the surface of the first. It is then a simple matter to again draw out the genitalia (under the binocular) and hold them so by sticking pins into the cork. Leaving the specimen to dry, a matter of two or three days, finishes the process.

Dry material will need to be placed in the relaxing jar for 24 hours, longer with very old specimens.

Where time cannot be allowed for relaxing, boil the specimen in water for a minute and proceed; the wings will be spoiled, but the pollen of the body surface generally comes back to its original appearance better than when merely warm water is used.

Modifications of the described method will naturally suggest themselves. A binocular microscope is not indispensable, though it is a very great advantage. Professor Melander's illuminating apparatus for the binocular (*Jour. N. Y. Ent. Soc.*, xxi, 227, 1913) has been used throughout the present work, and certainly doubles the usefulness of the microscope.

HABITS.

The species of *Sarcophaga* range in larval habit from scavengers to parasites of warm-blooded animals. Many have been reared from excrement of mammals, a few from carrion, many from dead insects.

Identifications recently made connect *Sarcophaga hæmorrhoidalis* with intestinal myiasis in man, and even suggest that many of the cases may be caused by this widespread species.

Several species deposit their larvæ in the cups or pitchers of the pitcher plant, *Sarracenia*, and are not known to have any other larval habit than to devour the decomposing insects that occur in the water of these cups. See discussion of this series under *Sarcophaga sarraceniæ*.

There appears to be a very interesting transition from the habit of devouring dead insect to parasitism upon living ones, in regard to which much more study of a critical nature will be required. Some species apparently may be called facultative parasites, others are obligates, being unable to live on dead tissues. To the latter class seem to belong all those in which the female possesses a more or less developed larvipositor; but the habit is probably not limited to these species.

Without exception as far as known, the species are larviparous. The larvae of several species have been studied by Nathan Banks, who has given (Bull. 22, Technical Series, Bureau of Entomology) many figures showing larval structures in this and allied families, with table for their separation. Almost no specific characters are known in the larvae, so the identification can go no further than "*Sarcophaga* sp." unless the adult is reared. The minute hooklets on the integument which serve for locomotion completely encircle the segments in *Sarcophaga*, which is the main larval differential character.

Pantel (*La Cellule*, xxi, 1 fasc., 105, 1910) states that the larvae of *Sarcophaga* which are parasitic in Orthoptera do not show any specialization for this mode of life, and simply lie among the tissues of the host, doing little damage until nearly fullgrown, and obtaining oxygen from the body fluid of the host.

Several entomologists have noted a peculiar larvipositing habit in species attacking grasshoppers, the female fly dashing at the flying host and attaching the sticky larva in midair. Evidently several species of *Sarcophaga* do this.

Many rearing records are enumerated in the following pages, most of which have been accumulated within recent years by workers of the Bureau of Entomology; each year sees a large increase in the number of such records, and it is to be hoped that there will be an increasing carefulness to eliminate the possibility that the supposed parasite did in fact larviposit after the death of the host. The general absence of precaution on this point vitiates a large part of existing records, except in Orthoptera, which the *Sarcophagas* parasitize very freely and commonly.

Besides the accumulated records of this paper, attention is directed to a summary by the writer in the *Journal of Economic Entomology*, viii, 242-246, 1915.

ACKNOWLEDGEMENTS.

In addition to the National Museum collection (inclusive of recent additions from the Bureau of Entomology), the writer has described the material in the University of Chicago (the Hough collection); the American Museum of Natural History; the University of Kansas, and that belonging to many individual dipterists who are mentioned in the proper places. Professor Hine's and Mr. A. H. Sturtevant's collections, and that of Mr. H. S. Harbeck, have been especially important in containing undescribed species. Dr. Ralph R. Parker assisted very materially by

identifying several European species occurring in our fauna, and by the donation of paratypes of his species.

SUMMARY.

One hundred and forty-five species and varieties, belonging to sixteen genera, are described in the present paper, and the genitalia are figured in 138 cases; other figures bring the total number on the plates to 170.

A list of the included species is given in the explanation of the plates. The number assigned to a species in the text is in every case the same as the number of the figure or figures illustrating it.

In a large number of the species, the female has not been described; and it is possible that some errors have occurred in identifying females with the wrong male, as but few pairs collected in copula exist in collections.

Not only is there much to be done in studying the females, but there are beyond doubt many species yet to be described, especially from tropical and subtropical regions. Nothing is ever final in taxonomy.

Only species seen by the writer are included. The numerous old names which cannot be elucidated at present (their types being lost or scattered in European museums) are to be found in the Catalogue of 1905, and are not repeated here. It is impossible to follow any other course than to ignore them, or else wait many years with the group in hopeless confusion. The latter course seems especially undesirable since a real key to the species has been found in the genitalic characters.

CLASSIFICATION

Table of Genera of Sarcophagidae*

1. Abdomen wholly shining black; arista long-plumose (tropics).

Phrissopodia Macq.

Abdomen with three rows of shining black spots on the second, third and fourth segments; these are sometimes confluent, but at least the intervening angles are densely pollinose; arista pubescent (widespread north)

Wohlfahrtia B. and B.

Abdomen pollinose, at most the hinder part of the segments shining black in certain lights, tessellated in others 2.

2. Veins 1, 3, and 5 hairy; first posterior cell closed and short petiolate (tropical).

Johnsonia Coq.

Vein 5 always bare 3.

3. Male with one orbital bristle, proclinate (the uppermost frontal sometimes simulating another, but reclinate) 4.

Male without orbital 6.

4. Front protuberant; vibrissæ approximated and high above oral margin (Louisiana)

Camptops n. g.

Front not protuberant, vibrissæ as usual 5.

5. Metacephalon greatly developed, hence the lower edge of head remarkably long, produced backward (tropical)

Sarothromyia B. and B.

Metacephalon not greatly developed (tropical)

Sarcophagula V. d. W.

*Note.—In order to utilize the most salient differences, the table is based to some degree on male characters, although it is believed that all the genera are recognizable in the female sex. Only genera studied by the writer are included, but notes on others supposed to be allied are given at the end.

6. Arista short-plumose 7.
 Arista long-plumose 10.
7. Parafacial with a single macrochaeta below, proclinate (Louisiana, Texas)
Camptopyga n. g.
- Parafacial with a row of hairs. 8.
8. No costal spine (widespread north)
Agria Desvoidy.
- Costal spine strongly developed 9.
9. Back of head with only black hair; anterior acrostichals very large (northeastern)
Harbeckia n. g.
- Back of head with some pale hair; no ant aer (widespread) *Hypopelta* n. g.
10. Two large posterior dorsocentrals, two equally large anterior ones (tropical)
Notochata n. sp.
- Generally three or four ps dc, if only two the anterior ones are much reduced 11.
11. Vibrissæ approximated and high above the oral margin (the distance equaling the length of the second antennal joint) (widespread)
Emblemasoma n. g.
- Vibrissæ normal, or if somewhat approximated they are not strikingly removed from the oral margin 12.
12. Parafacials quite bare; first vein hairy (Louisiana)
Sthenopyga n. g.
- Parafacials with hairs, sometimes delicate. 13.
13. Ocellars absent; frontal rows not noticeably divergent below, reaching base of antennae (tropical) *Harpagopyga* n. g.
- Ocellars present; if absent, the frontal rows are abruptly divergent below and reach about to the middle of second antennal joint 14.
14. Fifth sternite of male undivided; epaulet yellow; back of head with only black hair (northeastern) *Thelodiscus* n. g.
- Fifth sternite of male deeply divided (widespread) *Sarcophaga* Meig.

NOTES ON OTHER GENERA

Microchætina Van der Wulp, *Biologia*, Dipt., ii, 240, 1891, is a Dexiid, as stated by the describer. Brauer and von Bergenstamm placed it with their Sarcophagidæ, and their arrangement was followed by the writer in his 1905 Catalogue. Adams, however, in Williston's Manual, 1908, properly replaced the genus in Dexiidæ.

Paramintho Van der Wulp (*ibid.*, 265) is also a Dexiid, from its very small antennæ, and discal macrochaetæ on segments 2-4 of the abdomen.

Ouesia Desv. This European genus was reported from Mexico City by Van der Wulp (*O. lucilioides*, *ibid.*, 288, pl. vii, f. 11). The genus is close to *Cynomyia*, and from its bright metallic green coloration is readily distinguished from the group treated in the present paper.

Hesperomyia Brauer und von Bergenstamm, *Zweifel*, *Kais. Mus.*, iv, 114, 1889; v, 359, 1891; vi, 162, 1893. One species, *erythroceræ*, from Texas (*ibid.*). The genus is allied to *Senotainia*, but has the first posterior cell closed and petiolate; it does not come within the scope of the present paper. The arista is almost bare.

Erythraundra Brauer und von Bergenstamm, *ibid.*, v, 368, 1891; vi, 165, 1893; one species, *picipes*, from Georgia, U. S. A. The principal characters given are as follows: Parafacials with only very delicate hairs; arista pubescent, or at base short-plumose; no costal spine; first posterior cell open; male without orbitals; third antennal joint 2-2½ times the second; bucca wide; front of male very narrow; vibrissæ a little approximated. From the data given, I am unable to distinguish the species, but it would probably fall within the genus *Sarcophaga* as here accepted.

Genus **PHRISSOPODIA** Macq.

- Macquart, Nist. Nat. Dipt., ii, 222, 1835. Type designated as *Peckia imperialis* Desvoidy, which is stated to be without doubt the same as *Sarcophaga praeceps* Wied. Macquart, Dipteres Exotiques, ii, pt. iii, 253 (sep. 96), spelled Phrissopoda and Phryssopoda.
 Bauer und von Bergenstamm, Zweifl. Kais. Mus. iv, 1889 Phrissopoda; vi, 163, 1893 (id.).

This genus has by several writers been regarded as a synonym of *Peckia* Desvoidy (Myodaires, 1830. 335). The latter contained five species, no type being designated; only one (*imperialis*) had the shining black abdomen, the others apparently not differing from *Sarcophaga* as taken in the present work. Macquart was entirely within his rights in isolating *imperialis* in a new genus, and the only defect in his procedure as viewed by the most critical modern was that he failed to designate a type for *Peckia* from among the four species remaining in it. But it was not the fashion in those days for an entomologist to designate a type for another man's genus, if indeed he did so for his own. Macquart's genus *Phrissopodia* was a valid genus at the time; it contained besides *imperialis* (= *praeceps*) one other species evidently congeneric in the modern sense, also with a shining black abdomen.

Brauer and Bergenstamm in 1889 gave a rather full description of *praeceps* Wied., apparently from the types.

Generic characters: Very large, robust species, with shining black abdomen and the male having on the middle and hind legs very abundant, bushy villosity, both on femora and tibiae.

Head as in *Sarcophaga*; front narrowed in male, without ocellars or orbitals (B. B. however mention two pairs of vestigial orbitals in the male); third antennal joint more than three times the second in the male, nearly three times in female; epistoma somewhat produced forward and downward in the male, where the vibrissæ are a little above the oral margin; facialia hairy halfway up.

Thoracic chaetotaxy (from specimen) ; ps de only two pairs, far back ; ant de 0 ; ant aer 0 ; prsc 1 medium ; hum 3 (one is small) ; plum 1 or 2 small ; prs 1 ; npl 2 large ; sa 2 ; inta 1 ; pa 2 ; stpl 2 with some large hairs ; scutellum with 2 marginal and a stout, somewhat smaller pair of decussate apicals, no discal or subapical.

Abdomen shining black ; hypopygium large, of similar type to *Sarcophagas* (to the tropical group without ocellars, including *hillifera*, etc.).

No. 1. *Phrissopodia præceps* Wied.

Wiedemann, Auss. Zweifl. Ins., ii, 355, 1830 (*Sarcophaga*).—Cuba.

Desvoidy, Myodaires, 335, 1830 (*Peckia imperialis*).—Cuba [Macq.]

Macquart, Hist. Nat. Dipt., ii, 223, desc. and probable syn., Dipt. Exot., ii, pt. 3, 252, note.

Walker, Trans. Ent. Soc. Lond., n. ser., v, 310 (*Sarcophaga fortipes*).—Hayti. [G.-T.]

Brauer und von Bergenstamm, Zweifl. Kais. Mus., iv, 125, 1889 ; vi, 163, 1893, type redesc.—Cuba and Chile.

Williston, Trans. Amer. Ent. Soc., xiii, 307, 1886, oc. in San Domingo (*Peckia*).

Giglio-Tos, Ditt. del Mess., iii, 67, 1894, syn. and oc.—Mexico.

Williston, Manual of N. A. Dipt., 1908, 350, half-tone illustration (*Peckia*).

[F. H. Snow, Kans. Univ. Sci. Bull., ii, 345, 1904, reported the species from Arizona, but on examining his material I found it to be *Trivodes obesa* Coq.]

Male. Front .200 of head ; parafrontals and parafacials white pollinose, not very glistening, the latter with an irregular row of fine but long hairs below near the eye ; frontal stripe blackish, the anterior end twice as wide as near the ocelli ; frontal bristles about 13, the lowest three pairs abruptly diverging, and reaching almost to the middle of the second antennal joint ; antennæ blackish-brown, third joint slender, reaching five-sixths of the way to the vibrissæ ; arista with rather erect and long plumosity for three-fourths its length ; palpi and proboscis black, ordin-

ary; bucca one-half the eyeheight, with long, soft, mostly pale hairs; back of head with two or three irregular rows of black hairs, the rest pale, abundant and conspicuous; outer vertical wanting.

Thorax brownish-black, with 4-6 gray pollinose stripes, of which the submedian pair are divided beyond the suture; scutellum uniform brownish-black, convex; dorsum with fine erect black hair, longer on the humeri, mesopleura, sternopleura, postalar callosities, and sides of scutellum; calypters dark brown.

Abdomen shining black; first and second segments with only lateral bristles; third with a stout median marginal pair; fourth with a strong, irregular marginal row of some 20; fifth sternite blackish, excised U-shape, the arms with some inconspicuous black hairs but not much exposed.

Hypopygium large; first segment shining black, with fine erect hair and no bristles; second segment dark red, the sides brownish, hair erect and soft, no bristles; forceps long, slender, straight, shining black, the sharp tips curving gently forward; from behind they are well separated, slender, parallel. Accessory plate shining black, prominent and rather slender, with almost sharp tip, the hind edge thin and notched near tip; posterior clasper shining black, erect, long, gently curved, with small but distinct apical hook; anterior clasper robust, red at base but shining black apically, strongly curved forward, the tip obliquely truncate to a second shorter point below. Penis red, the division between the basal and distal segments not very distinct; the back plate is deeply cleft at apex into two side plates, which have a minute tooth at tip and a long, curved one forming the anterior apical angle; below this, on the front of the segment, are two lobes bearing pale hair, and between them is visible the blunt tip of a chitinous organ.

Legs black; anterior tibiae without bristles except at tip, and on its front side for nearly the whole length with a delicate brush of reddish hairs; middle tibia longer than its femur and a little curved, with one

bristle on the outer front side, the villosity extends upon the basitarsus; hind tibia with only two bristles before the tip; hind femur and tibia both swollen and curved away from each other in the middle; claws and pulvilli all long.

Wings brownish-gray, the base strongly blackened; no costal spine; third costal segment twice the fifth and sixth together; fifth hardly twice the sixth; first vein bare, third with a few hairs; fourth vein bent in an acute angle, barely appendiculate.

Length 22 mm.

One male, Santiago, Cuba, Oct. 25, 1903 (Capt. W. Robinson), in the National Museum.

Brauer and von Bergenstamm state that in the female the arista is short-plumose, and for only half its length; as they have added Chile to the type locality, I suspect that they have the wrong female, from that country.

Type.—In the Imperial Museum, Vienna.

Genus WOHLFAHRTIA B. and B.

Brauer und von Bergenstamm, Zweifl. Kais. Mus., iv, 123, 1889; vi, 165, 1893; Verhandl. Zool.-Bot. Ges., xliii, 1893, 501.

Portschinsky, Horæ Ent. Soc. Ross., ix, 1-180, 1875, 3 pl. and figs. (*Sarcophlia*), biology of *magnifica*, the type species, etc.; *ibid.*, xviii, 1884, 1-69, many figs., monograph on the same, 1884. All in Russian.

Osten Sacken, Berl. Ent. Zeitsch., xxxi, 1887, 17, résumé of Portschinsky's papers in English; p. 18, habits of *magnifica*.

Coquillett, Jour. N. Y. Ent. Soc., iii, 105, 1895 (*Paraphyto*); Rev. Tachin., 1897, 122 (*id.*). [Johnson, Psyche, xix, 103, 1912.]

This genus was separated from *Sarcophila* by its authors on characters which seemed very slight except as to the arista, which was said to be pubescent in *Wohlfahrtia*, short-pilose in *Sarcophila*. I doubted the validity of the genus until quite recently (and hence referred *opaca* to *Sarcophila* in Ent. News, xxiv, 215, 1913): Mr. Coquillett in 1910 (Type Spe-

cies, Proc. U. S. N. M., 620) held the same opinion. After examining a pair of the European *Sarcophila latifrons* in Professor Melander's collection, I see that *Wohlfahrtia* is very distinct from that genus, in which the bucca is narrow, the front not protuberant, and the head of entirely different shape, not to speak of other differences.

Brauer and von Bergenstamm included two species in the genus, *Sarcophila magnifica* and *meigenii* of Schiner; in the third paper mentioned above, they named the former as type. In the generic description, they attribute two pairs of orbital bristles to the male in both species; in one male of *magnifica* in the Hough collection there is only a single orbital pair, and in two males of *meigenii* (all these are European, presumably named by Strobl) there are none, as in our North American species. As Professor Bezzi has pronounced one of our species identical with *meigenii*, it is evident that an error was made in the original generic description.

Generic characters: Front and epistoma produced, giving the head a rather square outline in profile; front wide in both sexes, but more so in the female: third antennal joint not much longer than the second (except in the European *W. maxima*): arista pubescent: bucca high; parafacial with a few small hairs not in rows; ocellars and outer verticals present in both sexes; back of head with only black hairs.

Thoracic chaetotaxy (*magnifica*, from specimen in the Hough collection): ps dc 4; ant dc 3-4; ant acr about 4 pairs present; post acr 2 pairs large in male, one in female; hum 3; posthum 2; prs 1 and an inner very small; stpl 2 and a small below the front one; scutellum with 4 marginals, the fourth pair close together, no small apicals between them; subapicals, 2 rather large on one side and one on the other in the specimen; pa 2; sa 2.

Abdomen densely, uniformly pollinose, with permanent black shining or subshining spots in three longitudinal rows.

Wing as in Sarcophaga; third vein hairy; third costal segment longer than fifth and sixth together.

Hypopygium inconspicuous, turned under the abdomen.

The type species is in habit, according to Osten Sacken, the European analogue of our North American Screw-Worm Fly, *Chrysomyia macellaria* F., its larva frequently getting into the sores of animals and not rarely attacking man, in Eastern Europe.

Table of Species.—Males.

Western species, the abdomen mostly pollinose, its black spots small

No. 2. *meigenii* Schiner.

Eastern species, the black spots large and confluent, the pollinose part not very conspicuous

No. 3. *vigil* Walk.

Several other species assigned to Paraphyto by Coquillett do not belong to Wohlfahrtia; the types appeared to the writer to belong to Dexiid genera, hence are not further considered here. But the type of Paraphyto undoubtedly belongs to Wohlfahrtia.

No. 2. *Wohlfahrtia meigenii* Schiner.

Schiner, Fauna Austriaca, Dipt., i, 507 (*Sarcophila*).—Europe.

Meigen, Syst. Besch., v, 17, pl. xliii, f. 9, female (as *Sarcophaga ruralis* Fall.). [Schiner.]

Portschinsky, Horæ Soc. Ent. Ross., xviii, pl. ii (*Sarcophila*).

Megnin, *ibid.*, xv, v (*Sarcophila ruralis*).

Brauer und von Bergenstamm, Zweifl. Kais. Mus., iv, 123; vi, 165.

Villeneuve, Bull. Soc. Ent. France, 1900, 363 (*ruralis*).

Coquillett, Revis. Tachin., 1897, 122 (*Paraphyto opaca*).—Colo. and New Mexico.

Johnson, Psyche, xix, 103, 1912, notes; probable syn. of *opaca*.—Colorado and Utah.

F. H. Snow, Kans. Univ. Sci. Bull., ii, 344, oc. in Arizona (*Paraphyto opaca*).

Aldrich, Ent. News, xxiv, 215, oc. on flowers at Brigham, Utah (*Sarcophila opaca*).

The synonymy of *Paraphyto opaca* rests upon the authority of Professor Mario Bezzi, of Turin, Italy, to whom North American specimens were sent by the writer; he reported them to be identical with *Wohlfahrtia meigenii* (letter, June, 1915).

Male. Front .330 of head (average of five,—.319, .321, .326, .337, .349); parafrontals and parafacials broad, silvery pollinose, glistening; frontal stripe broad, its upper part glistening and hardly distinguishable from the parafrontal; frontal bristles not diverging below, reaching the base of the second antennal joint; transverse impression and middle of face reddish; antennæ red, third joint blackish apically, not much longer than the second, and reaching more than two-thirds of the way to the vibrissæ, which are at the oral margin; palpi yellow; bucca about four-fifths the eyeheight.

Thorax with thin gray pollen and three ill-defined black stripes; chaetotaxy as in *magnifica* (see generic description) except in the following points: ps dc 3, but room for another behind the suture; 1 pair prsc; prs 1; posthum 1 or 2; sc with 1 pair subapical, which as in *magnifica* might be considered discal.

Abdomen with three rows of shining black spots on densely pollinose ground; the pollen extends only to the edge, leaving the venter shining; first and second segments with only lateral bristles; third and fourth with an interrupted marginal row; fifth sternite not divided, yellow, at the middle of the hind edge a slight protuberance.

Hypopygium black: first segment pollinose at base, shining at apex, with a row of bristles near base; second segment shining, globose, not bristly. Forceps black, nearly straight in profile; from behind they are well separated but not divergent; accessory plate blackish, elongated, with a wide, bare, rounded free end farther forward than usual, beside the penis; posterior clasper yellow, very short and low, bent back but the tip curved forward, ordinarily quite invisible; anterior clasper yellow, erect and curved forward, the

blunt tips ordinarily lying between the arms of the penis like a part of that organ; the claspers and penis seem to coalesce at base, and all lie deep in the groove of the under side of the hypopygium. Penis with but one segment, yellow, simple, much like that of *Sarcophaga communis*; it has a pair of conspicuous straight black anterior plates.

Legs black, middle femur with comb; middle tibia with two bristles on the outer front side, and with long villosity in the inner, which is strikingly long at the very tip; hind tibia also with villosity, but not so long at the tip; both of these tibiae are curved, and the hind femur is thickened and curved.

Female. Front .413 of head (average of three, —.405, .412, .421); Genital segment brown and shining above, the orifice transverse. Femora and tibiae simple, but the hind femora are a little curved.

Length $7\frac{1}{2}$ to 14 mm.

Five males and three females: four males and three females were taken at Moscow, Idaho, by the writer, some on flowers of goldenrod and parsnips, at dates from June 24 to Sept. 4. The other male is from Koehler, New Mexico (W. R. Walton).

Coquillett's type of *Paraphyto opaca* is in the National Museum, and was examined by the writer.

Type.—In the Imperial Museum, Vienna.

No. 3. *Wohlfahrtia vigil* Walk.

Walker, List of Dipterous Insects in the British Museum, iv, 831 (*Sarcophaga*).—Nova Scotia.

Coquillett, Jour. N. Y. Ent. Soc., iii, 105 (*Paraphyto chittendeni*); Revis. Tachin., 122 (id.).—N. Y.: Michigan.

My attention was called to Walker's *Sarcophaga vigil* by C. W. Johnson, who had identified it; as I had just been studying the type of *Paraphyto chittendeni*, it was easy to detect the synonymy. Walker's description applies very well, and the species is so unique in coloration as to leave little doubt of its correct identification.

It differs from *mcigenii* in practically nothing but the more broadly expanded shining black spots of the abdomen, which coalesce wholly or partly. The figure shows the extreme of coalescence, but even the minimum that I have seen looks very different from the western form. One male has the fourth abdominal segment and hypopygium mostly red. The number of ps de evidently varies from three to four, but the fourth (just behind the suture) is small if present. The front measures in the males .333, .350, and .353 of the head (average .345, slightly more than in *mcigenii*), and in the females .417 and .424 (average .420).

Three males and two females: two males and one female are from Ludlowville, New York, in the Carnegie Museum; one male and one female Rochester Junction, N. Y., collected by M. D. Leonard.

Type.—Male, in British Museum.

Vigil antedates *mcigenii* by thirteen years (1849, 1862), and would replace the latter if it were ever shown that they are one species. The distinct geographical boundaries, and the apparent absence of the *vigil* form in Europe, added to the obvious color characters, seem to assure the distinctness of the species.

Genus JOHNSONIA Coq.

Coquillett, Proc. Acad. Nat. Sciences Phil., 1895, 316, female.

Head rather rounded, front broad in both sexes, with one proclinate orbital bristle in each; frontals only four or five, strong and somewhat reclinate, the rows not diverging below and reaching hardly to the base of the antennæ; ocellars minute; frontal stripe narrow, especially anteriorly; antennæ of ordinary size, third joint about twice the second, arista as usual in *Sarcophaga*, long-plumose for more than half its length; bucca narrow, a long turned-down bristle directly below the eye near its lower edge; palpi normal, proboscis short, eyes bare.

Thorax with long bristles and short, sparse hair. ps dc 3 large; ant dc 2 or 3, the hindmost large; ant aer are merely hairs, but somewhat noticeable from the absence of other hairs; prsc 1 small or none; pa 2; sa 2; inta 2; prs 1 large; npl 3; stpl 3; scutellum with two large marginals in both sexes, no apicals nor sub-apicals.

Wings with first, third and fifth veins hairy; costal spine small; third costal segment hardly half the fifth; first posterior cell closed and short petiolate, the petiole ending not very far before the tip of the wing.

Type.—*Johnsonia elegans* Coquillett, the only

Table of Species.—Males.

Abdomen and legs reddish-yellow, bristles moderately long (Florida, Mexico)

No. 4. *elegans* Coq.

Abdomen and legs black, bristles exceedingly long (Peru)

No. 5. *setosa* n. sp.

No. 4. *Johnsonia elegans* Coq.

Coquillett, Proc. Acad. Nat. Sci. Phil., 1895, 316, female.
St. Augustine, Fla.

Male. Front .311 of head at extreme vertex, where it is narrowest; at the middle of the front it is subparallel for some distance, and measures .355 of head; parafrontals and parafacials silvery pollinose, wide apart at the oral margin; palpi yellowish brown; antennæ red, third joint blackish on apical half, reaching four-fifths of the way to the vibrissæ, which are wide apart at the oral margin; palpi yellowish brown; bucca one-sixth the eyeheight, the downward-curving bristle at its middle apparently not well developed in the specimen; back of head with three widely separated rows of coarse black hairs and only one inner row of pale ones; outer vertical absent.

Thorax black in ground color, with gray pollen, on which are two broad, indefinite brown stripes; no prescutellars.

Abdomen in bad condition in the specimen; the ground color is brown, with thin gray pollen in part, much of the dorsal surface shining; first segment with only lateral bristles; second with a stout, erect median marginal pair; third and fourth with a marginal row, the latter except the base yellow.

Hypopygium small, yellow; first segment apparently with one or two pairs of bristles; forceps dark brown, short and nearly straight, rapidly tapering; from behind they are not divergent; accessory plates yellow, triangular, the free angle somewhat drawn out; claspers brown, long, slender and strikingly curved forward, but not apically hooked, the hind one with a long hair; penis small, with a distinct, yellow basal segment; distal segment brownish-yellow, widening backward and bearing at apex on each side two black plates, one behind the other, the front one like a stout claw.

Legs brown, middle femur without comb, middle tibia with two bristles on outer front side, hind tibia not villous; tarsi black, all claws moderately elongated.

Female. Front .336 of head at vertex, which is the narrowest part, orbital as in the male; ocellar small but distinct; no outer vertical; palpi yellow; bucca one-fifth the eyeheight, with a distinct bristle directed downward on its middle. Abdomen shining reddish-yellow, a little pollinose near base; genital segments retracted, yellow, without noticeable characters. Femora and tibiae concolorous with abdomen.

Length $4\frac{1}{2}$ mm.

One male, one female; the former is from Tampico, Mexico, Oct. 29, 1894, labeled "6448-57 Townsend. Par: on *Succinia brevis* on orange"; in the National Museum Collection. The female is from St. Augustine, Fla., collected by C. W. Johnson, and loaned by him for study. There are other specimens in the National Museum, seen but not studied by the writer.

The described male is a little darker in color than the female, and had not the latter been available for comparison I would have hesitated to identify it as this species.

Type.—Female, in the U. S. N. M.

No. 5. *Johnsonia setosa* n. sp.

Male. Front .319 of head (average of two.—.317 and .321); strikingly similar in all structural characters to *elegans*, but decidedly black throughout, with only the following parts yellow: tip of second antennal joint and basal half of the third; apical half or more of the fourth abdominal segment; and parts of the hypopygium and genitalia.

In the chaetotaxy there are a few slight differences. The back of the head has four irregular rows of black hairs: the prescutellars are distinct but small; the second abdominal segment has a fairly complete marginal row of bristles, the median pair, however, are the largest.

The abdomen, besides being quite black in ground color is in some lights completely pollinose and hardly tessellated; in other lights, however, it is largely shining.

Both segments of the hypopygium are infuscated above, but red on the sides; the forceps and claspers seem exactly as in *elegans*, the penis apparently differing a little apically. But the genitalia of one specimen have been destroyed, and those of the other are not in good condition for exact study.

Length $5\frac{1}{2}$ mm.

Two males from Peru, collected by H. A. Parish, in the author's collection.

Holotype.—Male, No. 20486, U. S. N. M.; paratype in author's collection.

CAMPTOPS New Genus.(καμπτός, *curved*; ὄψις, *face*)

Front broad in both sexes and with a single orbital in both, which is proclinate; frontals descending only to base of antennæ; vibrissæ much above edge of mouth and much approximated to each other, narrowing the clypeus (of Brauer); the suture runs close to the facialia down to the level of the vibrissa, where it disappears; parafacials with scattered minute hairs in female, in male they are barely discernible; antennæ three-fourths the face, third joint twice the second, arista with very short penultimate joint, the last or main one thickened at base, of ordinary length, with rather thick and long plumosity for two-thirds its length; bucca almost half the eye; palpi normal; proboscis small, short.

Thorax with the following chaetotaxy: de 3 behind, 2 before; 2 hum; 1 intrahum; 1 presutural; 2 npl; 2 stpl; 1 intraal; 2, postal; 3 supraal; 4 hypopl; no ant acr; prescut small; scutellum with 3 marginal large pairs, the basal of these on the upper surface, the others quite equally spaced around the apex, and the middle pair might be called apical, as there are no small ones between them.

Abdomen in male with large erect median marginal pair of bristles on first segment, absent in female; second segment with median marginal pair, third and fourth with marginal row; no discals; hypopygium of Sarcophagid type.

Wing like Sarcophaga; third vein with only a few hairs at base, first bare; fourth segment bent at a right angle, not appendiculate, ending not very far before the apex (half the fifth costal segment).

Type.—*Camptops unicolor* n. sp.

No. 6. Camptops unicolor n. sp.

Male. Front .33 of head, a little over one-third of this occupied by the red stripe; parafrontals and parafacials whitish pollinose, inclining to silvery; fa-

cial impression red, which color spreads broadly up and down and runs behind the eye; antennae and palpi red, the latter rather small; back of head bulging, with two principal rows of black hair and very scanty pale beard; lateral verticals barely a little larger than adjacent hairs.

Thorax and abdomen uniform smooth gray pollinose with a tinge of yellowish; mesonotum with three brown pollinose stripes, the central one more slender.

Hypopygium small, yellow, opaque like abdomen; first segment with a few hairs, two of which have the size of small bristles; second segment with a few hairs; forceps brown, straight, rather evenly and rapidly tapering, on the back pollinose and with recumbent hair, at tip slightly hooked, accessory plate yellow, small, slightly elongated; posterior clasper yellow, slender and strongly curved toward tip and with some long hairs on the front side; anterior clasper shorter and stouter but thin in profile, not hooked, yellow; penis with short and indistinct basal segment, the distal one large, globose and complicated. In the side view there are two chitinous processes extending forward in a membrane which is the outer wall of a swollen, whitish, half-transparent body, which extends forward into a second swollen mass, evidently of soft texture; on the posterior side or the back of the segment is a complex plate of chitin, attached at its hind corners to the more distal of the two processes, and in its middle behind giving way to a concavity filled with white membrane; fifth sternite greatly retracted, invisible.

Legs yellow, pollinose, the tarsi distinctly blackened from the base; bristles of all femora sparse; middle ones not with combs; middle tibiae with two or three small bristles on outer front side; hind tibiae on inner side with just a few long, erect villous hairs, behind with two long, divergent bristles at the middle, and below these one on the outer front side.

Wing with yellowish veins; no costal spine; third

costal segment half the fifth; hind crossvein quite straight.

Female. Front .38 of head; lateral vertical small; thoracic chaetotaxy as in male, including scutellum. General color as in male, but pollen less dense, the abdomen somewhat mottled above; front femora in some cases rather gray or dark in ground color.

Length of male 7 mm; of female 8 mm.

Six males, ten females, Opelousas, La., March and April, 1897, in the Hough collection. They bore the label "*Sarcophilodes nigrocaudata* Bigot." in Dr. Hough's handwriting. The evident intention was to identify them as Bigot's *Megerlea rufocaudata*, referred by Coquillett with a doubt to this genus. Brauer after that time (Sitzungsber. Kais. Akad., cvii, 22) published some notes on the type, which is from Mt. Hood, Ore., and indicated that it must be quite different from the present species.

Holotype and Allotype.—In the Hough collection. Paratypes in U. S. N. M., male and female, No. 20,487.

Genus SAROTHROMYIA B. and B.

Brauer und von Bergenstamm, Zweifl. Kais. Mus., v, 365, 1891, and vi, 160, 1893.

Head of very peculiar shape, the lower edge very long and straight, the metacephalon built out behind in a lobe partly separated by a groove. Front wide in both sexes, with one orbital in the male, two in the female, the reclinate uppermost frontal in line with them and simulating another orbital, and four or five other frontals, which hardly extend below the base of antennæ; ocellars strong. Parafacials wide, with scattered minute hairs, those along the facial impression in a delicate row. Outer vertical present in both sexes. Front protuberant at base of antennæ. Antennæ as in *Sarcophaga*, the plumosity of the arista not quite so long. Thoracic chaetotoxy exactly as in *Sarcophagula occidua*, except that there is a small third stpl, and the second marginal scutellar pair are

longer and closer together, might be considered apical. Venation as in *Sarcophagula*, but the hind cross-vein a little beyond the middle between the front one and the bend of the fourth vein.

Type.—*Sarcophila femoralis* Schiner, the only species mentioned by Brauer und von Bergenstamm.

No. 7. *Sarothromyia femoralis* Schiner.

Schiner, Novara Reise, 315, 1868, female (*Sarcophila*).—Brazil.

Brauer und von Bergenstamm, Zweifl. Kais. Mus., v, 365, 1891, types and male; vi, 160, 1893, same.

Johnson, Proc. Acad. Nat. Sci. Phil., 1895, 335, oc. at Lake Worth, Fla.; Psyche, xv, 1908, 76, oc. in Brahamas, Jamaica, and Florida; Bull. Amer. Mus. Nat. Hist., xxxii, 75, oc. at Lake Worth, Miami, and St. Augustine, Fla.

Male. Front .352 of head (average of two.—.344 and 359); head cinereous pollinose, not silvery; antennæ black, third joint twice the second and reaching four-fifths of the way to the vibrissæ, which are very stout, slightly approximated, and almost at oral margin; palpi long, somewhat clavate; proboscis black, rather short, with small labella; bucca one-fourth the eyeheight; back of head with several rows of black hairs, none pale except a few below the neck.

Thorax with dense, rather uniform pollen of whitish-gray color, the stripes indistinct even when viewed from behind, bristles large.

Abdomen concolorous, with black median stripe and a changeable one each side; second segment with long, appressed black hairs on hind edge; third with row of 8 bristles mixed with a few of the same hairs; fourth with row of about 16.

Hypopygium black, gray pollinose, strikingly similar to that of *Sarcophagula occidua*. First segment with row of four small bristles before hind margin; second with two large and several small bristles; forceps black, slender and tapering, straight; accessory plate very large, suddenly narrowing to a distal prolongation which is wider, shorter, and more

bent forward than in *occidua*; claspers as in that species; penis with the tubular central part more swollen and shorter, and the terminal process much larger. Fifth sternite only showing on the middle, apparently undivided, with black short brush.

Legs black, femora rather stout; middle femora without combs, middle tibia with an irregular row of bristles on outer front side, one of which is large; hind tibiae without villosity. Front tibiae and tarsi with peculiar erect hairs forming a fringe on the upper and outer side, the tarsi a little swollen and the segments somewhat shortened, the claws and pulvilli shorter than in the other tarsi.

Wing hyaline; veins yellow toward base, third with hairs almost to small crossvein; a small costal spine; third costal segment half as long as fifth.

Female. Front .369 of head (average of two,—.361 and .376). Genital segment black, retracted. Front tarsi normal.

Length, 5 to 6 mm.

Two males, two females, Nassau, Bahamas, Dec. 11 and 14, 1912 (F. Knab), from the National Museum.

Type.—In the Imperial Museum, Vienna.

The females appear to be indistinguishable from those of the following variety; they are merely associated from being collected together. As Schiner described only females originally, the identification depends on Brauer and von Bergenstamm, who described the fringes of the male front tarsi. Schiner's description of the pollen as yellowish in color would make the identification very doubtful if Brauer and von Bergenstamm had not had his types for comparison. Possibly Schiner was misled by the wide front and orbital bristles, and overlooked some males in his material.

No. 8. *Sarothromyia femoralis* var. *simplex* n. var.

Differs from the typical form only in having plain front tibiae and tarsi in the male. The material examined shows no intermediate forms. I cannot separate the females, except by associating them with males taken at the same time or place.

Four males, three females, Miami, Florida, Nov. 8 (C. H. T. Townsend), in the National Museum; one female, Ft. Worth, Fla., collected by Mrs. Slosson, probably belongs here.

Holotype.—Male, No. 20,488, U. S. N. M.

Allotype.—Female, No. 20,488, U. S. N. M.

Genus **SARCOPHAGULA** Van der Wulp.

Van der Wulp, Tijdsch. v. Ent., xxx, 173, 1887; Biologia, Dipt., ii, 289, 1896.

Brauer und von Bergenstamm, Zweifl. d. Kais. Mus., vi, 164, 1893.

Front wide, about one-third the head in both sexes, the middle stripe as wide as one side. Frontals reduced to four pairs, not divergent, the anterior a little below the base of the antennæ. One large orbital present in both sexes, the posterior frontal might be considered a reclinate orbital, as it is far from the next frontal and much closer to the orbit. Outer vertical present in both sexes. Parafacial narrow, with a single row of minute hairs. Antennæ as in *Sarcophaga*, but the third joint only twice the second; arista long-plumose on basal half, the last joint much thickened at its base. Vibrissæ not approximated, almost at oral margin.

Fourth vein with rounded, oblique angle, the first posterior cell open a little before the apex; third costal segment very short; hind crossvein rather erect, usually at about the middle between the anterior crossvein and the bend.

Type of genus, *Sarcophaga occidua* Fabricius, by designation of Coquillett, Proc. U. S. N. M., xxxvii, 602, 1910.

No. 9. *Sarcophagula occidua* Fabr.

Fabricius, Ent. Syst., iv. 315, 1794; Syst. Antl., 288, 1805 (both *Musca*).—West Indies.

Wiedemann, Auss. Zweifl. Ins., ii, 368, 1830 (*Sarcophaga*), type redescribed.

Van der Wulp, Biologia, Dipt., ii, 289, pl. vii, f. 12, 1896 (*imbecilla*, *canuta* and *tenuis*).—Mexico.

Williston, Trans. Ent. Soc. Lond., 1896, 361, pl. xii, f. 120 bis (*Sarcophilodes puella*).—St. Vincent, W. I.

Coquillett, Proc. U. S. N. M., xxii, 254 (*Sarcophaga*), occurrence in Porto Rico.

A very small gray tropical species.

Male. Front .358 of head (average of five,—.354, .354, .355, .359, .367); parafrontals and parafacials gray, not silvery; frontal stripe red anteriorly; antennæ black, tip of second joint and base of third reddish, the third reaches three-fourths of the way to the vibrissæ; palpi and proboscis black, ordinary; bucca about one-sixth the eyeheight.

Thorax yellowish gray pollinose, with three black stripes when viewed from behind; ps dc 3; ant aer 0; prese very small; postalar 2, the outer very small; intra-alars 2; supra-alars 1 large and two minute; hum 2; intrahum 1; presutural 1 large; stpl 2; npl 2; scutellum with 2 marginals and 1 discal, no apicals.

Abdomen black with changeable yellowish-gray pollen, which shows three shifting black stripes: first segment with only marginal bristles; second with some long depressed hairs along the margin, the middle pair of which are usually more erect and have the size of small bristles; third with a row of 6; fourth with a row of ten.

Hypopygium black, opaque; first segment large, declivous, with a row of four bristles near tip; second segment bent forward, with two large ascending and divergent bristles behind; forceps black, straight and tapering to a slender point, not hooked nor divergent; accessory plate brown, very large and wide, with a long slender tip which has several distinct barbs on the front side; posterior clasper brown, with slender

hooked tip and a long hair on the front side; anterior clasper brown, moderately slender and hooked; penis with basal joint indistinct, the distal rather tubular, swollen and black in the middle, with a tongue-like process protruding from the end, and a brown expansion attached to the front side. Fifth sternite showing very slightly.

Legs black; middle femora without comb; middle tibia with two bristles on the outer front side, one of them large; hind tibia of male not villous; claws and pulvilli all short.

Wings hyaline; costal spine small; third vein with rather long hairs nearly to crossvein; third costal segment hardly half the fifth.

Female. Front .382 of head (average of five,—.360, .369, .391, .394, .397). Scutellum with a small marginal pair between the two large ones. Genital segment black, much retracted.

Length 2.8 to 4.4 mm.

Numerous specimens of both sexes: 56 are from Havana, Cuba. (C. F. Baker); 5 Key West, Fla., Jan. 1, 1869 (C. V. Riley); 2 Porto Rico (Busck), determined by Coquillett as *occidua*; 1 Aguada Pas, Cuba (Sturtevant); 2 Panama, P. R.; 1 Jamacia (Hough); 1 St. Augustine and 1 Lake Worth, Fla. (Hgh.); 1 Miami, Fla.

The synonymy of Van der Wulp and Williston is from their descriptions only.

Type.—Probably in the Imperial Museum, Vienna, if still in existence.

CAMPTOPYGA New Genus.

(καμπτός, curved; πύγη, the hinder end)

Rather bare, black, medium sized species, with large, bulky hypopygium; the head rather convex behind, vibrissæ at oral margin and almost in the lower line of the head; face vertical; frontals only six in a row, but reaching to middle of second antennal joint, the last strongly diverging; one macro-

chæta at lower edge of parafacial next to eye, just above the facial impression; above this bristle only a few very small hairs; antennæ nearly as long as the face; arista long and slender, the penultimate joint as long as wide, the last joint somewhat thickened at base, with very short plumosity for hardly half its length, the hairs but little longer than the greatest thickness of the arista; palpi normal; proboscis short, fleshy; eyes bare. Thorax with rather few and strong bristles, nearly bare otherwise, the usual small hairs few and scattered; the scutellum has but four bristles, —two pairs of marginals.

Type.—*Camptopyga aristata* new species.

No. 10. *Camptopyga aristata* n. sp.

Male. Front of considerable width, .260 of the head (average of three,—.252, .257, .271); the stripe velvety black, wider than either side; face and front with plumbeous pollen, not glistening when viewed from below; antennæ black, third joint one and two-thirds times the second, reaching over five-sixths of the way to the vibrissæ; facial ridges bare; bucca one-fifth the eyeheight, a little bristly along mouth; palpi and proboscis black; back of head with three rows of black hairs and not much pale beard; outer vertical bristles large, more than half as long as the inner.

Thorax gray, thinly pollinose, three black stripes on dorsum: 3 ps dc; 3 stpl; no ant aer; prese very weak: 1 prothoracic; 1 on lower anterior corner of mesopleura; 3 humeral; 2 ant dc (one small).

Abdomen blackish, club-shaped; when viewed from behind the second, third and fourth segments each have a row of four silvery spots lying against the preceding segment, very distinctive; first and second segments with only a single long lateral bristle each side; third with a very large pair of median marginals, and two lateral each side; fourth with marginal row of 12.

Hypopygium large; first segment brown-black, with row of 6 stout bristles across hind part; second

brown-black, very large, with four large and some smaller bristles directed backward and curving upward; fifth sternite broad and conspicuous, black, with only a linear fissure, forming a sort of hood for the genitalia in repose; forceps black, smallish, evenly incurved and tapering in profile, the tips not divergent; hind claspers long and slender, curved; front claspers heavier, darker and more strongly curved; penis blackish, slender nearly to the tip, which is bent squarely forward and has several small anterior processes.

Legs very black; middle femur without combs; middle tibia with an increasing row of three bristles on outer front side; hind tibia not villous.

Wings yellowish; costal spine very long; third costal segment shorter than the fifth; fourth vein with square bend, either slightly rounded or provided with a slight appendix, ending at a distance before the extreme apex which rather exceeds one half the fifth costal segment; third vein with stout hairs to the crossvein; first vein bare.

Female. Front .331 of head, with two normal orbitals; second abdominal segment with a pair of erect median marginals; otherwise exceedingly like the male throughout; genital segment black, retracted, with transverse aperture.

Length of male 6, of female 5 mm.

Five males and one female: one of each sex from Tifton, Ga., Oct. 6, 1896 (Hough coll.); one male from Opelousa, La., June, 1897 (Hough coll.); one male Alta Loma, Texas, Dec. 29, 1914 (Bishopp, No. 3521); one male Anglesea, N. J. (C. W. Johnson); the other male Slidell, La., July 2-6, 1905 (Prof. Jas. S. Hine).

Holotype.—Male, No. 20,489, U. S. N. M., from Alta Loma, Tex.

Allotype.—Female, No. 20489, U. S. N. M.

Genus **AGRIA** Robineau Desvoidy.

Robineau-Desvoidy, *Myodaires*, 1830, p. 376, established the genus with the following definition: "Antennis paulisper incrassatis, cheto villosa; abdomen punctatum." He explained that he uses the term villosa as meaning subplumose. He described six species, all but one of which are regarded as synonyms of *Musca affinis* Fallén by Bezzi in vol. iii of the Palaearctic Catalogue: the sixth he recognizes as a Sarcophaga; *affinis* thus becomes the type of the genus, and is so designated by Coquillett, *Type-Species*, 1910. Macquart, *Hist. Nat. Dipt.*, ii, 229, 1835, recognized *affinis* as belonging to this genus and as being the prior name for at least one of Desvoidy's species; he however included a number of diverse forms which later caused some confusion in restricting the genus.

Affinis occurs in North America, having been identified for Dr. Parker by Dr. Böttcher, and for me by Parker. Its principal generic characters are as follows:

Front in male narrowed in front of the ocelli, in female rather wide, in both with the median stripe wider than the side; in the female the parafrontal has numerous rather large hairs, continuous with those of the parafacial, which are much the same as in Sarcophaga. Frontals about 12, widening gradually below, reaching nearly to middle of second antennal joint. Antennæ reaching nearly to oral margin, the arista with short and rather dense plumosity extending about half its length, vibrissæ at oral margin; eyes bare; palpi normal, proboscis short and fleshy; occiput without any pale beard. Fourth vein at bend with a square angle and a slight fold; its end is as far before the apex as half the length of the fifth costal segment. Hypopygium large, mostly occupied with the first segment, which has a pronounced hump before its middle, forming the apex of the abdomen in profile; a row of bristles before the hump; second segment small.

No. 11. *Agria affinis* Fall.

Fallén, Acta Holmiæ, 1816, 230: Dipt. Suec. Muscides, 1820, 39 (both *Musca*).

Pandellé, Rev. Ent., xv, 173 (*Sarcophila biclunis*), 1896.
Bezzi, Pal. Kat., iii, 469, bibliography, etc., 1907.

Male. Front narrowed below ocelli, .124 of head (average of four,—.117, .120, .125, .132); face and front silvery, hairs of parafacials distinct but varying in number; antennæ blackish, third joint twice the second, reaching four-fifths of the way to the vibrissæ; bucca nearly one-third the eyeheight; outer vertical not differentiated.

Thorax blackish, but when viewed from behind gray with three black stripes, the middle of which extends to the end of the scutellum; 3 ps dc; 3 stpl; ant acr 2 pairs, large; prsc rather large; hum 3; npl 2; scutellum with three marginal pairs and a smaller discal, no apical (or the inner marginal might be regarded as a very large apical pair).

Abdomen rather silvery pollinose; viewed from behind there is a median black stripe and a large black spot each side on segments two, three and four: first and second segments with only lateral small bristles; third with a small median marginal pair; fourth with marginal row of about 18.

Hypopygium black; segments as described above; forceps black, very short and blunt; accessory plates developed into a large yellow forceps-like organ on each side, as long as the true forceps; posterior claspers yellow, very low in position; anterior ones upright, with a hook on the posterior distal angle, the anterior point not much curved; penis mostly black, very thick and short, with a snout-like process in front turning down toward the base almost to the body of the hypopygial segment.

Legs deep black; middle femora with comb at tip below on hind side; middle tibia with two smallish bristles on outer front side; hind tibiæ not villous; front basitarsus with some bristles below at base.

Wings hyaline; hind crossvein nearly parallel with wing-margin; first vein bare, third bristly almost to crossvein; no costal spine; third and fifth costal segments equal.

Female. Front .308 of head, the middle stripe three times as wide as one side, two orbitals as usual, outer vertical well developed; scutellum bristled as in male; genital segment black, with a dense row of small bristles at edge, showing another complete end of a segment within, and another within this of which the sternite is modified into a short, blunt larvipositor: the first sternite of the abdomen is fully as long as the first tergite.

Length, 7-8 mm.

Seven males, one female: one pair North Mt., Pa., June 7 and Sept. 1 (no collector); two males, North Saugus, Mass., May 18, 1911 (H. E. Smith); one male, Las Vegas Mts., N. M., 11,000 ft., June, 1901 (Cockerell); two males, Victoria, B. C., bred from larvae of *Fanessa antiopa* by J. R. Anderson, in the Canadian National Collection: one male, White Mts. [N. H.] (Morrison), in the C. V. Riley collection, U. S. National Museum.

Type.—Probably in the Academy of Sciences in Stockholm.

HARBECKIA New Genus.

The principal generic characters are the protuberant front, short fronto-orbital rows, rather strong parafacial bristles in a long diagonal row, vibrissæ at oral margin but much above lower line of head, wide bucca, strong acrostichals, and the four equally-spaced and equally large bristles on the posterior margin of the scutellum in both sexes. The hypopygium of the male is Sarcophagid in type, while the protuberant front and strong development of the bristles suggest a Dexiid relationship. Against the latter on the other hand might be

urged the small number of bristles on the scutellum, and the partial plumosity of the arista.

Named in honor of H. S. Harbeck, the Philadelphia dipterist, who placed at my disposal for the present work the riches of his private collection.

Type.—*Harbeckia tessellata*, n. sp.; according to Mr. W. R. Walton, who looked up the matter for me, *Brachycoma pubicornis* Coq. (Proc. U. S. N. M., xxv, 116) is congeneric. It differs chiefly in not possessing median marginals on the second abdominal segment.

No. 12. *Harbeckia tessellata* n. sp.

Male. Head rather convex behind, front prominent, face vertical, lower line of head sloping up considerably to meet it. Front narrow, .114 of head (average of two,—.095 and .132); middle stripe brown, much wider above than parafrontals, the latter and the parafacials blackish, with a thin coating of lustrous gray pollen; frontals 10 to 12, hardly reaching base of antennæ and not strikingly divergent below; parafacials with a row of rather strong bristles, ascending diagonally along the expanding facial impression; antennæ dark brown, third joint one and one-half times the second and reaching two-thirds of the way to the vibrissæ, which are at the oral margin though much above the lower line of the head; arista thickened at base, penultimate joint very short, plumosity shorter than in a normal *Sarcophaga* and dwindling beyond the middle, so that from a third to almost a half of the length is bare; facial ridges with small hairs extending about a third of the way up; facial impression reddish-brown, conspicuous, wide toward the vibrissæ; bucca over two-fifths of the eye-height, very bristly below; back of head and bucca blackish, with thin cinerous pollen, the former with four or five rows of black hair and almost no pale beard; outer vertical bristle quite small but larger

than adjacent hairs; palpi black, ordinary; proboscis black, very short, fleshy.

Thorax strongly bristled, subshining black all over, but when viewed from behind showing the three main stripes as in *Sarcophaga*, dark with pollinose interspaces; 3 ps dc; 3 stpl; anterior acrostichals very strong, 3 pairs; prescutellars also large, equal to the dc beside them; scutellum with three pairs of marginals, of which the basal as usual are rather on the upper edge of the margin, the other four bristles are of equal length and equally spaced around the apical part; a large discal pair also on scutellum; notopleural two large and two small.

Abdomen rather cylindrical, black with almost silvery pollen in a tessellated pattern, leaving an indistinct median black stripe and somewhat shining hind margins; second segment with a large, erect pair of median marginal bristles; third and fourth with each a marginal row of 18 or 20.

Hypopygium of smallish size, subopaque, black; first segment with a row of small bristles; second with rather numerous erect black hairs; foreeps black, quite straight and tapering, with long black semi-recumbent hair behind except apically; accessory plate blackish, ending in an acute angle; posterior clasper smaller than anterior, deeply excised in front and bearing a long hair; penis rather short and stout, the distal segment bent forward with a blunt angle behind, below it in front a pair of black projecting points and basad of these a pair of long processes rather rolled in at tip; sternites slightly decreasing in width, the fifth concealed.

Legs black, strong and bristly; middle femur with long bristles but no comb below; middle tibia with two bristles on outer front side near middle; hind tibiae without villosity.

Wings subhyaline, slightly yellowish; a large costal spine; fourth vein with rounded bend, ending moderately (but not very) far before tip, the first posterior cell rather narrowly open in the two males;

first vein bare, third with several hairs; third costal segment shorter than the fifth.

Female. Front .313 of head (average of five,—.289, .307, .309, .329, .330), orbitals present; outer verticals well developed; bucca fully half the eye-height; scutellum as in male; genital segment black, with quite long bristles, orifice rounded; middle tibiae with three bristles on outer front side; costa with two spines, one of striking size; first posterior cell usually closed in or just before the margin, sometimes as widely open as in the two males.

Length $6\frac{1}{2}$ - $8\frac{1}{2}$ mm.

Two males, Germantown, Pa., July 2, 1904, and May 20, 1905, collected by Mr. H. S. Harbeck.

Nineteen females: 12 from Germantown, Pa., in summer of 1904 and 1905; 2 from Manahawkin, N. J., Sept. 5, 1909, and July 11, 1910; 3 from Trenton, N. J., Aug. 21, 1909, and Aug. 5, 1910 (all from Harbeck; one from Melrose Highlands, Mass., June 1, 1911; and one from "N. Andover Col." Mass., July 16, 1911 (H. E. Smith).

Holotype.—Male, No. 20,490, U. S. N. M., from Germantown, Pa.

Allotype.—Female, U. S. N. M., same number and locality.

HYPOPELTA New Genus.

(ὑπο, below; πέλτη, shield)

Allied to *Camptopyga*, but differing in having no macrochaetae on sides of face and with different genital characters in both sexes.

Black species with about the usual Sarcophagid appearance; the male without orbitals, and with small ocellars and distinct outer verticals: parafacial with row of hairs near the eye below, the lower ones rather coarse; frontals diverging rapidly below, reaching as far as middle of second antennal joint; third antennal joint twice the second, with long, slender arista which is short-plumose for two-thirds its length. Vibrissae at oral margin, facialia very flat, bare except

for a few hairs below; palpi normal, proboscis short. Eyes bare.

Thoracic chaetotaxy: ps dc 3; ant dc 2; hum 3; intrahum 1; presut 1; ant acr 0; ps acr 1 (prescutellar); stpl 3; scutellum with 1 marginal and 1 apical, both long, the latter nearer to each other than to the former.

Abdomen of male very large and clubbed apically, more than in *Camptopyga*; first segment declivous, with crescent-shaped row of 8 bristles near lower border, a deep notch between the two segments, the second bulging abruptly from the suture into a hump, on which are several long, upcurved macrochaetae. First four abdominal segments short on venter, the sternites covered with erect long hair; the fifth sternite standing out abruptly as a large protuberance which opens V-shaped behind; a sixth sternite stands out in plain sight as a lobe projecting from underneath the fourth at the side of the fifth, the end of this lobe almost or quite rests upon the forecoxae in repose.

The female has the genital segment much larger than in *Camptopyga*; wing as in that genus.

Type.—*Hypopelta scrofa*, new species.

No. 13. *Hypopelta scrofa* n. sp.

Male. Front .214 of head (average of four,—.197, .217, .221, .231); middle stripe more than twice the width of one side above; parafrontals and parafacials decidedly silvery; antennae and palpi black; back of head with three rows of black hairs and only a little pale beard.

Thorax with 3-5 black stripes; the apical scutellar bristles reach to the third abdominal segment.

Abdomen black with changeable pollen; segments 2-4 with a transverse row of four silvery spots against the front margin, giving the effect of three shifting black longitudinal stripes between them; first and second segments with only one moderate lateral bristle; third with a pair of erect median marginals

and two laterals; fourth with a marginal row which extends down the sides in full strength and numbers about 24 bristles.

Hypopygium as partly described; first segment black, second red. Forceps straight, hardly at all divergent, blackish, behind with dense hair slanting back and outward; at the tip a very minute tooth. Accessory plates large, broad, anterior edge shining black. Posterior clasper long, stout, and strongly curved; anterior clasper surprisingly modified,—it is reversed in position so that it closes backward, and greatly elongated, lying inside the margin of the cavity so as to be almost invisible even basally; the greatly elongated and enlarged tip is so far forward that it cannot be seen in ordinary spread specimens, but the hypopygium must be taken apart to reveal it; it is as large as the forceps of most species. A row of reddish hairs along its more slender basal part are plainly visible anterior to the hind clasper. Penis with a long, swollen, bright red basal segment, narrowing to a neck where it joins the distal one, the junction close and not hinged; distal segment with a rather small central mass, dorsally dividing just beyond this into two long thin plates, which diverging slightly curve over the end and partly conceal the inner parts: these are several incurved processes, basad of which is a flat transverse plate with three lobes; caudad of this a brown thin margin expanded from the side of the segment.

Legs black; middle femora without comb; middle tibia with two bristles on outer front side; hind tibia without villosity.

Wings subhyaline; costal spine large; third costal segment much shorter than fifth; the distance of the tip of the fourth vein from the extreme apex is about two-thirds the fifth costal segment.

Female. Front .312 of head; palpi slightly elevate; genital segment deep red, conspicuous, not retracted, with a fringe of stout bristles; below it has

a row of appressed black hairs at base and another in middle (sixth sternite coalesced with it!).

Length $6\frac{1}{2}$ - $8\frac{1}{2}$ mm.

Thirteen males and three females; seven males are from LaFayette, Ind., collected by the author; two males and two females Opelousas, La., in the Hough collection; one male Tifton, Ga., also in the Hough collection; one male each from Georgesville and Kent, Ohio, in Professor Hine's collection; one male Florida (C. W. Johnson); the third female is in the Hough collection, collected in Wisconsin by Professor Wm. M. Wheeler.

Holotype.—Male, No. 20,491, U. S. N. M., from LaFayette, Ind.

Allotype.—Female, No. 20491, U. S. N. M., from Opelousas, La.

NOTOCHÆTA New Genus.

(*νωτος*, back; *χάιτη*, bristle)

Eyes bare; front not very prominent, narrow in male; upper frontals strong, several of the upper pair reclinate in a decreasing degree, the rows moderately divergent below and reaching almost to the middle of the second antennal joint; third antennal joint long, arista long and with very long plumosity almost to its tip; vibrissæ at oral margin, not approximated; hairs of parafacials minute or wanting; palpi normal; proboscis short, fleshy; back of head nearly flat.

Thorax with uncommonly long bristles, as follows: Ps dc 2 (the anterior not much more than half way to the suture, usually a coarse hair close in front of it); ant dc 2 large; ant aer 0; prsc 1 small; hum 2; npl 2; inthum 1; prsut 1 large; pa 2; inta 2 or 1 (the anterior small or absent); supa 3 (the middle one large); stpl 3; scutellum with 3 or 4 marginals (only the first and last large), one small apical, and sometimes a minute subapical.

Abdomen largely shining; marginals only on third and fourth segments, no discals; hypopygium small.

Legs without villosity, not very bristly.

Wings without costal spine; third costal segment shorter than fifth; first vein bare, third hairy near base; apical cell open far before the tip of the wing, widened past its middle by a sinuosity of the third vein; apical crossvein forming a right angle with or without a small appendage.

Type.—*Notochaeta subpolita* n. sp.; Van der Wulp's *Sarcophaga plumigera*, as I identify it, also goes here.

Table of Species.

Facialia (facial ridges) hairy to much above the middle	No. 15. <i>plumigera</i> V. d. W.
Facialia hairy only a little above vibrissæ	No. 14. <i>subpolita</i> n. sp.

No. 14. *Notochæta subpolita* n. sp.

Male. Front .147 of head (three gave identical measurements); parafacials and parafrontals silvery pollinose, but with a yellow tinge, the former with a few almost imperceptible hairs; frontal stripe blackish, almost half the front in width above, widening below; frontal bristles about 12, erect and long, three or four of the upper pairs reclinate in some degree; antennæ black, third joint 3 times the second, reaching four-fifths of the way to the vibrissæ; facialia low and bare, face flat; palpi and proboscis black; bucca one-fifth the eyeheight; hairs of back of head and of bucca all black; ocellars smallish, outer vertical absent.

Thorax with bright yellowish gray pollen alternating with 3-5 shining black stripes, the median of which is narrowed in front; pleuræ with satiny gray pollen, in a certain light there is a black stripe from the humerus to the front part of the sternopleura; anterior intraalar present but small.

Abdomen largely shining black, but the anterior part of the segments with thin but bright, changeable

submetallic gray pollen, leaving a distinct, shining and metallic median black stripe; first and second segments with only lateral bristles; third with a row of 10 strong, erect marginals; fourth with a row of 10 or 12. Fifth sternite black, V-shaped, very inconspicuous, with slender, erect hairs on the exposed edge.

Hypopygium black, opaque, small; first segment with a row of small bristles behind; second with erect black hairs, hardly bristly, in profile rather humped near base. Forceps small, black, straight, hardly divergent, uniformly tapering. Accessory plate brown, rather long, and narrow at tip; posterior clasper small, slender, erect, blackish, with hooked tip and a long hair from the base in front; anterior clasper reddish toward tip, slender, rather sinuous. Penis with short, brownish basal segment; distal segment blackish, its basal portion slender, then rapidly widening; behind, it has a prominent angle, beyond which is a concavity bounded by two spreading ridges which converge and blend in a rounded apex; in front, there is a mandible-like process and several pairs of small hooks on the main part, suggesting the head of an animal with open mouth.

Legs black; middle femur without comb; middle tibia with one bristle on outer front side; hind tibia not villous, but ciliated on the outer side with several rows of noticeable hairs.

Wing subinfuscated in front and along the veins, almost hyaline behind.

Female. Front .268 of head (average of two,—.263 and .274); with the usual ocellars and outer vertical, but only 8 frontals; scutellum with the same bristles as in the male, including apicals (in both sexes the apicals seem to arise a trifle before the hind edge); genital segments black, small.

Length 8 mm.

Three males and two females, Los Amates, Guatemala, Jan. 16-20, 1905, collected by Professor Jas. S. Hine.

Holotype.—Male, in Professor Hine's collection.

Allotype.—Female, in same place.

No. 15. Notochæta plumigera V. d. W.

Van der Wulp, Biologia, Dipt., ii, 273, pl. vii, f. 6, 6a (*Sarcophaga*).—Tabasco, Mex.

Male. Front .187 of head; parafrontals and parafacials golden pollinose; frontal stripe red; ocellars present, outer vertical absent; frontals 8 or 9; antennæ brownish-black, third joint about five times the second, reaching six-sevenths of the way to the vibrissæ; arista longer and with longer plumosity than in *subpolita*; facialia ridged, hairy more than half way up; back of head with three rows of black hairs, on the middle and below to the metacephalic suture with pale hairs.

Thorax and abdomen as in *subpolita*, fifth sternite not visible.

Hypopygium in the described specimen with brown first segment, the second yellowish (Van der Wulp gives them as black), but they seem to be bleached. Forceps black, short, concave behind for half their length, then excised on inner side and ending in slender point, which in profile is nearly straight, with a small claw; accessory plate brown, rather long and narrow; posterior clasper brown, slender and gently curved, hooked at tip, and with a long hair far back from the tip; anterior clasper longer, slender, brown, with hooked tip. Penis stout, black and blunt at tip, the basal part yellowish; on the front side are two diverging plates near the apex, their front edges minutely serrate; the back plate makes a pronounced angle at the tip.

Legs and wings as in *subpolita*.

Length 9 mm.

One male, Punta Arenas, Guatemala, March 14, 1915, collected by Professor Hine.

Type.—In the Godman and Salvin collection, London. Not seen by the writer.

EMBLEMASOMA New Genus.(ἔμβλημα, *mosaic*; σῶμα, *body*)

Differs from *Sarcophaga* mainly in having the vibrissæ quite high above the oral margin (as far as the length of the second antennal joint) and considerably approximated, so as to narrow the facial plate below more than usual. Type, *Emblemasoma erro*, the following species; a second species is *E. faciale*, and the two agree in the following characters among others:

Parafacials with several rows of hairs, none bristle-like, encroaching on the facial impression; parafrontals also with small hairs; frontals reaching to about middle of second antennal joint, not suddenly diverging below, still with one or more extra bristles just outside the lowest in the row, evidently somewhat variable; antennæ short, third joint less than twice the second, and reaching three-fifths to three-fourths the way to the vibrissæ; bucca very wide, about half the eyeheight; scutellum with 3 or 4 marginal pairs, together with one discal and a small apical; 4 dc; ant aer long but not very distinct from the adjacent long, erect hairs; stpl 3; npl 4; sa 3; inta 2; pa 2; epaulets black; subepaulets almost white.

Table of Species.—Males.

Legs, palpi, proboscis and antennæ black (wide-spread) *erro* n. sp.

Legs, palpi, proboscis and antennæ yellow (Georgia) *faciale* n. sp.

No. 16. *Emblemasoma erro* n. sp.

Male. Front .206 of head (average of three,—.200, .203, .214); parafrontals and parafacials with yellow satiny pollen, with brown reflections opposite antennæ; frontal stripe brown, wide and well-defined; ocellars present, outer vertical not; antennæ brownish-black, small, the second joint rather long, third hardly longer than second, lacking almost its own length of reaching vibrissæ; palpi and proboscis black.

ordinary; back of head with about four rows of black hairs, the inner irregular, and with considerable pale yellow hair about the neck and below, which does not extend forward on the bucca.

Thorax gray pollinose, with 3-5 black stripes; the submedian gray stripes divided farther than the suture.

Abdomen gray pollinose, with black median stripe and two shifting lateral ones; fourth segment red behind more or less broadly, and a faint reddish tinge showing on the sides of the third and even the second segment; first and second with only lateral bristles; third with a stout median marginal pair and several laterals, making an interrupted row; fourth with a row of about a dozen.

Hypopygium red; first segment of medium size, subshining, with row of bristles behind; second rather small, with some erect bristly hairs; forceps red on basal half, not large, tapering to middle, then with a sudden enlargement almost like a barb behind, not much tapering beyond, the tip blunt and rounded. Accessory plate red, finger-like; posterior clasper red, with brown flat tip not much hooked; anterior clasper black from middle, with flat rather straight tip. Penis with short, red basal segment much retracted; distal segment becoming black, rounded but not greatly enlarged at tip, bearing a striking pair of large red outstanding arms on the front side beyond the middle. Fifth sternite red, inconspicuous, V-shaped, with only small hairs on inner side and very few bristles on edge.

Legs black; middle femur with two rows of spines below, the posterior forming a comb; middle tibia with two bristles on outer front side; hind femur with two rows of long bristles below; hind tibia not villous, with long bristles on hind side.

Wings sub-hyaline; no costal spine; third costal segment longer than fifth and six together; first vein bare; third hairy at base for a short distance.

Length 13-15 mm.

Three males: one from Russell Co., Kans., altitude 1,350 feet, July 26, 1912 (F. X. Williams), in the University of Kansas; one from Manahawkin, N. J., Aug. 21, 1911 (Harbeck); and one from Rio Janeiro, Brazil, collected in November by H. H. Smith, and given me by Professor Williston.

Holotype.—Male, No. 20,492, N. S. N. M., from Manahawkin, N. J.

No. 17. *Emblemasoma faciale* n. sp.

Male. Front .209 of head (one specimen); parafacials and parafrontals gray, frontal stripe brown; frontals 13, not widely divergent below, on one side there is an additional bristle outside the lowest frontal; antennæ red, third joint brown toward tip, one and two-thirds times the second, reaching three-fourths of the way to the vibrissæ; palpi yellow, slender, darker at tip; proboscis yellow, short; back of head as in *erro*.

Thorax gray, with 3-5 black stripes; the submedian gray stripes wide and rather widely divided past the suture.

Abdomen as in *erro*, fourth segment about half red.

Hypopygium red, very similar to that of *erro*, but smaller; first segment retracted, with row of bristles on hind edge; second small; forceps entirely red, small, shaped as in *erro*; accessory plate red, long and finger-like; posterior clasper red, slender, straight, with dark, hooked tip; anterior clasper red, low, rather straight, excised on inner side near tip; penis as in *erro*. Fifth sternite as in *erro*.

Legs red, tarsi black; bristles of mid femur comblike both in front and behind in the lower rows; otherwise the bristles of the legs are as mentioned for *erro*.

Wings not in good condition, but as far as the characters are discernible they are as in *erro*; this applies to absence of costal spine, long third costal segment, and hairy third vein.

Length 11 mm.

One male, Tifton, Ga., Aug. 27, 1896, in the Hough collection of the University of Chicago.

Holotype.—In the Hough collection.

STHENOPYGA New Genus.

(*σθένος*, strong; *πυγή*, the hinder end)

Type, *Sthenopyga globosa*, new species, described below. The characters are given in full in the description; those of principal generic importance appear to be the narrow parafacials, almost entirely destitute of even minute hairs, the large eye and narrow bucca; only one intra-alar, the posterior one; front protuberant above the insertion of the antennæ.

No. 18. *Sthenopyga globosa* n. sp.

Male. Front .188 of head (average of five,—.168, .184, .188, .195, .204); the eyes not diverging as rapidly below as in most species; face and front silvery with slight yellow tinge; frontals not suddenly diverging laterally at lower end of the row, but ending higher up, the lowest barely beyond the base of the second antennal joint, and not diverging more than the lower half of the row as a whole; parafacials entirely bare of hairs, densely pollinose; vibrissæ at oral margin, only a few small hairs above them; antennæ brown, third joint slender, fully twice the second, reaching three-fourths of the way to the vibrissæ; arista of medium length, long-plumose on basal two-thirds; bucca one-fifth the eyeheight; palpi dark yellow, apical two-fifths brown; proboscis short, fleshy; outer vertical not differentiated; back of head with only a few pale hairs about the neck.

Thorax densely gray pollinose, not shining in any part; when viewed from behind the usual 3-5 black stripes are visible but slender, in front view the 3 are brown; 3 ps dc; stpl 2; no ant aer; prescutellar very small; scutellum with two marginals (one very small between them), no subapicals, no apicals.

Abdomen gray, densely gray pollinose, tessellated, the fourth segment mostly red; first and second with only lateral, third with row of 10 or 12 marginal bristles; fourth with row of about 18.

Hypopygium red; first segment rather pollinose, with a row of small bristles at hind margin; second segment red, rather small and flattened; forceps small, red except tip, rather evenly pointed, posterior side basally with hair sloping away from apex; accessory plates yellow, finger-shaped, bare; both claspers of ordinary form; penis with globose, blackish distal segment, the apical portion of which curves forward and is divided mesially into two flat pieces side by side, the side plates extending considerably forward; fifth sternite concealed, pale yellow, the branches slender, bearing a few black hairs.

Legs yellow, or the femora partially infuscated, middle tibia with one bristle on outer front side; middle femur with moderate bristles below on hind side, not forming comb; hind tibia with very sparse villosity, only a few erect hairs, mostly on inner side; claws and pulvilli long, the latter yellow.

Wings hyaline, third and fifth costal segments about equal; first vein with only a few coarse hairs; third vein hairy almost to crossvein; no costal spine.

Female. Front .252 of head (average of five,—.231, .244, .246, .258, .282); orbitals and outer verticals present; lower frontals as in male, or a very little more diverging than in the male, but not extending any further down; parafacials with a very few hairs, minute and mostly pale; bucca one-sixth the eyeheight; scutellum with three marginal (the middle small), one pair subapicals (almost apical in position); genital segment red with roundish or triangular opening; middle tibia with 2 bristles on outer front side; middle femur without combs; first vein with numerous hairs.

Length of male $7\frac{1}{2}$ to $8\frac{1}{2}$, of female 6 to 8 mm.

Six males, seven females, Opelousas, La., March, April and May, 1897, all in Hough collection. One

female has a pair of median marginals on second abdominal segment. Another female, Miami, Florida, Dec. 19, 1912, shows no other apparent differences but has large median marginal bristles on second abdominal segment, in fact a complete but slightly irregular marginal row. It will require more material to explain these differences.

Holotype.—Male, No. 20,493, U. S. N. M.

Allotype.—Female, No. 20493, U. S. N. M.

HARPAGOPYGA New Genus.

(ἄρπαγη, hook; πύγη, the hinder end)

Parafacials with a few very delicate almost imperceptible hairs; vibrissæ slightly above oral margin and slightly approximated (as far apart as two-thirds the width of the front, in the male); ocellar bristles entirely absent; orbitals none in male, one in female; frontal bristles descending to base of antennæ; arista as in *Sarcophaga*; third antennal joint about twice the second, slender. Thoracic chaetotaxy exactly as in *Camptops*, except that there are five or six bristles in the hypopleural row (this is probably somewhat variable in all species). First vein bare, fourth ending not very far before the apex (half the fifth costal segment).

Agrees with *Camptops* and *Sthenopyga* in having the face destitute of the row of bristly hairs near the eye, and in the fourth vein ending not far before the apex of the wing. In this series of genera, *Camptops* is at once separated by having the vibrissæ high up and close together; both *Camptops* and *Sthenopyga* have the first vein hairy, though this is usually reduced in the males and might possibly fail entirely in some. The orbital bristles are as follows: *Camptops*, one in each sex; *Harpagopyga*, none in male, one in female; *Sthenopyga*, none in male, two in female. Ocellars strong in *Camptops*, weak in *Sthenopyga*, absent in *Harpagopyga*.

The type of *Harpagopyga* is the species identified as *Sarcophaga diversipes* Coq., and described below.

No. 19. Harpagopyga diversipes Coq.

Coquillett, Pro. U. S. N. M., xxii, 255, female (*Sarcophaga*).

Male. Front .25 of head width, over one-third occupied by the brown, sharply-defined median stripe; parafrontals and parafacials silvery pollinose, the latter rather wide; antennæ brown, the basal joints reddish, third reaching four-fifths of the way to vibrissæ, arista long-plumose a little over half way; palpi yellow, ordinary; proboscis blackish, short, fleshy; bucca one-fourth the eyeheight; outer vertical well developed; two regular rows of black hairs on back of head, with only a few pale hairs there.

Thorax gray pollinose with three brown stripes, the central one reaching to tip of scutellum; also a brown stripe on the notopleural suture and a short broad one on lower half of mesopleura.

Abdomen with changeable tessellation, on which a median brown stripe is constant on second and third segments, also a changeable lateral one each side; fourth segment mostly red; first and second segments with only lateral bristles, third with a marginal row of 8, fourth with one of 10.

Hypopygium red, gray pollinose; first segment large, rather humped at base in profile, with a row of bristles near hind margin; second segment also rather large and humped basally, with some erect hairs; forceps rather small, straight and evenly tapering, on the back pollinose and with recumbent hair, not hooked at apex; accessory plate roundish with slight notch at apex, the anterior lobe with a few long hairs; hind clasper yellow, slender, strongly curved, with a long hair on front side; fore clasper shorter, flat and curved at tip; penis with very short basal segment, the distal one bulky, globose, mostly of soft consistency; the central soft mass shows on the side in an oval shape and projects forward from the hard part; on the back it is concave to an apical rounded angle (in profile), then turns strongly forward with

two pairs of processes at front angle,—the inner short black, pointed, and the outer flattened and somewhat hooked. Fifth sternite very delicate, entirely concealed.

Legs rather stout, the coxæ, tarsi, and the basal part of the femora black, the tibiæ and apical third to half of the femora reddish yellow; middle femora without comb; middle tibia with one bristle on outer front side; hind tibia without villosity.

Wings hyaline; no costal spine; third costal segment about three-fifths of the fifth; hind crossvein rather straight.

Female. Front .29 of the head, genital segment red, not distinctly visible in the described specimen.

Length, 6 mm.

Two males and one female: one male Havana, Cuba, col. C. F. Baker, in collection of author; one male and one female, Nassau, Bahamas, Dec. 15, 1912, col. F. Knab, in the U. S. National Museum.

Holotype.—Female, No. 4,374, U. S. N. M., from Porto Rico.

The Havana specimen was compared with Coquillett's type female in the National Museum; the only discrepancy is the silvery face instead of golden. Males from the type locality (Porto Rico) will probably be necessary to determine the value of this character; in some species it appears to be of importance.

The striking similarity of the genitalia of males of this species and *Camptops unicolor* will be apparent from a comparison of the figures.

THELODISCUS New Genus.

(*θηλυς*, immature; *δίσκος*, disk)

Frontal bristles of male descending to base of second antennal joint, rather evenly diverging from above the middle of the front; vibrissæ a little above the oral margin; scutellum with three pairs of marginal bristles; middle pair are as close together as the subapical and might be regarded as apical bristles but

are longer than the other marginals. They are the same in both sexes. Fifth sternite undivided.

In the female the frontal bristles form exactly parallel rows not diverging anteriorly and the frontal stripe is wide, with parallel sides.

Type.—*Thelodiscus indivisus* n. sp.

No. 20. *Thelodiscus indivisus* n. sp.

Male. Front .146 of head (average of three,—.142, .144, .152); frontal stripe at the narrowest about half as wide as at anterior end; parafrontals and parafacials light golden yellow, the latter moderately wide, with small hairs not distinctly arranged in rows, and facial impression more or less red; the same color extending across the oral margin and partially on the facialia. Antennæ almost pure reddish yellow, the third joint hardly twice the second, reaching about three-fourths of the way to the vibrissæ; arista brown, plumose for three-fourths of its length; the plumosity a little shorter than in *Sarcophaga*. Palpi yellow, slender. Proboscis black, ordinary; bucca one-fourth the eyeheight; back of head with only black hairs, there being no pale beard at all.

Thorax gray pollinose, with 3 to 5 black stripes on the mesonotum, and the following chatotaxy: ps de 3; ant aer absent; prse 1 pair, of medium size; stpl usually 4; notopleural 2.

Abdomen gray pollinose, with the usual tessellation; the median black stripe is constant; tip of fourth segment red; first and second segment have only lateral bristles; third segment with an interrupted row; fourth segment with a row of about 12.

Hypopygium red, rather large, sloping downward so as to give the abdomen a truncate appearance. First segment pollinose at the basal edge, with a row of 4 stout bristles; second segment subshining; forceps uniformly tapering and curved forward, slender toward the apex, rather widely divergent, with long outstanding black hair on the back and sides. Accessory plate slender, finger-like, with short erect

hairs on the hind edge. Posterior clasper rather short and slender, with a sharp hook at tip; anterior clasper red, rather wide, much larger than the posterior, apparently truncate at tip. Penis with short and rather concealed basal segment; distal segment reddish brown, shining, deeply notched in apex into two simple lateral lobes which extend considerably forward; on the front side near the middle of the segment are two simple processes, between the tips of these a slender, tapering flat membrane projects toward the apex, the tips of which curve back between the apical lobes. The fifth sternite entirely undivided, projecting at its hind edge.

Legs black; middle femur with short comb below on hind side; middle tibia with two bristles on the outer front side; hind tibia not villous. All the pulvilli and claws very long, the former brown.

Wings slightly and uniformly infuscated; costal spine small; third costal segment about equal to the fifth; distance from tip of fourth segment to apex is equal to three-fourths of the fifth costal segment. First vein bare; third vein hairy nearly to crossvein; epaulet rather dark yellow; sub-epaulet light yellow.

Female. Front .346 of head (average of two,—.325, .366); the upper part of parafacials is changeable in color and this is more noticeable in the female than in the male; third antennal joint broad and rounded; palpi slightly clavate; genital segment red with rounded orifice fringed with black hairs; costal spine rather strong; middle femur without comb.

Length 6.5-10.5 mm.

Three males and two females. Two of each sex are from Melrose Highlands, Mass., H. E. Smith, collector. The other male is from Lunenburg, Mass., R. T. Webber, collector.

Holotype.—Male, No. 20,494, U. S. N. M., Melrose Highlands, Mass.

Allotype.—Female, No. 20,494, U. S. N. M., Melrose Highlands, Mass.

Genus **SARCOPHAGA** Meigen.

The history of the genus is sketched in the Introduction, and its principal characters are mentioned there. Being a residual genus of vast extent, its differential characters for the present purpose are mainly negative,—the absence of those which mark off the smaller related genera. In the analytical tables which follow, as a safeguard against mistakes by the beginner, all the species of the minor genera are included, except those of the strongly-marked ones *Phrissopodia*, *Wohlfahrtia* and *Johnsonia*.

TABLE OF GROUPS.—MALES.

Three distinct postsutural dorsocentrals

Hind tibiae with villosity (at the minimum there are at least a few erect, slender hairs that are longer than the diameter of the tibia)

Hypopygium wholly black
(p. 67) GROUP A.

At least its second segment red
(p. 74) GROUP B.

Hind tibiae not with erect villosity (at the utmost with appressed hairs)

Hypopygium wholly black
(p. 94) GROUP C.

At least its second segment red
(p. 113) GROUP D.

Four postsutural dorsocentrals, or else the anterior ones of the postsutural series indistinct, hardly differentiated from hairs.

Hind tibiae with villosity (as limited above)

Hypopygium wholly black
(p. 162) GROUP E.

At least its second segment red
(p. 174) GROUP F.

- Hind tibiae not villous
 Hypopygium wholly black
 (p. 236) GROUP G.
 At least its second segment red
 (p. 245) GROUP II.

GROUP A.

Three postsutural dorsocentrals; hind tibiae villous; both segments of hypopygium black.

Table of Species.—Males.

1. Middle tibia with a patch of yellow hair covering the apical third of the front side (widespread, also in Europe)
 No. 21. *sinuata* Meig.
 Middle tibia not with yellow hair 2.
2. Forceps thick, with long, slender tooth at tip, formed by the excision of the front side (New Mexico and Colorado; alpine)
 No. 22. *cockerellae* n. sp.
 Forceps not so thick, with a smaller tooth, which is about on the middle of the blunt tip (Ohio) No. 23. *hinei* n. sp.
 Forceps straight, with parallel front and back, an oblique rounded truncation at tip, and a tooth on front side of apex (Pennsylvania)
 No. 24. *pulla* n. sp.

No. 21. *Sarcophaga sinuata* Meig.

Meigen, Syst. Besch., v, 22, 1828 and v, 24 (latter *arvorum*).—Europe.

Pandellé, Rev. Entom., 1896, xv, 188.

Villeneuve, Bull. Soc. Ent. Fr., 1900, 364.

Böttcher, Deutsche Ent. Zeitsch., 1912, 708, fig.

Townsend, Trans. Amer. Ent. Soc., xix, 111 (*Sarcotachinella intermedia*).—Carlinville, Ill.

Johnson, in Smith's Catalogue of the Insects of New Jersey, both editions, oc. in New Jersey (*id.*).

Johnson, Diptera of Florida, both editions, oc. in Florida (*id.*).

Kelly, Jour. Agl. Research, ii, 441, 1914, bred from grasshopper, Columbia Crossroads, Pa.

Easily recognized in both sexes by a patch of appressed, silky yellow or whitish hair, almost like tomentum, on the outer third of the front side of the middle femur.

Male. Front .247 the width of the head; (average of five,—.225, .236, .256, .257, .263); median stripe about as wide as the side, the latter with pale yellow sheen which extends smoothly down the parafacial; a row of four or five small bristles on lower part of parafacial; frontal row of nine bristles, the lower strongly diverging; antennæ black, third joint less than double the length of the second, but reaching nearly to the mouth; arista long, plumose for about half its length; vibrissæ large, at oral margin; palpi black, not swollen; proboscis ordinary, black; bucca over one-fourth the eyeheight; inner verticals long, outer about half as long; back of head with about 3 series of black hairs, the inner irregular; the pale beard sparse.

Thorax gray, when viewed from behind with 3 blackish stripes and a short narrow one each side; 3 ps dc; no acrostichals except a small prescutellar pair; scutellum with 2 long marginal pairs, 1 small subapical pair, and small erect crossed apical pair; 3 stpl.

Abdomen black, tessellated, not tapering; second segment with a median marginal pair of bristles and a lateral; third segment with a median, a submedian, and two or three laterals; fourth with a continuous row of about 22.

Both segments of the hypopygium shining black, with erect hairs which become almost bristle-like on the hind margin of the first; genitalia as figured, shining black except at bases of the parts; fifth ventral segment in the form of a pair of black lobes bearing a stiff brush of spines, longer on the inner edge.

Legs black, middle femora without comb of spines below; hind tibiæ with a few long, slender hairs on inner front side.

Wings nearly hyaline; third and fifth costal segments about equal; costal spine distinct, third vein with 5 or 6 bristles.

Female. Front .324 as wide as head (average of five,—.311, .319, .322, .330, .338), with the usual two pairs of orbital bristles; parafacials with a row of hairs above the small bristles; outer vertical somewhat larger; palpi slightly clavate. Apical crossed bristles absent from scutellum. Abdomen convex, broad, with bristles as in male; genital segment black, with vertical slit guarded by a row of bristles.

Length, 5 to 9 mm.

Fifty-three specimens, both sexes; Mass., N. Y., Onatrio, Montreal, Pa., Ohio, Ind., N. D., Colo., Idaho.

Two males in U. S. N. M., from Sterling, Colo., bred from *Melanoplus differentialis*, No. 419 x 04, emerged Aug. 6, 1900. They were labeled by Coquillett *Sarcophaga aegra* Walk.

Type.—In the Meigen collection in Paris.

I examined the type of Townsend's *Sarcotachinella intermedia*, now in the Snow collection at the University of Kansas; and by the kindness of Professor S. J. Hunter I was allowed to spread its genitalia, thus removing the possibility of error.

In the collection of the Illinois State Laboratory of Natural History at Urbana, I found this species determined by Mr. Coquillett as *aegra* Walker; other references to *aegra* (N. J., Fla., and Kansas in local lists) may have originated in the same way.

Böttcher states that an occasional specimen is found with 4 post-sutural dorso-centrals; in the 53 specimens mentioned, there are regularly 3 except on one side in one specimen, where there are 4. This would be less than 1 per cent of deviation.

Mr. Townsend has proposed the name *Xenoppia hypopygialis* new genus and species for the specimen determined by Coquillett as *Brachycoma intermedia* Tns. I have not seen it. Johnson's references to *intermedia* (supra) may refer to the latter species.

No. 22. *Sarcophaga cockerellæ* n. sp.

Male. Front .221 as wide as head (average of two,—.215 and .226); somewhat golden near vertex, paler, almost silvery, below and on parafacials, rather protuberant at insertion of antennæ; 10 frontals in row, diverging anteriorly; middle stripe much wider than one parafrontal; a row of about 4 bristles below near eye, the middle two large; antennæ black, third joint hardly twice the second and reaching three fourths of the way to vibrissæ, which are on the oral margin, palpi and proboscis black, ordinary; bucca almost half the eyeheight; back of head with 3 series of black hairs, the pale beard not very abundant.

Thorax with the usual 3-5 black stripes, otherwise light gray; anterior acrostichals well developed, 3 pairs; one pair prescutellars; 3 ps dc, strong; scutellum with 2 marginal, 1 subapical, 1 apical, the last quite large.

Abdomen black with whitish tessellations; second segment with a pair of median marginals, but small and depressed; third segment with a row of 10; fourth with row of about 20.

Hypopygium black, shining, the first segment but little visible; forceps wide, strongly divergent at tips, which are excised in front to a clawlike tooth; penis hooded, but the terminal member protruding in front, divided at tip into several parts, the two lateral of which are turned back.

Legs black, middle femora without combs; middle tibiæ with 3 large bristles on outer front side; hind tibiæ with sparse long villosity on both inner and outer sides in front.

Wings subhyaline; costal segments 3 and 5 equal; third vein with about 7 setules.

Female. Front .335 of head; parafrontals and parafacials more gray; scutellum without apical bristles; second abdominal segment without median marginals; genital segment black, opening in a vertical slit which is guarded with small bristles.

Length of male, 8 mm.; of female, 5 mm.

Two males, "Truchas Peak II, N. M., Aug. 4. Above timber line. W. P. Cockerell." One female, "Colo. 1582," from the Colo. Agri. College, in the Hough collection.

Holotype.—Male, No. 20495, U. S. N. M.

Allotype.—Female, in Hough collection.

No. 23. *Sarcophaga hinei* n. sp.

More shining black than usual, hypopygium small, second abdominal segment with a pair of median marginal macrochaetae.

Male. Front narrow, only .181 of the head in width (average of five,—.169, .172, .171, .195, .196); the parafrontals much narrower above than the median stripe, silver gray; parafacials of same color, a row of hairs beginning near the last frontal and continuing down to the facial impression, the lower hairs coarse; lower frontals diverging; antennae black, third joint hardly twice the second, reaching to three-fourths the face, arista rather short-plumose for over half its length; palpi and proboscis black; bucca one-third the eyeheight, with black hairs except behind; back of head with black hairs except about and below the foramen.

Thorax whitish gray with the usual 3-5 black stripes; acrostichal bristles not very distinct among numerous erect hairs, one anterior pair and the pre-scutellars recognizable; scutellum with the following pairs; 2 marginal; 1 subapical (small), 1 apical of moderate size. Stpl 3.

Abdomen rather shining, with gray-white pruinosity which is less changeable than usual, tending to form stripes; second segment with median marginals; third segment with a median pair and 5 each side somewhat removed; fourth with the usual row of about 16.

Hypopygium black, very small, the first segment less than a third as wide as the middle of the abdomen, with gray pruinosity and black hairs, no bristles; second segment sometimes more brown than black, shin-

ing, with long black hair; forceps nearly straight and with parallel front and hind edges, the tip with a minute tooth at its middle; penis with distal part subglobose, rather hooded, mostly black.

Legs black; middle femur with comb below on hind side, composed of rather long spines; mid tibia with one small and one larger bristle on outer front side; hind tibiæ with a little scattering villosity on both sides in front, that on outer side quite short.

Wings subhyaline, third and fifth costal segments sub-equal, costal spine absent; third vein with 7 setules.

Female. General color subshining black; front .268 of head; scutellum without apicals, genital segment black, the opening rounded above and slitlike below; a small costal spine present.

Length of males 6-8½ mm.; of females, 7 mm.

Six males, Cedar Point, Sandusky, Ohio, July 8, 1901 and June 8, 1902; one female, same place, June 30, 1900. All collected by Professor Jas. S. Hine, for whom the species is named in recognition of his long-continued and valuable service in dipterology.

Holotype and Allotype.—In Professor Hine's collection.

Paratype.—Male, No. 20496, U. S. N. M.

No. 24. *Sarcophaga pulla* n. sp.

Male. Front narrow, .155 of head; middle stripe wider than either side; parafrontals and parafacials silvery with a slight yellow tinge; a row of small hairs extend from lower part of parafrontals down to facial impression, the last two or three rather coarse; antennæ black, reaching three-fourths of the way to oral margin, second joint more than half as long as third; arista long, and rather long-plumose for three-fifths its length; frontals divergent anteriorly; vibrissæ at oral margin; palpi and proboscis black, ordinary; bucca almost one-third the eyeheight, with black hair except behind; back of head with black hair except

around and below the foramen; outer vertical not differentiated.

Thorax with the usual 3-5 black stripes; no acrostichals except prescutellar; 3 large ps de; scutellum with the usual pairs—2 marginal, 1 small subapical, 1 rather small apical, the last crossed; stpl 3.

Abdomen black, with the usual tessellation; first and second segments with only lateral bristles; third with 1 pair median and 3 lateral; fourth with the usual row of about 12.

Hypopygium black, the first segment of rather moderate size, gray pruinose, and with a row of bristles at apex; second segment subshining but somewhat gray pruinose, with erect black hair; forceps with parallel front and back surfaces in profile, the outer corner rounded at tip, the inner produced into a short, oblique point; penis apically with a thin, bladelike median portion, and on the front side a pair of divergent slender sharp processes.

Legs black, middle femur with both anterior and posterior combs well developed on lower side; middle tibiae with two smallish bristles on outer front side near middle; hind tibiae with rather sparse villosity spreading both ways from the front side; pulvilli large on all the feet, brown; claws all long.

Wings subhyaline, costal segments 3 and 5 subequal; costal spine absent; about 10 setulae on third vein.

Female unknown.

Length, 10 mm.

One male, Westmoreland Co., Pa., Carnegie Museum acc. 321.

Type.—In the Carnegie Museum, Pittsburgh.

GROUP B.

Three postsutural dorsocentrals; hind tibiae vil-
lous; hypopygium more or less red.

Table of Species.—Males.

- | | | | |
|-----|--|--|-----|
| 1. | With a large proclinate orbital bristle (Louisiana)) | No. 6. <i>Camptops unicolor</i> n. sp. | |
| | Front without orbital bristle in male | | 2. |
| 2. | First vein hairy | | 12. |
| | First vein bare | | 3. |
| 3. | Legs yellow (Georgia, Florida) | No. 25. <i>tarsata</i> n. sp. | |
| | Legs black | | 4. |
| 4. | Hind femora on outer side with a median row or part of a row of longer bristles than the upper and lower rows; sternites 1-4 not successively narrower | | 5. |
| | Hind femora not with long bristles in a middle series | | 8a. |
| 5. | Anterior acrostichals present | | 6. |
| | Anterior acrostichals absent | | 8. |
| 6. | With an almost complete median row of bristles on hind femur (widespread). | No. 28. <i>cimbicis</i> Townsend. | |
| | With only the distal end of the row present | | 7. |
| 7. | Accessory plate slender, finger-like (widespread) | No. 26. <i>latisterna</i> Parker. | |
| | Accessory plate long and wide, with a brush of short hook-like spines on the posterior side (Jamaica) | No. 27. <i>parkeri</i> n. sp. | |
| 8. | With a complete median row of bristles on hind femur (widespread) | No. 29. <i>bisetosa</i> Parker. | |
| | With only two bristles in the distal part of the row (Porto Rico) | No. 30. <i>taurus</i> n. sp. | |
| 8a. | Anterior aer well developed (California, New Mexico, Idaho) | No. 31. <i>cessator</i> n. sp. | |
| | Ant aer not developed | | 9. |

9. Anterior clasper slender, widened apically, the tip excised to form a claw above (Georgia)
No. 32. *sarraceniæ* Riley.
Anterior clasper not as described 10.
10. Hind tibiæ with long and abundant villosity; gray species (Ohio)
No. 33. *tetra* n. sp.
Hind tibiæ with only a few villous hairs; black and silvery species 11.
11. Hypopygium larger, forceps tapering gradually; penis with unusually large distal segments (Massachusetts)
No. 34. *idonea* n. sp.
Hypopygium smaller, forceps more blunt; penis with small but globose distal segment; fourth abdominal segment with red hind border (Maryland, Louisiana)
No. 35. *sima* n. sp.
12. Tibiæ yellow; parafacials bare (Louisiana)
No. 18. *Sthenopyga globosa* n. sp.
Tibiæ black 13.
13. Hind basitarsus wide and flat, with two projecting angles below (Cuba)
No. 36. *pervillosa* n. sp.
Hind basitarsus normal (Bahamas)
No. 37. *pervillosa* var. *inchoata* n. var.

No. 25. *Sarcophaga tarsata* n. sp.

No. 25. *Sarcophaga tarsata* n. sp.

A medium-sized species with yellow femora and tibiæ, and black antennæ, palpi and tarsi.

Male. Front narrow, .149 of the head (average of four,—.136, .147, .151, .161); parafrontals narrow and subshining above, more silver-gray below, which continues down the face; hairs of parafacials bristly below, ascending in a delicate and decreasing row to the middle of the front; facial ridges with some minute hairs extending nearly half-way to base of antennæ; vibrissæ at oral margin, antennæ over three-fourths the length of the face, third joint fully double the sec-

ond, arista long, plumose to about the middle; bucca one-fourth the eyeheight; back of head with only black hairs except around and below foramen; outer vertical not differentiated.

Thorax rather shining, but showing the usual 3-5 black stripes; anterior acrostichals numerous, about 5 medium-sized pairs; prescutellars rather large; 3 large ps dc; 3 stpl; pleuræ rather shining, in part rather brown than black; scutellum with the usual bristles,—2 marginal, 1 subapical (small), 1 apical (medium and crossed).

Abdomen subshining, black, but the hind margins of the segments at the sides and beneath more or less bordered with red, and the fourth always at least one third red; first and second segments with only lateral bristles; third with a median marginal pair widely separated from the 3 or 4 marginals; fourth with row of about 14 marginal.

Legs yellow, including coxæ but not the tarsi, the latter almost black; all the femora in most of the specimens with a large dark spot on the front side near tip; middle femur with two rows of bristles beneath, hardly forming combs distally; middle tibia with one small and one large bristle on outer side near middle; hind femur with very sparse villosity on both sides in front, only a few hairs; pulvilli large, especially the front ones; base of front tarsus with some longer hairs beneath.

Wings rather smoky in color; third and fifth costal segments about equal; costal spine distinct.

Length, 6-8 mm.

Four males: One Miami, Fla., Dec. 19, 1912, on *Persea* flowers (collected by F. Knab, and belonging to the National Museum); one with same label but no data about the flower; one Tifton, Ga., Oct. 16, 1896, in the Hough collection; one from Crestview, Fla., Oct. 15-16, 1914, in the collection of the American Museum of Natural History.

Holotype.—Male, No. 20497, U. S. N. M., the first mentioned.

No. 26. *Sarcophaga latisterna* Park.

Parker, Proc. Boston Soc. Nat. Hist., vol 35, p. 67, 1914; pl. 5, f. 35, and pl. 8, f. 49, male only (*Böttcheria*).

Mr. Parker has described the species so fully that only the characters most essential for the recognition of the species will be mentioned here.

A large elongated black gray-tessellated species; outer vertical absent; 3 pairs of anterior acrostichals; preutellars quite absent or more rarely small and hairlike; 3 ps de; 3 stpl; scutellum with 3 or 4 marginal, the intermediate of these small; preapical and apical scutellars very slender and quite small. First and second abdominal segments with only lateral bristles; third with a median pair, erect, and couple of small, appressed ones between these and the laterals; fourth with a marginal row of about 16.

Hypopygium red; first segment sometimes darker basally, in profile very convex near base and rather straight near posterior end, somewhat pruinose on the middle part, with a row of bristles across hind margin; second segment red, globose, subshining; forceps wide and short, black apically, the basal half or more with strikingly long and dense tuft of black hair; accessory lobe slender, finger-like but bluntly pointed; penis strikingly long and complicated, seemingly with a reduplication of the distal segment. Sternites markedly widened from 1 to 4.

Hind femur with one entire row of bristles on outer upper side, near tip with two or more partial rows below this, some of which are very long, about one-third the length of the femur.

Length, 8-13 mm.

Twenty-five males; Mass., Conn., N. Y., Md., Ind., Ill., Wis. The Maryland specimen is from College Park, and the label states that the specimen was bred from *Pontia rapae*, issued Nov. 18, 1907, E. D. Brown, coll.

The type locality is not mentioned by Parker; he had numerous specimens from all the New England States, as well as N. Y., N. J., Pa., and Minn.

For the female, see under *cimbicis*.

Type.—Male, in Massachusetts Agricultural College.

Paratype.—No. 18245, U. S. N. M.

No. 27. *Sarcophaga parkeri* n. sp.

Male. Front narrow, .133 of the head; sides and face yellowish silvery; parafacials rather narrow, with only a few perceptible hairs, on the lower part; antennæ brown, third joint three times the second, yellow at base, reaching four-fifths of the way to the vibrissæ, which are at the oral margin; arista very long, long-plumose over half its length; facial ridges with only a few hairs above the vibrissæ; palpi and proboscis black, ordinary; bucca one-fourth the eye-height; back of head with dark hairs, only about the foramen and below with yellowish beard; outer vertical not differentiated.

Thorax (not very well preserved) with 3-5 black stripes; 3 ps dc; 2 stpl; anterior acr present; scutellum with 3 marginals (intermediate small), 1 very small subapical, 1 small thin apical pair.

Abdomen (not well preserved) black, somewhat red on end of fourth segment; bristles as in *latisterna*; sternites 1-4 widening successively.

Hypopygium red; first segment globose behind, the second attaching below rather than behind, with a row of bristles on posterior margin; second segment red, globose, hairy; forceps red except apex, short and broad, with a notable tuft of black, crinkly hairs crowded on a restricted area at base; the accessory plate instead of being fingerlike as in allied forms is flat, rather long, rounded at tip, and bears a series of little teeth, which appear normally to face the forceps, —quite unlike any other species known to the writer. Posterior claspers much longer and wider than the anterior, not excised in front to form a claw at tip; penis with a rather small distal median part turned forward, and two much larger subdistal lateral lobes, which extend much beyond the former and turn back

somewhat as in *bisetosa* but smaller; the V-shaped opening of the fifth sternite bears no padlike organs, but instead a small, smooth, reddish tooth near the base on each side.

Legs rather dark brown than black, the hind tibiae almost a dark yellow; middle femora with comb; middle tibia with a single bristle on outer front side below middle; hind femur on outer side, besides the entire upper row of bristles, with 3 long ones below them near tip, and a few irregular along the lower edge below these; hind tibia with long villosity spreading both ways; hind trochanter with a small, compact group of stubby spines, about six in a row, the femur attached very obliquely.

Wing subhyaline; costal spine absent; third costal segment about equal to the fifth; apical cell notably wide open; third vein with only half a dozen hairs.

Length about 10 mm.

One male: Jamaica, W. I., obtained by the writer many years ago from Mr. Henry K. Klages. The abdomen has been detached in spreading the genitalia, and the latter broken apart, but all are glued on a paper attached to the pin.

Type.- No. 20498, U. S. N. M.

Named in honor of Dr. Ralph R. Parker, who has done excellent morphological and taxonomic work in this group.

No. 28. *Sarcophaga cimbicis* Towns.

Townsend, Canad. Ent. xxiv, 1892, 126, male and female.

Parker, Proc. Bost. Soc. Nat. Hist., vol. 35, p. 72, pl. v, f. 36, and pl. viii, f. 47, male only (*Böttcheria fernaldi*).

(Other references in literature between 1892 and 1914 are erroneous, the species having been misidentified).

Male. Parker has described the male so fully that only the more essential taxonomic characters are given here. Outer vertical wanting; 3 ps dc; 3 stpl; ant acr present, prs very fine and hairlike if present, generally absent; scutellum with 3 or 4 marginals, the

intermediate of these small; subapical and apical pairs of scutellum very thin and small. First and second abdominal segments with only lateral bristles; third with an irregular row; fourth with a row of about 18, its hind margin sometimes red.

Hypopygium red, the first segment, however, sometimes dark basally; it is pollinose in the middle region, convex in profile near base, with a row of bristles on hind margin; second segment red, subshining, globose, without bristles; forceps short and wide, basal half or more with tuft of very striking long, black hair; accessory lobe finger-like, blunt; penis complex and rather soft, so that it is shriveled in preserved specimens and difficult to describe or figure in detail; anterior clasper with a small tooth at apex; fifth sternite near the base of the V with two pad-like structures facing backward.

Hind femora with two entire rows of bristles on outer side above the middle; the lower of these is in some cases a little irregular, but bears the longest bristles near the apex; a third, lower, row is only partly developed distally.

Female. As the characters separating *latisterna* and *cimbicis*, though ample, are confined to the male sex, the following notes on the female will apply to both species, which at present do not appear to be separable in the female sex.

The numerous specimens examined agree in having no prescutellar bristles, well developed ant. acr. 3 ps. de, an uncommonly long arista, changeable reflecting spots alongside the base of antennæ, anterior cross-vein bordered with brown, and apical cell rather widely open. The abdomen is black, with the hind edge of the fourth segment sometimes a little red, bristles of abdomen as in male; genital segment red (dull orange of Parker), genital opening nearly circular, fringed with hairs, with a distinct flat, red sternite below.

Length of male, 8-12 mm.; of female, 6-10 mm.

Forty-eight males: Mass., N. Y., Pa., Ind., Ill., Alab., Kans, Ida., Wash., Calif.

Sixty-five females: Mass., N. Y., Pa., Ind., Ill., S. D., Ida., Wash., Calif.

Type.—In University of Kansas.

The type locality is Brookings, S. D., the original pair having been bred from *Cimbex americana*, the Willow Sawfly, by the writer; date of emergence, May 30 and June 2, the specimens having wintered in the host or its cocoon. On account of the omission in the original description of the villosity of the hind tibiae, Mr. Coquillett, Mr. Parker and myself had all come to a wrong conclusion regarding the identity of the species, which I was enabled to rectify in November, 1914, by an examination of the types, and by spreading the genitalia of the male.

Mr. Parker's material came from various states, ranging from Maine to California and as far south as Virginia.

Several abnormalities occur in the series of females, which make their allocation with the proper males still more difficult. Several have two stpl while provided with anterior acrostichals; two have pre-scutellars and no anterior acrostichals; one has only two postsutural dorsocentrals, the hindmost one being absent on both sides; one has two stpl on one side and three on the other. These deviations would nearly if not quite include the female of *bisetosa*.

No. 29. *Sarcophaga bisetosa* Park.

Parker, Proc. Boston Soc. Nat. Hist., vol 35, p. 69, pl. v, f. 34, and pl. viii, f. 48, male only (*Böttcheria*).

This species was separated from *cimbicis* by Parker mainly by the characters given in the table,—absence of anterior acrostichals and only two sternopleurals. Beyond these the differences are mainly genitalic; they are slight except in the shape and size of the penis. This organ in *bisetosa* is large, elbowed behind, and the lateral distal lobes turn back at a very unusual angle, and are much larger than in *cimbicis*.

The accessory plates are red to the tip and have coarser hairs; the posterior claspers are stouter, and have a deeper and shorter emargination to form the terminal claw; the anterior claspers are more rounded at tip, then in *cimbicis*.

Three males: Greene Co., N. Y., Carnegie Museum; and Pittsburgh, Pa., May 9 and 17, 1891, in the author's collection.

Type.—In the Massachusetts Agricultural College.

The females might be expected to separate by the characters given in the table; but as I have shown under *cimbicis* these characters are not regularly coordinated in this sex; it remains therefore uncertain whether the group of females there mentioned may not contain a representation of this species.

Parker's 15 males were from Mass., Vt., and N. Y.

No. 30. *Sarcophaga taurus* n. sp.

Male. Front, .163 of head (average of two,—.153 and .173). Parafrontals and parafacials golden pollinose; frontal stripe black; frontal bristles about 14, rapidly diverging below, reaching fully to the middle of the second antennal joint; parafacials with almost no hairs of perceptible size; those that exist are yellow; antennæ black, rather elongated, third joint fully three times the second, reaching five-sixths of the way to the vibrissæ, which are at the oral margin. Arista uncommonly long, with long plumosity for three-fifths of its length; middle of face yellow pollinose; facialia bare, a little deeper yellow than the face; palpi black, proboscis short and black; bucca about one-fifth the eyeheight; back of head with about three rows of black hairs and numerous pale ones toward the center and below; posterior orbit of the eye golden pollinose; outer vertical bristles absent; ocellars small.

Thorax whitish pollinose with 3 to 5 black stripes; ps dc 3; ant acr none; prsc almost none; stpl 3; scutel-

lum with 3 pairs of marginals, one pair a little behind the center of the disk; apical hardly more than hairs. Abdomen whitish pollinose, tessellated, with three changeable indistinct stripes; first and second segments each with lateral bristles; the third with a single marginal pair and one lateral; fourth with a marginal row of about ten.

Hypopygium: First segment with a pronounced hump beyond the middle; red except before the hump, where the black color extends down the side only about half way; hind edge with an interrupted row of about 8 smallish bristles; second segment red, rather short, subshining; forceps reddish yellow, of complicated shape; on the posterior side, just at the beginning of the free part, is a long curved and twisted process suggesting to the writer the horns of a bull, from which the name is derived. The remainder of the free part is rather straight with a black point; the attached part bears a sharp median keel, at the base of which, just below the anus, there is a striking tuft of long black hairs directed straight backward; accessory plate yellow, long, widened near the tip, bearing on the outer front side a dense row of stiff black hairs; posterior claspers yellow, small, with a sharp rather twisted point; anterior claspers yellow, very low and blunt; penis with very short and obscure basal segment, distal one narrow, for some distance, becoming black toward the end, bearing a large pair of complex, diverging and somewhat fleshy processes on the front side, and apically a black rounded median somewhat hooded structure which has a considerable angle posteriorly; fifth sternite reddish and rather broad at base, with a wide excision, beyond which the sides narrow together again in black curved points bearing brushes. At the base of the point of each side there is a small, sharp, black peg-like process.

Legs black; all femora short, stout and covered with a grayish dust; middle femur without comb; middle tibia on outer front side with a single bristle below the middle; hind femur without any bristles in the

lower row on the outer side and with two long ones in the middle row near the tip; the upper row is practically complete. Both middle and hind tibiae have erect villosity which is especially long and striking on the hind ones.

Wings hyaline, no costal spines; third segment of costa slightly longer than fifth; first vein bare; third with a few hairs at base; anterior crossvein slightly clouded.

Length 14 mm.

Two males: Naguabo, Porto Rico, Mar. 7-9, 1914. (Amer. Mus. Nat. Hist.).

Holotype.—Male, in American Museum of Natural History.

Paratype.—Male, No. 20499, U. S. N. M.

No. 31. *Sarcophaga cessator* n. sp.

Male. Front, .192 of head (average of four,—.181, .183, .187, .217); frontal stripe with whitish reflection, wider than side; parafrontals and parafacials silvery with a slight yellow tinge, with changeable spots near base of antennae; parafacials with row of slender rather long hairs next to eye; antennae dark brown, reaching fully three-fourths of the distance to vibrissae, the third joint $2\frac{1}{2}$ times as long as second; arista of medium length, plumose to the middle; vibrissae at oral margin; small hairs ascending the facial ridges half way to base of antennae; palpi long, slender, black; proboscis very short, black; bucca over one-third the eyeheight; occiput with three series of black hairs behind the eye; beard rather abundant, white; outer vertical bristle not differentiated.

Thorax with 5-7 stripes when viewed from behind, the two intermediate pollinose stripes usually present being in this case divided each by a narrow black stripe; three pairs of anterior acrostichals, pre-scutellars large; 3 ps dc; 3 stpl; scutellum with 2 large marginal, 1 small subapical, and 1 small apical.

Abdomen black, strongly tessellated with gray pollen, still there are indications of three dark stripes

which are quite persistent in different angles of view; segments 1, 2, and 3, with only lateral bristles, or at most the third with a very small, depressed pair, hardly noticeable; fourth segment with a row of about 14.

Hypopygium rather large; first segment reddish brown, somewhat pruinose, with a row of stout, small bristles at hind margin; second segment globose, red, a little pruinose behind, not bristly; forceps slender, tapering, gently curved forward at apex, red for more than half their length; penis ending in two divergent black, curved, shining processes, each of which divides distally into three points; middle part of penis shining black, broad, with two lateral lobes and two central ones that bear numerous minute teeth pointing forward; posterior claspers longer than front one.

Legs black; middle femur with a short comb behind and below at tip, consisting of only half a dozen blunt spines; middle tibia with two bristles on outer front side near middle; hind tibia with moderate villosity spreading both ways; pulvilli and claws elongated; anterior tarsi with some longer hairs underneath at base.

Wings hyaline, third costal segment longer than fifth; no costal spine; third vein with about 8 hairs.

Female not known.

Length 9-11 mm.

Four males: Two are from Pine Lake, Calif., collected by Johnson, and sent the author by Professor C. F. Baker; one Moscow, Idaho, collected by the author; the remaining one from Bernalillo Co., N. M., collected by B. Brown, now in the Hough collection.

Holotype.—Male, No. 20500, in U. S. N. M., from Pine Lake, Calif.

The absence of the median marginals on the third segment is a character which will probably aid in connecting the females with this species.

No. 32. *Sarcophaga sarraceniæ* Riley.

Riley, Trans. Acad. Sci. St. Louis, iii, 238. South Carolina, larvae living in the cups of *Sarracenia variolaris* and *flava*, feeding upon the decomposing insects therein.

[For other references to *sarracenia* in literature, see *Sarcophaga sarracenioides* and *sternodontis*.]

Male. Front rather wide, .208 of head (average of five,—.186, .208, .214, .215, .216).

A little narrowed between the ocelli, where the median stripe is about three times as wide as one side; pollen of front and face yellowish silvery; facial impression red in ground color, which color extends in one specimen up and down the face; some distinct bristles and hairs in a row on parafacial; antennæ reddish brown, third joint fully twice the second, and reaching three-fourths of the distance to the vibrissæ, which are at the oral margin; arista of usual length and plumosity; palpi and proboscis black, ordinary; bucca one-third the eyeheight; back of head with three series of black hairs behind the eye, and rather conspicuous pale beard; outer vertical bristle not differentiated.

Thorax with 5-7 black stripes, the usual intermediate pollinose stripes being narrowly divided with black, when viewed from behind; ps dc 4, but the second one from the suture sometimes reduced somewhat, giving the appearance of only 3; 3 large stpl; scutellum with 2 marginal, 1 small subapical, 1 rather large decussate apical pair.

Abdomen wholly gray, tessellated, the latter segments more sprinkled in the tessellation than usual; first segment only with lateral bristles, second with a pair of half-erect, rather large bristles, generally with only depressed and rather small ones; third segment with a subinterrupted row; fourth with a row of about 16, and its hind part more or less reddish.

Hypopygium red, rather large; first segment with pollinose hind edge and middle portion, not

bristly; second segment globose, shining, hairy but not with bristles; forceps stout, tapering on the outer side, the tip prolonged in an oblique tooth inwardly, anterior lateral edge with a few teeth; penis with a well-developed stalk, distal segment globose with a median terminal part curved forward between two lateral members which curve back; anterior clasper flattened toward tip, where it is distally expanded and notched below a claw; fifth sternite V-shaped, the arms almost concealed, bearing only delicate yellow pubescence.

Legs black; middle femur with well-developed rows of bristles below, forming combs on apical half, especially behind; middle tibia with two bristles on outer front side, and on inner with slight, short villosity beyond the middle; hind femur with three well-developed rows of bristles; hind tibiae with long, rather dense villosity spreading both ways; pulvilli long, brown.

Wings subhyaline; no costal spine; third costal segment rather longer than fifth; third vein bristly almost to crossvein.

Female. Front, .305 of head (average of five,—.290, .301, .306, .310, .317); three or four distinct bristles near the eye on the lower part of parafacial, from which a row of hairs extends up to the orbitals (also present in the male, but more delicate); outer vertical half as large as inner. Fourth abdominal segment sometimes narrowly margined with red at tip; fifth and following segments yellowish-red, retracted and without any striking features.

Length, 8 to 12 mm.

Six males and four females, Summerville, South Carolina, reared from larvæ in cups of *Sarracenia flava* and *minor* by F. M. Jones. One of these males with spread genitalia has been compared by Dr. C. H. T. Townsend with the holotype male (now spread by Dr. Townsend) in the National Museum, and is so labeled.

Two males and three females, Theodore, Alabama, reared from larvæ in cups of *Sarracenia drummondii* by F. M. Jones.

Two males, Tifton, Georgia, in the Hough collection.

Holotype.—Male, in U. S. N. M.

The male standing in the National Museum as holotype of *sarraceniæ* is so exceedingly like the species herein designated as *sarracenioides* n. sp. that I took it for the latter when examining it in 1914, deeming it unwise to risk the damage of spreading its genitalia. Dr. Parker, who was in Washington at the time shared this view. Hence we both perpetuated for the time the error made very early by Riley, of failing to separate *sarracenioides*. Only when I received Mr. Jones's *Sarracenia* rearings and spread them did I discover the probability that *sarraceniæ* had been misidentified almost from the time of its description. This discovery was confirmed by Dr. Townsend, who spread the holotype at my request and compared it with spread specimens from Mr. Jones's rearings and of what had been called *sarraceniæ*, now separated as *sarracenioides*. The true *sarraceniæ* has never been reared from anything but the cups of *Sarracenia*, while *sarracenioides* is a common scavenger and apparently a grasshopper parasite.

Riley's original material comprised several specimens, fortunately still preserved though not with the holotype; among these are specimens of *rileyi* and *jonesi*. Mr. Jones has reared from the cups of *Sarracenia* the following species of Sarcophaga: *sarraceniæ*, *rileyi*, *jonesi*, *clarata*, *fletcheri*, and a variety of *utilis*. The last may with the study of more material prove a distinct species; it is the only apparent exception to the statement that not one of the species in the list is known to have any other larval habit than that of living in *Sarracenia* cups, and the rule will hold good throughout if this shall prove to be a distinct species.

As in this small series of forms there is considerable variation in the group characters, especially in the number of ps dc and the color of the hypopygium, I give a table for the separation of all the species that have been reared from *Sarracenia*.

Table of *Sarcophagas* reared from *Sarracenia*.

Males only.

1. Hind tibia with long, erect villosity
sarraceniae Riley.
- Hind tibia without villosity 2.
2. Scutellum with a small pair of decussate
(crossed) bristles at the apex. 3.
- Scutellum without such bristles, or if rather
coarse hairs are present they are divergent.
fletcheri n. sp.
3. Middle femur with a short comb of stubby, thick-
ened bristles on hind lower edge near tip;
palpi black 4.
- Middle femur with only ordinary bristles in this
series; palpi yellow apically
utilis Ald., var.
4. Penis with deep, cup-like concavity in front, in
which no copulatory tube is visible
rileyi n. sp.
- Penis with obvious copulatory tube projecting
from front side 5.
5. Free part of accessory plate long, finger-like,
divergent *clarata* n. sp.
- Free part of accessory plate flat but somewhat
slender *jonesi* n. sp.

No. 33. *Sarcophaga tetra* n. sp.

Male. So nearly like *sarraceniae* that it will suffice to point out the differences. Front narrower, .159 of head; three distinct ps dc, the anterior large and well spaced with the others; first segment of hypopygium black, with small bristles at apex; forceps not so heavy in profile and not toothed on front edge; penis seemingly more opened out to the front; both

claspers heavier and blunter; the anterior flat instead of compressed at tip.

Female (on same pin). Front, .308 of head, orbitals normal; several of the facial bristles stout; outer vertical well developed; no acr. except prescutellar pair; distinctly with three ps dc; three stout stpl; scutellum with two marginal, one stout subapical, no apical; abdomen with no median marginals on second segment; genital segment red, the opening slit-like, with bristles; middle femur with rows of bristles below, dwindling toward tip and not forming combs; three increasing bristles on outer front side of middle tibia.

Length of male 11 mm.; of female 10 m.

One male, one female, on same pin, Columbus, Ohio, no date, in the Hough collection.

Holotype and Allotype.—In the Hough collection.

No. 34. *Sarcophaga idonea* n. sp.

Male. Exceedingly like *sima*, but with a somewhat different hypopygium. This is larger, the first segment shining red, dark at base, with an interrupted row of stout bristles at posterior margin; second segment shining red, globose; forceps stout and rather long, with a gradual taper from behind and slightly bent forward, red except less than half the free part, ending in an incurved tooth; penis composed of similar parts to those of *sima*, but much larger, in profile not much smaller than second segment of hypopygium; on each side at the beginning of the distal segment there is a small white plume, like a little downy feather. The figures show the differences. 3 ps dc; 3 stpl.

Length 10 mm.

Two males, New Bedford, Mass.; one collected May 17, 1896, the other marked "July." Both in Hough collection. Front, .162 and .165.

Holotype.—Male, in the Hough collection.

Paratype.Male, No. 20501, in U. S. N. M.

No. 35. *Sarcophaga sima* n. sp.

Male. Front narrow, .148 of head; pollen of front and face white or somewhat plumbeous, without yellow tinge, somewhat changeable about the divergent lower frontals; parafrontals much narrower than middle stripe; parafacials with the usual row of hairs below close to eye, the lower ones bristle-like; antennæ black, the third joint somewhat reddish at base, not twice as long as second, reaching about two-thirds of the way to the vibrissæ, which are on the oral margin; arista of usual length and plumosity; some small erect hairs on facial ridges, reaching half way to base of antennæ; palpi and proboscis black, the latter very short; bucca not quite one-third the eyeheight; back of head with three rows of black hairs, beard yellowish, not very abundant; outer vertical not differentiated.

Thorax subshining black with white pollen, which leaves the usual 3-5 black stripes; 3 ps dc; 3 stpl; no ant acr; a pair of distinct prescutellars; scutellum with 2 marginal, 2 subapical (one evidently abnormal as it does not occur in the paratype male), and one large pair of apicals.

Abdomen subshining black, with silvery changeable pollen; fourth segment red on hind margin; first and second segments with only lateral bristles; third with a pair of median marginals, widely separated from the laterals; fourth with row of about 14.

Hypopygium red, the first segment somewhat brownish, with subinterrupted row of small bristles at hind margin; second segment red, globose, not large; forceps rather short and stout, curved gently forward, tapering sharply on the hind side to a slight tooth on the inner edge; penis rather small, its stalk black behind, whitish and swollen in front; distal segment with a claw bent closely forward over a compact central part; both claspers stout and dark brown.

Wings hyaline; a small costal spine; third costal segment a little longer than fifth; third vein bristly almost to the crossvein.

Legs black; middle femur with well-developed comb of spines below apically, the anterior row, however, more slender and slanting; middle tibia with two bristles (one small) on outer front side; hind tibia with sparse villosity consisting of only a few erect long hairs, spreading both ways; pulvilli very large, brown,

Female (on same pin). Front .28 of head, with usual orbitals; lateral vertical well developed; ps de 3, with a doubtful looking hair behind the anterior one; scutellum with 2 marginal and 1 subapical; third abdominal segment with median marginal pair and a smaller interval than in the male each side; fourth abdominal segment with red tip as in male; genital segment red, the opening somewhat rounded; middle femur not with combs, the rows of bristles dwindling toward apex.

Length of male $8\frac{1}{2}$, of female 8 mm.

Two males and two females; the holotype male and allotype female (on same pin), Plummer's Id., Md., June 21, 1908, F. Knab, in the National Museum; one male and one female, paratypes, Opelousas, La., March and May, 1897, in the Hough collection.

Holotype.—Male, No. 20502, U. S. N. M.

Allotype.—Female, No. 20502, U. S. N. M.

No. 36. *Sarcophaga pervillosa* n. sp.

A silvery tropical species with entirely red forceps, first vein hairy.

Male. Front wide, .256 of head (average of three,—.243, .261, .265); parafrontals about as wide as middle stripe, very silvery; parafacials concolorous, wide, with a row of slender hairs which become more scattered above; frontals 9, the usual two or three diverging ones absent, so that the row ends at the first fourth of the second antennal segment; the lowest pair only slightly divergent; vibrissæ distinctly above the edge of the mouth, the epistome, however, making a square angle, not rising obliquely; above the vibrissæ some bushy hairs, merging into a row that extend half way to base of antennæ; antennæ strikingly slender,

black, the third joint brown, less than double the length of the second, reaching three-fourths of the way to the vibrissæ; arista long, plumose for two-thirds of its length; palpi brown or yellowish-brown; proboscis black, normal; under side of head in profile straight and square, longer than usual; bucca almost equal to half the eyeheight; back of head with two rows of black hairs behind the eye, white beard rather abundant below, outer vertical present.

Thorax with almost silvery pollen, the usual 3-5 black stripes distinct from behind, brown from front; no acr except a very small prescutellar pair; 3 ps dc; 3 stpl; scutellum with no apicals, but with an additional pair of marginals between the usual two; sub-apicals very small.

Abdomen with silvery tessellation on ground color changing from black at base to red at apex; first and second segments with only lateral bristles; third with a median pair and laterals; fourth almost wholly red, with a row of about 20 marginals, partly double.

Hypopygium red, first segment a little pruinose on the middle, without bristles; second shining, with erect hair; forceps entirely red, tipped back and knobbed at apex, laterally with conspicuous, long, laterally-directed hair; behind the penis a median red process; penis with black, gibbose distal portion, a pair of flat, sharp processes projecting forward; posterior clasper with a strikingly long hair on front side.

Legs black, all the femora below and tibiae on inner side villous; middle femora without comb; middle tibia with one long bristle below middle on outer front side, and very long, dense, spreading villosity on inner side; hind coxa with dense brush of short spines on inner surface distally; hind femur thickened and much curved, villosity especially dense near base; hind tibia with a few large bristles behind, and dense villosity on inner side; hind basitarsus short and flat, with two projections below; the following joint with one similar but smaller one; middle basitarsus villous below; all pulvilli enlarged.

Wings hyaline, first vein hairy, third with half a dozen hairs; third costal segment about equal to the fifth; no costal spine.

Female not represented.

Length, 10-12 mm.

Four males: Two labeled Cabanas, P. R., Cuba, Sept. 5-8, 1913, Amer, Mus, Nat. Hist.; the other two from Havana, Cuba, Baker coll., in the collection of the author.

Holotype.—Male, No. 20503, U. S. N. M., from Havana.

No. 37. *Sarcophaga pervillosa* var. *inchoata* n. var.

Differs from the male of *pervillosa* only in having the hind tarsi plain, and the hind femora somewhat less robust and curved; hypopygium identical.

Female. Abdomen black except the fourth segment, which is red except narrowly at base; middle tibia with two large bristles on outer front side.

Two males and a female, Nassau, Bahamas, Dec. 14, 1912, in the National Museum (Frederick Knab, coll.). The size seems to be a little smaller, 8 and 9 mm. for the males.

The front in the female is .321 of the head, in one male is .244; the head of the other male is slightly damaged on one side and could not be accurately measured.

Holotype.—Male, No. 20504, U. S. N. M.

Allotype.—Female, No. 20504, U. S. N. M.

GROUP C.

Three postsutural dorsocentrals; hind tibiae not villous; hypopygium black.

Table of Species.—Males.

1. First vein hairy	12.
First vein bare	2.
2. Male with wide front and two orbital bristles on each side, the posterior one reclinate	10.
Male without orbitals	3.

3. Frontals not extending below base of antennæ; arista short-plumose (Massachusetts, Pennsylvania, New Jersey)

No. 12. *Harbeckia tessellata* n. sp.

Frontals extending below base of antennæ 4.

4. Anterior acrostichals wanting 5.

Anterior acrostichals large 6.

5. With the usual row of small hairs on lower parafacial; second abdominal segment usually with a pair of median marginals; second segment of hypopygium shining black (Manitoba)

No. 38. *fletcheri* n. sp.

With a single macrochaeta on lower parafacial; hypopygium large; second abdominal without median marginals (Georgia, Louisiana, Texas, New Jersey)

No. 10. *Camptopyga aristata* n. sp.

6. Arista short-plumose; hypopygium large (widespread) No. 11. *Agria affinis* Fallén.

Arista as usual, hypopygium small. 7.

7. Second segment of hypopygium shining; palpi black; forceps short, stout, black (California) No. 39. *davidsoni* Coq.

Second segment opaque; palpi black; forceps yellow, slender, strongly curved (New Hampshire, Ohio)

No. 40. *atlanis* n. sp.

Second segment opaque; palpi yellow; forceps slender, largely yellow 8.

8. Forceps with a protuberance on the attached part, on which is a striking tuft of long, straight black hair, which is invisible in repose (widespread)

No. 41. *hunteri* Hough

Forceps not with such tufts 9.

9. Distal segment of the penis very slender for half its length (Ohio)
 No. 42. *spatulata* n. sp.
 Distal segment thickened from its base (widespread, see Group D)
 No. 48. *opifera* Coquillett.
10. Bucca strongly produced behind in a lobe, separated by a deep furrow from the rest of the head 11.
 Bucca not so produced (Florida to South America)
 No. 9. *Sarcophagula occidua* Fabr.
11. Front tibiae and tarsi with fringe of short, erect hairs on outer and upper side (Florida to South America)
 No. 7. *Sarothromyia femoralis* Schiner.
 Front tibiae and tarsi plain (Florida)
 No. 8. *Sarothromyia femoralis* var. *simplex* n. var.
12. Second abdominal segment with erect median marginal bristles 13.
 Second abdominal not with such bristles 14.
13. Distal segment of penis full and globular, flat behind (widespread)
 No. 43. *melampyga* n. sp.
 Distal segment with hollow sides and a keel behind (Florida)
 No. 44. *melampyga* var. *alata* n. var.
14. Forceps at tip with a barb behind, like a crochet-hook (West Indies)
 No. 45. *chactopygialis* Williston.
 Forceps uniformly tapering at tip (Guatemala)
 No. 46. *albisignum* n. sp.

No. 38. *Sarcophaga fletcheri* n. sp.

Male. Front rather wide, .236 of head (average of two,—.223 and .248); 9 frontals, reaching to middle of second antennal joint, and diverging strongly at lower end of row; front and face with gray lustrous pollen, tinged slightly with yellow; the row of para-

facial hairs includes only a few, scattering, not large; antennæ reddish-brown, third joint one and two-thirds times as long as second, and reaching five-sixths of the way to the vibrissæ, which are at the oral margin; arista as usual; bucca one-third the eye-height; palpi and proboscis black, ordinary; back of head convex, with three rows of black hairs and only a little pale beard; outer vertical not differentiated.

Thorax gray, the usual 3-5 black stripes; 3 ps de; 3 stpl; no anterior acrostichals; prescutellar a very feeble pair; scutellum with two large marginals, the subapical pair minute or absent, apical absent or represented by a pair of divergent hairs.

Abdomen gray, rather long and cylindrical, with tessellated pattern; a distinct median black stripe on the first three segments, accompanied by changeable indications of one on each side; ground color of abdomen largely reddish, especially below; first segment with only lateral bristles; second and third each with a large, erect median marginal pair; fourth with a marginal row of 10.

Hypopygium rather small; first segment black, opaque pollinose, with a row of small bristles; second usually shining black, but in some specimens more brown, rarely reddish brown; without conspicuous hairs; foreeeps black, rather bare, short and at base wide, diverging and near tips again converging, in profile straight with a short turn forward at the point; accessory plate small; posterior clasper small, black, pointed; anterior clasper in profile short and straight, rounded at tip, not hooked,—viewed from behind it is very wide, the end emarginate, and all shining black; penis very short and broad, basal segment not visible, the distal bearing on each side at tip a flap turned forward like an ear; fifth sternite conspicuous with a linear fissure (not V-shaped as usual): on each side of the fissure behind is a small black hoodlike point.

Legs black; middle femur with distinct comb behind on lower side near tip; middle tibia with two bristles on outer front side; hind tibiæ not villous.

Wings hyaline; no costal spine; third costal segment about three fourths as long as the fifth; first vein bare; third with several bristles.

Female. Eleven females reared with Mr. Jones's males belong without much doubt here. Eight of them have the large, erect macrochætæ on the margin of the second segment, as in the males; in three these are small or absent. The genital segments are red in all, except the deeply emarginate fifth sternite, which is black in most. Aside from the presence of the bristles on the second segment, I see no characters to distinguish these females from those of *rileyi*, *jonesi*, and *clarata*.

Length about $6\frac{1}{2}$ mm.

Eight males and eleven females. Two males are from Aweme, Manitoba, June 19, 1903, collected by James Fletcher and bearing his manuscript labels. Five males and all the females were reared by F. M. Jones from larvæ in cups of *Sarracenia minor*, *rubra*, and *purpurea*, at Southern Pines, N. C., emerging throughout August, 1916. One male, Tuckerton, N. J., reared by Mr. Jones from *Sarracenia pupurea*. One North Carolina male and three females lack the median marginal bristles on the second abdominal segment.

For a list and table of *Sarcophagas* reared from *Sarracenia*, see under *sarraceniae*.

Named in honor of James Fletcher, whose charming personality and vigorous pioneering work in Canadian entomology are vividly remembered.

Holotype.—Male, No. 20505, in the U. S. National Museum, Tuckerton, N. J., reared by F. M. Jones from *Sarracenia purpura*, Aug. 20, 1916.

Allotype.—Female, No. 20505, U. S. National Museum, reared by F. M. Jones from *Sarracenia rubra*, Aug. 26.

No. 39. *Sarcophaga davidsoni* Coq.

Coquillett, Insect Life, v. 24, 1892.

Davidson, *ibid.*, vi, 268, 1893, notes on parasitism.

Male. Front of medium width, .195 of head (average of three,—.190, .193, .201); middle stripe fully three times as wide as one side at the narrowest; parafrontal and parafacial silvery, the latter with the usual row of hairs, coarse below; frontals 10, the lower sharply diverging, as low as first third of the second antennal joint; antenna blackish, third joint less than twice as long as the second, but reaching three-fourths of the distance to the vibrissæ, the latter just above the oral margin; arista long-plumose for over half its length; palpi and proboscis black, ordinary; bucca one-fourth the eyeheight; back of head with three rows of black hairs, the pale beard scanty; outer vertical bristle not differentiated.

Thorax blackish, from behind appearing gray with three black stripes; 3 ps dc; 3 stpl; 2 large pairs of ant acr; prescutellar rather large; scutellum with two large marginal, one smallish subapical, and one rather long apical pair.

Abdomen black, from behind showing three changeable black stripes on silvery pollinose ground; the middle stripe rather constant; second segment with more or less of a row of depressed large hairs at margin, sometimes simulating bristles; third segment with a row of 12 erect stout bristles, fourth with a row of about twenty.

Hypopygium minute; first segment subopaque, with some small bristles at tip; second shining black, with coarse erect hairs; forceps short, stout, straight, black, with a terminal tooth almost on inner edge; accessory plate oval; both claspers much alike, tapering, with curved tips; penis with distinct swollen basal segment, distal one black, shining behind, almost egg-shaped, in front with a pair of yellow protruding points and a pair of flat black processes; fifth sternite V-shaped, the inner edge fringed with black hairs.

Legs black; middle femur with two rows of bristles below but no combs; middle tibia with one bristle on outer front side; hind tibia not villous.

Wings hyaline; no costal spine; third costal segment equals fifth; first vein bare, third hairy almost to crossvein.

Female. Front .285 of head (average of two,—.265 and .304), with the usual two orbitals; outer vertical bristle large; lower facial hairs rather bristle-like; scutellum without apicals; genital segment black, with slit-like orifice; middle femur with lower rows of bristles very feebly developed; middle tibia with two bristles on outer front side.

Length, $5\frac{1}{2}$ mm.

Six males, two females; one pair from Los Angeles, Cal., sent by Dr. Anstruther Davidson, reared by him from a nest of *Epeira argentata lutatius*, the nest accompanying the material; one female, Moscow, Idaho. June 19, 1910, which has been compared with the type material of the species in the National Museum, and is so labeled; one male, Midland, Texas, Nov. 12, 1914 (Bishopp No. 3983, adult on fresh cow manure); one male, Havana, Cuba, collected by C. F. Baker; two males in the Hough collection without locality, one marked June 22.

Originally described from two male specimens bred by Dr. Anstruther Davidson from nest of *Phidippus opifex* McC. at Los Angeles; in the reference given above, Dr. Davidson mentions rearing other material, including what I have seen from him.

Holotype.—Male, in U. S. N. M.

No. 40. *Sarcophaga atlanis* n. sp.

Male. Front rather narrow, .144 of head (average of three,—.133, .143, .155); frontal stripe at least twice as wide as one side; frontal bristles more numerous than usual, 11 to 13 in number; strongly divergent below, reaching below the middle of the second antennal joint. Parafrontals and parafacials shining gray pollinose, the latter with a row of coarse

hairs or bristles. Antennæ black; third joint slender, twice as long as second, reaching four-fifths of the way to the vibrissæ; arista plumose as usual; vibrissæ at oral margin, a few hairs above them on facial ridge. Palpi and proboscis black, ordinary. Bucca one-third of eyeheight. Back of head with three rows of black hairs behind the eye and abundant but not very long whitish beard. Outer vertical bristles absent.

Thorax gray pollinose when viewed from behind with 3-5 black stripes; 3 ps de and 2 pairs large ant aer; 1 large prse; 3 stpl; on scutellum there are two marginals, one preapical and one apical.

Abdomen gray pollinose with three stripes, the median one being quite constant, the lateral ones changeable; first segment with only lateral bristles; the second segment with a small pair of median marginal bristles; the third segment with a large pair of median marginal bristles and five laterals; the fourth segment with a row of about 16.

Hypopygium: first segment rather small, brown pollinose, with a row of six or eight small bristles near the apex; second segment small, reddish brown, subshining, without conspicuous hairs or bristles. Forceps slender, yellow, not divergent, strongly hooked forward and blackened at apex. Accessory plate short but with an acute tip. Posterior clasper slender, strongly hooked. Anterior clasper much stouter and shorter, broad at apex; penis with rather long basal segment, the distal one shining black, bent forward at an angle; its flat posterior part expanded apically into two lateral lobes, the median part black, compressed; fifth sternite with V-shaped opening bearing a few hairs and delicate pubescence.

Legs black; middle femur with short, well developed comb on hind side below; middle tibia with two bristles on outer front side; hind tibia without vilosity.

Wing subhyaline; no costal spine; third costal segment shorter than fifth; first vein bare; third vein hairy half way to crossvein.

Female. Front .274 of head. The usual two orbital bristles; third antennal joint less slender than in the males. General color more grayish. Outer vertical bristles present. No apical bristles on scutellum. Second abdominal segment without median marginal bristles. Abdomen distinctly reddish; genital segment dull red opaque, enclosing a well developed short larvipositor like that of *hunteri*. Middle femur without comb.

Length, $5\frac{1}{2}$ -8 mm.

Five males and one female; one male and one female bearing label "from *C. atlans*, Franklin, N. H., collected July 15. Flies Aug. 1st. C. L. M.," from the collection of C. V. Riley, No. 421X; two males Sandusky, O., June 30, 1900 (Prof. Jas. S. Hine); two males Aberdeen, S. D., July 12, 1916 (W. E. Dove, collector).

Holotype.—Male, No. 20506, U. S. N. M., from Franklin, N. H.

Allotype.—Female, No. 20506, U. S. N. M.

Marlatt, Insect Life, ii, 68, 1889, mentions this as *Sarcophaga sp.*, and states that about 5 per cent. of the grasshoppers in the outbreak at Franklin, N. H., contained dipterous larvæ.

No. 41. *Sarcophaga hunteri* Hough.

Hough, Kansas Univ. Quart., vii, 207, figs.; in S. J. Hunter's bulletin "Alfalfa, Grasshoppers and Bees," from Ent. Dept. Univ. Kansas, p. 34, figs.

Morgan, Bull. 30, n. ser., Div. Ent. 25.

Kelly, Journ. Agr. Research, ii, 441.

Aldrich, *ibid.*, 444, footnote.

Male. (Type). Front narrow, .122 of head (average of five,—.115, .115, .122, .123, .134). Frontal bristles rather widely divergent below, 10 in number, reaching the middle of second antennal joint. Parafrontals and parafacials silvery, the latter with the usual hairs, coarse below. Antennæ reddish

brown, reaching three-fourths of the distance to vibrissæ; third joint rather slender, fully twice the second; arista rather long, plumose on the basal half or more. Vibrissæ at the oral margin. Palpi yellow; proboscis brown, retracted, small; front of head rather reddish in ground color; bucca one-fourth the eyeheight; back of head with three rows of black hairs and rather abundant pale beard which does not quite reach the margin of the mouth. Outer vertical bristles absent.

Thorax gray pollinose with the usual 3-5 black stripes; 3 ps dc; 2 pairs ant acr; prsc rather large; scutellum with two large marginals, one small pre-apical, and one small apical.

Abdomen whitish gray pollinose, with distinct median black line and changeable lateral line each side; first segment with only lateral bristles; second segment the same but with small depressed bristles along the hind margin, the middle pair somewhat larger; third segment with a row of about 12; fourth segment with a row of about 16; genitalia minute; first segment opaque, pollinose, black, with a row of coarse hairs or small bristles near its apex; second segment very small, rather reddish than black, without noticeable hairs; forceps are slender, yellow, delicate and rather square at tip. Behind them there is on each side a prominent yellow lobe which really is a part of their base, bearing a striking tuft of straight black hairs twice as long as the forceps themselves. These tufts are concealed in the ordinary position of the organ and are different from anything occurring in the related species so far as known. Posterior clasper flat, slender, yellow, with a minute straight black tooth at tip; anterior clasper dark brown, rather heavy and blunt, with several hairs near the apex; fifth sternite V-shaped, inner edges with pubescence and scattering slender black hairs.

Legs black; middle femur with a few stout spines, hardly forming a comb; middle tibia with one

bristle on outer front side; hind tibia without villosity.

Wing subhyaline, no costal spine; third costal segment a little shorter than the fifth; first vein bare; third vein hairy half way to crossvein.

Other males show the second segment of hypopygium considerably blacker but still partly reddish.

Female. (Cotype). Very much more ashy pollinose than the male, which is comparatively black.

Front .304 of the head (average of five,—.282, .306, .306, .311, .314). Frontal stripe yellow, narrower than one side; the usual two orbital bristles; antennae almost yellow; outer vertical bristle present. Thorax light gray, hardly striped at all. Scutellum without apical bristles. Abdomen light gray with a median indistinct stripe. All of the bristles shorter and indistinct. The largest are those of the third segment; the fourth segment bears only hairs. Genital segment retracted, not visible, but the orifice closed by a distinct larvipositor which is spatulate at apex, bears two tufts of convergent hairs near the base and does not protrude enough to be noticeable. Middle tibia with two bristles, one small. Other females are not quite so pale and show a more striped and tessellated abdomen.

Length, males 6 mm; females 5 mm.

One male and one female, type material in Hough collection, bred from *Melanoplus differentialis*, Ford County, Kansas; emerged Sept. 6; one male, bred from a grasshopper, St. Louis, Mo., emerged April 22, 1819 (Riley, No. 1027 p.); one male without locality, collection C. V. Riley, Sept. 6, 1884, No. 2882; four females, Natrona, Cal., July 18, 1885, C. V. Riley; one of them labeled "pupa found in ground," July 12; two females Payson, Utah, reared from grasshoppers by C. N. Ainslie (Webster, No. 6673); two females Charleston, Mo., Sept. 28, 1914, reared from undetermined grasshopper by G. W. Barber (Webster No. 7973); two females Marysville, Neb., Oct. 7, 1914, reared from *Melanoplus dif-*

ferentialis by W. E. Pennington (Webster No. 13535); one male Wellington, Kan., E. G. Kelly, (Webster No. 7398); two pairs reared from *Melanoplus atlantis* at Brawley, Cal., by T. D. Urbahn (his No. 1653); one female Three Rivers, Cal.; one male Moscow, Idaho; one female Kaslo, B. C., Aug. 17, A. N. Caudell, collector; one female Williams, Ariz., May 29, H. Barber collector; one male, Melrose Highlands, Mass., July 30, 1912, H. E. Smith collector; one male Hinckley, Ohio, June 29, 1901, J. S. Hine, collector; one male Manahawkin, N. J., July 5, 1909, Harbeck; one female Lucaston, N. J., Harbeck; two males and one female Pocono Lake, Castle Rock and Germantown, Pa. Harbeck; one male without locality (Webster No. 6299); three females, reared from codling moth at Roswell, N. Mex., Dec. 9, 1912 (Quaintance No. 6208).

Types.—In Hough collection and University of Kansas.

This species, as will be seen, has been repeatedly reared from grasshoppers and occurs throughout most of the United States. Kelly's article mentioned above records rearing from grasshoppers in several places. I find that the material there mentioned from Wilson Creek, Wash., is *opifera* and not *hunteri*.

No. 42. *Sarcophaga spatulata* n. sp.

Male. Front narrow, .136 of head; frontals 10, the anterior opposite middle of second antennal joint and moderately divergent; face and front gray pollinose, not very silvery; parafacial with rather irregular row of the usual coarse black hairs; antennæ brownish-red, third joint one and two-thirds times as long as the second and reaching four-fifths of the way to the vibrissæ, which are perceptibly above the oral margin; arista black, rather long; plumose only to the middle; a few scattered hairs extend nearly halfway up the facial ridges; bucca over one-fourth the eye-height, the hairs coarse and black, edge of mouth with bristles along the sides; palpi yellow; proboscis

brown, very short; back of head with three rows of coarse, rather erect black hairs, the pale beard not abundant; outer vertical bristles barely larger than adjacent hairs.

Thorax gray with the usual 3-5 black stripes; 3 ps dc; 3 stpl; anterior acrostichals strikingly large; 3 pairs; prescutellar 2 small pairs; scutellum with 2 large marginals, 1 small subapical, 1 long, decussate apical pair.

Abdomen gray, somewhat changeable, with one permanent median black stripe and on each side a subpermanent one; first and second segments with only lateral bristles, third with a row of 10, fourth with 14.

Hypopygium dark, minute, opaque; first segment in the specimen almost invisible; second brown or reddish-brown, more red around anal area, with rather abundant but not striking hair; forceps pale yellow, rather thin and bladelike, not diverging at tip; accessory plates with slender tip; penis with yellow basal segment, the apical one long, slender at base for half its length, then with two lateral flap-like lobes extending forward, the terminal part flat, shining, truncate; fifth sternite concealed.

Legs black, rather stout; middle femur with posterior comb of spines on lower edge near apex; middle tibia with one bristle on outer front side; hind tibia without villosity.

Wings hyaline; no costal spine; third costal segment equal to fifth; first vein bare, third hairy two-thirds of the way to the crossvein.

Female. General color cinereous; front .277 of head (average of two,—.273 and .281); 7 or 8 frontals, the lower reaching the middle of second antennal joint as in male; parafacial hairs few and small; outer vertical strong; scutellum with two very large marginal, one very small subapical; genital segment of abdomen gray, opaque, the opening oval, filled by the basal part of the larvipositor, which is a modified sixth sternite; it protrudes in sword shape (in profile,

viewed from above it is more spatulate), and is grooved above; the tip turns up, and the free part is shining black, at the base of which it bears some long hairs below. Middle femur without comb. One of the two females has 2 stpl, the other 3.

Length of male, $5\frac{1}{2}$ mm.; of female 5 mm.

One male, two females, Wauseon, Ohio, collected by Professor Jas. S. Hine; the male is dated Aug. 25, 1902, the females Sept. 4 of the same year; one female, Aberdeen, S. D., Aug. 12, 1916 (W. E. Dove). It seems practically certain that these males and females belong together; nevertheless I have taken the precaution to place the type label on one of the females, as the specific name refers to the larvipositor.

Holotype.—Female, in Professor Hine's collection.

Allotype.—Male, in Professor Hine's collection.

Paratype.—Female, No. 20507, U. S. N. M., from Aberdeen, S. D.

No. 43. *Sarcophaga melampyga* n. sp.

Male. Front broad, .279 of head (average of five,—.238, .264, .281, .293, .317); frontal stripe is about as wide as one side; parafrontals and parafacials silvery, the latter with the usual row of hairs, rather scattered and not short below; antennæ black; third joint less than double the length of the second, reaching four-fifths of the way to the vibrissæ: arista with rather shorter plumosity than usual, extending a little over half way. Vibrissæ at oral margin; palpi black; proboscis black; back of head with two rows of black hairs and shorter third row; the pale beard rather conspicuous. Outer vertical bristles well developed; bucca one-fifth the eyeheight.

Thorax gray pollinose with 3-5 black stripes when viewed from behind; 3 ps dc; ant acr wanting; prsc small; stpl, 3; scutellum with 2 marginals, preapical and apical very minute; on each lateral edge with a brush-like patch of erect white hairs, brown at base.

Abdomen black, rather silvery pollinose, tessellated, not striped. First segment with only lateral bristles; second and third segments each with a very large pair of median, erect bristles; fourth segment with a row of about 18 marginal bristles; an erect pair of still larger submarginals.

Hypopygium blackish; first segment of moderate size, subopaque, becoming red at lower edges, with a row of bristles near the hind margin; second segment concolorous, globose, with several scattered erect bristles; forceps flat, straight, shining black; uniformly tapering, the tips rather blunt and not at all divergent, near the basal outer angle with long bristles sloping back; accessory plate small, triangular; posterior clasper excised near tip, on outer side with a long hair; anterior clasper black, smooth, rather spoon-like at apex; penis with basal segment, very wide in profile; apical segment enlarging from the beginning, broad and black, with two widely separated horn-like points at tip, on front side in the middle a funnel-like protuberance with several little points above and below it; fifth sternite with a V-shaped excision which bears a very delicate black brush.

Legs black; middle femur without comb; middle tibia with three bristles on outer front side, the intermediate one strikingly large; hind tibia without villosity.

Wings subhyaline; costal spines well developed; third segment of costa shorter than fifth; first and third veins with rather large hairs; hind crossveins very straight and less oblique than usual.

Female. Front .351 of head, with the usual two orbitals; outer vertical present; lateral edges of scutellum ornamented precisely as in the male, the brush of white hairs with brown basal part extends from the base to the second marginal, near the tip; first marginal rather on the upper surface, as usual; a pair of small apicals just as in the male; genital segment hid-

den by the folding together of the sides of the fourth segment in the only female.

Length 4-7½ mm.

Ten males, one female. One male, Trenton, N. J., June 26, 1910 (Harbeck); two males Opelousas, La., April and May, 1897 (Hough collection); one Uvalde, Texas, July 16, 1914, adult on fresh cowdung (Bishopp, No. 3489); one without locality label (Bishopp 3325); Cincinnati, O. (Hine); Manayunk and Castle Rock, Pa. (Harbeck); LaFayette, Ind. (J. M. A.); one male and one female, Key West, Fla., May 1-3, 1915 (Sturtevant).

Holotype.—Male, No. 20508, U. S. N. M., from Uvalde, Tex.

Allotype.—Female, No. 20508, U. S. N. M., from Key West, Fla.

No. 44. *Sarcophaga melampyga* var. *alata* n. var.

Differs from *melampyga* only in the structure of the penis. The distal segment on the posterior side has a median rather double keel, which divides and diverges at each end; the terminal tube is larger in diameter; and on the front side beginning near the middle is a wide turned-back fold or thin, pale, corrugated or ruffle-like expansion, which turns back and narrows laterally. This last is represented in *melampyga* by a rather narrow flap as shown in the figure. In *melampyga* the body of the distal segment is full and round on the sides, while in the variety it is hollow. The difference would easily be specific if accompanied by any other characters, but in their absence this form may stand as a variety.

Twenty-seven specimens, both sexes; eight of both sexes from Miami, Fla. (C. H. T. Townsend and Mrs. Townsend); six from Key West, Fla., Feb. 1-6, 1869 (C. V. Riley); one male, one female, on same pin, Biscayne Bay, Fla. (Mrs. Slosson); one male, Miami, Fla., American Museum Nat. Hist.; one male, Witfeld, Fla., July, 1882 (C. V. Riley); ten both sexes, Havana, Cuba, in the writer's collec-

tion, collected many years ago by Prof. C. F. Baker.

Holotype.—Male, No. 20509, U. S. N. M., Miami, Fla.

Allotype.—Female, No. 20509, U. S. N. M., Miami, Fla.

No. 45. *Sarcophaga chætopygialis* Will.

Williston, Trans. Ent. Soc. Lond., 1896, 366.

Williston described the species from numerous specimens, some of which he retained in his collection while returning most of them to the Entomological Society in London; the retained material ultimately became a part of the collections of the University of Kansas (four males) and of the American Museum of Natural History (four specimens under this name, of which three are *Sarcophaga communis* Pk.). As Dr. Williston did not designate any particular type, these specimens have the same standing as those in London. I exclude the specimens of *communis*, and redescribe the other species.

Male. Front about one-third as wide as one eye (not measured); pollen of front and face yellow but not intensely so, inside the lunule blackish; antennæ blackish at base, third joint brown, its base red-brown; third joint four times as long as second; arista long-plumose on basal three-fifths; parafacial destitute of hairs (even under high power of Zeiss binocular); palpi black, smallish; outer vertical absent.

Mesonotum with black and white stripes; ps dc 3; stpl 3; scutellars rubbed off.

Abdomen black and silvery, with unusually distinct pattern: at side a silvery band on segments 1 to 4, on the upper surface of each two oblique silvery spots, the rest black; legs black, not villous, not very bristly; middle tibia with only one small bristle in front near middle.

Wing hyaline, first vein with a few setæ near the base, third with a short row.

Hypopygium: both segments black, of moderate size; probably no bristles on first segment; forceps

black with a hook on the back at tip, just like a crochet-hook; accessory plate low and wide, with silky yellow appressed hair; posterior clasper long, straight and slender, and hooked on the front side at tip; anterior clasper immense, black, rounded at apex, with a deep concavity on the side; penis yellowish-brown, bulky, hooded, no processes visible.

Five males, St. Vincent, W. I., as above stated.

Some of Williston's data are evidently taken from the other species, especially the red hypopygium.

Types.—In Entomological Society of London, University of Kansas, and American Museum of Natural History.

No. 46. *Sarcophaga albisignum* n. sp.

Male. Front of more than medium width, .217 of head; frontal stripe reddish black, sharply defined, wider than one side; frontals 8, strongly divergent below, barely reaching middle of second antennal joint; sides of face and front shining yellow pollinose, a little paler than golden; facial impression concolorous; facialia black, middle of face whitish; parafacialia with very few and slender hairs; antennæ black, third joint three and one-half times as long as the second, reaching five-sixths of the way to the vibrissæ, which are at the oral margin; arista very long plumose for four-sevenths of its length; bucca one-fourth the eye-height; palpi and proboscis black, ordinary; back of head with all black hairs except a few yellow just below the foramen; outer vertical absent.

Thorax densely whitish pollinose, when viewed from behind the three main black stripes are very strongly contrasted; 3 ps dc; ant acr 1 or 2 smallish; 3 strong stpl; prescutellar of medium size; scutellum with 2 large marginal (a small between them), a small subapical, no apical.

Abdomen with silvery pollen; median stripe black, a lateral each side very changeable; first and second segments with only lateral bristles; third with

one pair median and 3 lateral, fourth with a row of about 16.

Hypopygium of moderate size, black, opaque; first segment with 4 to 6 stout bristles in a transverse row near tip; second with long, erect hairs, a few of which may be called bristles; forceps black, slender, tapering, widely diverging, bent forward near base, thence nearly straight to apex; accessory plate triangular; posterior clasper robust, excised before tip, and with a long hair; anterior clasper shining brown-black, wide at base, narrowing to a long slender curved tip, and at the place of narrowing bearing a supplementary point on outer side; penis rather long, basal joint distinct, the distal one globose, bearing on the front side near base an ascending curved median organ, white except its base and edges; connected with this organ toward the base a median yellow process ending in a minute hook.

Legs black; median femora on hind side below with about four stubby spines (a short comb); middle tibia with only one small bristle on outer front side, considerably below middle; hind tibiæ not villos.

Wing subhyaline; fourth vein ending only a little before apex (one-third the length of the fifth costal segment); third costal segment shorter than fifth; first vein hairy; third hairy over half way to cross-vein; no costal spine.

Female not known.

Length 7 mm.

One male, Los Amates, Guatemala, Jan. 16-20, 1905, collected by Professor Jas. S. Hine.

Holotype.—In collection of Professor Hine.

GROUP D.

Three postsutural dorsocentrals; hind tibia not villous; at least the second segment of the hypopygium red.

Table of Species.—Males.

- | | | |
|----|---|-----|
| 1. | First vein hairy | 25. |
| | First vein bare | 2. |
| 2. | Palpi yellow | 3. |
| | Palpi black | 7. |
| 3. | At least the hind knees and tibiae red; outer vertical present; 2 stpl (West Indies). | |
| | No. 19. <i>Harpagopyga diversipes</i> Coq. | |
| | Legs black; outer vertical absent in male | 4. |
| 4. | First segment of hypopygium with a row of stout bristles near the base, not the apex; usually four stpl (Mass.) | |
| | No. 20. <i>Thelodiscus indivisus</i> n. sp. | |
| | First segment with row at apex, often indistinct | 5. |
| 5. | Large species (12 mm.), very robust; penis with a hook behind near tip (Georgia) | |
| | No. 47. <i>magna</i> n. sp. | |
| | Small species; penis not with hook | 6. |
| 6. | Forceps with a pair of processes on the basal attached part which bear a striking tuft of long, straight black hair (concealed in repose) (widespread, Group C) | |
| | No. 41. <i>hunteri</i> Hgh. | |
| | Forceps not with such processes or tufts (widespread) | |
| | No. 48. <i>opifera</i> Coq. | |
| 7. | Arista long and thin, short-plumose; hypopygium large, second segment red, with long, upcurved bristles (widespread) | |
| | No. 13. <i>Hypopelta serofa</i> n. sp. | |
| | Arista as usual | 8. |
| 8. | First segment of hypopygium black; forceps wholly yellow (tropical and subtropical, Group II). | |
| | No. 127. <i>sternodontis</i> Tus. | |
| | Both segments yellow | 9. |

9. Frontal rows not strongly divergent below;
epaulets yellow (widespread).
No. 49. *peniculata* Park.
Frontal rows suddenly diverging in the last two
or three bristles; epaulet black 10.
10. Anterior acrostichals absent or very indistinct
New Jersey, Pennsylvania, Ohio)
No. 50. *parallela* n. sp.
Anterior acrostichals well developed. 11.
11. Parafacials and front part of bucca golden yel-
low (Indiana, Louisiana, Missouri)
No. 51. *rudis* n. sp.
Parafacials gray 12.
12. Penis with a pair of erect recurved hooks on the
back near apex 13.
Penis not with hooks on back 16.
13. Accessory plate broad and excised at apex
(Massachusetts)
No. 52. *excisa* n. sp.
Accessory plate nearly round 14.
Accessory plate at least twice as long as wide,
not excised 15.
14. Forceps near the tip swollen behind and cov-
ered with minute barbs (Colorado, New
Mexico) No. 53. *cleodis* n. sp.
Forceps straight, slender (Georgia)
No. 54. *masculina* n. sp.
15. Distal segment of penis slender, narrowed at tip
(widespread) No. 55. *alcedo* n. sp.
Distal segment enlarged at the end, blunt (Kan-
sas) No. 56. *prohibita* n. sp.
16. Distal segment of the penis in the form of a long
tube, incurved at the end and forming a
loop that can be seen through in profile be-
yond the lateral processes (widespread)
No. 57. *reversa* n. sp.
Distal portion not forming a loop that can be
seen through 17.

17. Distal segment of the penis on its apical half with lateral thin, expanded margins which are whitish or transparent, somewhat like a ruffle. 18.
 Penis not with ruffle-like expansions 21.
18. Distal segment (beyond the hinge) evidently divided into two subsegments 19.
 Distal segment not distinctly divided 20.
19. The division of the distal segment is near the tip, which is divided into two delicate processes attached to the fringe (widespread)
 No. 58. *marginata* n. sp.
 The division is just beyond the middle, the apex broadly and deeply cleft into two strong but flat claws, which are not connected with the fringe (widespread)
 No. 59. *falciformis* n. sp.
20. The chitinous distal segment notched into two sharp points at apex; a pair of erect median marginal bristles on second abdominal segment (widespread)
 No. 60. *setigera* n. sp.
 The distal segment swollen and whitish near end, not perceptibly notched; rarely with median marginals on second segment of abdomen (widespread)
 No. 61. *coloradensis* n. sp.
21. Second abdominal segment with median marginals; distal segment of penis divided just beyond the middle, second part running out smooth and chitinized to an almost square, slightly emarginate end (Maryland, Virginia)
 No. 62. *websteri* n. sp.
 Second abdominal segment of abdomen without median marginals 22.
22. Front generally less than one-tenth the head-width (maximum .12) (Georgia)
 No. 63. *angustifrons* n. sp.
 Front at least .16 of the head-width 23.

23. The stout divergent prongs at the tip of the penis cover and conceal the minute incurved copulatory tube, or at most have a V-shaped opening (widespread)
 No. 64. *aculeata* n. sp.
 The prongs spread apart U-shaped so as to show the much larger incurved tube 24.
24. The penultimate lateral processes of the penis extend forward and are thick and black, with spinose outer side (widespread)
 No. 65. *aculeata* var. *gavia* n. sp.
 The penultimate lateral processes extend forward only a short distance, but extend backward and underneath in the form of a thin brown margin (widespread)
 No. 66. *aculeata* var. *tadiosa* n. var.
25. Tibiæ yellow (Georgia)
 No. 67. *flavipes* n. sp.
 Tibiæ black 26.
26. First segment of hypopygium very large, flat behind, giving the abdomen a truncated appearance; acrostichals well developed (widespread)
 No. 68. *larga* n. sp.
 Not as described 27.
27. Abdomen red except first segment (Texas, Mexico, South America)
 No. 68. *rufiventris* Wied.
 Abdomen black 28.
28. Penis in the shape of an elongated flask (Texas)
 No. 70. *ampulla* n. sp.
 Penis not flask-shaped 29.
29. First segment of hypopygium prominent (Cuba)
 No. 71. *biseriata* n. sp.
 First segment retracted, almost invisible 30.
30. Hypopygium and posterior half of fourth abdominal segment red (Cuba, Mexico)
 No. 72. *surrubea* V. d. W.
 Fourth abdominal segment black 31.

31. Anterior acrostichals strong, three pairs (British Guiana) No. 73. *hospes* n. sp.
 Anterior acrostichals hardly differentiated from hairs (widespread)
 No. 74. *helicis* Towns.

No. 47. *Sarcophaga magna* n. sp.

Male. Front almost exactly one-fifth of the head width (in the five specimens, .182, .200, .203, .204, .204, average .1986); parafrontals and parafacials subsilvery, the former with numerous small hairs up to the level of the lowest ocellus; the latter with numerous rather coarse hairs not evidently arranged in rows, which continue on the facial impression; frontals strongly diverging below, reaching as far as the middle of the second antennal joint; frontal stripe brown, twice as wide above as one side; vibrissæ about two-thirds the length of the second antennal joint above the oral margin; facialia hairy half way or more to base of antennæ; antennæ brown, third joint reddish, rather slender, twice the second, reaching three-fourths of the way to the vibrissæ; arista plumose only a little over half way; palpi dark yellow, hairy, the base brown; proboscis short; back of head with three very distinct rows of black hairs, and all round the neck abundant pale ones, which, however, are mostly replaced by black below; lateral vertical not differentiated.

Thorax gray pollinose with 3-5 black stripes; 3 ps dc; 2 ant dc; 3 stpl; ant acr well developed; pre-scutellars one pair of good size; scutellum with two large lateral pairs (between them one or two smaller), one subapical and one apical of fairly large size.

Abdomen gray pollinose with the usual tessellations, the fourth segment rather broadly red at apex; first and second segments with only lateral bristles, third with a pair of erect median marginals and four lateral, fourth with row of about 18.

Hypopygium entirely red, first segment with row of about six stout bristles near tip; second seg-

ment with a pronounced hump in profile, covered with evenly placed erect black hairs; forceps black, rather stout, bent back on the attached basal portion, which is covered with coarse black hair; the free part straight nearly to tip, then bending forward to an oblique, outwardly directed point; from behind, the forceps are quite widely separated from the base. Accessory plates yellow, shining, elongated apically but the basal part very short; both claspers dark brown, stout and equally hooked, the anterior shorter. Penis large, basal segment reddish, of moderate size; distal segment large, blackish, shining, notched into two sharp points at tip; on the back just behind these is a pair of divaricate and recurved large hooks, united at base; viewing the distal segment from obliquely in front, it is strongly protuberant beyond the middle, with a large central orifice, basad of this orifice and on a less protuberant level is a wide rim, extending laterally past the body of the organ into an earlike lobe; distad of the orifice the shape is like a goat's head, the orifice being its mouth, and back from this (disto-posteriorly) it bears two processes like the horns but with retrorse minute spines; these processes nearly meet the tips of the segment first mentioned. Fifth sternite widely excised at base, dark, yellow; on each side near the base is a prominent, smooth red process; beyond these the sides approach each other and are covered with black bristles, thence rapidly diverging.

Legs black, of ordinary structure; middle femora with a comb behind on lower side; middle tibia with two bristles on outer front side; hind tibia without villosity.

Wings almost hyaline; a minute costal spine; first vein bare, third hairy half way to crossvein; third costal segment as long as fifth and sixth together.

Length 11-13 mm.

Five males: four from Tifton, Ga., June 13, 1896, in the Hough collection; the other Tampa, Fla., April 29, 1915, collection of A. H. Sturtevant.

Holotype.—Male, No. 20510, U. S. N. M., from Tampa, Fla.

No. 48. *Sarcophaga opifera* Coq.

Coquillett, Insect Life, v. 22, 1892.

Townsend, Proc. Biol. Soc. Wash., xxviii, 23, 1915, designates as type of the undescribed genus *Opsophyto*.

Male. Front narrow, .122 of head (average of five, .111, .112, .116, .126, .144); 12 fronto-orbitals, reaching almost to middle of second antennal joint, gradually (not suddenly) divergent below; front and face quite silvery pollinose, much of the ground color red; frontal stripe red; parafacial with the usual row of hairs, rather double below; antennæ red, second joint nearly as long as third, with an erect bristle; third reaching three-fourths of the way to vibrissæ; palpi yellow; proboscis brown, short; back of head concave above, with two rows of black hairs; beard inconspicuous; outer vertical not differentiated.

Thorax with 5-7 black stripes, the intervals gray pollinose; 3 ps dc; 3 stpl; ant acr strong; prescutellars large; scutellum with two large lateral, one small subapical, one smallish erect decussate apical pair.

Abdomen densely gray pollinose with changeable reflections and three rather constant blackish stripes; first and second abdominal segments with only lateral bristles, but the second has several large depressed hairs on hind margin; third segment with median marginal pair and several lateral; fourth with row of 12.

Hypopygium small, red and retracted: first segment pollinose, with several bristles in a row on the visible portion; second segment subshining red, with coarse hairs; forceps red except extreme tips, distal portion bare, curved forward, ending in a small point, bent in; accessory plate tapering to a slender tip, yellow; penis with yellow basal segment, the blackish distal one is bent at an angle with this, and has a shining black basal part, a middle softer region, and an

apical dark snoutlike one; fifth sternite small and concealed.

Legs black or brown, without villosity; hind side of middle femur with comb below near tip; middle tibia with two bristles on outer front side.

Wings hyaline; no costal spine; third and fifth costal segments subequal; first vein bare and third bristly two-thirds of the way to the crossvein.

Female. Front .326 of head (average of five,—.305, .311, .313, .334, .367); two to four orbitals; thorax and abdomen rather more densely pollinose than male, stripes generally fainter or on abdomen almost absent; no apicals on scutellum; fourth abdominal segment red at tip; genital segment red, not with larvipositor, but the last sternite oval, hairy.

Length, $5\frac{1}{2}$ - $6\frac{1}{2}$ mm.

Thirteen males and thirteen females; six from Natrona, Cal., July 18, 1885 (C. V. Riley, part of a large series in the National Museum, bred from *Melanoplus devastator* and *marginates*), six Sacramento, Cal., "From *C. spretus*, bred in confinement" (C. V. Riley, in National Museum): two Pullman, Wash., Sept. 12, 1896 and Sept. 1, 1897 (R. W. Doane); one pair, Wilson Creek, Wash., June 22, 1908 (G. I. Reeves, Webster, No. 3995, in National Museum); one Stanford University, Cal. (J. M. A.); three Moscow, Ida. (J. M. A.); one Uvalde, Texas, July 16, 1914, adult on fresh cowdung (Bishopp, No. 3498); two males and two females from Maxwell, N. M., bred by C. K. Wildermuth from *Melanoplus differentialis*, *plumbeus* and *bivittatus* (Webster Nos. 10241, 11167, 11169); two males reared from adult Acridiid at Brawley, Cal., by C. M. Packard (Urbahns No. 16163).

A single somewhat darker male with hypopygium rather blackish even on second joint, was collected by the writer at Michigan City, Ind., June 29, 1915: the only eastern specimen, and possibly a different species.

The type material was bred from *Melanoplus devastator* near Los Angeles, Cal. The writer examined the type in the National Museum, but it was not at hand when the present description was drawn up; however, a male was used that had been compared with type and was so labeled. The species appears to be an important grasshopper parasite in the West.

Holotype,—Male, in U. S. N. M.

No. 49. *Sarcophaga peniculata* Park.

Parker, Proc. Bost. Soc. Nat. Hist., xxxv, 58, pl. vii, f. 44 (*Ravinia*), male only.

Male. Front .204 of head (average of three,—.22, .19, and .204); the stripe on upper part about four times as wide as one side; lowest frontals hardly reaching the middle of the second antennal joint, diverging moderately, so that the lowest ones are $1\frac{1}{2}$ times as far apart as the rows are at the middle of the front; sides of front and face golden pollinose, the latter with fine hairs not in distinct rows; antennæ black, third joint more than twice the second and reaching five-sixths of the way to the vibrissæ, which are a little above the oral margin; arista plumose hardly more than half way; bucca about two-fifths the eyeheight; palpi and proboscis black; ordinary; back of head convex, with only black hairs except below, where there is some yellow beard; outer orbital half as long as the inner, still not much larger than the next hairs in the row.

Thorax gray, with 3-5 black stripes; anterior aer well developed, prescutellars of good size; scutellum with two long marginals and a subapical of fair size, no apicals; 3 stpl.

Abdomen strongly tessellated, with a median black stripe; first and second segments with only lateral bristles, third with a median marginal pair and two laterals, fourth with a marginal row diminishing down the sides.

Hypopygium red, or the first segment a little dark basally; first segment with a row of bristles near hind margin; second segment quite long, almost

humped in profile, extending forward, with slender black hairs. Forceps reddish yellow, with black tips, straight and tapering, slightly curved forward apically, behind and on outer margin with long outstanding black hair; accessory plate small, yellow; posterior clasper brown, deeply excised before the apex, so it is strongly hooked; anterior clasper longer, lighter colored, not hooked. Penis brownish, unsegmented, long and nearly straight, smooth and shining, ending in two rounded enlargements separated by a median notch; on the front side well before the apex and slanting away from it are two pairs of pale, soft processes. Fifth sternite visible as a pair of narrowly separated black slender sclerites covered with dense short black hairs.

Legs black; middle femur with long and well-developed comb on lower hind side toward tip; middle tibia with one bristle on outer front side; hind tibia without villosity.

Wing subhyaline, no costal spine; third and fifth costal segments nearly equal; first vein bare, third hairy nearly to the crossvein.

Female. Front .339 of head width (average of five,—.320, .338, .340, .345, .350), the usual two orbitals, and the outer vertical developed; frontal stripe over three times as wide as one side above; frontals about 10, the lowest just at the middle of the second antennal joint, and the two rows perfectly parallel; parafrontals and parafacials golden pollinose, the latter with numerous rather scattered small hairs. Two genital segments (tergites) distinctly visible, the fifth and sixth; they are red, the fifth with a fringe of black bristles, and its spiracle conspicuous; the red sternites are apparently the sixth and seventh, as there are five black ones before them; the latter is long and wide, but square at end, not in the least drawn out to form a larvipositor. Middle tibia with two bristles on outer side.

Length 7-8½ mm. A pair of dwarfed specimens from Montana (R. R. Parker) measure only 4½ mm.

Seven males and six females: besides the pair of dwarfs just mentioned from Montana, there are three males and one female from New Bedford, Mass. (Hough Coll.); one male, East Eddington, Me. (Hgh); one male Polk Co., Wis. (C. F. Baker); one male Friday Harbor, Wash. (author's collection); four females Melrose Highlands, Mass. (H. E. Smith).

Parker's material was from Maine, Mass., Conn., N. Y., and Pa.

Holotype.—Male, in Massachusetts Agricultural College.

No. 50. *Sarcophaga parallela* n. sp.

Male. Front .154 of head (average of five,—.130, .151, .155, .166, .169); parafrontals and parafacials silvery, the latter with a row of strong hairs below; antennæ black, third joint hardly twice the second, reaching barely three-fourths of the way to the vibrissæ, which are at oral margin; arista long-plumose for two-thirds its length; bucca one-third the eyeheight; palpi and proboscis black, ordinary; back of head convex with four or five rows of black hairs and some yellow close to the neck and below it; outer vertical not differentiated.

Thorax with the usual 3-5 stripes of black; ps dc 3 large; ant dc 2; stpl 3; scutellum with two marginal, 1 subapical, 1 rather strong apical, suberect.

Abdomen strongly tessellated, with permanent median black stripe on second and third segments; fourth segment with decided red hind margin; first and second segments with only lateral bristles, third with a median marginal pair and four or five laterals; fourth with a marginal row of about 16.

Hypopygium red: first segment with row of small bristles near hind border; second globose, shining, with erect black hair. Forceps very character-

istic in shape: in profile the free part has a marked bend forward just before its middle, from which it is straight to the apex with the front and hind edges parallel; at the extreme tip it is rounded, with a tooth placed just behind the middle. Accessory plate triangular, yellow; posterior clasper stout, brown, flat at tip, not much hooked; anterior clasper the same but longer, with an expanded margin near middle on outer side. Penis with large basal segment, whitish except on the back; distal segment beginning behind with a sharp keel, shining black, which widens to a flat, shining surface and narrows again to a keel, which turns sharply forward in the shape of an apical hook; from each side of the keel first mentioned there proceeds a flat, dark process forward and outward, ending near the apical hook and, with pale margins, enclosing the inner organs in a globose compartment. Fifth sternite yellowish, rather widely excised at base, the edges bordered with erect small black bristles.

Legs black: median femur with close rows of slanting spines below near tip, the posterior could almost be called a comb; middle tibia with two bristles on outer side; hind tibia not really villous, but with a few small erect hairs approaching what is herein defined as villosity; they are, however, not quite so long as the diameter of the tibia.

Wings nearly hyaline; no costal spine; third costal segment about equal to the fifth; first vein bare, third hairy two-thirds of the way to the crossvein.

Length $7\frac{1}{2}$ to $8\frac{1}{2}$ mm.

Seven miles: two Trenton, N. J. (Harbeck); two with puparia but no rearing data, Philadelphia, April 19 and 21, 1891 (Hough Coll.); one Roxborough, Pa. (Harbeck); one Columbus, O. (Hine); one Philadelphia (C. W. Johnson).

This may be only a variety of *sima*, with which it has certainly a very close relation; the forceps have a different shape, and the penis seems larger and its parts better differentiated in these specimens than is the case with what I have called *sima*.

Holotype.—Male, No. 20512, U. S. N. M., from Trenton, N. J.

No. 51. *Sarcophaga rudis* n. sp.

Male. Front .199 of head (average of three,—.193, .197, .207), widening rapidly below the middle, so that the parafacials are wider and the bucca higher than usual; the parafrontal is yellowish pollinose, the yellow increases in intensity below, so that the parafacial and front of bucca are golden; the row of hairs on parafacial keeps close to the eye as it ascends; frontals about nine, rows rather wide apart and only moderately diverging below, hardly reaching the middle of the second antennal joint; antennæ black, third joint twice the second and reaching three-fourths the way to vibrissæ, which are slightly above the oral margin; arista plumose as usual, a little over half way, its middle third light colored; bucca over one-third the eyeheight; back of head with several rows of black hairs, and only a few pale ones close to the neck and below; outer vertical not differentiated.

Thorax with the usual 3-5 black stripes; ant aer well developed, prescutellar pair of good size; stpl 3; scutellum with the usual two marginals, one smallish subapical, one apical of rather large size, suberect.

Abdomen with the usual strong tessellations, a permanent median black stripe on the middle two segments, hind edge of fourth red; first and second only with lateral bristles, third with an interrupted row, fourth with row of about 12.

Hypopygium red; first segment rather small, pollinose, on its hind edge with row of bristles, sometimes hardly more than hairs; second segment subshining, globose. Forceps with the free part bent back at right angle to the attached part, the latter with rather dense hair, the former almost straight, black but somewhat reddish at base, shining, curved forward just at apex, with scattering minute spines hardly more than granules) on the hind edge. Accessory plate padlike, rounded, yellow, small. Posterior

clasper stout, blackish, strongly hooked at tip; anterior clasper shorter and paler, strongly curved, stout basally. Penis with yellow basal segment of moderate length, the distal slender for over half its length, curved slightly forward, shining; the apex on the posterior side widened, notched into two sharp points, at the base of the notch a small pair of recurved and divergent hooks, united at base; on the front side of the tip is a blunt, black protuberance in the middle, from which arise near the base (almost in the notch at the tip of the back part) two pairs of upright processes. Fifth sternite dark yellow, narrowly excised basally for a distance, then widening V-shaped, with brownish pubescence on the inner margin.

Legs black; middle femur with comb behind on lower side; middle tibia with two bristles on outer front side; hind tibia without villosity.

Wings almost hyaline; no costal spine; third costal segment about equal to fifth; first vein bare, third hairy halfway to crossvein.

Female. Front .326 of head (two just the same); golden color of head as in male; outer vertical present; the usual two orbitals; palpi strongly clavate; no apical scutellars; fourth abdominal segment broadly red; genital segment yellow, the orifice slit-like, with rather weak bristles.

Length, 6-7 mm.

Eleven males and two females: three males La Fayette, Ind.: two males, one female, Charleston, Mo., Jan. 22, 1915, reared from *Ligyris gibbosus* by E. H. Gibson (Webster, No. 13668; one male, one female, Opelousas, La., June (Hough Coll.); five males Chapada, Brazil, collected by H. H. Smith (author's collection); one male, Wellington, Kans. Webster, No. 15945).

Holotype.—Male, No. 20513, U. S. N. M., from LaFayette, Ind.

Allotype.—Female, No. 20513, U. S. N. M., from Charleston, Mo.

No. 52. *Sarcophaga excisa* n. sp.

Male. Front rather wide, .185 of head; parafrontals and parafacials silvery, the latter with the usual row of small bristles below; antennæ dark brown or blackish; third joint hardly double the second, reaching four-fifths of the way to the vibrissæ, which are a little above the edge of the mouth; arista plumose a little over halfway; palpi rather long; proboscis short, fleshy; bucca about one-third the eye-height; back of head with three rows of black hairs and some pale beard below; outer vertical bristles absent.

Thorax gray pollinose, with the usual 3-5 stripes, the central one rather narrow; ps dc 3; ant acr well developed; prsc of medium size; stpl 3. Scutellum with the usual bristles, viz., marginals, two large; pre-apical, one rather small; apical, one rather small and slender.

Abdomen gray pollinose, tessellated, with rather distinct median blackish line; first and second segments with only lateral bristles; third with a pair of median marginals and two laterals; fourth segment red at apex and with a row of more than a dozen bristles.

Hypopygium entirely yellow and quite shining; the first segment of medium size, with a row of bristles across the hind margin; second segment globose, with numerous erect, coarse black hairs. Forceps black except on basal part, rather short and uniformly curved forward, ending in a point on the inner side; viewed from behind they diverge suddenly almost at the tip. Accessory plate yellow, shining, arcuately excised at tip, the posterior lobe slender, the anterior merely forming a blunt angle. Claspers small, brownish; posterior with short, deep excision before the hooked tip; anterior shorter and more slender. Penis with rather long basal segment; the distal segment long and stout, shining black or dark brown, square in cross section as far as the middle; bent in and en-

larged apically with a pair of large diverging hooks on the back near the tip. Underneath the tip is a white ear-like margin on each side and a central lip. The other apical parts rather hidden in the specimen. Fifth sternite distinctly visible; blackish for almost half its length, suddenly changing to yellow; the inner apical angles covered with short, black, hook-like bristles.

Legs black; middle femur with short comb below on posterior edge; middle tibia with two bristles on outer front side; hind tibia without villosity.

Wings hyaline; small costal spines; third costal segment fully equal to fifth.

Length, 9 mm.

One male, Woods Hole, Mass., June 25, 1913 (A. H. Sturtevant).

Holotype—Male, No. 20514, U. S. N. M.

No. 53. *Sarcophaga eleodis* n. sp.

Male. Front .183 of head (average of five,—.167, .179, .183, .187, .197). Like *excisa* except in genitalic characters. The forceps have a large, hump-like protuberance on the basal attached part, covered with recumbent long black hair; between this and the remainder of the forceps is a deep excision in profile; the apical free part of the forceps is black, enlarged and bent forward in the middle, with short reclinate spines behind, the extreme apex curved forward and sharp. Accessory plate somewhat rounded, the apical angle, however, a little drawn out, darker in color, with a few long hairs. Posterior clasper strong, nearly black, with hooked point; anterior clasper low and short, yellow, stout at base; penis with a rather short basal segment, the distal one brown and shining, rather elongated, semicircular in cross section on basal part, with a pair of recurved hooks on the back at tip; the apical part bears in front a winglike expansion on each side, the two uniting in a pointed plate below; in front of the pair of hooks is a concave space before the extreme tip. Fifth sternite entire-

ly yellow, with short, thick hairs at the angle of divergence, but not with spines.

Female. Front .342 of head (average of five,—.321, .327, .343, .355, .362), with the usual two orbital bristles. Palpi large and much thickened at apex, bare except on lower edge. Genital segment red; the last sternite not at all protruding, soft and rather distinctly trilobed before the transverse genital opening.

Four males, two females, reared from adult *Elcodes obsoleta* at Maxwell, N. M., by J. S. Wade and D. J. Caffrey (Webster No. 11148); four males and ten females, reared from *E. tricostata* adult at Maxwell, N. M., by J. S. Wade (Webster No. 11146); one male, three females, reared from *E. caricata* adult at Maxwell, N. M., by J. S. Wade and D. J. Caffrey (Webster No. 11141); three males, reared from *E. hispilabris* adult at Maxwell, N. M., by J. S. Wade (Webster No. 11156); two males, one female, reared from *E. tricostata* adult at Alliance, Neb., by J. S. Wade (Webster No. 14952); one female, reared from *E. obsoleta* adult at Golden, Colo., by J. S. Wade (Webster No. 14972); two males, one female, reared from adult *E. obsoleta* at La Junta, Colo., by J. S. Wade (Webster No. 155504); one male, three females, reared from *Asida obovata* adult at La Junta, Colo., by J. S. Wade (Webster No. 155505); one female reared from adult *E. hispilabris* at Koehler, N. M., by V. L. Wildermuth (Webster No. 12727); one female, reared from *E. obsoleta* at Trinidad, Colo., by H. F. Wickham (Webster No. 14999); one male, reared from adult *E. fusiformis* at Maxwell, N. M., by J. S. Wade (Cage 16645); four males, three females, reared from adults of *E. obsoleta* and *tricostata* near Koehler, N. M.; two are labeled "Larva from adult *Elcodes tricostata* which died in Cage 1"; two are from larvæ that emerged from dead specimens of *E. obsoleta* found in the field.

Two males, Colorado (Experiment Station), Nos. 1527 and 1631, in the Hough collection.

One female, Cimarron, N. M., "larvipositing on *Eleodes obsoleta*" (W. R. Walton); this is the specimen mentioned by the writer in Jour. Econ. Ent., viii, 245, where is also printed a statement from Professor Wickham as to the possibility that the specimens reared by him were not true parasites but only scavengers affecting dead insects;—a possibility which seemed to him to be excluded by the manner of conducting his experiments.

Holotype and allotype.—Male and female, No. 20515, U. S. N. M., from Maxwell, N. M. (Webster No. 11148, in the first lot mentioned).

No. 54. *Sarcophaga masculina* n. sp.

Male. Front .132 of head (average of three,—.125, .127 and .143); head with gray pollen which is rather more shining on the parafacials; parafrontals and parafacials both bearing scattering black hairs, which gradually arrange themselves in a single row below, the lowermost ones being slightly bristle-like; frontal bristles about 13, rapidly diverging below and reaching the middle of the second antennal joint; ocellars well developed; antennæ reddish brown, third joint slender, $2\frac{1}{2}$ times the second, reaching three-fourths of the way to the vibrissæ and slightly above the oral margin. Bucca one-third the eye-height; palpi and proboscis black, ordinary; back of head with about three rows of black hairs, the central part bearing whitish hairs, longer below; most of the bucca is covered with black hairs; outer vertical bristles absent.

Thorax with gray pollen and the usual 3 to 5 black stripes, the intermediate ones more or less margined with brownish color when viewed from behind; ps dc 3; ant acr well developed; prsc 1 pair; stpl 3; scutellum with 2 pairs lateral, 1 pair smaller preapical and 1 pair apicals slightly larger.

Abdomen with whitish changeable pollen and three indistinct stripes; first and second segments with only lateral bristles; third segment with a median pair

and two laterals; fourth segment with a marginal row of about 20, the outer ones gradually diminishing.

Hypopygium red; first segment red with gray pollen, on the hind margins with an interrupted row of smallish bristles; second segment red with rather distinct hump behind, covered with scattered erect hairs but not bristly; forceps black, straight, very shining, slender in profile, abruptly turned forward at the end; from behind they run close together almost to the tip, where they are suddenly cut away on the inner side; accessory plate yellow, broad, with a blunt point at the attached end and a more slender one at the free end; posterior clasper dark brown, rather long, curved forward at tip and excised on front side; anterior clasper very short and low, but with a distinct, brown hook; penis slender, the basal joint elongated, the distal joint still longer, rather square in cross section on the basal two-thirds, the apical third suddenly widened with a black head-like extension forward, from which arise several horns at the outer corners and a single long lateral process on each side. On the back of the organ in the middle near the tip is a long recurved hook divided near the base into two divergent points. The sclerite which forms the back of the distal segment diverges broadly at the apex and is produced into a sharp recurved horn at each of the two tips. Just on the inner side of each of these horns is a process directed backward which bears minute hairs giving it a fringed appearance. Fifth sternite blackish, bearing a wide brush on each side of the incision, the two brushes in contact or nearly so for their entire length.

Legs black; middle femur with a well developed short comb on the lower hind side near the tip; middle tibia with two bristles on the outer front side; hind tibia without villosity.

Wing hyaline with a small costal spine; third costal segment about as long as the fifth and sixth together; first vein bare; third with a few hairs.

Female. The head in the female is precisely like that of the male. Width of front .131 of head (average of five,—.124, .126, .132, .134, and .141). This highly interesting character does not appear to be associated with anything else which differentiates it from the genus *Sarcophaga*. In the rest of its characters the species belongs to the group of *Sarcophagas* which are most closely related to each other and in which the females, so far as known, are at the present time almost or entirely indistinguishable from each other. I am forced to believe that in the midst of this closely interwoven series of species there exist several in which the female has male head characters. It is evident, therefore, that with the present limitations of knowledge these characters could not possibly be regarded as of generic importance.

Ocellar bristles well developed; outer vertical bristles not developed; scutellum without apicals; genital segment red; sixth sternite somewhat elongated, ending with a thin expanded, almost transparent hind margin which is almost one-third as long as the sclerite itself. This is apparently a rudimentary form of larvipositor.

Length 6 to 7 mm.

Three males and five females. All from Tifton, Ga., in the Hough collection; collected in June, 1896.

Holotype.—Female, in the Hough collection.

Allotype.—Male, in the Hough collection.

Paratype.—One male, one female, No. 20516, U. S. N. M.

No. 55. *Sarcophaga alcedo* n. sp.

With the same characters as *excisa* except the following:

Front .158 width of head. Parafrontals and parafacials and front part of bucca with distinctly yellow cast. Wing slightly smoky. Hind calypter is light brown except the margin.

Forceps with basal portion convex and bearing rather long, recumbent hairs; beyond this consider-

ably bent backward, straight, with a sudden bend forward to a sharp apex; viewed from behind they diverge strongly from the base. Accessory plate quite long and slender, almost finger-like, with a few hairs at the tip. Posterior claspers rather straight and slender; anterior claspers short. Penis with a well developed basal segment. Distal segment bending forward at an angle from this; long and slender, shining black; smooth for two-thirds of its length. Near the apex a pair of recurved hooks on the back; a whitish soft spot beyond these on the side. The organs at the extreme apex are too closely united for description. Fifth sternite rather U-shaped in basal part suddenly diverging apically at an angle with a tuft of black hairs; underneath a small brown callus.

Female. Front .31 of head, with the usual two orbital bristles. Parafacials with hairs not very regularly arranged in a row. The yellow color of the face of the male only shows faintly in the female. Genital segment red. The sternite not elongated and protruding but merely rounded.

Twelve males and one female. One male, one female, La Fayette, Ind., Sept. 15, 1914, one one pin, taken in copula by the writer; one male, La Fayette, Ind., Oct. 6, 1914 (author's collection); seven males, Opelousas, La., March and May, 1897 (Hough collection); two males, Lockbourne, Ohio, July 6, 1900, and Columbus, Ohio, May 11 (Prof. Hine; one male, Rawlins Co., Kan. (F. X. Williams), in Univ. Kan. collection.

Holotype and Allotype.—Male and female, No. 20517, U. S. N. M., from La Fayette, Ind.

No. 56. *Sarcophaga prohibita* n. sp.

Male. Characters the same as *caveisa* except as follows: Front .188 of head (average of two.—.183 and 194). Palpi rather slender, yellowish brown, apices blackened. Third costal segment fully as long

as the fifth and sixth together. Forceps comparatively long and strong, rather straight, not diverging from each other except a little at the tip; near the apex with minute granulations behind, the tips sharp and a little bent forward. Accessory plate rather elongated, with dark tip bearing a few hairs. Posterior clasper excised just before the apex in front; anterior clasper very short and low with a hump behind and a few erect hairs on the hind edge. Penis with basal segment distinct, brown; distal segment long, slender for half its length, rapidly enlarging at apex, bearing on the back a pair of recurved hooks. In front of these deeply hollowed out in a concavity each side, separated by a central short keel. Fifth sternite with a heavy covering of short black spines but not with a brush.

Female. Front narrow, .22 of head (average of four,—.205, .221, .221, .233); orbitals entirely wanting, as in *masculina*. Agrees with the male just described, but as usual in females the outer verticals are well developed and the apical scutellar bristles, as well as the comb on middle femur, are wanting. Fifth and sixth sternites red, distinctly separated, the former hairy, the latter rather long, with broadly rounded tips, and numerous short, spiny bristles, which are directed laterally along the sides. The (apparent) fifth tergite is shining red, with a row of coarse black hairs on the hind margin.

Length 9 to 9.5 mm.

Two males, four females, from Gove, Ellis, Russell, Thomas and Trego counties, Western Kansas, all collected by F. X. Williams, and in the University of Kansas collection.

Holotype and Allotype.—Female and male respectively, in the University of Kansas. Paratypes, male and female, No. 20518, U. S. N. M.

One female of still a third species without orbital bristles was collected in New Mexico by Mr. Walton, but without the male it would be unwise to give it a name.

No. 57. *Sarcophaga reversa* n. sp.

Male. Characters like those of *excisa* except the following: Front .146 of head. Antennæ reaching three-fourths of the way to the vibrissæ. Middle tibia with three bristles on outer front side. The bristles of the first segment of hypopygium are not very strong. Forceps red nearly to apex, with very minute spines on the posterior and outer side, the base with erect fine hair; in profile with a distinct hump behind, nearly straight from this to apex, which turns forward very sharply. Viewed from behind they gradually diverge from the base, and the terminal hook is bent somewhat laterally. Accessory plate rather elongated, with a blunt point; posterior claspers rather long, slender, evenly curved forward to tip; anterior claspers short and rather thick. Penis with somewhat short basal segment, the distal segment shining black except at base, characterized by a long projecting loop at the end which doubles back on the front side, the lateral processes attach at about the middle of this segment and extend forward in such a way that in profile there is a large visible opening in the loop. Fifth sternite black, the two sides closely approximated for a considerable distance, then spreading apart at right angles and bearing yellow pubescence along this edge.

Length 7.5-9 mm.

Numerous males, several from LaFayette, Ind.; one from Vincennes, Ind., May 8, 1914; seven from New Bedford, Mass. (Hough collection); two from Woods Hole, Mass. (A. H. Sturtevant); one from Melrose Highlands, Mass. (H. E. Smith); five from Manahawkin, N. Jersey; one from Clementon, N. J. (Harbeck); one Darby, Pa. (Harbeck); one Greene Co., N. Y. (Carnegie Museum); one Montreal, Quebec (Harbeck); one Sacramento, Cal., and one without locality, No. 655, both labeled "Collection C. V. Riley" (U. S. Nat'l Museum); one Moscow, Idaho; one Camp Howard, Idaho (author's collection) one

Colorado, No. 1413 (Experiment Station); one Seattle, Wash. (Hough); one Erwin, S. Dak.

Holotype.—Male, No. 20519 U. S. N. M., from LaFayette, Ind.

Several females collected at LaFayette, Ind., on flowers of parsnips growing wild, along with males of *reversa* and *marginata*, undoubtedly belong to one or both of these species. They have much grayer color than the males, which are comparatively dark; the front in three specimens measured .300, .309, and .325 of the head (average of .311); ocellars and orbitals as usual; bucca sloping upward anteriorly in profile, and the stout vibrissæ slightly above edge of mouth. Abdomen strongly tessellated, more than in males; fifth and sixth sternites red or a little brownish, the latter somewhat elongated and trough-shaped, but straight.

The characters given do not suffice to separate these females from numerous specimens taken farther west, which probably belongs to other species of the closely allied group, in which even the males can hardly be separated except by genitalic characters.

No. 58. *Sarcophaga marginata* n. sp.

Male. Characters like *excisa* except as follows: Front .148 of head. Antennæ reaching three-fourths of the way to vibrissæ. Fourth abdominal segment entirely black. Third costal segment as long as fifth and sixth together. Forceps entirely yellow or only the extreme apex a little darkened, with moderate black hair at base; beyond the middle of the free part where they begin to bend forward there is a thickening on the outer side surmounted by numerous rather long slender little spines; apex with a minute hook on front side; viewed from behind the forceps diverge from base and become suddenly wider on the outer side a little past the middle. Accessory plate slender, yellow. Posterior clasper very long, slender toward the apex and strongly hooked. Anterior clasper broad and stout. Penis with a very long basal joint,

yellow; apical joint black, long and slender in profile. Beyond the middle it bears on each side a white fringe or ruffle and on the back is deeply cut into by a transverse notch in which the color is whitish. Fifth sternite yellow, rather V-shaped with delicate hairs and light colored pubescence along the inner margin.

Female. See note under preceding species.

Length 8-8.5 mm.

Twelve males. Three, including the type, from LaFayette, Ind.; one from Wellington, Kan. (H. E. Smith, Webster No. 7319, from dead grasshoppers collected outdoors and placed in cage); one from Seward Co. (F. X. Williams) in Univ. of Kan. collection; one from Falls Church, Va. (C. T. Greene, collector) in Forest Insect collection of the Bureau of Entomology; five from Manahawkin and Wenonah, N. J. (Harbeck); one from Algonquin, Ill. (Dr. Nason, collector, in author's collection).

Holotype.—Male, No. 20520, U. S. N. M.

No. 59. *Sarcophaga falciformis* n. sp.

Characters the same as *excisa* except the following:

Front .163 of head. Hairs around vibrissæ and on the parafacials rather strong; frontals 12 in number. Mesonotum with rather abundant erect hairs and strong bristles. Fourth abdominal segment entirely black. Forceps yellow at base, becoming black at tip, in profile wide and strongly curved forward suggesting a sickle shape, with short black hairs, hardly spine-like, at the bend behind; apex rather bluntly pointed. Posterior clasper blackish, slender, rather flattened at the apex; anterior clasper stouter but nearly as long; penis with basal segment well developed, yellow, the apical one standing at an angle, yellow at base, with a broad, pale fringe on each side from about the middle; the back part dividing into two diverging claw-like flat processes bending forward at the tip. Fifth sternite retracted and almost

invisible, with dense yellow pubescence all along the inner side.

Length 5.5-8 mm.

Ten males; five reared Sept. 8, 9, 10, 1892, from *Ménanoplus devastator*, at Eureka, Cal. (Bureau of Entomology, No. 5485-0); one male Aweme, Manitoba, reared by N. Criddle, July 25, 1813, from *Melanoplus atlantis*, No. 8036; one Milwaukee, Wis., June 26, 1895, collected by Prof. Wm. M. Wheeler; one Algonquin, Ill., July 7, 1894, collected by Dr. Nason; one Colorado, No. 2179 (Experiment Station); one Black Hills, S. Dak.

A female specimen bearing the same label as the lot including the holotype, and probably belonging to this species, is scarcely distinguishable from that of *coloradensis*, having the same type of larvipositor. It is teneral, and the diagnostic characters, if any, cannot be positively determined.

Holotype.—No. 20521, U. S. N. M., from Eureka, Cal.

No. 60. *Sarcophaga setigera* n. sp.

Characters like *arcisa* except the following: Front .162 of head. Second abdominal segment with a pair of erect median marginal bristles (one missing in one specimen). Forceps yellow at base, becoming shining black at tip; outer side quite covered except at base and tip with short recurved spines; in profile the forceps curve uniformly forward on hind edge, on the front edge more suddenly toward the tip, tapering to a minute hook. They diverge from each other rather uniformly or increasingly from the base. Accessory plate quite narrow and slender, not blackened at apex; posterior clasper long and slender, nearly straight except at the tip, where it bends forward forming a hook; anterior clasper shorter and stouter, rather flattened at tip; penis with an unusually long and stout basal segment, which is yellow; the distal segment in profile much more slender, yellow to the apex; in the back view the distal segment is not di-

vided transversely, but runs out with almost parallel sides to the apex, where it is notched into two sharp points; back of this there is a black thickening, projecting out on each side encircled by a membrane, which on the two sides forms almost a complete circle. In profile there is a short, black, stout tube projecting forward a little before the apex. Fifth sternite quite retracted, V-shaped, with yellow pubescence on inner edge.

Female. Front .251 width of head. Palpi quite long and stout. Occiput convex. Bristles of thorax very stout. Second abdominal segment with erect marginals as in males; third segment with interrupted row; fourth segment entirely black; genital segment pale yellow; fifth sternite pale and rounded; the sixth one having a distinct sharp larvipositor which is bent forward.

Legs very bristly; middle tibia with an increasing row of bristles on the outer front side.

Length 9 mm.

Two males and two females; one male and one female from Melrose Highlands, Mass., July 14, 1911 and June 23, 1909, collected by H. E. Smith and J. D. Tothill respectively; one male, Glencarden, Va., July 14, F. Knab (National Museum); one female, Lawrence, Kan. (author's collection).

Holotype (male) and allotype (female).—No. 20522, U. S. N. M., from Melrose Highlands, Mass.

No. 61. *Sarcophaga coloradensis* n. sp.

Male. Characters of *cavisa* except the following: Front .159 of head; bucca one-fourth the eye-height; bristles of parafacials and facial ridges unusually long; third joint of antennæ one and one-half times the second joint, reaching about three-fourths of the way to the vibrissæ. Second abdominal segment usually without marginal bristles but a pair is present in two of the specimens. Fourth abdominal segment entirely black. Forceps reddish yellow, becoming black at apex; in profile with straight and

parallel edges for about half the free length, then curving forward to a straight apex, rather sickle-shaped. Viewed from behind, the forceps are very thin, diverging slightly, and bear on the outer side of the bend some long and rather delicate spines. Accessory plate curved, rather wide, the apex smooth and darkened, with a few long hairs. Posterior claspers rather long, moderately stout, not very strongly curved forward; anterior claspers rather stout and erect, somewhat hooked at tip; penis with yellow basal segment well developed, the distal segment not very long, in profile thin at base, becoming convex apically behind so that the apical half is a globose, semi-transparent hollow structure; on each side of this there is a light colored ear-like lobe at the apex; front side of segment is decidedly concave with well marked rim. Fifth sternite rather widely open, margin with a few black hairs, lined with pale pubescence. Middle femur with a row of four or five bristles on the outer front side.

Female. Front .28 of head. Thorax with very strong bristles. Genital segment red, with a heavy row of bristles; fifth sternite almost straight on the hind margin. The enclosed segment visible in a triangular space from the center of which there arises abruptly a slender round, sharp larvipositor grooved behind and curved a little forward (Figs. 61a, 61b).

Legs very bristly and femora uncommonly stout. Fourth vein of wing ending in margin unusually far before the apex, the distance being a little greater than the fifth costal segment. The third vein rather sinuous from the crossvein to its end, curving forward in the middle of this segment.

Twenty-two males and twenty-six females, all from Colorado Experiment Station except one male, which is from New Bedford, Mass. (Hough collection).

Holotype.—Male, in Hough collection.

Allotype.—Female, in Hough collection.

Paratype.—Male and female, No. 20523, U. S. N. M.

No. 62. *Sarcophaga websteri* n. sp.

Male. Characters of *excisa* except as follows: Front .158 of head; bucca one-fourth eyeheight; about 10 hypopleurals; second segment with a pair of erect median marginals (one of them absent in one specimen). Abdomen not so changeable, and with three moderately distinct black stripes; fourth segment entirely black. Forceps red, notched between basal and free part behind, the latter part rather wide in profile, straight in front and curved behind, with a prominent tooth bent forward at tip, on outer side with minute spines; viewed from behind the forceps are moderately diverging and more spinose; both claspers well developed and strongly hooked, the anterior shorter and heavier, dark at tip; penis with large red basal joint, distal one at an angle, long, the basal half smooth; distinctly divided just beyond middle, the apical median portion pale, smooth behind, at tip notched or emarginate; anterior to this the fleshy part of the organ has two lobes on each side, one projecting forward, the other back; fifth sternite yellow, V-shaped, somewhat hairy along edge, with pale pubescence inside.

Length 9 mm.

Three males: Glencarlyn, Va., July 14; Rosslyn, Va., July 4; Kensington, Md., July 4, 1907, the first and last collected by Frederick Knab, of the National Museum.

Named in honor of Francis Marion Webster, whose distinguished career in economic entomology came to an end a few days before these lines were written, and who in December, 1913, requested the author to take up the study of the North American Sarcophagidæ.

Type.—No. 20524, U. S. N. M., from Glencarlyn, Va.

No. 63. *Sarcophaga angustifrons* n. sp.

Male. Like *cacisa* except in the following particulars: Front narrower than in any other of the series, averaging .098 of head width (the six males give the figures .090, .084, .096, .120, .085, and .111); the narrowest point is at the third frontal bristle; bucca one-fourth the eyeheight; fourth abdominal segment entirely black. Forceps reddish brown, almost straight on front edge, the hind edge parallel for over half the free length, then approaching the front edge with a diminishing angle of convergence, so that there is a concavity in the profile and the tip seems drawn out and slender; at the extreme tip there is a well-marked tooth on the front side; back of forceps with minute spines on basal two-thirds; in back view the forceps diverge moderately from base, more rapidly near the apex. Accessory plates yellow, slender and curved; posterior clasper slender, dark brown, curved strongly forward at apex; anterior clasper stouter and shorter, with a considerable hook at tip; penis with yellow basal segment, the distal one black, flat, moderately long, the apical processes spreading U-shaped with the ends twisted outward; between the arms of the U, arising from the pale central mass, is the terminal part, which looks like the head of some little animal with a long snout turned down; on the front or inner side of the distal segment are a pair of disklike, rather soft pads or lobes, surrounded by a harder rim. Fourth sternite rather widely open below, the fifth, however, but little visible, bearing only a few hairs and pale pubescence.

Length 8-8½ mm.

Six males, Tifton, Ga., September and October, 1896 (Hough collection); one male, Socorro, N. M., collected by Dr. S. W. Williston in the summer of 1916.

Three females, Tifton, Ga., Oct., 1896, are presumably of the same species. The front measures .28, .299, and .307 of the head; there are the usual

two orbitals, and the outer vertical is well developed; genital segment red, the tergal part with long marginal bristles; sternite developed into a short, blunt point, which does not bend forward, and hardly protrudes from the abdomen in repose. Middle tibia with a row of three increasing bristles on the outer front side.

Holotype.—Male, No. 20525, U. S. N. M., from Socorro, N. M.

No. 64. *Sarcophaga aculeata* n. sp.

Male. Like *cavisa* except in the following points: Front .166 of head (average of six, which gave .162, .166, .160, .183, .165, and .161); fourth abdominal segment wholly black. Forceps yellow, brown toward apex; concave twice in front in profile—once near the middle and again near the apex; behind rather evenly curved nearly to the tip, where they are slightly concave; the tip has a tooth projecting forward; back of forceps rather coarsely spinose; from behind they are moderately diverging with the tips twisted outward. Accessory plate rather long and slender, curved; posterior clasper long, blackened apically, and gradually curved forward; anterior clasper of medium length, black, stout, curved; penis with long yellow basal segment, the distal blackish, flat, normally at a right angle with the preceding; the apical processes are wider than those in *angustifrons* and vary in the amount of their divergence,—in some cases they separate U-shaped and show the central terminal organ much as it appears in *angustifrons*, in others they touch each other and conceal the organ; on the front or inner side of the segment is a pair of flat pads microscopically denticulate or granulate anteriorly. Fifth sternite narrowly split at the bottom, with a sudden almost square widening before the middle of the fourth tergite, the basal exposed part black, somewhat hairy, the border with pale pubescence, the terminal lobes concealed.

Female. Front .29 of the head (three gave .29, .29, 303); in most of the specimens the frontal stripe is pollinose above, blending with the parafrontals; orbitals and outer verticals present; parafacials quite wide, with a double row of hairs below; genital segment red, the last sternite moderately elongated, sometimes distinctly blackened, ending in an almost square tip.

Length $6\frac{1}{2}$ -9 mm.

Twenty-six males, fifteen females: eight males and twelve females are from Wellington, Kan., bred from grasshoppers by E. G. Kelly (Webster No. 7398); three additional males differ only in having other Webster numbers (7399, 8281); two males Sacramento Co., Cal., Sept., "bred from *C. spretus*" (C. V. Riley collection in National Museum); three pairs bred from *Melanoplus atlantis* at Brawley, Cal., by T. D. Urbahns (his No. 1654); three males Natrona, Cal., July 15 and 18, 1885, bred material but unaccompanied with data (same collection); a pair from Alpine, Cal., reared from a grasshopper by C. M. Packard (Pasadena, No. 16163); two from London, Ont. (Hough coll.); two from Lewistown, and one from Moscow, Idaho (author's coll.); one Pullman, Wash. (Doane).

Although none of the females were taken in copula, there is no reason to question the identity of these from Wellington; I have a large number of females from the other localities which appear to be the same, among them five collected at Trenton, Ky., Sept. 2, 1915, by Geo. G. Ainslie, who noted that they attacked flying grasshoppers (*Schistocerca americana*) in the manner recorded by E. G. Kelly for *S. Kellyi* (Jour. Agr. Research ii, 435), Webster No. 10895.

Holotype—Male, No. 20526, U. S. N. M., from Wellington, Kan.

Allotype.—Female, No. 20526, U. S. N. M., from same place.

No. 65. *Sarcophaga aculeata* var. *gavia* n. var.

Differs from the species only in the genitalia, and in these principally in two respects: the lateral lobes of the distal segment of the penis are much larger, heavily chitinized, and spinose on the outer side; while the apical processes are stout and much more strongly divergent at their base than in *aculeata*, so that they form a U rather than a V.

Five males; two (including the type) from Koehler, N. M. (W. R. Walton, coll.); two old specimens from the Bureau of Entomology are marked only "6-1690"; a fifth from Ocean Grove, N. J., may be another variety, but is not in very good condition to identify.

Holotype.—Male, No. 20527, U. S. N. M., from Koehler, N. M.

No. 66. *Sarcophaga aculeata* var. *tædiosa* n. var.

Males. Differs from *aculeata* in no measurable way, except in having the characters of the penis set forth in the table and shown in the figure; the forceps also are in back view uncommonly thin and at tip more broadly truncate than in the related forms; the front of some specimens is a little narrower, the width compared with the entire head being .158, .156, .172, .181, .173, .151, and .161 (average .165).

Seven males: five Brookings, S. D., two of these dated May 30, 1891 (all collected by the writer); one "12 miles northwest of Lusk, Wyo., July, 1895," in the Kansas collection; one Koehler, N. M. (W. R. Walton).

Three females, Brookings, S. D., are of the same lot as the five males and presumably the same species, but offer no distinctive characters; the width of the front is .292, .285, .302 (average .293).

Holotype.—Male, No. 20527, U. S. N. M., from Brookings, S. D. Allotype, female, same number and locality.

No. 67. *Sarcophaga flavipes* n. sp.

Male. Front .157 of head (in one specimen); parafrontals narrow, thinly gray pollinose, the black ground color showing through; the pollen becomes considerably denser below, so that the parafacials have a silvery sheen, but thinner than usual; they are narrow, and bear a long and almost double row of stout hairs; facial impression reddish, extending up the facialia almost to a connection with the frontal stripe, which is of similar color and texture; antennæ yellow, third joint brown, $2\frac{1}{2}$ times the second, and reaching almost to the vibrissæ; arista with usual plumosity for half its length; the vibrissæ are slightly above the oral margin, which is itself, owing to the curvature of the bucca, much above the lower line of the head; palpi yellow at base, strongly infuscated, almost black on apical half; proboscis mostly yellow; bucca one-third eyeheight; back of head flat, with about three rows of black hairs behind eye and considerable pale beard below and about the neck; outer vertical absent; ocellars slender, not large.

Thorax gray pollinose, with the usual 3-5 black stripes; ps dc 3; ant acr strong; prese medium; stpl 3; scutellum with two lateral, one subapical rather small, one apical of medium size.

Abdomen whitish-pollinose, tessellated, with a fairly distinct median line, fourth segment with red hind border; first and second abdominal segments with only laterals, third with a pair of large median marginals and several laterals at a distance from them; fourth with the usual marginal row, about 14.

Hypopygium small, red; first segment retracted, with a row of slender bristles near hind edge; second with several straight scattered erect small bristles; forceps small, yellow, thin and bladelike when viewed from behind, in profile tapering, slightly curved forward to a symmetrical point, which bears a small tooth; accessory plate yellow, ending in a rather sharp point; posterior clasper rather narrow,

straight, with hooked tip; anterior clasper yellow, curved, stout, with blunt tip; penis slender, yellow, basal joint quite long; distal one slender for half its length, then with a padlike, partly pale lobe on each side, and a central short copulating tube turned forward.

Coxæ, femora and tibiæ yellow, tarsi black; middle femora without a comb; middle tibia with two bristles on outer side; hind tibiæ not villous.

Wings distinctly blackened at base; a small costal spine; third costal segment nearly equal to fifth; first and third veins hairy, the latter almost to cross-vein.

Female. Front .297 of head (average of two,—.292 and .301); with the usual two orbitals, ocellars stout and outer verticals distinct but not very large; frontals about seven, extending to middle of second antennal segment; divergent below (in male 12, otherwise the same); antennæ and palpi slightly lighter than in male; no apicals on scutellum; genital segment red, with oval opening; the sixth and seventh sternites pollinose, modified into a distinct larvipositor which curves downward and ends in a somewhat blunt, shining point. Wings subhyaline.

Length, 6-7½ mm.

One male, two females: Tifton, Ga., Aug. 30, and Oct. 5 and 16 (Hough coll.).

Holotype and allotype, male and female, in Hough collection, University of Chicago; paratype female, No. 20529, U. S. N. M.

No. 68. *Sarcophaga larga* n. sp.

Male. Front .305 of width of head (average of five,—.285, .304, .305, .308, .321); parafrontals and parafacials silvery; the latter rather wide with a few slender hairs in a row on the lower part; frontal bristles about 7, descending hardly below the base of the second antennal joint; moderately diverging below. Antennæ black, the third joint twice as long as the second and reaching four-fifths of the way to the vi-

brissæ which are at the oral margin; arista plumose as usual a little over half its length. Palpi black; proboscis very short; bucca one-third the eyeheight; back of head with irregular black hairs above except the outside row, below with some pale beard. Outer vertical bristles present.

Thorax heavily gray pollinose with the usual 3 to 5 black stripes; ant aer unusually strong, 2 pairs; prsc rather small and slender; ps de 3; scutellum with 2 marginals; 1 subapical of good size and no apical.

Abdomen with the usual changeable tessellation; the median dark line indistinct; in profile, the segments become successively deeper so that with the flat hypopygium the shape of the abdomen is quite unusual, being large and truncate behind. The first and second segments have only lateral bristles, the third with an interrupted row, the fourth with a row diminishing on the sides, about 14 in all. First segment of hypopygium broad and bulky, usually black with red apical margin, sometimes almost wholly red, pollinose with erect hairs, some of which near the hind margin are occasionally large enough to be regarded as a row of bristles. In profile this hind margin is nearly parallel with that of the fourth abdominal segment. Second red with rather abundant black hair, short and more massive than in some species. Forceps peculiarly small, entirely yellow, the free part suddenly narrowed from the attached part and almost perfectly straight, with a minute hook on the front side at the tip; in profile not at all divergent. Accessory plate yellow and stout, standing away from the forceps at a considerable distance. Posterior clasper yellow-white almost to tip, then excised in semicircular form, leaving a slender apical hook; at the beginning of the excision is a long hair; anterior clasper in the form of a large, rounded yellow lobe, concave behind, standing up beside the penis, at its inner hind edge suddenly prolonged into a long slender semicircular hook. Basal segment of the penis strikingly slender; the apical segment from behind is

rather pear-shaped, shining yellow; in side view it has at the apex a pair of very delicate, almost hair-like small processes curved backward; just outside of these are two short, very slender yellow processes curving around in a semicircle; in front of these, arising from the middle of the segment, are two stout brown lobes covered on the front and outer sides with a dense brush of spines. Fifth sternite yellowish brown, not very widely excised along its inner margin, with a brush of short stiff spines.

Legs black; middle femur without spines; middle tibia on outer side with two bristles, the lower one strikingly long; hind tibia without villosity; two posterior bristles at its middle are strikingly long.

Wings hyaline; first and third veins hairy; a very short costal spine; third costal segment considerably shorter than fifth. Epaulet black.

Female. Front .362 of head (average of five,—.340, .351, .360, .378, .379). Parafacials with very small and inconspicuous hairs. Proboscis shining black, rather swollen in the middle. Genital segment red, the orifice oval and fringed with hairs.

Length 6-10 mm.

Numerous males and females. New Bedford, Horse Neck Beach and Woods Hole, Mass.; Oak Island, N. Y.; Malaga, Clementon and Manahawkin, N. J.; Beaufort, N. C., 4 specimens bred from terrapin eggs by W. P. Hay, issued Sept. 29, 1915; College Park, Md.; Virginia Beach, Va.; Columbia, S. C., "Puparium found in tunnel of *D. saccharalis*, Luginbill"; Tifton, Ga.; Opelousas, La.; La Fayette and Vincennes, Ind.; Lawrence, Kan.; Brookings, S. Dak., and Colorado.

Holotype.—Male, No. 20530, U. S. N. M., from Oak Id., N. Y.

Allotype.—Female, No. 20530, U. S. N. M., from Virginia Beach, Va.

No. 69. *Sarcophaga rufiventris* Wied.

Wiedemann, Auss. Zweifl. ii, 362, 1830.—Brazil.

Brauer und von Bergenstamm, Zweifl. Kais. Mus., v, 414, 1891, oc. in Texas.

A slender species, somewhat below medium size, instantly distinguished from all others by the abdomen being a bright red except at the base, and not very strongly pollinose.

Male. Front .257 of head; parafacials and parafrontals silvery; parafrontals, however, subshining above; parafacials with a few hairs near the eye; about 8 frontal bristles, descending only to the base of the antennæ, moderately divergent below; the antennæ brownish red; third joint less than twice the second, reaching three-fourths of the way to the vibrissæ, which are at the oral margin. Bucca over one-fourth the eyeheight, bare and somewhat silvery in front; palpi black; proboscis small; back of head with two rows of black hairs and considerable pale beard; outer vertical bristle present, the inner one very large.

Thorax densely gray pollinose, the usual stripes not very distinct; ps dc 3; ant aer rather small but distinct; prse smallish; stpl 3; the scutellum with two marginals, subapicals almost imperceptible, 1 pair smallish apicals, not convergent.

Abdomen as described; first and second segments with one lateral bristle; third segment with an interrupted row; fourth with a row of 14.

Hypopygium yellowish red, of medium size, lightly pollinose; first segment apparently without bristles; second segment with some rather coarse black hairs. Forceps nearly straight, hardly diverging at all, in profile about equally slender from base to apex and not provided with any hook or tooth; accessory plate small, narrowing into a slender point; posterior clasper brown and slender, nearly straight, not hooked at apex, bearing on the front side a very long hair, beyond which it is considerably narrowed; anterior clasper stout, strongly curved, with a thin edge, but not hooked; penis small, rather difficult to

see in the single specimen; its distal segment bears at the tip a pair of blunt, diverging points, between which is a third one of about the same shape and size.

Legs black, middle ones missing in the specimen; hind tibia not villous.

Wings subhyaline; first and third veins with long bristles; costal spines strong; third costal segment a little shorter than the fifth; apical cell rather narrowly open, or closed in the margin, or even short-petiolate. Fourth vein ending considerably before the apex. Hind crossvein rather erect, a little nearer to the bend than to the small crossvein.

Female. Front .314 of the head (average of three,—.306, .314, .321), with the usual orbital bristles, outer vertical rather weak. Genital segment red, orifice roundish, fringed with small black hairs. Middle tibia with two bristles on outer front side. Scutellum with a pair of small, diverging apicals.

Length 6 to 7 mm.

One male and three females: one male and one female are from San Rafael, Vera Cruz, Mex. (C. H. T. Townsend), correctly identified by Mr. Coquillett in the U. S. National Museum collection; two females from Brownsville, Tex., in the University of Kansas collection.

Type.—In Imperial Museum, Vienna.

No. 70. *Sarcophaga ampulla* n. sp.

Male. Front .208 of head; parafrontals and parafacials silvery, the latter with a row of conspicuous hairs, rather coarse below; frontal stripe black; frontal bristles about 8, the lower ones diverging moderately and reaching the base of the second antennal joint; ocellar bristles strong; outer vertical bristles distinctly developed; antennæ black, second joint elongated so that it is more than half the length of the third, the latter, however, reaches four-fifths of the way to the vibrissæ, which are at the oral margin; bucca one-fifth the eyeheight, clothed mostly with pale yellow hairs, many of which are before the

suture; back of head with two rows of black hairs, running out at the lower edge of the orbit; palpi and proboscis black, ordinary.

Thorax thinly gray pollinose, with the usual three to five stripes, which are brown when viewed from in front; ps dc 3; ant acr present but small; prsc small; stpl 3, large; scutellum with 3 pairs of marginals, the intermediate small; one pair smallish subapicals. The scutellum bears numerous pale hairs along and underneath its border at each side.

Abdomen gray pollinose, tessellated, with a shining median black line; fourth segment more than half bright red; first and second segments with only lateral bristles; third with stout, erect median marginal pair; fourth with marginal row of about a dozen, of which several near the middle are very stout; fifth sternite red, deeply excised, sides not very strongly divergent and bearing only small hairs.

Hypopygium red; first segment considerably retracted, apparently without bristles; second segment globose, shining, without bristles; forceps shining black, the attached part short, the free part unusually long and slender, straight for two-thirds of its length, then gradually bent forward, tapering to a sharp point. Viewed from behind, the forceps diverge very little. Accessory plate small, triangular, blackish; posterior clasper erect, nearly straight, blackish, moderately curved forward at tip; anterior clasper shorter and more strongly curved, shining black, the tip thin and straight; penis with short, small brown basal segment, the distal segment elongated and swollen, suggesting a flask; the back part of it is shining brown, the sides and front are mostly white and semi-transparent. It bears no perceptible appendages except at the front edge at tip, where there are three processes in a row, the lateral pair curving outward, the median one slightly bent forward.

Legs black; middle femur without comb; middle tibia with two bristles on outer front side; hind tibia not villous.

Wings hyaline; no costal spine; third costal segment about equal to the fifth; first and third veins with a dense row of hairs.

Length $6\frac{1}{4}$ mm.

One male. Dallas, Tex., April 29, 1914. (Bishop No. 3169). Adult collected on flowers of *Chamaecrista cinerea*.

Holotype.—Male, No. 20531, U. S. N. M.

No. 71. *Sarcophaga biseriata* n. sp.

Male. Front rather wide, .243 of head; parafacials and parafrontals silvery, the former with a single row of delicate hairs close to the eye; frontals seven, reaching to first fourth of the second antennal joint, not very strongly divergent below; antennæ black, rather slender, third joint twice the second and reaching five-sixths of the way to the vibrissæ, which are almost at the oral margin; arista with the usual plumosity for a little more than half its length; palpi and proboscis black, ordinary; bucca over one-fourth the eyeheight; back of head with two rows of black hairs, and rather abundant white ones around the neck and below; outer verticals not differentiated.

Thorax gray pollinose with the usual 3-5 black stripes; ps dc 3; anterior acr rudimentary, hardly more than hairs; stpl 3; prsc damaged by pin; scutellum with two marginals and a small apical, no trace of apicals.

Abdomen with the usual changeable pollen, fourth segment with apical half red; first and second segments with only lateral bristles; third with a median marginal pair and two lateral; fourth with marginal row of 12.

Hypopygium red; first segment large and long, not much curved downward, with a row of small bristles on hind margin; second segment globose, subshining, with erect hairs. Forceps yellow nearly to

the tip, perfectly straight on front side; viewed from behind they are not divergent, and are blunt, almost truncate at tip; accessory plate small, turned in against forceps; posterior claspers yellow, flat and curved forward, with a long hair about middle; anterior clasper dark at tip, slender and rather straight. Penis with long, curved, yellow basal joint, the distal one suddenly enlarging in front and behind; in front it spreads out into a disk that runs back somewhat toward the base; behind it slopes back, then downward into a minute hooded terminal tube; between this tube and the disk in front is a large cavity open apically but closed on the sides. Fifth sternite showing as two little pads with a brush of small bristles.

Legs black; middle femur not with combs; middle tibia with two bristles on outer front side; hind tibia not with villosity.

Wings subhyaline; a moderate costal spine; first and third veins hairy; third costal segment three-fifths of the fifth.

Female. Front .333 of head in width; the usual orbitals, and the outer vertical developed; frontals and occipital hairs as in male; ant acr absent; pre-scutellar very small; third abdominal segment with marginal row of 8 or 10; fourth segment almost wholly red, its sides converging almost to a point, and the transverse row of bristles located a little beyond the middle; the infolded sides of the fourth segment conceal the genital segment.

Length $5\frac{1}{2}$ mm.

One male, one female, Havana, Cuba (C. F. Baker).

Holotype and allotype.—Male and female, No. 20532, U. S. N. M.

No. 72. *Sarcophaga surrubea* V. d. W.

Van der Wulp, Biologia Centrali Americana, Dipt., ii, 273.—Mexico.

Male. Front .233 of head (average of five,—.216, .220, .240, .242, .245); parafrontals and para-

facials silvery pollinose, the pollen being rather coarser than usual; parafacials with a row of hairs below, which are occasionally rather strong; frontal bristles about seven, descending to the base of the second antennal joint, not very widely divergent. Antennæ black, the third joint not quite as long as the second, reaching four-fifths of the way to the vibrissæ, which are at the oral margin; arista long, plumose for about two-thirds of its length. Palpi black; proboscis small; bucca one-fifth the eyeheight; back of head with three rows of black hairs and a few pale ones around the neck as well as below.

Thorax gray pollinose with the usual 3 to 5 black stripes: ps dc 3; ant acr not differentiated; prsc very minute; stpl 3; scutellum with 2 large marginal, 1 small preapical and one small apical. The second submarginal is usually long, reaching to about the middle of the third abdominal segment.

Abdomen black and silvery, with changeable tessellation; fourth segment mostly red; first and second segments with only lateral bristles; third with an interrupted row; fourth with a row of ten.

Hypopygium red, rather large; first segment considerably retracted, with a few short hairs on the hind margin; second segment red, subshining, globose, with a few rather large erect hairs, two of which are quite bristle-like. Forceps nearly straight, slender, not divergent, red nearly to apex, gently inclined forward near tip, which is moderately sharp but not hooked. Accessory plates large, yellow, drawn together behind the penis and not distinctly separated from the body of the second segment. Posterior elasper black, rather short, stout and strongly curved; anterior ones much more slender, yellow, with hooked slender tip. Penis with yellow basal joint, much constricted between the segments, the distal one slender and yellow for a third its length, then suddenly large, globose and black; there is a large lateral plate on each side, circular, partly white; these unite in front and conceal the inner parts ex-

cept from the apex, which is open. Fifth sternite yellow, concealed except narrowly along the middle line, the fourth tergite forming a compressed median ridge.

Legs black; middle femur sometimes dark brown; the hind trochanters with a bunch of spines; middle femur without comb; middle tibia with two bristles; hind tibia not villous.

Wings slightly brownish; first and third veins hairy, the hairs on the third extending beyond the crossvein; no costal spines; third costal segment considerably shorter than the fifth.

Female. Front .325 of head (average of five,—.314, .317, .323, .348), with the usual orbital bristles and the outer verticals developed. No apical bristles on the scutellum. Fourth abdominal segment red for at least half its length. Genital segment red, the small orifice slit-like, with a fringe of erect bristles.

Numerous specimens of both sexes collected at Havana, Cuba, by C. F. Baker; two males, Bermuda Islands (C. W. Johnson).

Holotype.—In the Godman and Salvin collection, London.

No. 73. *Sarcophaga hospes* n. sp.

Male. Front .141 of head. Parafacials and parafrontals yellow, pollinose, the latter rather narrow, with numerous hairs; frontal bristles about 12, widely diverging below, reaching to the middle of the second antennal joint; antennæ black; third joint less than twice the second, rather slender, reaching three-fourths of the way to the vibrissæ, which are on the oral margin; arista long-plumose for a little more than half its length; the facial impression and facialia blackish, the latter hairy for more than half the length; palpi black, hairy, rather long; proboscis very short; bucca one-fourth the eyeheight, with yellow pollen. Back of head with about three rows of black hairs, considerable yellowish hair above the neck as well as below. The eye is narrowly bordered with

yellowish pollen behind. Outer vertical bristles absent. Ocellars slender.

Thorax with yellowish gray pollen and very distinct black stripes; ps dc 3; ant aer well developed; prsc quite small; stpl 3; scutellum with 2 long marginal, 1 smallish subapical, and a rather large pair of apicals.

Abdomen with yellowish gray changeable pollen. A distinct median black stripe on the second and third segments, which is shining in certain lights. First and second segments with only marginal bristles; third with an interrupted row, and fourth with a row of about 14.

Hypopygium small. First segment red, a little brownish at the base, with slender hairs but no real bristles; second segment yellowish red, pollinose, with erect hairs. Forceps yellow except at tip; the free part somewhat blade-like or sickle-shaped, curving rather uniformly forward, with a tooth on the front side at the apex; viewed from behind, they diverge very little; accessory plate pale yellow, long and slender; claspers brown, rather slender, the hind ones longer and more hooked; penis long, slender and simple; basal joint yellow, small; distal one slightly darker, long and rather flat, curved forward toward tip and ending in a small, blunt tube at right angles to the body of the segment. There is a single small, earlike lobe on each side near the base of the tube, no other processes visible.

Legs black, the middle femur underneath on the hind side with only about three blunt spines near the apex. Middle tibia with two bristles on outer front side; hind tibia without villosity.

Wings distinctly brownish, paler along the hind margin; no costal spines; third and fifth segments of costa about equal; first and third veins hairy.

Length 7 mm.

One male collected by H. S. Parish at Bartica, British Guiana, May 2, 1901.

Holotype.—Male, in Professor Hine's collection.

No. 74. *Sarcophaga helicis* Towns.

Townsend, Psyche, vi, 220, 1892.—Ohio, bred from *Helix thyroides*.

Coquillett, Proc. Acad. Nat. Sci. Phil., 1895, 317 (*Helicobia*); Proc. U. S. N. M., xxii, oc. in Porto Rico (id.).

Howard, Insect Life, vi, 372, bred from *Loxostege sticticalis*.

Townsend, Psyche, vi, 468, 1893, reared by Forbes in Illinois from *Lachnosterna* sp., *Pontia rapae*, and *Heliofila unipuncta*.

Morgan, Bull. 30, n. ser., Div. of Entomology, 1901, 25, bred from *Melanoplus differentialis* in Mississippi.

Washburn, Diptera of Minnesota (Bull. 93, Minn. Exp. Sta.), 143, reared from *Melanoplus atlantis* in Minn.

Pratt, Canad. Ent., xlv, 181, 1912, bred from cow manure in Texas.

Kelly, Jour. Agr. Research, ii, 441, bred from grasshoppers at Wellington, Kan.

Aldrich, Jour. Econ. Ent., viii, 245, summary of rearings.

Male. Front .215 of head (average of five,—.192, .211, .211, .219, .241); parafrontals and parafacials silvery, the latter narrow with the usual row of hairs which are bristle-like below; frontal bristles about 7, only descending to the base of the second antennal joint, moderately divergent; antennæ black, the third joint almost twice the second, reaching three-fourths of the way to the vibrissæ, which are at oral margin; arista with ordinary plumosity; palpi and proboscis black, ordinary; bucca one-fifth eye-height; back of head with three rows of black hairs and rather numerous white ones around the neck and below.

Thorax gray pollinose, with the usual three to five black stripes; ps dc three; ant acr absent or very rudimentary; prsc rather small; stpl 3; scutellum with 2 pairs of marginals (second very long); preapical short, apical rather small but distinct.

Abdomen black and silvery, with strong tessellation and indications of three changeable black stripes; hind edge of fourth segment red; first and third segments with only lateral bristles; third with an interrupted row; fourth with a row of about 12.

Hypopygium small; first segment somewhat blackish on the narrow visible part, with a few rather strong hairs; second segment red, with scattered erect stout hairs or small bristles. Forceps yellow at base, scarcely divergent, curving forward and rather rapidly tapering to a simple point; accessory plate yellow with a black outer margin, rounded and hairy; posterior clasper erect, straight, sharp and curved forward at apex with a stout hair near base; anterior clasper strongly bent forward, nearly bare, the apical part almost straight, flat, not hooked; penis with rather short, reddish-brown basal segment; the distal segment on its basal third is brown behind and white in front, the body of the segment is globose, the back part shining black; the various processes are mostly concealed within broad black lamellæ. Fifth sternite yellow, broadly V-shaped, with yellow pubescence and delicate black hairs.

Legs black, the middle femur without comb; middle tibia with two bristles on the outer side; hind tibia without villosity. Claws and pulvilli elongated, the latter brown.

Wings hyaline; no costal spines; third and fifth costal segments about equal; the first and third veins hairy, the hairs of the latter extending to the cross-vein.

Female. Front .329 of head (average of five,—.315, .326, .33, .336, .34); outer vertical bristles large; palpi somewhat clavate; scutellum without apical bristles; genital segment red with a slit-like orifice, with a few bristles.

Length 3-8 mm.

One of the commonest North American species; in the Hough collection I saw 1250 specimens. Coquillett (Proc. U. S. N. M., xxii, 255) has reported it from Porto Rico, and Johnson (Annals E. S. A., vi, 447), from Bermuda, and there are before me specimens from Panama (Sturtevant), British Honduras, and Havana; in the United States it is common everywhere, most of the states being represented

in the material; it appears to diminish northward, as there are no Canadian specimens in what I have accumulated (Gibson, however, reports it from Montreal in his 1913 Record,—Report Ent. Soc. Ont., 1913, 122).

Bred material is abundant; most of the records known to me have been included in my article on The Economic Relations of the Sarcophagidæ, in Journal of Economic Entomology, viii, 242-246. It is very likely that the species breeds largely in dead insects, and some of the records were made without allowing for this possibility. However, the species is a true parasite in grasshoppers and in *Eleodes*, and probably quite often in Lepidoptera and other insects. With this element of uncertainty to be kept in mind, the following are the cases of rearing recorded for the material I have examined.

Two males and four females from adult *Corydalis cornuta* at Washington (Bur. Ent. no. 422-xo); issued July 14, 1894.

Three males, two females from *Cicada tibicen* collected at Waterfield, Va. (Bur. Ent. no. 2851-o); issued Sept. 4, 1894.

Two females from a jar that had contained larvæ of *Calosoma* sp., at Washington (Bur. Ent. no. 3668-o); issued Sept. 13, 1894.

One of each sex from *Leucania unipuncta* (Bur. Ent. no. 35c); issued July 17, 1880.

Four males, eight females, from adults of *Lachnosterna arcuata* in breeding cage at Washington; issued July 12, 1893. These were probably scavengers (Bur. Ent. no. 5163-a).

Two females from adults of the beetle *Dinapate wrightii* in breeding cage in Washington; issued Sept. 11, 1897. Probably scavengers (Bur. Ent. no. 7386-o).

Numerous specimens, Wellington, Kan., bred from grasshoppers by E. G. Kelly (Webster Nos. 7393, 7398); mentioned by Kelly in Journal of Agricultural Research, ii, 441.

Numerous specimens, La Fayette, Ind., bred by J. J. Davis from larvæ of the Army Worm collected in eastern Michigan; issued June 7, 1915. Some were from cages in which care had been taken to introduce only living caterpillars (Aldrich, *Journal of Economic Entomology*, viii, 244); Mr. Davis, however, expressed some doubt to me later about the exclusion of all uncertainty in this case.

One male, three females, Belleville, Kan., reared from *Eleodes opaca* by W. E. Pennington (Webster No. 13510).

One female, Enola, Va., reared from *Sparabolus* sp. (a Myriapod), by Sara Reynolds.

Type.—Female, in University of Kansas.

***Sarcophaga amblycoryphæ* Coq.**

Coquillett, Proc. Ent. Soc. Wash., vi, 187, 1904, female only.

The species was described from a single female, bred by Dr. George Dimmock, at Springfield, Mass., from "a living adult of *Amblycorypha oblongifolia*." In the Hough collection I found a female from Jamesburg, N. J., which on comparison with the type in the National Museum appeared to be identical and is so labeled; no males have been found which can be determined as the same species, hence it is impossible to say positively whether the species would be correctly located in Group B or Group D. As my female shows a rudimentary larvipositor, the latter alternative is very likely the correct one. The comparison with the type having been made some time ago, I dare not press it too far in announcing minute characters from my specimen; so I will only add to the original description that the anterior acrostichals are well developed. Until a corresponding male is found the species cannot be satisfactorily known. The habit, however, was worth noting, and probably justifies the description of the species from the female.

Holotype.—Female, No. 7963, U. S. N. M.

GROUP E.

Four postsutural dorsocentrals; hind tibiae vil-
lous; hypopygium entirely black.

Table of Species.—Males.

1. Front about as wide as one eye; middle tibiae with long, dense villosity on distal half of inner side; very robust species (Atlantic sea-coast from Massachusetts to Texas)

No. 75. *johnsoni* n. sp.

Front much narrower than one eye; middle tibiae not conspicuously villous 2.

2. Forceps large and long, deeply grooved on the back, the base with long, dense black hair (Europe and Massachusetts)

No. 76. *uliginosa* Kramer.

Forceps not as described 3.

3. Anterior claspers large, thick, with grooved back (Massachusetts, Ontario, Washington)

No. 77. *aldrichi* Park.

Anterior clasper not grooved on back 4.

4. Penis hooded and with a hump on the back, no processes visible (Massachusetts, New York)

No. 78. *houghi* n. sp.

Penis globose with several characteristic slender processes at apex (Europe, Massachusetts, Idaho)

No. 79. *tuberosa* var. *harpaw* Pand.

No. 75. *Sarcophaga johnsoni* n. sp.

Male. Front .317 of the head (average of five, —.306, .309, .318, .320, .333), strongly protuberant, as is also the oral margin; eyes rather small so that the parafacials and bucca are considerably wider than usual, the latter as high as the eye; front and face silvery white; parafacials with several rows of small hairs, none bristle-like; vibrissæ slightly approximated, a little above the oral margin; antennæ black, reddish at base of third joint, the latter hardly twice the length of the second, reaching fully three-fourths of the way to the vibrissæ; arista short-plumose a lit-

tle over halfway; palpi brownish yellow, slender; proboscis nearly black; back of head with about three rows of black hairs and conspicuous yellow beard; occiput rather bulging, with some stout hairs behind the ocelli; ocellar bristles small; frontal bristles also rather small, about 13 in number, extending as far forward as the middle of the second antennal joint, suddenly diverging below; outer vertical bristles absent.

Thorax gray pollinose with the usual 3 to 5 black stripes, which in the front view are satiny brown; in the side view the median black and submedian gray stripes are more or less divided by additional stripes; ps dc only two, near the scutellum, the anterior one somewhat smaller; before the suture there are no bristles except laterally; ant aer absent; prsc one very small; humeral two; presutural one, almost in line with the three supra-alar; scutellum with two marginals, one preapical of moderate size.

Abdomen rather dark, with characteristic tessellated appearance; first and second segments with only lateral bristles; third with one pair median marginal bristles and three laterals; fourth entirely black, with a row of more than 20 marginal bristles, most of which are on the lower side.

Hypopygium entirely black; first segment rather large, moderately gray pollinose, with erect, fine hairs and no bristles; second segment globose, shining, with abundant erect hair and no bristles; the lower edge along the sides slightly reddish. Forceps black, short and stubby, with a pronounced angle on the back, the front nearly straight, so that they are somewhat obliquely truncate; beyond the angle behind they have abundant short, stiff, erect hairs and the same on the front side opposite these, so that only the extreme tips are bare; accessory plate very large, shining yellow, but the free part narrow; posterior clasper black, straight on the basal part, curving to a sharp point; anterior clasper larger, black, rather straight toward the apex, ending in a hook in profile. Viewed from

behind they are broad and flat and bluntly rounded at the tip; penis brown, basal segment rather short and wide; the distal segment very complicated; from its base it widens rapidly in profile and the back part is jointed at the middle, the second part widening into a transverse plate which is as long as the rest of the organ. From the middle of the segment there are several rather straight processes standing up in front of this plate. On the front side there is a very complex structure standing out near the base and bending forward, which contains two or three pairs of processes parallel to those previously mentioned. Fifth sternite brownish yellow, broadly visible, keeled at base; at the point of separation of the two arms there is a ridge on each side which at its base bears a tuft of short, stiff black spines.

Legs black; middle femur without comb; middle and hind tibia densely villous, the former having the villosity mostly on the apical half and bearing two bristles on the outer front side. All the femora are stout and have long hair on the under side; claws and pulvilli long, the latter brownish.

Wings slightly brownish, without costal spines; third segment of costa much longer than the fifth; third vein hairy about halfway to crossvein.

Female. Front .403 of head (average of four, —.389, .392, .414, .415), with the usual two orbital bristles present but smallish; parafrontals and parafacials inclining to silvery in color, bearing rather numerous hairs, especially above. Frontal bristles small; bucca three-fourths the eyeheight; subapical bristles of the scutellum very nearly in line with the marginals; genital segment black, strongly chitinized and hairy, the orifice wide, heavily fringed with bristles above. Tibia destitute of villosity; middle tibia with three bristles on the outer front side.

Length 10-14 mm.

Fifteen males and four females. Five males and one female are from Anglesea, N. J.; one male and one female on the same pin are from Cape May, N.

J.; three females Wildwood, N. J. (Harbeck); five males Horse Neck Beach, Mass.; one male New Bedford, Mass.; one male Galveston, Texas (University of Kansas); one male Virginia Beach, Va. (National Museum, F. Knab, collector). Except where otherwise stated, this material is all in the Hough collection.

This species, I am informed, is found only on sea beaches. It is named in honor of the eminent dipterist, C. W. Johnson, Curator of the Boston Society of Natural History.

Holotype.—Male, No. 20534, U. S. N. M., from Virginia Beach, Va.

Allotype.—Female, same number, U. S. N. M., from Anglesea, N. J.

No. 76. *Sarcophaga uliginosa* Kramer.

Kramer, Entom. Wochenbl., xxv, 152, 1908.—Europe.
Böttcher, Deutsche Ent. Zeitsch., 1912, 732, fig.

Male. Front .180 of head (one specimen); parafrontals and parafacials silvery, rather narrow, the latter with the usual row of hairs, rather coarse below; frontal bristles about 14, rapidly diverging below, reaching the middle of the second antennal joint; ocellars as long as frontals; outer vertical bristles not differentiated; antennæ brownish black; third joint about $2\frac{1}{2}$ times the second, reaching seven-eighths of the distance to the vibrissæ, which are on the oral margin; arista rather long-plumose for three-fifths of its length; bucca one-third the eyeheight; palpi and proboscis black; back of head with three or four rows of partly irregular black hairs and abundant white ones.

Thorax whitish pollinose, with the usual 3 to 5 black stripes; the submedian gray stripes are narrowly divided by a dark line before the suture; ps de four; ant acr slender, barely showing, no erect hairs surrounding them; prsc well developed; stpl three; bristles of the scutellum with two pairs of marginals, one pair preapicals widely separated, and one pair apicals.

Abdomen whitish pollinose, with the usual tessellation and three changeable black stripes; first and second segments with only lateral bristles; the third with an interrupted row of ten; the fourth with a row of about 14.

Hypopygium black; first segment pollinose, with erect hairs but no bristles; second segment shining, with numerous erect hairs; forceps black, long and broad, with dense long black hair on basal part; the free part is tapering and gently curved forward in profile to a sharp point, with a small tooth on it. Viewed from behind, they are readily distinguishable from all other species by being deeply grooved, especially on the apical half. The groove is broad, so it is only bordered by a narrow elevated ridge on each side; the points are widely divergent. Accessory plate rather slender, posterior clasper brown, slender, curved, sharp at tip; anterior clasper very similar in shape; penis with rather short basal joint, distal suddenly expanded into a globose structure, at the end of which on the back part there arises a round, tubular prolongation, ending in two long plates reaching forward and lapping over each other; between these there arises a soft, slender, pale process; the globular central mass also bears on its front apical side two flat plates side by side, which are bent into strong recurved hooks, and basally from these on each side there is a slender rolled up transparent plate; fifth sternite very much retracted.

Legs black; middle femur with a rather well developed comb on the hind edge below; middle tibia with one bristle on outer front side; hind tibia with rather dense, long villosity, spreading both ways.

Wings almost hyaline; no costal spines; third costal segment longer than the fifth and sixth together; first vein bare; second hairy for two-thirds the distance to the crossvein.

Length 8 mm.

One male, Gypsy Moth Laboratory, Melrose Highlands, Mass., May 13, No. 1400. "Reared from a

miscellaneous lot of puparia which were received from Europe in 1908. Our records show that one specimen of this species was collected at North Saugus, Mass., Sept. 29, 1909, near the temporary laboratory that we maintained there during the summer of that year, and that a single specimen was collected in the field at Lunenburg, Mass., July 14, 1914. The determination of these specimens was by Mr. R. R. Parker."—A. F. Burgess, letter, Feb. 8, 1916.

Type.—Location of type unknown to the writer.

No. 77. *Sarcophaga aldrichi* Park.

Parker, Jour. Econ. Ent., ix, 438, 1916.

Male. Front .246 of head (average of five.—.195, .202, .207, .209, .217); frontal stripe brown, rather wide; parafrontals and parafacials silvery, the latter with the usual row of small hairs, the lowest ones coarse; frontal bristles about 12 in number, moderately large, widely divergent below, reaching to about the first third of the second antennal joint; facial impression brown, rather conspicuous; vibrissæ at oral margin; facialia with rather distinct, erect hairs reaching more than halfway to the base of the antennæ; antennæ black; third joint fully twice the second, reaching four-fifths of the way to the vibrissæ; arista with the usual plumosity for three-fifths of its length; bucca fully one-fourth the eyeheight; palpi and proboscis black; back of head with four rows of black hairs and considerable pale beard; outer vertical bristles not longer than adjacent hairs, which are better developed than usual; ocellars rather strong.

Thorax gray pollinose, with the usual 3 to 5 black stripes; ps dc four, the anterior two of these slightly smaller; ant acr slender, one pair just before the suture well developed; prse long but rather slender; stpl three; scutellum with two pairs of marginals, one preapical and one apical; all the hairs of the mesonotum are rather slender and erect.

Abdomen black and silvery, with three changeable stripes and the usual tessellation; first and second segments with only lateral bristles; the third with median marginal hairs and laterals; fourth with a marginal row of about 12.

Hypopygium black; first segment with considerable gray pollen and slender erect hairs, but no bristles; second segment shining, reddish on the lower border, with rather abundant erect hairs; forceps dark brown, rather large, in profile straight and parallel for more than half of the free portion, then broadly curved forward, ending in a small tooth which is just behind the middle of the apex. Viewed from behind, they are flat and united for more than half of their entire length, then separated by a U-shaped excision which narrows a little apically and then widens suddenly; the whole posterior surface is shining and covered with small recumbent hair, which as usual is longer at the base. Accessory plate slender, brown, the free part nearly half as long as the forceps; posterior clasper brown, nearly straight, tapering rapidly near the tip, where it is strongly curved forward; anterior clasper much larger, broad and stout, yellow or brownish yellow, the posterior side deeply and broadly grooved almost to the apex, which is not hooked. The basal segment of the penis brown, rather square, of considerable length; distal segment in general outline rather square, having the appearance of being attached at one corner; from this point of attachment four chitinized processes develop; one of these, the posterior one, forms the back of the segment, bending in a rounded angle and proceeding to the apex, where it is broadly flattened and lighter colored; it is smooth and shining throughout its course; two of the processes form lateral supports, spreading out on the two sides of the central structure; the fourth one projects forward and is quite short; from the middle of the segment two wide plates extend forward, while the apical part spreads out in a transverse plate armed with a slender hook. Fifth sternite

broadly excised in a U-shape, bordered along the inner edge with a close row of short bristles.

Legs black; middle femur with a fairly well developed comb below on the hind side; middle tibia with two bristles on the outer front edge; hind tibia with rather sparse villosity, longest on the mesial side.

Wings subhyaline, no costal spines; third segment of costa much longer than the fifth; first vein bare; second hairy about halfway to crossvein.

Female. Front .327 of head (average of three, —.320, .329, .333); the usual orbital bristles; outer verticals well developed; bucca fully one-third the eyeheight; no apical bristles on scutellum; genital segment black, with oval aperture surrounded by dense bristles; middle femur not with comb; middle tibia with three bristles on outer front side; hind tibia not villous.

Length 8-10 mm.

Eleven males and three females. One male and one female from East Eddington, Me. (Hough collection); 5 males Melrose Highlands, Mass. (H. E. Smith); two males N. Saugus, Mass. (H. E. Smith); one male Lunenburg, Mass., paratype) collected by R. T. Webster, sent me by R. R. Parker; one male and one female reared from *Malacosoma disstria* in Ontario by Prof. Lawrence Caesar; one male Friday Harbor, Wash., collected by the author; one female Southport Creek, B. C., R. P. Currie collector (Nat. Mus.).

Holotype.—Male, in collection of Mass. Agricultural College. Paratypes in National Museum, etc.

Mr. Parker publishes a note by Prof. Caesar on this species, from which it appears to be a parasite of importance upon the Forest Tent Caterpillar.

No. 78. *Sarcophaga houghi* n. sp.

Male. Front .181 of head (average of five,—.174, .177, .178, .188, .188); parafrontals and parafacials silvery, the latter with the usual row of bristles, coarser below; frontal bristles about 12, rapidly diverging below, reaching about to the middle of the second antennal joint; antennæ black or dark brown; third joint twice the second, reaching fully three-fourths of the way to the vibrissæ, which are at the oral margin; arista with the usual plumosity for three-fifths of its length; palpi and proboscis black; bucca one-fourth the eyeheight; back of head with three rows of black hairs and considerable pale beard; outer bristles not differentiated; ocellars slender, but nearly as long as the frontal bristles.

Thorax whitish pollinose, with the usual 3 to 5 black stripes; ps dc four, of which the foremost two are slightly smaller; ant acr not distinctly differentiated from the erect hairs of the surface, the last pair before the suture slightly noticeable; prsc one pair slender but of moderate length; stpl three; scutellum with two marginals, a slender pair of preapicals and a pair of rather large apicals.

Abdomen whitish pollinose, almost silvery, with three changeable stripes, of which the middle one is fairly permanent and somewhat shining; the surface has the usual tessellation; first and second segment with only lateral bristles; the third with a broadly interrupted row of about 10 and the fourth with a row of about 16.

Hypopygium black; first segment of moderate size, gray pollinose, with erect hairs, a few along the hind border rather larger, almost bristle-like; second segment subshining, perceptibly pollinose, with erect hairs, some of which are almost bristle-like. Forceps small, brownish black, in profile slightly curved, but little tapering, the apex very blunt, bearing a minute tooth in the middle; viewed from behind they taper quite rapidly and are not divergent; accessory plate rather triangular with rounded corners, the hind side

somewhat longer than either of the others; posterior clasper small, yellow except at tip, very slender, and curved forward but not hooked; anterior clasper long, slender at base, shining black or brown, widened and truncate at apex, strongly curved forward; forceps with yellow basal segment, the distal segment mostly enclosed in a shining black hood-like envelope, which has a large white spot on the side. This envelope covers a large hump which is almost apical; on the front side of this, separated by a concavity in the profile is a broad ending of the central tube surrounded by an expanded rim; on the front side about the middle, two flat plates project, each of which has two divergent teeth at its apex; fifth sternite V-shaped, the diverging lobes distinctly visible, covered with short black bristles.

Legs black; middle femur without comb; middle tibia with one bristle on outer front side below the middle; hind tibia with rather sparse villosity, mostly on mesial side.

Wings almost hyaline, no costal spines; third segment of costa slightly longer than the fifth; first vein bare; third vein hairy for two-thirds of the way to the crossvein.

Length 8 mm.

Seven males, four from New York City (Amer. Mus.); one from New York City (Sturtevant); two from Melrose Highlands, Mass. (H. E. Smith), and one from New Bedford, Mass. (Hough).

Holotype.—Male, No. 20533 U. S. N. M., from Melrose Highlands, Mass.

Named in honor of Dr. Garry de N. Hough, whose early retirement from the dipterological field was a great loss to our science.

No. 79. *Sarcophaga tuberosa* var. *harpax* Pand.

Pandellé, Rev. Ent., xv, 189.—Europe.

Böttcher, Deutsche Ent. Zeitschr. 1913, page 735 (as var. of *tuberosa* Pand.).

Male. Front .213 of head (average of two,—.205 and .222); parafrontals and parafacials shining

silvery pollinose, the latter with the usual row of hairs below, some of which are quite bristle-like; frontal bristles about 12, widely diverging below and reaching the middle of the second antennal joint; ocellars of good size; antennæ brownish black; third joint twice the second and reaching four-fifths of the way to the vibrissæ, which are at about the oral margin; arista with the usual plumosity, extending a little over half its length; bucca fully one-third the eyeheight; back of head with three and partly four rows of black hairs, together with numerous pale ones; palpi and proboscis black, ordinary; outer vertical bristles not differentiated.

Thorax whitish pollinose, with the usual 3 to 5 black stripes, the submedian gray stripes partly divided by a narrow dark line; hairs of the thorax erect and long; ps de four; ant acr not differentiated; prsc one distinct pair; stpl three; scutellum with two pairs of marginals, one large preapical, and one rather large apical.

Abdomen silvery pollinose, tessellated, with a distinct median and a pair of changeable lateral stripes, the former shining. First and second segments with only lateral bristles; third with an interrupted row of about ten; fourth with a strong row of about 20.

Hypopygium entirely black; first segment pollinose, with erect fine hairs and no bristles; second segment shining, globose, with abundant erect hairs; forceps black, with dense recumbent black hair, especially near the base, varying in form apically, either slender or blunt and toothed; accessory plate brown, with dense long hair, the basal angle acute and apical end truncate; both pairs of claspers shining black or brown, of similar shape, curving forward to a slender sharp point; penis brownish, basal segment distinct; on the back it bulges into a globose form, across the middle of which is a distinct suture, beyond this is a brown sclerite rapidly narrowing into a sharp apical point; this sclerite bears on each side a long, slender

arm extending nearly straight forward. Between these arms two upright similar slender processes arise from the central portion of the segment, longer than the apical processes first mentioned. The arrangement of these five processes is highly characteristic of the species in all of its variations. The front part of the segment is bounded by two overlapping plates which originate from the lateral expanded sides of the segment, so that two erect processes seem to come out of a deep cavity. The fifth sternite appears to be variable, as in one of the specimens it shows a rather wide excision lined with strong spines which meet each other from the two sides, while in the other specimen the fourth tergite comes together over this organ, entirely concealing it and bearing along its approximated borders a keel-like, dense series of erect black bristles.

Legs black; middle femur with two series of stout spines below, the posterior of which are somewhat comb-like; middle tibia with a single bristle on the outer front side and sometimes an added small one; hind tibia with very long and very dense villosity spreading both ways.

Wings subhyaline, no costal spines; third costal segment much longer than the fifth; first vein bare; third hairy two-thirds of the way to crossvein.

Length 8 mm.

Four males. One from Gypsy Moth Laboratory, No. 3338-S; one from Juliaetta, Idaho, collected by the author; one from Oahu, Hawaii (H. H. Severin); one male Nadi, Fiji Islands (Prof. J. F. Illingworth). Referring to the first, in a letter dated Feb. 8, 1916, Mr. A. F. Burgess says, "All the specimens under this number were reared from puparia received from Germany with an importation of Gypsy Moth caterpillars." I am indebted to Mr. Parker for the determination of the variety. It was originally described from European material, and belongs to one of the most widespread variable species known.

Type.—In the Pandellé collection in Paris.

GROUP F.

Four postsutural dorsocentrals or only the hind ones developed; hind tibiae in male villous; at least second segment of hypopygium red.

Table of Species.—Males.

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|----|--|-----|
| 1. | First vein hairy | 2. |
| | First vein bare | 3. |
| 2. | Glaucous or bluish species, the frontals not diverging much below; two stpl (Mexico) | |
| | No. 80. <i>villipes</i> V. d. W. | |
| | Gray species, the frontals diverging below; three stpl, all stout (Lower Cal.) | |
| | No. 81. <i>cabensis</i> n. sp. | |
| 3. | Legs red or yellow (tarsi may be black) | 4. |
| | Legs black | 6. |
| | Knees broadly and the middle and hind tibiae red; palpi yellow; no ant acr; frontals very small; middle tibiae villous (Cuba) | |
| | No. 82. <i>pedata</i> n. sp. | |
| 4. | Middle tibiae with dense villosity on apical half; forceps large, tapering and strongly curved forward near tip (W. I., Fla., La.) | |
| | No. 83. <i>fulvipes</i> Macq. | |
| | Middle tibiae not villous | 5. |
| 5. | Forceps with a lateral erect smooth arm near the base of the free part (Ga.) | |
| | No. 84. <i>singularis</i> n. sp. | |
| | Forceps not with lateral arm (Ga.) | |
| | No. 85. <i>deceptiva</i> n. sp. | |
| 6. | Large tropical species with yellow beard; penis with enormously developed long stalk curved almost in a semicircle and bearing at end a large divided disk (Central and South America) | |
| | No. 86. <i>cotyledonea</i> n. sp. | |
| | Not as described | 7. |
| 7. | First segment of hypopygium black, at least on apical half | 8. |
| | First segment yellow, at least on apical half | 17. |

8. Prescutellars absent; forceps nearly straight, in profile with a notch behind near base (very widespread)
 No. 87. *hamorrhoidalis* Fall.
 Prescutellars present 9.
9. Middle tibiae villous, no ant aer 10.
 Middle tibiae not villous. 15.
10. Only one row of black hairs behind the eye; robust tropical species with golden head and beard, and yellow pollen on sides of thorax and abdomen (W. I. and south)
 No. 88. *wiedemanni* n. sp.
 More than one row of black hairs behind the eye; a group of slender, blackish western species, head gray 11.
11. Anterior clasper short, with sharp, curved point and a sudden widening on outer side half-way to base (Colo., N. M.)
 No. 90. *clongata* n. sp.
 Anterior clasper much longer, with rounded or forked tip, and not abruptly wider on outer side on basal half 12.
12. Penis with five or six slender processes at apex 13.
 Penis ending in a more globose or platelike structure 14.
13. Forceps bent forward on hind edge near tip with a rather distinct angle; front lobes of distal segment of penis in the form of shining blackish plates (Idaho)
 No. 89. *thatuna* n. sp.
 Forceps evenly curved forward in profile; front lobes of distal segment of penis in the form of a delicate pale membrane or fringe (Ida., Wash.) No. 91. *occidentalis* n. sp.
14. Penis with two pairs of very large longitudinal plates on the front side, and the apex fringed with yellowish pubescence (Idaho)
 No. 92. *juliaetta* n. sp.

- Penis with moderate plates on the front, the apex not fringed (Colo.)
 No. 93. *perspicax* n. sp.
- Penis smaller and more globose, not with distinct plates on front side (Colo.)
 No. 94. *gracilis* n. sp.
15. A single row of black hairs behind the eye (widespread) No. 95. *securifera* Will.
 With more than one row of black hairs 16.
16. Forceps in profile with an emargination behind followed by a hump (widespread)
 No. 96. *falculata* Pand.
 Forceps not with hump; penis with four slender processes at tip (widespread)
 No. 109. *tuberosa* var. *cauberans* Pand.
17. Middle tibiae with long villosity 18.
 Middle tibiae not villous, at most with appressed hair about as long as the tibia is wide 23.
18. Face and front golden yellow pollinose 19.
 Face and front gray pollinose 21.
19. Forceps rather straight, with an oval concavity on outer side; terminal portion of penis straight, swollen (W. I.)
 No. 101. *otiosa* Will.
 Forceps curved forward; distal part of penis bent forward in an angle, not globose or swollen 20.
20. Anterior claspers short and very stout (Dominica) No. 97. *amaena* n. sp.
 Anterior claspers slender (Porto Rico)
 No. 98. *capitata* n. sp.
21. Middle tibia with rather moderate villosity, beginning about the middle; northern species (New England, Europe)*
 No. 102. *scoparia* Pand.
 Middle tibiae with very long villosity, beginning near the base; tropical species 22.

*A blacklegged variety of *fulvipes* has been noted by Parker, which would come out here; it has yellow palpi.

22. Fourth abdominal segment broadly red apically
(Fla., Bahamas) No. 100. *spectabilis* n. sp.
Fourth abdominal segment black (Fla.)
No. 99. *hillifera* n. sp.
23. Parafacials with satiny deep golden yellow pollen and almost imperceptible hairs (West Indies) No. 103. *peltata* n. sp.
Parafacials gray or with but little yellowish tinge, and with distinct hairs 24.
24. The row of bristles on the fourth abdominal segment entirely marginal 25.
The row marginal at the side, subdiscal in the middle (N. J.)
No. 104. *subdiscalis* n. sp.
25. Anterior acrostichals distinct 26.
Anterior acrostichals not differentiated, at most faintly discernible at the front edge of the thorax 27.
26. Blackish species, front narrowest a little below anterior ocellus, thence rapidly widening (La., Ga., Tex.)
No. 105. *impar* n. sp.
Gray species, the front parallel nearly to the antennæ (Kans., Tex.)
No. 106. *sulculata* n. sp.
27. Third abdominal segment without median marginals 28.
Third abdominal with median marginals 29.
28. Forceps long, black, simple (Montana, Colo.)
No. 107. *cooleyi* Park.
Forceps with a long yellow process on the attached part, simulating the real forceps (Texas, S. Cal., W. I.; Group H)
No. 128. *robusta* n. sp.
29. Forceps with nearly parallel front and back edges, and an apical tooth formed by an excision of the front edge (widespread)
No. 108. *sarracenioides* n. sp.
Forceps tapering to a sharp point 30.

30. Distal segment of the penis short and very broad and blunt, a curved hornlike process at each outer apical angle (widespread)

No. 110. *bullata* Park.

Distal segment wide, but lacking the hornlike processes and provided with some long apical ones (Montana)

No. 111. *libera* n. sp.

No. 80. *Sarcophaga villipes* V. d. W.

Van der Wulp, Biologia, Dipt., ii, 269, male and female; pl. vii, f. 2, 1895.—Mexico, Northern Sonora and Guerrero.

Of this species I have only the female, but it seems readily recognizable.

Female. General color bluish gray or glaucous. Front .407 of head; frontal bristles only about 7, the rows wide apart, not diverging below, and reaching only a little beyond the base of the second antennal joint; ocellars large; outer vertical well developed. Parafrontals rather hairy, with bluish-gray pollen, which spreads over most of the frontal stripe; parafacials more shining gray pollinose, with the usual row of hairs, which are slender; antennæ black, third joint double the second, reaching four-fifths to the vibrissæ, which are at the oral margin; arista plumose barely to the middle; proboscis and palpi black, ordinary; bucca one-third the eyeheight; back of head with several rows of black hairs, the very few pale ones difficult to see.

Thorax densely bluish gray pollinose, with the usual 3 to 5 black stripes; the submedian gray stripes divided before the suture; ps dc 4; ant dc 3; ant acr 0; prese very minute; sa 3; int al 2; pa 2; stpl 2; npl 3; scutellum with 2 marginal and one discal.

Abdomen glaucous pollinose, not very changeable, with an indistinct median dark stripe; first and second segments with only lateral bristles; third with a median marginal pair and two laterals; fourth with a marginal row of 10 or 12. Genital segment gray,

without developed larvipositor, the orifice rather wide, with a few bristles.

Legs black; middle femora without comb; middle tibia with two bristles on outer front side.

Wings hyaline; a small costal spine; third costal segment noticeably shorter than fifth; first and third veins hairy, and with slender hairs on the under side also.

Length 9 mm.

Two females, Cordoba, Mexico, collected by Frederick Knab on March 25, 1908 (National Museum).

According to Van der Wulp, the male has all the femora and tibiae villous on the flexor side, and the "hypopygium brownish-red, densely haired."

Type.—Male, in the Godman and Salvin collection, London.

No. 81. *Sarcophaga cabensis* n. sp.

Male. Front wide, .286 of head, protuberant at base of antennae; parafrontals gray pollinose, with numerous fine hairs; 8 or 9 frontals, the anterior 3 parallel with eye margin but moderately divergent from the middle line: lowest at middle of second antennal joint; outer vertical not differentiated; parafacials gray pollinose, rather wide, with the usual row of hairs, the lower bristly; vibrissae barely above oral margin, with numerous hairs not in a row extending over half way up the ridges; antennae blackish, third joint nearly four times the second and reaching five-sixths of the way to the vibrissae; palpi and proboscis black, ordinary; bucca one-half the eyeheight; occiput with about two rows of black hairs, long yellowish hairs above and at the sides of the foramen, as well as below.

Thorax gray pollinose with 3 to 5 black stripes; anterior acrostichals present, two or three moderate pairs; 4 ps dc; 3 stout stpl; scutellum with 3 stout marginal pairs, 1 subapical (sears only in the specimen); 1 smallish apical pair.

Abdomen gray, tessellated, fourth segment mostly red; segments one and two with only lateral bristles; third with a row of 10, fourth with row of over 20.

Hypopygium red, subshining, not very large; first segment retracted, not with bristles; second segment very convex in profile or with a hump, and bearing numerous long black hairs; forceps red, with abundant black hairs on basal portion, bent back on the free part and at tip again bent forward, the latter part black; from behind it appears that the pair of organs are fused, at tip each shows two lateral points and a smaller median one; accessory plate oval, yellow, smooth; posterior clasper with an unusually long hair on inner side; penis with the appearance of a truncated tip, the lateral lobes surpassing the middle one in profile; fifth sternite showing as a broad yellow lobe with short black spines on inner edge.

Wing subhyaline, third costal segment much longer than fifth; no costal spine; first vein with a dense row of hairs over half its length, bare the rest of the way to its tip; third vein with hairs two-thirds of the way to crossvein.

Length 13 mm.

One male, San Jose del Cabo, Lower California, in the Hough collection.

Holotype.—In the Hough collection.

No. 82. *Sarcophaga pedata* n. sp.

Male. Front .198 of head; parafrontals and parafacials silvery with slight yellow tinge, a few scattering hairs on both, the lowest ones slightly longer; antennæ brown, the second joint reddish; the third is three times as long as the second and reaches four-fifths of the way to the vibrissæ, which are barely above the oral margin; arista long-plumose for three-fifths of its length; palpi yellow, proboscis black, short; bucca one-third the eyeheight; back of head with a single row of black hairs and numerous pale

ones, which extend forward on the bucca below almost to the widening of the facial impression; outer vertical bristles absent; ocellars minute; frontal bristles about 12 in number, rather small, diverging rapidly below and extending about as far down as the middle of the second antennal joint.

Thorax gray pollinose with 5 to 7 stripes when viewed from behind, the two submedian gray stripes being each divided by a narrow dark line; only two ps dc developed, bristles all small anterior to these; no ant acr, prsc small, stpl two, scutellum with two pairs of marginals, an almost imperceptible pair of preapicals, which are widely separated, and a small pair of apicals.

Abdomen with the usual changeable tessellation, median stripe very faint; fourth segment red at apex, more broadly so at middle; first, second and third segments with no median marginal bristles and only one lateral; fourth with a row of 8, stopping abruptly on the side.

Hypopygium red, mostly shining; first segment rather large with a median pollinose whitish stripe and an interrupted row of six bristles; forceps with a hump on the attached basal part, the free part straight, not at all tapering, enlarged at the apex somewhat in the form of a foot with an abnormally large heel which bears a few little granulations, the sharp toe projecting forward; the foot and ankle are black; accessory plate developed into a long process like a clasper but larger, the black tip curved forward and rather sharp. Posterior claspers slender, straight, with a small hook; anterior clasper very small and short, with a curved black tip. Penis mostly yellow, rather small, the basal joint well developed, the distal joint curved back and then forward with a widely spreading flap on each side, these are rather concave in front and partially enclose some small plate-like organs; fifth sternite very widely open U-shaped, yellow, fringed with hairs.

Legs black, the knees broadly yellow; middle and hind tibiae yellow and both villous; tarsi black.

Wings hyaline, no costal spines; third costal segment about as long as the fifth and sixth together; the sixth longer than usual. The third vein with a few hairs at base; the first vein bare.

Length 10.5 mm.

One male, Havana, Cuba, collected by C. F. Baker, and presented to me by him many years ago.

Holotype.—No. 20535, U. S. N. M.

No. 83. *Sarcophaga fulvipes* Macq.

Macquart, Dipt. Exot., ii, 3, 105, pl. xii, fig. 5, 1842.—Cuba.

Walker, Dipt. Saund., 328, 1852 (*fulvipes* n. sp.).—U. S. Johnson, Dipt. of Florida, 1895 and 1913, occurrence at St. Augustine, Fla.

Male. Front .202 of head; parafrontals and parafacials silvery with slight yellow tinge, the latter with a few scattering long hairs below; frontal bristles about 12 in number, diverging rapidly below and reaching about to the middle of the second antennal joint; antennae yellow, third joint partly brownish, two and a half times as long as second, reaching about three-fourths of the way to the vibrissae, which are at the oral margin; arista with long plumosity reaching considerably beyond the middle. Ocellar bristles well developed; palpi and proboscis yellow, bucca one-third the eyeheight; back of head with three rows of black hairs and considerable pale beard; outer vertical bristles absent; occiput with a pair of rather long bristles behind the verticals and several pairs of smaller ones behind the ocelli.

Thorax with the usual stripes, the hair on the dorsum rather abundant and erect; ps dc rather hair-like except the posterior two, there seem to be 5 in all; ant acr none; prsc of moderate size; stpl two; scutellum with two large marginals, one smallish preapical and a pair of apicals of the same size.

Abdomen with the usual tessellation and three indistinct changeable stripes; the hind edge of the fourth segment yellow, more broadly below; first and second segments with only lateral bristles, third with a pair of strong median marginals, fourth with an uneven row of about 16, mixed with some coarse hairs.

Hypopygium yellow; first joint rather large, slightly pollinose above, with an interrupted row of six or eight slender, small bristles along the hind margin; second segment globose and shining, with erect hairs but no bristles. The forceps are strongly curved forward near the tip, not diverging, the basal part yellow and stout; tip black, sharp, but not toothed; accessory plate ovate, yellow, evenly covered with long hairs; posterior claspers brownish toward tip, rather straight, with a blunt hook at apex; anterior claspers yellow, nearly straight, grooved underneath and not much curved at tip; penis with slender yellow basal segment, the distal one large and mostly black; on each side there is a prominent square shoulder about the middle of the back and in front of this a smaller elevation bearing a long slender hook; near the apex on the back are a pair of transparent yellow thin marginals; at the tip is a large tubular opening which seems to be double like the nostrils of an animal. Fifth sternite yellow, V-shaped, with stout black brush on each side intermingled with a few longer bristles.

Legs yellow, including all the coxæ, the tarsi look darker principally because of the dense covering of black hair; the hind tarsi are noticeably shorter than the tibiæ; middle femur without comb; middle tibia with two bristles on outer front side; both middle and hind tibiæ villous; hind femur and tibia both somewhat curved.

Wing hyaline, no costal spine; third segment of costa about equal to fifth and sixth together; first vein bare, third with small hairs more than halfway to crossvein.

Length 11 mm.

One male, Opelousas, La., March, 1897, from Hough collection.

Type.—Location of type unknown to me, perhaps in Paris.

Mr. Parker identified this specimen for me, as the same species which Mr. Johnson had identified as *fulvipes* from Florida. In Johnson's first reference he identified it as *fulvipes* of Walker but in the second he changed to *fulvipes* of Macquart. There is of course no absolute certainty in the identification, but to avoid confusion I have accepted it and have considered Walker's species identical with Macquart's.

Mr. Parker informs me that a variety with black legs occurs also, but I have not seen it.

No. 84. *Sarcophaga singularis* n. sp.

Male. Front .229 of head (average of five,—.215, .222, .234, .235, .240); parafrontals and parafacials silvery, almost without yellow tinge; frontal bristles about nine in number, suddenly diverging below, reaching below the middle of the second antennal joint; ocellar bristles well developed; parafacials with a row of smallish hairs below; antennæ reddish yellow; third joint more brown toward apex, more than twice the length of the second joint and reaching four-fifths of the way to the vibrissæ, which are at the oral margin; arista long-plumose to about the middle; bucca one-third the eyeheight; back of head with three distinct rows of black hairs and abundant pale ones around the neck and back of the bucca; palpi yellow, proboscis brown, short; outer vertical bristles absent, a few rather large bristles behind the ocelli on the occiput.

Thorax gray pollinose, with five to seven stripes; ps dc four, all distinct, but the anterior two slightly smaller; ant acr well developed, four or five pairs; of medium size; stpl three; scutellum with two marginals, one preapical and one apical, the latter two pairs of moderate size.

Abdomen with the usual changeable tessellation, rather silvery, with very indistinct longitudinal stripes; first and second segments with only lateral bristles; third with median marginal pair (sometimes weak or wanting) and two laterals, the fourth with a decreasing row of about 18.

Hypopygium reddish yellow; first segment large, swollen, slightly pollinose, in the middle with a row of six stout bristles behind; second segment shining, globose, with abundant erect hairs, no bristles; forceps of very peculiar shape, the attached part joined together on the median line to form a sharp, almost keel-like protuberance. Below this is a deep transverse bare and shining concavity, divided in the median line. Viewed from behind each of the forceps bears a transverse ridge below this concavity, following which it is again concave; beyond the second concavity there is a small protuberance, on the inner edge, directed mostly backward, and a long arm or protuberance on the outer side, beyond which it runs to a slender sharp blackish point. In profile both of these concavities are very distinct. Accessory plate yellow, slender, bent in the middle almost at right angles; posterior clasper yellow, slender, erect, not distinctly hooked at tip; anterior clasper much stouter, strongly bent forward, with two points at the apex, the apical portion black and shining. Penis with very short basal segment, the distal one bearing a conspicuous sharp median keel from its base, which forms the back edge and tip of the organ. In front about the middle is a broad expansion bearing lateral blades and a basal transverse plate. Most of the parts are more yellow than black; fifth sternite quite complex; close to the base of the incision there is a roundish brush of short spines with a few long bristles; behind this a sharp rim diverges laterally and bears a row of stiff spines. The lateral end projects in the form of a yellow lobe from under the fourth tergite.

Legs yellow, coxae partially black; front femur with a more or less dark streak on the outside; all

tarsi quite black; middle femur with a short, well-developed comb near the tip on the hind side below; middle tibia with two bristles on the outer front side and no villosity; hind tibia with rather short villosity on the mesial side; both middle and hind tibiae have on the exterior surface two rows of small hairs widely separated by a bare space from any other hairs.

Wings hyaline, no costal spines; third costal segment rather longer than the fifth; first vein bare; third vein hairy halfway to crossvein.

Female. Front .290 of head (average of two,—.285 and .295); outer vertical bristles distinct. Third segment of abdomen without median marginals in the described specimen. Genital segments yellow, shining above; without specialized larvipositor. Middle and hind tibiae on the extensor surface as in the male.

Length 7.5 to 10 mm.

Eleven males and two females: Seven males and two females Tifton, Ga., in the Hough collection; one male Kushla, Ala., June 11, 1914 (Sturtevant); three males Enola, Va., May 1, 1915, reared from *Sparobolus* sp. (a myriopod) by Sara Reynolds.

Holotype.—Male No. 20536, U. S. N. M., from Enola, Va.

Allotype.—Female, No. 20536, U. S. N. M., from Tifton, Ga.

No. 85. *Sarcophaga deceptiva* n. sp.

Like *singularis* except in the following respects. Front .235 of head. Hind tibia almost without villosity, there being only three or four erect hairs on the mesial side which are, however, barely equal to the diameter of the tibia. In *singularis* the hind tarsus is perceptibly shorter than its tibia (42:46 by micrometer measurement in the type); in *deceptiva* the proportion is reversed and the tarsus is longer than its tibia (37:33). In *deceptiva* the forceps are only once concave at the base and do not have the diverging lateral arm; the penis has a much lower keel, ending in a plain point at the apex; the organs are

covered by a broader lateral plate, out of which a pair of stout black points project.

Length 7 mm.

One male from Tifton, Ga., June 13, 1896. The specimen has one proclinate orbital bristle on the left side. Also a male from Kushla, Ala., June 11, 1914, from Mr. A. H. Sturtevant, without orbitals.

Holotype.—Male, No. 20537, U. S. N. M., from Kushla, Ala.

No. 86. *Sarcophaga cotyledonea* n. sp.

Male. Front .217 of head (average of three,—.202, .224, .225); parafrontals and parafacials shining yellow pollinose, which color extends entirely around the eye and covers the bucca; parafacials with a few small hairs; facialia black, the intervening space on the face yellow; antennæ brown, the third joint about three times as long as the second, reaching fully four-fifths of the way to the vibrissæ, which are perceptibly above the oral margin and a little approximated; arista plumose about four-fifths of the way to the tip; frontal bristles about twelve, the rows rather far apart and moderately diverging below, reaching to the middle of the second antennal joint; ocellars small; palpi and proboscis black; bucca one-third the eyeheight; back of head with two rows of black hairs, the second rather incomplete; beard abundant, pale yellow.

Thorax with three rather even black stripes when viewed from behind; they are brown when viewed from the front; a yellow pollinose stripe from the humerus and a similar spot on the mesopleura; ant acr none; prsc of medium size; ps dc only two; stpl three; scutellum with two large marginals, preapicals small and almost in line with the rather large apicals.

Abdomen tessellated, with median black stripes, in profile deep and thick toward apex; first and second segments with only lateral bristles; third with a median marginal pair and one lateral; fourth with a marginal row of 8.

Hypopygium large; first segment rather dark red, partially brown, pollinose above, with a sparse row of long hairs behind; second segment large and globose, but rather flat behind in profile, without bristles; forceps brownish black, terminal part in profile greatly resembling a foot, near the base slender; accessory plate brown, elongated, with broadly rounded tips; penis without visible division, greatly elongated and broadly curved forward, and then doubling upon itself, where it is expanded into two large concave plates, the whole having a striking resemblance to a young bean plant when it first comes up out of the soil. On the inner side of the plates are two long undulating thread-like processes and a central black structure; posterior claspers long, shining, brownish, with a black central hooked tip; at its basal hind angle, usually difficult to see, there is a small black additional hook; anterior clasper in the form of a wide brown blade without any hook or distinct apical point; fifth sternite with a pair of large and conspicuous black brushes, at the apical end of which are a few bristles.

Legs black; middle femur with a short, stubby comb below near the apex on the hind side; middle tibia with one bristle on the outer front side and some villous hairs on the inner side of the apical half; hind tibia with distinct but not very long villosity, spreading both ways.

Wing hyaline, no costal spines; third costal segment a little longer than the fifth; first vein bare, third with a few hairs.

Female. Front .258 of head (average of two,—.250 and .265), narrowest at vertex; the usual orbital bristles; ocelli small; outer vertical bristles well developed; lower frontals more strongly diverging than in males. The yellow beard is more striking than in the males and extends forward to a group of hairs around the vibrissæ; preapical bristles of scutellum small and not in line with the apicals, which are stout. Genital segments yellow, with deep golden pollen

and bearing two pairs of visible spiracles, the outer at the margin; the orifice is a vertical slit with small bristles.

Length $11\frac{1}{2}$ -15 mm.

Five males and two females: One male is from Santa Lucia, Guatemala, Feb. 2, 1905, collected by Prof. Hine; three males Rio Janeiro, Piedras Bay, and Chapada, in Brazil, collected by H. H. Smith, in the collection of Dr. S. W. Williston; one male and two females, Bartica, British Guiana, collected by H. S. Parish and now in the collection of Prof. Hine. Two of the males were evidently teneral when captured and the frontal measurements were not included, being obviously less than normal.

Holotype.—Male, No. 20538, U. S. N. M., from Rio Janeiro.

Allotype.—Female, No. 20538, U. S. N. M., from British Guiana.

No. 87. *Sarcophaga hæmorrhoidalis* Fall.

Fallén, Vet. Akad. Handl., 1816, 236 and Muscides, 1830, 37 (both *Musca*)—Sweden.

Meigen, Syst. Besch., v. 28.—Europe.

Wiedemann, Auss. Zwielf., 11, 357 (*georgina*)—Georgia.

Böttcher, Deutsche Ent. Zeitsch., 1913, 10, fig. and desc.; 369, oc. in N. A. and syn. of *georgina* from type.

Parker, First Biennial Rept. Montana State Board of Entomology, 1914, 43. Captured abundantly in traps baited with human excrement, in Montana.

Male. Front .243 of head (average of five,—.239, .241, .242, .243, .249); parafrontals and parafacials silvery with a decided yellow tinge, the frontal rows rather far apart, composed of about 11 bristles, the lower ones suddenly diverging and extending as far as the middle of the second antennal joint; ocellars somewhat smaller than frontals; parafacials wide with the usual slender hairs, rather long below; antennæ brownish black, third joint fully double the second, reaching three-fourths the way to the vibrissæ, which are at the oral margin. Arista plumose as usual for three-fifths of its length; bucca about half

the eyeheight; palpi black or brown, proboscis black. Back of head with two rows of black hairs, the second not very regular, and abundant whitish ones forming a conspicuous beard below. Outer vertical bristles not developed.

Thorax densely gray pollinose with the usual 3 to 5 black stripes very distinct; the submedian pollinose stripes are narrowly divided before the suture. No ant acr and no prescutellar bristles; ps ds only two well developed; stpl two or three; scutellum with two long marginals, a slender discal pair and a rather erect vertical pair.

Abdomen densely pollinose, with changeable tessellation and three indistinct changeable stripes. First and second segments with only lateral bristles; third with a median marginal pair; fourth with a marginal row of about 14.

Hypopygium with the first segment of good size, usually black on the apical half, red on basal half. The black part is pollinose and there is a variable row of bristles on the hind margin. The second segment is red, shining, globose, flat behind, with numerous erect hairs but no bristles. Forceps black; in profile a very distinct, characteristic notch behind at the beginning of the free part; before the middle of the free part they are rather strongly bent backward, curving again forward to a sharp tip. Viewed from behind they diverge sharply near the base and converge slightly near the tips; posterior claspers slender, short, with a well developed hook on the tip; anterior clasper larger and longer with about the same kind of a hook; accessory plate rather small, yellow, shining, with rounded tip; penis long, straight, black, with a square end, at which there is a process projecting forward in the middle; arising from the front side a little before the tip are a pair of black curved arms reaching forward which, in conjunction with the flat and enlarged tip, suggest the figure of a little dog sitting up in the attitude of "begging." The basal joint of the penis is so short as not to be distinguishable; fifth sternite

short, rather U-shaped, the terminal parts of the U with short spines directed toward the center.

Legs black, middle femur with short spines near the tip, which could hardly be called a comb; middle tibia on front side with one or two bristles; hind tibia with long villosity, spreading both ways.

Wings hyaline, no costal spines; third segment of costa as long as fifth and sixth together; first vein bare; third hairy about half way to the crossvein.

Female. Front .326 of head (average of five,—.310, .317, .333, .333, .339); outer verticals and orbitals distinct; genital segment deep red with rather round opening, having a notch above.

Length 10-14 mm.

Many specimens of both sexes from Massachusetts to California; a common scavenger. Parker reports it breeding in human excrement, and I found specimens with the same habit noted in the collection of the State Laboratory of Natural History of Illinois.

Mr. John B. Gill, of the Bureau of Entomology, Monticello, Fla., sent specimens for identification, accompanied by the following note, which I am permitted to publish:

"Passed a number of rather large dipterous larvae with my stool on the morning of June 21, 1916, after taking a strong dose of "Pluto" water. Some feces containing a few larvae caged for the purpose of rearing adults. June 24th, all larvae have left the excrement and entered the sand for pupation. Found five pupae and two larvae buried in the sand in depths varying from 2 to 4 inches. July 3d, six adults (*Sarcophagids*) emerged. July 4-16, two adults emerged. All specimens pinned. Quaintance No. 10590."

Mr. Gill also stated in his letter that the larvae had attained full growth within his alimentary canal.

Prof. Leonard Haseman, of the University of Missouri, sent adults of this species for identification, which had, as in the case just recorded, been passed from the human alimentary canal. He received them from Dr. A. L. Lewis, Sumner, Mo., who at Profes-

sor Haseman's request furnished additional information, from which the following is extracted:

"The larvae of flies I sent you were collected by the mother from a chamber; I personally do not know that they were passed by the patient. There are four in the family. The father, aged about 30, has never noticed any larvae. The mother, aged about 26, has passed larvae in 1912-13-14-15, none yet this year; has had from one to three attacks each year, in the months of July, August, and September. A girl, aged 7½, first passed larvae in July this year,—flies sent you. Boy aged 5, no larvae this year, one attack last year. * * * The attacks are short, one or two days; some elevation of temperature (101 to 102 degrees), colicky pains in abdomen, anorexia, sometimes nausea and vomiting. Calomel with salts or oil will bring the larvae, after which the patient recovers."

Dr. L. O. Howard, Chief of the Bureau of Entomology, states in reply to an inquiry that many cases of *Sarcophaga* larvae passed in stools have been referred to the Bureau; as far as I know these are the first in which the species has been determined. Precisely similar cases are noted by Dr. Ernest Warren in *Annals Natal Museum*, i, 215, 1906-08, as occurring in Natal; since *haemorrhoidalis* occurs throughout Africa, as well as in Europe and Asia, it is not improbable that he was dealing with this species, although his single reared adult was a female, and was identified at the British Museum by Mr. Austen only as *Sarcophaga* sp. Mr. Austen's partial description of the specimen agrees with this species. In Europe also, according to Mr. Austen, similar cases have been recorded without specific identification.

These cases raise the suspicion that intestinal myiasis in man may be often or generally caused by this insect. The habit involves, not only the deposit of larvae on human food, which probably occurs at times in several scavenger species of *Sarcophaga*, but also the ability of the larva to develop almost or quite to full size within the alimentary canal of man, which has not as yet been proved in any other species.

Prof. C. L. Metcalf has recently published in *Bull.* 253, Maine Experiment Station, some interest-

ing information on myiasis due to species of *Syrphida*.

Type.—Presumably in the Academy of Sciences in Stockholm. Böttcher attributes the species to Meigen, ignoring Fallén, although Meigen quotes Fallén's description.

The synonymy of *georgina* was made out by Böttcher by examining the type in Vienna. Whether the references to *georgina* in our literature since Wiedemann refer to this species is a question. They are as follows:

- Harris, Ins. Inj. Vegetation, 3d ed., 613, oc. in Mass.
 Walker, List, iv, 829, oc. in British Amer.
 Emmons, Nat. Hist. of New York, pt. v, iii, 181, plate.
 —N. Y.
 Johnson, Cat. Ins. N. J., oc. in N. J.; Psyche, xix, 104, notes; Annals E. S. A., vi, 1913, doubtful oc. in Bermudas.
 Webster, Bull. 67, Bur. Ent., 98, parasitic on *Caloptenus* differentials in Wyoming; same in Yearbook Dept. Agr., 1907, 248, fig.
 New Mexico, several places—Cockerell.
 Colorado—Tucker.
 Felt, 28th N. Y. Ent. Rept., 1913, 80-82, pl. vii, larval characters; bred from carrion in New York. Dr. Parker, in Canada Ent., xlviii, 359, identifies Felt's species with *S. bullata* Park.

No. 88. *Sarcophaga wiedemanni* n. sp. *

A very large, robust tropical species with yellowish pollen.

Male. Head covered with yellow pollen, including the back, except just below the neck; front .204 of head; frontal stripe broad and dark brown; frontal bristles about 12, only a little diverging below, reaching past the base of the second antennal joint; parafacials with a delicate row of small hairs; antennæ

*I had called this species *chrysostoma* Wied., overlooking the note by Boettcher, Deutsche Ent. Zeitsch., 1913, 373, in which he states that the types of that species include a whole series of forms. Unfortunately the plates were printed when I changed the name; the reader is therefore requested to correct the explanation of Fig. 88.

black at base, the third joint brownish, slender, nearly three times the second, reaching three-fourths of its length; the plumosity is especially erect and long close to the base; vibrissæ a little above the oral margin and slightly approximated; facialia black, strongly separated from the middle of the face, which is yellow; palpi brown, inclining to yellowish at tip; proboscis black, moderately short; back of head with a single row of black hairs behind the eye, elsewhere covered with dense, long, yellow hair which extends forward on the bucca almost to the vibrissæ. Outer vertical bristle absent; bucca one-third the eye height.

Thorax with conspicuous yellowish pollen, on which are three broad black stripes and two slender lateral ones; ps de two, close together, just before the scutellum; ant acr none; prsc one small pair; scutellum with two lateral bristles and stout apical pair (in the described specimen one of these apical bristles is not developed).

Abdomen with light yellow, changeable pollen, not very distinctly striped; some of the pollen is rather brown; first and second segments with only lateral bristles; third segment with a single median marginal pair and two laterals; fourth segment with a marginal row of about 12.

Hypopygium much narrower than abdomen, without any bristles, but with numerous slender erect hairs. First segment dark brown, moderately long, with some yellowish pollen above; second segment reddish in color, inclining to brown on the sides, rather globose; forceps black, long and slender, not diverging at apex, with a conspicuously shining area about the middle behind and with coarse black hair along the sides, directed outwardly. The accessory plate black and stout, rather elongated, bearing hair like the forceps; posterior claspers very slender, black, nearly straight; anterior claspers broad and black, slightly concave behind, strongly bent forward, tapering to a moderate hook at the apex; penis rather small, reddish brown, basal joint distinct, the distal

one quite smooth in outline, bearing on the middle of the front side a stout lobe turned toward the base and black at tip and a pair of twisted hooklike organs directed forward; fifth sternite exposed in a brown ridge for a considerable distance before the excision, behind which it rapidly diverges, with a brush of black bristles along the edge.

Legs black, stout; long villosity on the under side of all the femora and the inner side of all the tibiæ; this villosity is least on the front tibiæ, but is strongly developed on the middle as well as the hind ones; middle femur without comb; middle tibia with single bristle on outer front side; hind tibia and hind femur distinctly curved.

Wings with brownish tinge; no costal spines; third segment of costa longer than fifth and sixth together; first vein bare; third hairy almost half way to crossvein.

Female. Front .266 of head, with the usual orbital bristles; outer vertical bristles distinct; the apical bristles of the scutellum are fully as strong as the two lateral pairs, all very stout at base. Genital segment red, its margin thickened and forming a vertical slit of which the upper part is guarded by a very dense row of short bristles. The first and second sternites bear respectively four and two stout bristles; third and fourth also each have a pair which are less conspicuous. The bristles of the fourth tergite extend along the entire lower surface, there being about 10 very stout ones below the lateral angle. Both the angle and tergite are prolonged somewhat into a pointed flap which also bears heavy, short bristles.

Length of male, 19 mm.; of female, 18 mm.

One male and two females. The male is from Santa Marta, Colombia, May, 1913, collected by J. H. Egbert (U. S. N. M.); female from Punta Arenas, Costa Rica, collected by Frederick Knab (U. S. N. M.); the other female from Brazil, (H. H. Smith) in Dr. Williston's collection.

Holotype and Allotype.—Male and female, No. 20552, U. S. N. M.

No. 89. *Sarcophaga thatuna* n. sp.

An elongated, blackish western species.

Male. Front .182 of head (average of six,—.163, .174, .178, .179, .183, .217); parafrontals and parafacials pale yellow pollinose, shining, the latter with the usual row of hairs, the lower ones coarse; frontals about 13 in number, rapidly diverging below, reaching a little below the base of the second antennal joint; ocellars distinct; antennæ blackish, the third joint brown, twice as long as the second and reaching four-fifths of the way to the vibrissæ, which are barely above the oral margin; arista plumose for three-fifths of its length; facialia with rather conspicuous hairs for nearly half their length; palpi and proboscis black, ordinary; bucca one-third the eye-height; back of head with about four rows of black hairs, the pale hairs confined to the space around the neck and below it; outer verticals not developed.

Thorax with rather thin gray pollen, the usual 3 to 5 black stripes; the submedian gray stripes indistinctly divided before the suture; ps dc four; ant acr none; prsc, one pair; stpl three; scutellum with 2 or 3 marginal pairs, one or two preapical and one smallish apical pair.

Abdomen with rather silvery changeable pollen, with indications of three stripes; first and second segments with only lateral bristles, several on each segment; third segment with a median marginal pair and a short lateral row; fourth segment with a dense marginal row of about 24.

First segment of hypopygium shining black or brown on its hind margin, with a row of stout hairs; second segment globose, shining, with numerous erect hairs; forceps long, straight, shining black, more brown on the base; near the tip rather abruptly bent forward, tapering to a point without a distinct hook; accessory plate yellow, moderately elongated,

rounded at tip; posterior claspers long, rather straight, blackish brown, shining, moderately curved and pointed at tip; anterior clasper similar but straighter and more depressed; penis mostly shining, blackish, basal segment elongated, the distal segment on the back with a narrow keel at the base, widening at the middle into a prominence on each side, then narrowing rapidly to a slender brownish process divided near the tip and bent forward. From the center of the distal segment arise two pairs of slender, black, straight processes, which extend straight out as far as the posterior organs go, and then curve forward. On the anterior side of the base of these arise two shining black elongated plates with two notches in the apex, enclosing between them some softer tissues. As the figure shows, those apical developments of the distal segment are quite separated from each other, giving the organs a unique appearance. Fifth sternite with a wide V-shaped opening, fringed with only a few bristles.

Legs black; middle femur without comb; middle tibia with three bristles on the outer side and some erect villosity on the inner side; hind femora curved but not much enlarged; hind tibia with erect villosity spreading both ways.

Wing subhyaline; no costal spine; third costal segment longer than fifth and sixth together; first vein bare; third vein hairy more than half way to the crossvein.

Female. Front .327 of head. Outer vertical bristles distinct; bucca about one-half of the eye-height; scutellum without apical bristles; hind margin of fourth segment red on outer part; genital segment yellow, rather protuberant, with vertical slit bordered with long black bristles. A small costal spine.

Length 13 to 15 mm.

Six males and one female; Moscow, Idaho, mostly collected Sept. 9, 1908, resting on stones at the summit of Cedar Mountain near Moscow, Idaho.

This mountain, locally called "Moscow Mountain," is about 4,900 feet high and is part of a range designated on the map as Thatuna Hills, from which the name of the species is derived, in commemoration of many delightful collecting excursions by the writer.

Holotype and Allotype.—Male and female, No. 20539, U. S. N. M.

No. 90. *Sarcophaga elongata* n. sp.

So nearly like *thatuna* that it will suffice to indicate the differences.

Front .202 of the head (average of two,—.200 and .204); third antennal joint slightly shorter; forceps dark brown at base, the rest shining black, gradually diverging and curving forward to a slender, tapering tip; anterior claspers more strongly curved near the apex and with an oblique excision at the tip, underneath which is a second point behind the main one; the distal segment of the penis is of quite different shape, widening into a blunt tip from which project some very short small processes, one pair of which are whitish and have a delicate white fringe; on the front side of the distal segment there are a pair of large erect plates, dark along the edges, nearly transparent in the middle. They are connected together by a delicate membrane on the apical side and form a sort of expanded tip; the middle and hind tibiae with dense villosity, that of the former comparatively short, and that of the latter very long.

Length 14 mm.

Two males; one is from Colorado, collection of C. V. Riley in the National Museum; the other specimens from Jemez Mountains, N. Mex., July 5, 1914, in the collection of Mr. Harbeck.

Holotype.—Male, No. 20540, U. S. N. M., from Colorado.

No. 91. *Sarcophaga occidentalis* n. sp.

Male. Very similar to *thatuna*, differing in the following respects:

Front .160 of head (average of five,—.145, .157, .158, .164, .175); third segment of abdomen with an incomplete row of marginal bristles; forceps evenly curved forward to a sharp tip; anterior claspers with an elongated lobe underneath the apex; the distal segment of the penis is rather small, produced into a slender process which curves forward, bearing on the front side two pairs of slender processes, longer than the preceding, and a long curved fringe which extends forward in a slender prolongation supported by a darker colored thickening. Middle tibia with dense villosity and with two bristles on outer side. Hind femora curved slightly, stouter than in *thatuna*. The villosity of the hind tibia long and dense, spreading both ways.

Female. Front .295 of head. One pair well developed ant aer; no apical bristles on scutellum. The pollen on the abdomen consists principally of four spots on the anterior part of each segment, the posterior half of the segment being almost entirely shining black. The males show this peculiarity in a more or less degree and in *thatuna* it is still less. The fourth segment of abdomen broadly yellow at apex; genital segment yellow, retracted, forming a vertical slit, fringed with a scattering row of long black bristles. Wings rather distinctly infuscated, especially near the base.

Length 6 to 14 mm.

Five males and one female. The holotype is from Moore's Lake, Idaho, collected July 10, 1907, at an altitude of 6300 feet. It is the largest specimen. One male Moscow Mountain, June 1, 1907; one male Vancouver, B. C., July 25, 1907, collected by R. V. Harvey (Prof. Hine's collection); two males and one female Friday Harbor, Wash., May 29 and June 1, 1906. All collected by the writer except as indicated. The specimens vary so much in size that it is difficult to believe that they all come within one species. However, no differences have

been detected which would justify a different conclusion.

Holotype and allotype.—Male and female, No. 20451, U. S. N. M.

No. 92. *Sarcophaga juliaetta* n. sp.

Very similar to *thatuna*, differing only in the following characters:

Front .187 of head (average of three,—.186, 187, .188); third segment of abdomen with an interrupted row of bristles, the posterior part of all the abdominal segment broadly shining; forceps slender, brownish at base, the remainder shining black, diverging and tapering to a slender point, evenly curved forward. The distal segment of the penis strikingly large, the posterior part straight, rather reddish toward the apex, where it curves forward, bordered along the apex with a whitish fringe. Near the base of the distal segment arise on the front side two large half transparent shining brown plates which have the anterior edge minutely serrated. Between these and extending forward are two whitish plates very much larger. From the middle of the distal segment arise two black, straight processes, extending toward the apex and bearing whitish fringelike structures which are more or less covered by the part behind them. Middle and hind tibiae with long villosity; the middle tibia has more than four bristles on the outer front side.

Female. Front .325 of head, with the usual orbital bristles; the outer verticals well developed. The hairs on the parafacials unusually strong and bristle-like below; in the described specimen there are five ps dc on each side and the scutellum has seven marginals on one side and six on the other; the third abdominal segment with an interrupted row of very appressed bristles; genital segment red, with roundish opening fringed with black hairs.

Length 14 to 17 mm.

Four males and one female. All from Juliaetta, Idaho, except one male from Moscow. In this species name I commemorate one of the delightful collecting grounds of the Northwest; a little town situated in a valley, almost a canyon, 1500 feet below the surrounding region, just at the dividing line between the Upper Sonoran and the Transition zone.

Two males and one female from Craig's Mountain, Idaho, are probably to be referred to this species. The outer anterior plate of the distal segment of the penis is quite different in shape, having a long recurved point apically and a short one basally; the interior large plates of *juliaetta* are in this case much contracted, but I have reason to suppose that these extended wide membranes are really of the nature of erectile tissue, in which case they would naturally show different degrees of expansion.

Two females from Kanaka Bay and Longmire's Springs, Wash., belong certainly in this group, but the exact species cannot be determined at present.

Holotype and Allotype.—Male and female, U. S. N. M.

No. 93. *Sarcophaga perspicax* n. sp.

Male. Front .205 of head (average of two,—.197 and .212). Resembles *thatuna* very much but differs in the following particulars. All the tibiae are villous on the inner side, the villosity especially long and dense on the middle and hind ones. Forceps long, slender and curved forward toward apex, also diverging widely; tips sharp; both claspers black, curved forward, the anterior ones with a little lobe underneath at apex, giving them a forked appearance. The distal segment of the penis of moderate size, swollen in the middle, the back part continued forward to apex in a broad curved plate which is not fringed or barely fringed at the tip. Just in front of this and partially concealed is a round black tube of the same length, in front of which again are two plates with teeth on the outer front edge

near the tip; attached on the front side before the middle of the distal segment are a pair of broad plates, mostly blackish in color.

Length 16 mm.

Two males, Golden, Colo., June 10, 1898. One from Prof. Hine and the other from the Hough collection.

Holotype.—Male, in Professor Hine's collection.

No. 94. *Sarcophaga gracilis* n. sp.

Male. Front .183 of head (one specimen). Exceedingly close to *thatuna* in all of its characters, except that the tibiae are all much more strongly villous, as in *perspicax*; also the genitalia show decisive differences. The forceps are slender, widely divergent, and very highly polished; claspers as in *perspicax*, except that the anterior pair are red; distal segment of penis strikingly small in comparison with all the rest of the *thatuna* group, not with any striking prolongations beyond the central part; on the front side with a deeply concave plate developed into rather thickened lobes at the sides not extending much beyond the body of the segment, but the tips turned a little back.

Length 13 mm.

One male, Colorado 2019. In Hough collection, received from Colorado Experiment Station.

Holotype.—In Hough collection.

No. 95. *Sarcophaga securifera* Vill.

Villeneuve, Mittheilungen aus d. zool. Mus. Berlin, iv, 123, fig.—Canary Islands.

Böttcher, Deutsche Ent. Zeitsch., 1913, 15 and 370, fig.—Europe.

Male. Front .230 of head (average of five,—.223, .226, .226, .229, .247). Gray pollinose; parafrontals and parafacials and orbit of the eye with a distinctly yellow cast; frontals about 11 in number, some of the upper ones very weak, the rows suddenly diverging below, reaching the middle of the

second antennal joint; ocellar bristles rather slender; parafacials rather wide, with the usual row of hairs, which are rather long and slender below; antennæ black, the third joint more than twice the second, reaching three-fourths of the way to the vibrissæ, which are at the oral margin; arista plumose slightly more than halfway; palpi and proboscis black, ordinary; bucca almost half the eyeheight, with abundant white beard, which extends over the back of the head, there being only a single row of black hairs behind the eye. Outer vertical bristles hardly larger than the adjacent hairs.

Thorax gray pollinose, with the usual three to five black stripes; the two submedian gray stripes divided before the suture; ps dc rapidly diminishing in size, the hindmost one strong, several in front of this dwindling to about the size of the adjacent hairs; ant acr not differentiated from hairs; prsc one pair; stpl three; scutellum with two marginal, one small subapical and one small apical pair.

Abdomen gray, tessellated, with an indistinct middle stripe. First and second segments with only lateral bristles; third with one median marginal and one lateral pair; fourth entirely black with a marginal row of 14.

Hypopygium rather dark red; first segment of moderate size, shining, along the hind margin somewhat darker in color and with a row of short, rather stout bristles; second segment globose, shining, with numerous hairs but no bristles. Forceps wide and short, in profile with a moderate hump before the apex, thence obliquely truncate or a little concave to a hooked tip, which is on the front edge. Accessory plate rather large, thick and dark brown, oval in shape; posterior clasper rather stout, brown, curved forward to a sharp apex; anterior clasper blackish, rather straight and flat toward the tip; penis mostly blackish; basal segment of moderate length; distal segment broad and rather thick, with two small lobes protruding from the apex, which are

partly surrounded by two peculiar long, slender processes, widened at their apices, which originate from the back of the segment and project forward; underneath these are a pair of very distinct slender recurved hooks. Fifth sternite yellow and shining on the basal part, broadly divided into two large shining black lobes, bare except on inner edge, where they have a brush of short hairs.

Legs black; middle femur with comb on the lower side behind; middle tibia not villous, with two bristles on the outer front side; hind femur with fairly abundant and long villosity, mostly on the inner side.

Wings hyaline; no costal spine; third costal segment a little longer than fifth and sixth together. First vein bare; third hairy for a short distance at the base.

Female. Front .317 of head (average of five,—.308, .308, .319, .319, .332), narrowed at vertex; orbitals and outer verticals distinct. Beard and black hairs behind the eye as in the male, one of the best characters for distinguishing this female. Prsc quite small; no apical bristles on the scutellum. Genital segment dark red; the orifice fringed with the usual bristles. Middle femur not with comb; tibia not villous.

Length 9.5-14 mm.

Numerous specimens of both sexes. 15 specimens from Washington, D. C., five pairs taken in copulation. These were all collected by Mr. F. Knab in the neighborhood of the Washington Market, close to the National Museum, which would indicate that the species is a scavenger. Four specimens from New York City (Sturtevant); two from Miami, Fla. (Knab); one, Nyack, N. Y. (J. L. Zabriskie, 1883); one Philadelphia (H. Skinner); 11 specimens from Mr. Harbeck's collection taken at various places in eastern Pennsylvania; five specimens from Worcester, Mass. (S. T. Orton); these were labeled *sarracenia* in the National Museum); one specimen D. C., collection Coquillett, also named *sarracenia* in

National Museum. The female of this species differs from the numerous allied forms principally in having only a single row of black hairs behind the eye. This, with the reduction of the ps dc, the general light color, the long third costal segment, with the front narrowing toward the vertex, will easily distinguish the species in the female sex.

I am indebted to Mr. Parker for the identification of this European species.

The species is omitted from the Zoological Record and the International Catalogue of Scientific Literature, no doubt on account of the fact that "n. sp." was accidentally left out after the name, in the original description.

Bœttcher indicates (loc. cit.) that part of Schiner's types of *Sarcophaga dalmatina* (Fauna Austri., i, 571, 1862) are this species. He does not explain his preference for the later name, but I deem it best to leave the European nomenclature in the hands of Europeans.

Type.—In the collection of Dr. J. Villeneuve, Rambouillet, France.

No. 96. *Sarcophaga falculata* Pand.

Pandellé, Revue ent., xv, 185, 1896.—Europe.

Böttcher, Deutsche Ent. Zeitsch., 1913, 13, fig. and 370, note.—Europe, North India.

Male. Front .243 of head (average of three,—.241, .244, .245); frontal bristles about nine, the rows suddenly diverging below, reaching about to the middle of the second antennal joint; ocellars slender but distinct; parafrontals and parafacials shining gray pollinose, a little silvery below, the latter with the usual row of hairs near the eye; antennæ brownish black; third joint more than twice the second, reaching three-fourths of the way to the vibrissæ, which are at the oral margin; arista plumose a little over halfway; palpi and proboscis black, ordinary; bucca one-third the eyeheight, with abundant white hair, which covers the back of the head except for two rows of black

hairs behind the eye. Outer vertical bristles not developed.

Thorax gray pollinose with the usual three of five black stripes; submedian gray stripes divided before the suture; ps dc four or five, the anterior ones very small; ant acr none; prsc, one pair; stpl three and occasionally four; scutellum with two pairs of marginals, a small pair of preapicals and a moderately large pair of apicals.

Abdomen gray pollinose, with well developed tessellation. First and second segments with only lateral bristles; third with a variable row of 8 to 14, more or less interrupted; fourth with a rather dense row of nearly 20, diminishing on the sides.

First segment of hypopygium blackish or dark brown, pollinose above toward the apex, without bristles, sometimes with a row of hairs on the hind margin; second segment shining red, globose, with numerous erect hairs; forceps dark brown, the attached part with abundant fine black hair, the free part small, mostly bare and shining, with a hump behind it, from which it tapers with a slight forward curve to the apex, which is not very sharp; accessory plate brown, thick, mostly shining, rounded; claspers brown, slender, sharp and the posterior a little hooked; anterior noticeably straight toward its tip without any hook at all. Penis with short brown basal segment; the distal segment blackish, rapidly widening, short, with a blunt point, in front of which are two small shining black lobes and two shining brown more divergent and longer ones; on the front side apically, are two plates rather curled in, looking like hooks in profile; basally from these a pair of prominent, erect thin brown plates, which stand nearly parallel to each other on the apical part but spread out flat basally. Fifth sternite shining yellow on the basal united part, the V-shaped excision filled in broadly at the base with a membrane; beyond this the sides diverge into two high, rounded, smooth black lobes, bearing spines not brush-like on the inner side.

Legs black; middle femur with poorly developed comb on the lower side behind; middle tibia with a single bristle on the outer front side and with some rather appressed villosity near the apex on the inner side. Hind tibia with well-developed but not striking villosity.

Wings hyaline; no costal spine; third costal segment a little longer than fifth and sixth together. First vein bare; third hairy part way to crossvein.

Female. Front .325 of head. Back of head with same light and dark hairs as in male; easily separated from the related *securifera* by having two rows of black hairs behind the eye instead of one. Genital segments red, not conspicuous, the opening circular; underneath the abdomen it is easy to count five black and two red sternites, the latter small, the last one forming a slight protuberance.

Length 10-15 mm.

Five males and one female. One male Charleston, Mo. (Vernon King), "Reared from *Lachmosterna*"; one male, one female, Dallas, Texas, bred in decaying meat (Bishop, "Screw worm No. 245"); one male Wernersville, Pa. (Harbeck); one male La Fayette, Ind.; one male Oahu, Hawaii (H. H. Severin).

I am indebted to Mr. Parker for the determination of this European species.

No. 97. *Sarcophaga amœna* n. sp.

Male. Front .200 of head (one specimen); parafrontals and parafacials deep golden yellow pollinose; frontal stripe blackish, well defined; frontals about 13, moderately divergent below and reaching to middle of second antennal joint; parafacial with only small hairs in a row near eye; ocellars small but distinct from the hairs behind them; outer vertical barely perceptible; antennæ black, third joint three times the second and reaching four-fifths of the way to the vibrissæ, which are considerably above the oral margin; second antennal joint with a good-sized, out-

curved bristle; arista long-plumose for three-fourths its length; facialia black, hairy for half their height; palpi and proboscis black, ordinary; bucca golden pollinose in front and covered with yellow beard, which extends up the back of the head, there being but two rows of black hairs behind the eye.

Thorax whitish pollinose with 3-5 strong black stripes, the submedian gray stripes divided narrowly before the suture; ps dc 2, close to scutellum; ant dc 1, just before suture; ant acr none; prsc 1; stpl 3, the intermediate small; scutellum with two large marginals and an apical but little smaller.

Abdomen black, strongly tessellated; first three segments with only lateral bristles; fourth with marginal row of nearly 20.

Hypopygium deep red; first segment long, shining, with small row of bristles at apex; second segment shining, globose. Forceps long, black on apical half or more, diverging at base and thence almost parallel, strongly bent forward about middle, thence nearly straight to the slender, sharp tips; accessory plate large, oval, brown, thin and paler on hind edge, excised at tip; posterior clasper black, straight, blunt; anterior clasper very stout, strongly curved, black except base. Penis yellowish-red, its basal segment not visible; the distal segment smooth, with a square end, from which on the front side arise two pairs of long, irregular arms, the inner longer; from the hollow apex protrude three points, one unpaired. Fifth sternite widely excised, near the base on each side forming a yellow ridge with short black brush; the remainder concealed under the fourth tergite.

Legs black; middle and hind tibiae and femora with dense long villosity; middle tibia with one bristle on outer front side.

Wings hyaline; no costal spine; third costal segment longer than fifth and sixth together; first vein bare, third with a few hairs.

Female. Front narrowest at vertex, .240 of head (one specimen), with the usual orbitals and

outer vertical; ocellars very small; apical scutellars very strong, equaling the marginals; fourth abdominal segment with dense row of marginals; genital segment red, white-pruinose below, the orifice slit-like, two spiracles in each lateral sclerite, the outer separated by more than its own width from the margin (in other species one of them is generally at the outer edge of the sclerite if visible at all); legs not villous, middle tibia with two bristles on outer side. Otherwise as in male.

Length of male, 9 mm; of female, $6\frac{1}{2}$ mm.

One male, one female, Dominica, W. I., H. W. Foote, Yale Expedition, 1913.

Holotype and allotype.—Male and female, No. 20543, U. S. N. M.

No. 98. *Sarcophaga capitata* n. sp.

Male. Front .183 of head (average of two,—.182 and .185). Like *amaena* except in the following respects:

Parafrontals, parafacials, and anterior part of bucca with deep fulvous pollen, beard of same color, very showy, covering bucca and back of head, except a single row of black hairs behind eye. Third abdominal segment with a large pair of median marginals; accessory plate hardly excised, the thin hind edge continued to a point; anterior clasper ordinary, rather long and slender, straight near tip; fifth sternite with rather striking black brushes. Metatarsi of hind and middle legs with some villous hairs below (not the case in *amaena*).

Female. Front .245 of head (one specimen). Like the female of *amaena*, but has the head-pollen and beard quite deep yellow, including back of head except the sharply-defined dark occiput; third abdominal segment with a pair of median marginals and several smaller between these and the laterals; the outer spiracle of the genital segment is barely enclosed by the sclerite.

Length of male 15 mm.; of female 11 mm.

Two males and one female, all from Porto Rico; one male and the female are from the collection of the American Museum of Natural History, collected at Mayaguez, March 7-9, and Arecibo, March 1-4, 1914, respectively; the other male is from the National Museum, collected at Mayaguez July 1, 1915, by R. H. Van Zwahlenberg.

Holotype.—Male, No. 20544, U. S. N. M., from Mayaguez.

Allotype.—Female, No. 20544, N. S. N. M., from same place.

Holotype and allotype.—Male and female, No. 20544, U. S. N. M., from Mayaguez.

No. 99. *Sarcophaga hillifera* n. sp. (*hilla*, a sausage).

Male. Front .237 of head (average of five,—.229, .233, .237, .240, .246); parafrontals and parafacials silvery pollinose, rather shining; frontal bristles 10 or 11, rather weak above the middle, the rows diverging moderately below, reaching the middle of the second antennal joint. Ocellar bristles not differentiated from hairs; parafrontals with rather numerous erect hairs; parafacials with scattered hairs near the eye not arranged in rows. Antennæ black, third joint three times the second, reaching four-fifths of the way to the vibrissæ; arista plumose for two-thirds of its length. Bucca almost half the eye-height, with largely pale hairs; back of head with three rows of black hairs behind the eye and rather abundant pale hairs centrally. Outer vertical bristles slightly developed; palpi and proboscis black, ordinary.

Thorax with whitish pollen and 3 to 5 conspicuous black stripes; ps dc indistinct except the hindmost two or three, which diminish rapidly in size. Ant acr none; prsc very slender; stpl with two large bristles and numerous erect hairs, some of them rather coarse; scutellum with two stout marginal bristles and a fairly large apical pair, the subapical hardly distinguishable from the long hairs of the disk.

Abdomen black and silvery, tessellated, very robust, segments short and deep. First two with only lateral bristles; third with a pair of coarse appressed hairs in the place of median marginal bristles; fourth segment with a mixed row of hairs and bristles on the margin, about a dozen are rather stout.

Hypopygium red and shining; first segment remarkably long and curved so as to suggest a sausage, from which it is named, and with a row of bristles at the posterior end; the second segment of equal diameter with the first and of the same color so that it helps to increase the resemblance to a link of sausage. Both segments have numerous erect hairs. Forceps long and nearly straight, the front and hind edges almost parallel, not pointed at the apex; viewed from behind they diverge slightly and then converge again at the tips, touching each other; accessory plate almost white, rather small, with a long basal process running back on the segment. The body of the organ is nearly round, the posterior edge thin and bare, with an indistinct point slightly set off at the apex; posterior clasper short, erect, nearly straight, rounded at the tip, shining black; anterior clasper rather short, nearly straight on the inner side, the outer curving to a point; penis red, basal segment small and short, distal segment rather small, pointed, mostly enclosed in a broad expansion of the back plate which, however, is widely open at the tip showing some internal processes when viewed from that direction. On the front side of the distal segment there is a thick tongue-like red lobe that turns back toward the base, and there are also on the front side of the middle two minute yellowish hooks and another pair widely diverging at the outer margin. Fifth sternite yellow near the base, on each side developed into a pointed erect horn, very striking and readily seen in specimens that have not been spread. From this horn the organ extends laterally to a considerable length, bearing dark hairs but no brushes.

Legs black; middle and hind tibiae with strik-

ingly long and dense villosity, the former with a single stout spine on the outer front side; middle femur without comb.

Wings hyaline; no costal spines; third costal segment nearly as long as fifth and sixth. First vein bare; third hairy about halfway to crossvein.

Length 15-16 mm.

Five males from Miami, Fla., collected by C. T. Townsend, and one by Frederick Knab. Collected in November and December.

Holotype.—Male, No. 20545, U. S. N. M.

No. 100. *Sarcophaga spectabilis* n. sp.

Very similar to *hillifera*, the most obvious difference being that in both sexes the fourth abdominal segment is broadly red on the apical part, generally as much as one-half its length; the single male showing this peculiarity also has perfectly distinct genitalic characters. Ocellar bristles wanting in both sexes; third abdominal segment without distinct median marginal pair of bristles in the male, but with them in the female.

Male. Front .205 of head. First segment of hypopygium red, shining, long and sausage-like, but not so much so as in *hillifera*, with row of bristles at end; second segment red, globose; forceps black, long and slender, distinctly more curved forward about the middle; accessory plate almost circular in outline, the posterior edge thin and bare; posterior clasper black, straight, hardly tapering; anterior clasper yellow, very wide and short, with only a tooth at outer angle; the basal part concealed behind an expansion of the second genital segment; penis yellow, small, basal segment short; distal segment in profile almost concealed by the lateral expansion of the back plate, which however is deeply excised near its middle, and is widely open apically; on the front side a pair of stout ascending yellow processes arise, ending in two sharp points turned forward; at the apex a pair of small points project forward, with a wide, transpar-

ent margin in front. Fifth sternite brownish-yellow, stout at base, with widely divergent arms which are covered on the inner edge with a dense cluster of rather long black bristles, becoming less dense outwardly. Fourth abdominal segment with a more uniform row of stout bristles than in *hillifera*.

Female. Front narrowest at vertex, where it is .279 of head (average of three,—.271, .279, .286); apical scutellars as long and strong as the adjacent marginals, divergent; row of marginals on fourth segment notably stout; genital segment red, its side pieces separated above by a triangular sclerite. Legs not villous, middle tibiæ with two spines on outer front side.

Length of male, 15 mm; of female, 13 mm.

One male, three females; the male is from Nassau, Bahamas, collected December 16, 1912, by F. Knab; the females are from Miami, Florida, collected November 30 and December 1 and 2 by C. H. T. Townsend.

Holotype and allotype.—Male and female, No. 20546, U. S. N. M.

No. 101. *Sarcophaga otiosa* Will.

Williston, Trans. Ent. Soc. Lond., 1896, 364, male (the female is mentioned under *concinata*).—St. Vincent. W. I.

I examined a cotype of each sex in the American Museum of Natural History, and was permitted to spread the genitalia of the male, from which I made the sketch reproduced in Fig. 101.

The species is closely allied to *hillifera*, but has golden face and yellowish pollen on thorax; Williston noted the absence of ocellars; the forceps are rather straight in general shape, with minor undulations, and have a peculiar oval concave space on the outer side, different from anything else that I have seen. By an oversight, I did not complete my notes on the type, and cannot give a detailed description, but it would hardly be necessary with the ascertained

resemblance to *hillifera* and the outline of the genitalia.

No. 102. *Sarcophaga scoparia* Pand.

Pandellé, Revue ent. xv, 1896, 198, male and female.—East Prussia.

Böttcher, Deutsche Ent. Zeitsch., 1813, 3, fig.—Europe.

Male. Front .215 of head (average of five,—.203, .205, .215, .221, .233); parafrontals and parafacials with smooth yellowish-gray pollen, the latter with an irregular row of hairs near eye, somewhat coarse; frontal stripe broad and sharply defined; frontal bristles about 13, suddenly divergent below, reaching as far as middle of second antennal joint; ocellars well developed, outer vertical absent; antennæ brownish black, third joint twice the second, reaching four-fifths of the way to vibrissæ, which are at oral margin; arista long, plumose halfway; palpi and proboscis black, ordinary; bucca half the eyeheight, with black beard as far back as metacephalic suture; back of head with about four rows of black hairs, but the inner irregular, only a little whitish beard about and below the neck and on the hind part of bucca.

Thorax thinly whitish-gray pollinose, with the usual 3 to 5 stripes rather shining black; ps dc 4; ant acr 0; prsc 1; stpl 3, the middle one large, and some long erect hairs; scutellum with the usual two marginals, one smaller subapical, and one apical,—the apical and subapical are rather large, and there are rather frequent deviations in the scutellar bristles, additional marginals, etc.

Abdomen changeable black and whitish pollinose, the black parts seem unusually shining until they are turned in a different light, when they reverse their color; first and second segments with only lateral bristles; fourth with a marginal row of about a dozen, diminishing at the sides.

Hypopygium rather large; first segment red on exposed part, the basal part somewhat infuscated and

the membrane connecting the first and second segments above also darkened; a row of bristles near hind edge; second segment red, shining, globose, without bristles; forceps black, brownish on the long and wide attached part; free part long, tapering, divergent, gently curved forward to a sharp point; accessory plate brown, large, rounded at tip; posterior clasper blackish, slender, strongly curved forward to a sharp tip, with a distinct hair on front edge; anterior clasper red, long and low, nearly straight near tip; penis blackish; basal joint large and flat, darker than usual; distal segment wide, shining, at its tip with two shining black transverse arms which curve around forward and make an almost perfect ring, very characteristic; they overlap a little at the tips which are divided into two points; before these arms on the front side are two diagonal transparent plates, and between these a transverse blackish plate bearing a black claw on each outer angle. Fifth sternite widely excised, brown, with a long tuft of bristles on each arm where it turns laterally.

Legs black; middle femora with dense row of bristles below both anteriorly and posteriorly, but hardly stubby enough to be called combs; middle tibia distinctly beyond middle, and with two bristles on the outer front side; hind tibiae with dense and long villosity.

Wings subhyaline; no costal spine; third costal segment longer than fifth and sixth together; first vein bare, third hairy halfway to the crossvein, which is slightly infuscated.

Length $11\frac{1}{2}$ to 15 mm.

Eleven males: five from East Eddington, Maine (Hough); two from New Bedford, Mass. (Hough); one from North Saugus, Mass. (D. H. Clemons, in National Museum); one Seattle, Wash. (Hine); one Kanaka Bay, Friday Harbor, Wash.; and one from Moscow Mt., Idaho, the last two in my collection.

Böttcher states that in the female the genital segment protrudes notably in the form of two plates with a vertical fissure between them, bristly only along the middle. He figures the structure.

It would appear from the localities represented that the species is limited to northern latitudes or high altitudes.

Type.—In the Pandellé collection in Paris.

No. 103. *Sarcophaga peltata* n. sp.

Bigot, in Sagra's Cuba, Spanish edition, vii, 1856, 344 (*incerta*, preoc. by Walker, Diptera Saundersiana, 1852, 324, an unrecognizable species from Jamaica).—Cuba.

Male. Front .178 of head (average of five,—.172, .172, .179, .182, .187); with smooth golden pollen extending from upper part of parafrontals down over parafacials and front half of bucca, and narrowly bordering the eye behind; frontal stripe sharply defined, wider than one parafrontal above, black above but reddish near the antennæ; ocellars distinct but small; parafacials with only a few small hairs below near eye; antennæ black, third joint fully three times the second, reaching four-fifths of the way to vibrissæ, which are at oral margin; arista plumose for three-fifths its length. Facialia blackish, middle of face gray; proboscis and palpi black, ordinary; bucca one-third the eyeheight; back of head with about $2\frac{1}{2}$ rows of black hairs, some white ones about neck and forming posterior part of beard below, Outer vertical absent.

Thorax whitish pollinose with three to five black stripes; ps dc four or five; ant acr hardly differentiated from hairs except at front edge; prsc 1; stpl 3; scutellum with three marginal (the intermediate small and close to the hindmost), one subapical, and no apical.

Abdomen tessellated with gray on the first three segments, with golden on the fourth, which has mostly yellow ground color; a shining black median stripe, becoming brownish on fourth segment; segments one,

two, and three with only lateral bristles, the fourth with a marginal row of about a dozen; fifth sternite brownish yellow, the edges not divaricate but touching each other to the tips, which project from the abdomen almost at a right angle, like a shield over the genitalia in repose; outer margins fringed with erect, stiff hairs.

Hypopygium yellow, both segments rather large and covered with golden pollen; first with a very widely interrupted row of hairs near hind edge; second globose, with erect hairs, none bristle-like; forceps yellow at base, free part becoming black, short, obliquely truncate diagonally at apex, so that the front and inner angle is the longest, with a slight tooth projecting back in profile just behind the tip. Accessory plate triangular, brownish-yellow, the hind edge thin; posterior clasper black, moderately curved and tapering, sharp at tip; anterior clasper yellow at base, strongly curved to a black complex tip, of which the main point is directed forward, a shorter one forms a square angle below, and another projects on the outer side on a level with the first but shorter. Penis with very short yellow basal segment; distal segment dark yellow, with a smooth, hooded apex which greatly overhangs the basal part in front; basally from the hooded part a pair of complicated plates arise from the stalk, lie rather close to the hooded mass, and give off a pair of curved filaments on the basal side.

Legs black; middle femur with distinct comb on hind side below near tip; middle tibia with one bristle on outer front side and no villosity on inner side; hind tibia with minute but fairly distinct villous hairs along the middle, spreading both ways, but not much longer than the thickness of the tibia.

Wing hyaline; no costal spine; third costal segment longer than fifth; first vein bare, third hairy nearly to crossvein.

Female. Front .276 of head (average of five,—.270, .272, .276, .278, .283), golden as in male, orbitals

and outer vertical present; ant. ac. somewhat stouter than in male; but not very distinct; scutellars as in male; fourth abdominal segment golden pollinose, and mostly yellow in ground color; genital segment almost concealed by the folding together of the sides of the fourth segment.

Length 6-8 mm.

Five males and five females; one male is from Mayaguez, Porto Rico, collected by R. H. Van Zwalenburg, April 15, 1914; another male from the same place November 2, 1914, comes from some material that was identified by Coquillett as *Sarcophaga incerta* Walk.; a third male from Nassau, Bahamas, December 14, 1912 (F. Knab); a female from Miami, Fla. (Mrs. C. H. T. Townsend). All the foregoing are in the National Museum. One male in the American Museum of Natural History from Naguabo, Porto Rico, March 7-9, 1914; one male and four females from Havana, Cuba (C. F. Baker), in my collection.

Holotype.—Male, No. 20547, U. S. N. M., from Mayaguez.

Allotype.—Female, No. 20547, U. S. N. M., from Miami, Fla.

The name *incerta* Walk. has been used several times in literature, but apparently not always for the same species. The species so reported in Canadian Entomologist, xxxiii, 43, as bred from cow-manure in Virginia, and again in the same, xlv, 181, from Dallas, Texas, may not have been the same one, as I have seen none of this species from those regions. For the same reason I doubt the occurrence at Mesilla Park, N. M., recorded by Professor Cockerell on Coquillett's identification. Johnson, Psyche, xv, 75, reports a species from the Bahamas as *incerta* Walk., probably the present one. Banks describes a larva from cow manure (Tech. Bull. 22, Bur. Ent., 16, pl. iv, f. 75), probably not the present species.

The nearest allied species do not have any villosity on the hind tibiae; see list of them under *assidua*.

No. 104. *Sarcophaga subdiscalis* n. sp.

Male. Front .202 of head (one specimen); parafrontals and parafacials gray pollinose, not silvery nor yellow; the latter with row of hairs which are coarse and bristly; frontals about 14, abruptly divergent below, reaching middle of second antennal joint; ocellars large, outer verticals absent; antennæ black, third joint brown, twice the second, and reaching almost three-fourths of the way to the vibrissæ, which are a little above the oral margin; facialia hairy almost halfway up; arista long, plumose three-fifths of its length; palpi and proboscis black, ordinary; bucca almost half the eyeheight; beard black and coarse except on metacephalon, where it is whitish; back of head with about four quite irregular rows of coarse black hairs, and some whitish in middle.

Thorax gray pollinose, with the usual 3 to 5 black stripes; all the bristles longer and stouter than usual; ps dc 4, all of large size; ant dc 3, the front one smaller; ant acr 0; prsc 1; stpl 3; scutellum with 2 marginals, 1 smallish subapical, 1 larger apical.

Abdomen with changeable gray pollen and three shifting blackish stripes, the fourth segment red apically (three-fourths its length in middle, one-fourth at sides); first and second segments with only lateral bristles, third with a large median marginal pair; fourth unique in having the row of about 16 that is marginal in other species considerably drawn in from the hind edge across the middle of the dorsum (the meson), so it stands at two-thirds the length of the segment, approaching the hind margin gradually toward the sides; a row of long hairs fringes the hind margin all the way across. Fifth sternite blackish, V-shaped, with dense hairs along inner edge.

Hypopygium red, without bristles, first segment subshining, second globose, shining; forceps brown nearly to tip, then black; they do not taper, but are broad and then obliquely truncate with a small tooth on the slightly produced front edge; accessory plate yellow, triangular; posterior clasper

blackish, with strongly hooked, sharp tip; anterior clasper much the same, but more broadly curved; penis with stout yellow basal joint, distal segment blackish, wide and bulky, with a pair of flat black widely separated arms or plates projecting forward at tip from an apical part which is set off from the back plate by a suture; another pair of more slender processes arise with an ascending curve from the front part near its base.

Legs black; middle femora with dense rows of fine bristles on lower side near tip, both before and behind; middle tibia not villous, with a single bristle on outer front side; hind tibia with very long but thin villosity projecting on the mesial side, almost none on the outer.

Wing subhyaline; no costal spine; third costal segment much longer than fifth and sixth combined ($1\frac{1}{2}$ times by micrometer); first vein bare, third hairy for some distance.

Length 12 mm.

One male, Angelsea, N. J., June 11, 1905 (Harbeck).

Holotype.—Male, No. 20548, U. S. N. M.

No. 105. *Sarcophaga impar* n. sp.

Male. Front .243 of head (average of five,—.233, .237, .244, .245, .256), widening from above the middle; parafrontals and parafacials with distinct yellowish cast, shining pollinose; frontal bristles about 8 or 9, the rows suddenly diverging below, reaching below the middle of the second antennal joint; ocellars stout; parafacials with the usual row of small hairs next the eye; antennæ brownish black, the third joint twice the second and reaching three-fourths of the way to the vibrissæ, which are at the oral margin; arista plumose a little over half its length; palpi and proboscis black, ordinary; bucca nearly one-third the eyeheight; back of head with three rows of black hairs and considerable pale beard; outer vertical bristles not developed.

Thorax gray pollinose with slight yellowish tinge; the usual three to five black stripes; ps dc four, the anterior two small; ant acr three or four pairs distinct; prsc one smallish; stpl three; scutellum with two marginal, one small preapical and one small apical.

Abdomen gray pollinose, tessellated, with three very indistinct changeable stripes. The first three segments with only lateral bristles; fourth segment reddish along the hind edge, with a marginal row of about 12 bristles.

Hypopygium: First segment large and broad, pollinose and somewhat tessellated above, with a row of about 8 stout bristles; the ground color varies from yellow to dark brown; second segment red, globose, slightly pollinose above, with erect black hairs but no bristles. Forceps very characteristic in structure, the free part black and polished, the front and back edges parallel in profile, near the tip suddenly bent almost at right angles and bearing at the angle behind four or five stiff spines of different sizes as shown in the figure; accessory plate yellow, the attached part rather long and broad, the free part pointed. Posterior clasper quite straight, shining brown, with a slight bend forward at the tip; anterior clasper slender and strongly curved, shining black; penis with rather slender reddish brown basal joint a little longer than usual; distal segment with a small intermediate subsegment of plain structure, separated off by an evident suture; beyond this it divides into four principal parts which are unsymmetrically arranged. On the right side is a long brown widening plate with edges turned down partially enclosing a stout black process which ends in a curved sharp point projecting from under the plate. On the left side there is a short shining brown simple process not much over half as long as the one just described. Between these, attached by a sort of joint that has the appearance of a ball and socket, there is a long one-sided membrane folded at sides but not enclosing any visible structure.

All the specimens agree exactly in this one-sided arrangement which is unique in the genus as far as I have seen. Fifth sternite yellow, narrowly excised, the two sides close together for almost the whole length, then diverging, near the point of divergence with an indefinite black brush of short hairs.

Legs black; middle femur with short comb below near apex. Middle tibia not villous, with two bristles on the outer front side; hind tibia with only a few erect villous hairs on the inner and outer sides.

Wings hyaline, a distinct but not very large costal spine; third segment of costa as long as fifth and sixth. First vein bare; third hairy almost to the crossvein.

Length 8-10 mm.

Twenty-three males; fifteen from Mr. F. C. Bishopp, collected at various points in Texas, and one from Paul's Valley, Okla.; three from Greenwood, Miss. (C. F. Turner, No. E 96); one specimen from 12760); one Greensboro, Fla., reared from the large lubber grasshopper, *Dictyophorus reticulatus*, by R. N. Wilson (Gainesville, No. 16587); one specimen from Cameron, La., collected by Prof. Hine in 1903; two specimens from Tifton, Ga., in the Hough collection.

I have not so far been able to separate the females of this species from those of *robusta* coming in group II. Some of the Texas material was collected in traps baited with stale beer, and the lining membranes from the intestines of animals, obtained from the slaughter house where the intestines were made into sausage casings. One lot was bred from beef refuse at Victoria, Texas, by J. D. Mitchell. Mr. E. G. Kelly reports that the Big Cabin specimen was reared from pupæ of *Heliophila unipuncta*, which were living when placed in the cage.

Holotype.—Male, No. 20549, U. S. N. M., from Galveston, Texas, collected about decaying fish on the beach (Bishopp No. 3516).

No. 106. *Sarcophaga sulculata* n. sp.

Male. Easily recognizable among specimens that have not been spread by the peculiar shape of the hypopygium which, as shown in the figure, extends forward underneath the abdomen, the dividing line between the first and second segments being horizontal.

Front wide, equally so from the vertex almost to the antennæ and .325 of head (average of five,—.314, .318, .324, .333, .335); parafrontals gray; parafacials more silvery; frontal stripe wide and partially covered with gray pollen; frontal bristles about seven, the rows wide apart, nearly parallel down to the last one or two bristles, which diverge rapidly and extend a little below the base of the second antennal joint; orbital bristles large; parafacials with a delicate row of hairs; antennæ brown, second joint rather yellowish; third twice the second and reaching more than three-fourths of the way to the vibrissæ, which are at the oral margin; bucca one-third the eye-height; back of head with about four or five rows of black hairs and only a few pale ones around the neck and just below it; palpi and proboscis black, ordinary; outer vertical bristles distinctly developed.

Thorax gray pollinose, with five to seven black stripes, the median one quite narrow; ps dc four, well developed; ant acr two or three strong pairs; prsc one; stpl three; scutellum with two marginal, one sub-apical and no apicals.

Abdomen gray, tessellated, with three changeable, indistinct dark stripes; first and second segments with only lateral bristles; third with some appressed marginal bristles or coarse hairs, but not with characteristic erect marginals. Fourth segment slightly red behind, with a row of about ten bristles and coarse hairs intermingled.

Hypopygium red; first segment large, blackish at base, with a row of coarse hairs along the hind edge; second segment red with coarse black recum-

bent hairs or small bristles. It extends far forward under the abdomen, the anus near the extreme front end, and from this back to the second segment it has a distinct median groove which has suggested the specific name. Forceps minute, yellow, the free part slender, bent back and convergent at apex, with more or less of a knob on the outer side. As the forceps are divergent near the base, they enclose an oval opening when viewed from behind. Accessory plate yellow, large, concave, rather oval or quadrangular, so large that they conceal most of the inner organs, and in making the drawing it was necessary to remove the plate and indicate its position by a dotted line. Posterior clasper yellow, very wide in profile, the apex developed into two divergent points connected by a membrane; anterior claspers yellow, exceedingly slender and delicate toward the tip, rather upright in position. Penis with a very slender, yellow basal portion, the distal part yellowish, developed backward from the basal segment more than usual, with a black spot on the side; without any visible processes or plates except on the front side near the tip, where there is a minute double row of recurved and apparently branched spines. Fifth sternite very widely excised, the only part showing being rounded yellow lobes on each side, tipped with black and clothed with long hairs.

Legs black; middle femur without comb; middle tibia with two long bristles on outer front side; hind femur with well developed but rather short villosity.

Wings hyaline; no costal spine; third segment of costa equaling the fifth. First vein bare; third hairy nearly to crossvein.

Female. Front .370 of head; sides parallel nearly to antennæ, with usual orbital bristles. Back of head as in male, but pale beard showing rather more distinctly; third segment of abdomen with well developed median marginal bristles and enough lateral ones to form an interrupted row; fourth segment reddish at tip. Genital segment red with roundish open-

ing; no larvipositor developed. Otherwise as male.

Length 8-9 mm.

Six males and one female: One male from Ellis County, Kansas, July 19, 1912; another from Graham County, Kansas, and a female from Russell County, Kansas, all collected by Mr. F. X. Williams and in the University of Kansas collection; two males from Barksdale, Texas, June 28, 1914 (Bishopp 3431); one male from Crystal City, Texas, July 31, 1914 (Bishopp 3345), D. C. Parman, collector; one male from Belleville, Kansas, W. E. Pennington, collector (Webster No. 13510).

Holotype.—Male, No. 20550, U. S. N. M., from Crystal City, Texas.

Allotype.—Female, No. 20550, U. S. N. M., from Kansas.

No. 107. *Sarcophaga cooleyi* Park.

Parker, Canad. Ent., xlvii, 417, 1 pl., 1914.—Montana.

Male (Paratype). General color rather lighter gray than usual. Front .243 of head (average of three,—.236, .245, .249); parafrontals and parafacials silvery pollinose, with slight yellowish tinge; frontal stripe not very well defined above; ocellars distinct, outer vertical absent; frontals about 9, the lower ones moderately divergent, not reaching the middle of the second antennal joint; parafacials with double or irregular row of hairs, the lower bristly; antennæ black, third joint nearly three times the second and reaching four-fifths of the way to the vibrissæ, which are at the oral margin; arista plumose a little more than half its length; palpi and proboscis black; ordinary; bucca half the eyeheight, with black beard as far back as the metacephalic suture, behind which the hairs are white and conspicuous; back of head with two rows of black hairs, the rest inside white.

Thorax gray-pollinose, with three to five black stripes; the submedian gray stripes divided far beyond the suture; ps dc four or even five, only the two hindmost large; stpl 3; ant acr hardly distinguishable

from hairs; prsc 1; scutellum with 2 marginals, 1 smallish subapical, 1 smallish apical.

Abdomen densely gray-pollinose, tessellated, with three blackish stripes, the outer shifting; first three segments with only lateral bristles; fourth with a marginal row of 16 or more; its hind edge generally a little red; fifth sternite black, with sharp, protuberant base and dense brushes beyond the fork, which shade off longer on inner edge.

Hypopygium red, subshining, first segment of good size, with a row of bristles behind; second large, globose, not bristly; forceps long, black except basally, tapering, rather straight and divergent, near tip turned rather strongly forward, ending in a sharp point; accessory plate yellow, triangular with the corners rounded; the side next the forceps concave; posterior clasper black, stout at base and with a stout hair arising on the front side there, the tip sharp and bent forward; anterior clasper yellow, long and low, nearly straight apically; penis with yellow basal segment, the distal one blackish, wide and compact; on its hind side near the tip arise a pair of yellowish processes which extend over the end and diverge from each other; out of the middle of the segment arise subapically two very black, large lobes; the back plate embraces these and gives off at the extreme lateral angle a sharp black point.

Legs black; middle femur with comb on hind side below near tip; middle tibia hairy but not villos, and with two bristles on outer front side; hind tibia with very long and rather dense villosity, spreading both ways.

Wing hyaline; no costal spine; third costal segment longer than fifth and sixth together; first vein bare, third a little hairy near base.

Female. Color light gray, densely pollinose. Front .391 of head (average of five,—.376, .382, .385, .388, .432); with the usual two orbitals and outer verticals; frontal stripe not distinct above; stpl regularly four, occasionally one is small; no apicals on

scutellum; genital segment yellow, with vertical slit bearing heavy bristles above; row of bristles on fourth abdominal segment interrupted in the middle; middle femur without comb; hind tibiae not villous.

Length 10 to 14 mm.

Six males and six females: Four males and six females, including a paratype of each, from Laurel, Mont. (Parker); one male in the Hough collection from Pullman, Wash. (R. W. Doane), and another from Colorado (Experiment Station 2044).

Mr. Parker reports rearing the species in numbers from decaying fish; he also found the adults "in privies and common around garbage, especially if the latter contained fish."

Type.—Male, in Massachusetts Agricultural College.

Paratypes—In U. S. N. M., deposited by Mr. Parker.

No. 108. *Sarcophaga tuberosa* var.

***sarracenioides* n. var.**

Howard, Insect Book, 1902, 165, fig.; Proc. Wash. Acad. Sci., ii, 565, fig., bred from human excrement (*sarraceniae* Riley).

Morgan, Bull. 30, n. ser., Div. Eutom., 1901, 25, figs. larva and adult (id.).—Miss.; bred from *Melanoplus differentialis*.

Williston, Manual, 1908, 348, fig. (id.).

Hermes, Jour. Exper. Zool., iv, 45-83, biol., breeds in dead fish on the shore of Lake Erie (id.).

Banks, Tech. Bull. 22, Bur. Ent., 17, larva desc., but identity somewhat doubtful (id.).

Kelly, Jour. Agric. Research, ii, 441, bred from grasshoppers at Wellington, Kans., and Washington, D. C. (id.).

Aldrich, Jour. Econ. Ent., viii, 242, notes (id.).

Male. Front wide, .230 of head (average of five,—.223, .223, .228, .238, .238); front of head and the posterior orbits light yellow pollinose, the facialia however blackish below; frontals about 10, suddenly diverging below and reaching fully to middle of second antennal joint; ocellars small but distinct; para-

facials with the usual row of hairs, the lower quite long; antennæ black, the third joint $1\frac{1}{2}$ times the second, reaching hardly three-fourths of the distance to the vibrissæ, which are at the oral margin; arista plumose for three-fifths its length; palpi and proboscis black, ordinary; back of head with three rows of black hairs and considerable whitish beard, which however is sharply limited anteriorly on the bucca by the metacephalic suture; outer vertical absent.

Thorax gray pollinose, with the usual three to five black stripes, the submedian stripes divided to the suture; ps dc 4; ant acr wanting or quite small; prsc 1 pair; stpl 3; scutellum with 2 marginal pairs and one discal.

Abdomen gray, tessellated; first and second segments with only lateral bristles; third with a median marginal pair and four laterals; fourth largely red (usually the posterior half or more), which extends to the lower side; it bears a marginal row of about 14 bristles, and on the under side the ends of the tergite bear dense, long hair.

Hypopygium red; first segment of medium size, pollinose above, generally without bristles on hind edge, but occasionally with small ones; second segment red, shining, globose, without bristles; forceps black, not very large, gently curved forward, in profile the front and back edges nearly parallel, at the tip the front edge is excised, leaving a tooth on the hind edge; the attached part of the forceps is covered with dense, black hair. Accessory plate yellow, triangular; posterior clasper black, unusually stout, with a sharp tip curved forward; anterior clasper black, rather slender, with sharp tip; penis largely blackish; basal segment rather short, distal one small on basal part, with a wide, rather thick middle, from which on the front side projects a concave, partly pale transverse plate; at the tip behind is a sharp point, from each side of which at its base arises a long slender process directed forward. Between these arms and out of a central apical cavity arise two slender proc-

esses projecting almost straight out of the apex, which have one edge flattened and toothed. The four slender processes, with the sharp tip of the distal segment, are very characteristic. Fifth sternite reddish-brown, its basal ridge very shining, the excision wide at bottom with the sides bearing brushes of stiff spines, part of which are rather long.

Legs black; middle femur with a rather loose comb of spines on lower hind side near tip; middle tibia not villous, with two bristles on outer front side; hind femur with well-developed lower row of bristles on outer side; hind tibia with rather dense villosity spreading both ways.

Wings hyaline; no costal spine; third costal segment as long as fifth and sixth together; first vein bare, third bristly about halfway to crossvein.

Female. Front .334 of head (average of five,—.318, .322, .328, .339, .363); orbitals and outer verticals present; lower hairs of parafacials bristly; bucca almost half the eyeheight, with coarse black hairs before the metacephalic suture, whitish behind it; scutellum without apicals. Genital segment reddish-yellow, with almost triangular orifice which is fringed with a few small bristles above. The most characteristic features of the female appear to be 4 dc, three rows of black hairs behind the eye, minute or no ant acr, and fourth abdominal segment largely red toward apex. It seems not to differ from that of *utilis*.

Length 8 to 13 mm.

Nearly two hundred specimens have been examined, many with rearing records; *helicis* is the only species rivaling this one in the number of times it has been reared. As there appears to be incontrovertible evidence that this species in its larval habits runs the entire gamut from scavenger to parasite, some space and care have been taken to group the rearings.

A. From Grasshoppers.

29 both sexes, Wellington, Kansas (E. G. Kelly, W 7398, Expt 2225, 2227); in this case dead grasshoppers were collected and placed in cage.

1 male, 1 female, Wellington, Kans. (E. G. Kelly, W. 7319, Expt 2228); like the preceding.

1 female, Wellington, Kans. (E. G. Kelly, W 8281, Expt 2250); live grasshoppers placed in cage.

3 males, 4 females, Ashland, Nebr. (W. E. Pennington, W 13524, Cage A791; adults of *melanoplus differentialis*, alive when they were placed in the cage at Wellington.

2 females, Chickasha, Okla. (E. G. Kelly, W 14449, Expt A1920); adults and nymphs of grasshoppers all alive when placed in cage. The females of the fly were attacking the grasshoppers when collected, swarming about them, dashing at the flying grasshoppers and depositing their larvae in flight, at the same time knocking the grasshopper to the ground.

1 male, 1 female, Washington Experiment Station, No. 73; dead grasshoppers clinging to weeds were collected at Wawawai, Wash., by C. V. Piper, in August, 1897, from which these flies issued.

3 males, Wilder, Idaho, reared from grasshopper by T. H. Parks.

B. From *Anabrus* (the Western Cricket).

1 male, Okanogan Valley, B. C., "ex *Anabrus*, emerged April, 1896. Jas. Fletcher."

C. From *Heliophila unipuncta*.

2 females, Big Cabin, Okla. (W. E. Pennington, W 12760, Cage A653); the pupæ were collected and placed in cage, all living at the time.

3 females, Muskogee, Okla. (E. G. Kelly, W 12713, Expt A648); pupæ of the moth, dead when received at laboratory.

D. From *Chorizagrotis agrestis*.

13 males, 10 females, Wellington, Kansas (E. G. Kelly, W 5431, cage 1520); pupæ of the moth were collected under shocks of alfalfa, believed alive when caged.

E. From *Lachnosterna*.

1 male, 2 females, no locality (Expt A1529), "ovipositing on *Lachnosterna*."

1 male, Wellington, Kans. (E. G. Kelly, W 4450, cage 1397); adults of *Lachnosterna calceata* collected at light May 16, 1911; placed in cage alive; flies emerged June 14.

1 male, Wellington, Kans. (E. G. Kelly, W 7393, Expt A680); adults of *Lachnosterna lanceolata* collected in the field, caged while living, June 12, 1914; flies emerged July 20, 1914.

F. From *Eleodes tricostata*.

2 females, Chickasha, Okla. (E. G. Kelly, W 12760, Expt A1915); the beetles were alive when taken (adults), and did not die for some time afterward.

G. From *Allorhina nitida*.

2 males, Norfolk, Va., reared by D. E. Fink.

H. Bred from Carrion.

66 males and females, Texas (Bishopp); "several lots bred from carcasses; Bishopp 4365 was bred from decaying meat."

I am under obligation to Messrs. Kelly and Bishopp for data given. Other specimens examined are as follows:

Colorado, 2 males in Hough collection from the Colorado Experiment Station, Nos. 1965 and 2082; Moscow, Ida., 1 male (Aldrich); Tempe, Ariz., 1 male, 1 female (F. H. Gates, Tempe 381); Gila River, Ariz., 1 male (R. N. Wilson, W 10535); Michigan City, Ind., 1 male, on dead fish on beach of Lake Michigan; La Fayette, Ind., 1 male (Aldrich);

Washington, D. C. (W. 9573), adult collected, not reared; Wenonah, N. J., 1 male; Manyunk, Pa., 2 males (Harbeck).

Holotype.—Male, No. 20551, U. S. N. M., La Fayette, Ind., July 11, 1914.

Allotype.—Female, No. 20551, U. S. N. M., Wellington, Kans., Webster No. 7398, Experiment No. 2225.

No. 109. *Sarcophaga tuberosa* var.
exuberans Pand.

Pandellé, Rev. ent., xv, 186.—Europe.

Böttcher, Deutsche Ent. Zeitsch., 1912, 735 (as var. of *tuberosa* Pand.).

Male. Differs from *sarracenioides* chiefly in the male genitalia, most noticeably in having the first segment of the hypopygium shining black. Other characters are slight; the forceps are more uniformly tapering, but said by Becker to be variable; the processes arising out of the apical cavity of the penis are more slender, filiform, not flattened and toothed on one side.

Four males, three from New Bedford, Mass. (Hough collection), the other from Palo Alto, Cal., in my collection. The width of the front is .197, .211, .220, and .240 of head, averaging .217. A corresponding female form with black genital segment might be expected, but would be hard to separate from the variety *harpax*; I have not seen such females.

Böttcher grouped the three forms *tuberosa*, *harpax* and *exuberans* as follows:

1. Both segments of hypopygium black.

Antennæ reaching below lowest edge of eyes, the third joint twice as long as the second; forceps with parallel front and back edges in profile, and an apical tooth at or behind middle
harpax Pand.

Antennæ shorter, third joint $1\frac{1}{2}$ times as long as second; forceps slender
tuberosa Pand.

2. Second segment of hypopygium red; forceps slender *exuberans* Pand.

To complete this grouping for North America it would be necessary to add a third alternative:

3. Both segments of hypopygium red; forceps parallel-edged *sarracnioides* n. var.

Tuberosa is not known as North American.

No. 110. *Sarcophaga bullata* Park.

Parker, Canad. Ent., xlviii, 359, 1916, fig.—Widespread. Felt, 28th Rept. N. Y. State Ent., 1913, 80-82, figs. (*georgina* Wied.; corrected, 31st Rept., 100.—bred from carrion in New York.

Weiss, Ent. News, xxvii, 166, 1916, oc. in N. J.

Male. Front wide, .248 of head (average of five, —.233, .234, .252, .254, .265), narrowest a little below the ocelli; parafacials and parafrontals silvery pollinose, with a slight yellowish tinge; the former with irregularly arranged hairs, the lower bristly; frontal stripe brown, wide; frontals 12, abruptly diverging below, reaching beyond the middle of the second antennal joint; ocellars distinct, no outer vertical; antennæ reddish-brown to black, the third joint about $2\frac{1}{2}$ times the second, and reaching three-fourths of the way to oral margin; arista long, plumose over halfway; palpi brown to black; proboscis black, ordinary; bucca nearly half the eyeheight, the hairs rather fine, black anteriorly, but the whitish beard of the metacephalon extends well forward of the suture, blending with the black; back of head with two rows of black hairs, and more or less of a third above.

Thorax gray pollinose, with the usual three to five black stripes, the submedian gray stripes divided to the suture and beyond; ps de 4 or more, only the hindmost two of any size; ant aer 0; prse 1; stpl 3, the intermediate large; scutellum with two marginals, one large subapical, one large apical.

Abdomen gray, tessellated, with a slender median black stripe; first and second segments with only lateral bristles; third with a stout median pair of marginals; fourth with red hind edge and marginal

row of 12. Fifth sternite as in *cooleyi*, its basal part black and rather sharply prominent, the arms with heavy black brushes, of which the innermost bristles are less stubby and longer.

Hypopygium red; first segment rather large, subshining, with a varying generally weak row of hairs across apical part; second segment globose, shining, without bristles; forceps stout, brown at base, becoming black, tapering and curving forward to a sharp point; accessory plate yellow, smallish, the free part rather slender but not fingerlike; posterior clasper small, brown, slender, the tip sharp and bent forward, a stout hair arising from the basal front side; anterior clasper brown, polished, low, not hooked at tip. Penis with yellow basal segment, the distal one very wide and compact, blunt in profile; viewed diagonally there are a pair of curved black horns at the outer apical angles; on the front side of the middle are a pair of lobes bearing teeth; the black back plate has a pair of bubble-like thin whitish areas which are conspicuous.

Legs black; middle femur with comb; middle tibia not villous, with three bristles on outer side; hind tibia with very long and rather dense villosity spreading both ways.

Wings hyaline; no costal spine; third costal segment longer than fifth and sixth together; first vein bare, third hairy for some distance.

Female. Front .304 of head (average of five,—.276, .290, .295, .320, .340); orbitals and outer vertical present; beard as in male; no apicals on scutellum; genital segment reddish yellow, with vertical slit guarded by strong bristles above.

Length $7\frac{1}{2}$ to 15 mm.

Fifty-one males, fourteen females. One pair taken in copulation and on same pin, were collected at Lakeland, Fla., by Geo. G. Ainslie (National Museum). The rest of the material is from Massachusetts (New Bedford, Melrose Highlands, North Saugus, North Andover); New York (Cold Springs

Harbor); New Jersey (Manahawkin, New Brunswick and Westville); Pennsylvania (Germantown); Ohio (Newark and Columbus); Indiana (LaFayette, Elkhart, Michigan City and Evansville); Colorado (Experiment Station 1632); Virginia (Virginia Beach); Florida (Miami, Biscayne Bay, Charlotte Harbor); Georgia (Tifton); and Texas (Dallas and Victoria).

The Michigan City specimens were captured on dead fish on the beach of Lake Michigan.

The female is much like that of *sarracenioides* and *utilis*, but can be distinguished by the beard, as described.

Holotype and allotype.—Male and female, in the Massachusetts Agricultural College; paratypes, No. 19167, U. S. N. M., and in several other collections.

No. 111. *Sarcophaga libera* n. sp.

Male. Like *bullata*, but differing as follows:

Front .209 of head; sides of front and face not with yellow tinge; third antennal joint a little over twice the second, reaching less than three-fourths of the way to the vibrissæ, which are at the oral margin; bucca about one-third the eyeheight, with no pale beard before the metacephalic suture; back of head with the third row of black hairs very irregular, but more developed than in *bullata*; forceps hardly divergent; posterior claspers reddish; distal segment of penis not blunt, but continued on in the form of two pairs of processes, the dorsal yellow and slender, the others black, wide apart at base and approximated at tip; these processes are about as long as the body of the segment; hind tibiæ only moderately villous; middle with two bristles on outer front side.

Female. Like the male except as follows: Front .274 of head; the usual orbitals and outer vertical

present; genital segment red, with slitlike aperture guarded by moderate bristles; middle femur without comb; middle tibia with three bristles on outer front side.

Length of male 15 mm; of female 9 mm.

One pair on same pin, taken by Prof. S. J. Hunter on Beaver Creek, Mont., altitude 6800 feet, August 1913. In University of Kansas collection.

Holotype—Male, in University of Kansas.

GROUP G.

Four species, of which the foremost one or two may be small; hind tibiae without villosity in male; both segments of hypopygium black (but this last is not constant in *rileyi*, *jonesi* and *celarata*).

Table of Species—Males.

- | | | |
|----|--|---|
| 1. | First vein hairy (widespread) | |
| | | No. 112. <i>salva</i> n. sp. |
| | First vein bare | 2 |
| 2. | Middle femur with well-developed comb below | 3 |
| | Middle femur not with comb | 5 |
| 3. | Penis with a large concavity on the front side, in which no copulatory tube is visible (S. C.) | |
| | | No. 113. <i>rileyi</i> n. sp. |
| | Penis with very distinct copulatory tube projecting forward from the front side near tip | 4 |
| 4. | Accessory plate long but flat, not diverging laterally (S. C., Ga.) | No. 114. <i>jonesi</i> n. sp. |
| | Accessory plate very long, the distal part round, slender, brown, strongly diverging laterally (when viewed from behind especially) (Ala.) | |
| | | No. 115. <i>celarata</i> n. sp. |
| 5. | Bucca with abundant pale beard before the metacephalic suture (Ind.) | No. 116. <i>servilis</i> n. sp. |
| | Bucca not with pale beard before the suture | 6 |
| 6. | Parafrontals and parafacials gray; facialia (facial ridges) hairy much less than halfway (Guatemala) | |
| | | No. 14. <i>Notochata subpolita</i> n. sp. |

Parafrontals and parafacials golden; facialia hairy much more than half-way (Mexico, (Guatemala))

No. 15. *Notocheta plumigera* V. d. W.

No. 112. *Sarcophaga salva* n. sp.

Male. Front .191 of head (average of five,—.178, .186, .193, .194, .202); parafrontals and parafacials silvery pollinose, the latter with a row of small hairs close to the eye; frontal stripe black; frontal bristles about 11, rather broadly divergent below, reaching almost to the middle of the second antennal joint; ocellars present, outer vertical absent; antennæ black, the base of the third antennal joint distinctly red, this joint only about a third longer than the second (which is unusually long), reaching three-fourths of the way to the vibrissæ, which are at the oral margin; arista short-plumose for barely half its length; palpi and proboscis black, ordinary; bucca one-fifth the eyeheight; back of head with three rows of coarse black hair, the white hair below not extending forward of the metacephalic suture.

Thorax cinereous pollinose, with three black stripes, the usual outer short stripes (making five) are indistinct; ps dc 4; ant aer 0; prsc 0 or minute; stpl usually 2; scutellum with 2 marginal, a minute subapical, no apical.

Abdomen gray, strongly tessellated; first and second segments with only lateral bristles; third with a median marginal pair and two laterals; fourth with a row of eight which are submarginal, in the middle they are at the last fourth of the segment; fifth sternite yellowish-brown, in the base of the incision lined with a brush each side and not spreading, then suddenly wider and bare, moderately diverging.

Hypopygium small; first segment black, opaque, without bristles; second black, the sides reddish to some extent, without bristles, normally opaque but easily denuded; forceps reddish-brown, at base with rather striking recurved hair which curls up over the

hypopygium; the free part bends back at an angle, then curves gradually forward to a rather blunt point; at the basal part of the curve behind there is a small hump, increased in appearance by dense, short, erect hairs; accessory plate very small, rounded at tip, with almost no free part; posterior clasper black, stout, much curved, with hooked tip; anterior clasper small, slender, black, resting up against the front side of the posterior; penis black; basal joint imperceptible, distal one widening towards apex, where it ends in an oblique funnel with a white margin; from each side of the segment arises a heavy black simple arm, which projects outward, forward, and toward the base; from near the base in front arises an erect slender transverse black plate, recurved and divided at tip; back of distal segment sharp and keel-like toward the tip.

Legs black; middle femur with pronounced comb; middle tibia with two bristles on outer front side; hind tibia not villous.

Wings hyaline; costal spine as long as anterior crossvein; third costal segment only about two-thirds the fifth; first and third veins hairy.

Female. Front narrowest at vertex, where it is .271 of head (average of five,—.258, .265, .272, .279, .282); abdomen flat, wide; fourth segment with submarginal bristles as in male; genital segment yellow, the aperture slitlike, with only a few bristles; hind femur without comb.

Length $6\frac{1}{2}$ to $8\frac{1}{2}$ mm.

Twenty-one males and six females; three males are from La Fayette, Ind., June (Aldrich); one male, one female, Evansville, Ind., swept on winter wheat May 7, 1914 (Aldrich); twelve males, three females, Opelousas, La., in the Hough collection; two males, Crowley, La., in Professor Hine's collection; one male Nebraska and one female Algonquin, Ill. (Hough coll.); one female Vinton, O. (Hine); one male San Augustine, Tex.; one male Attica, Ind., October 7, 1916 (Aldrich).

There is some difference in the length of the plumosity of the arista; in occasional specimens it is not very much shorter than in many other Sarcophagas.

Holotype.—Male, No. 20553, U. S. N. M., from La Fayette, Ind.

Allotype.—Female, No. 20553, U. S. N. M., from Evansville, Ind.

No. 113. *Sarcophaga rileyi* n. sp.

Male. Front .229 of head (average of five,—.212, .212, .234, .236, .253); parafrontals and parafacials silvery with a tinge of yellow; frontal stripe reddish, rather narrow, not sharply defined above. Parafacials with the usual row of hairs, rather large below; antennæ brown or reddish brown; third joint twice as long as second, reaching four-fifth of the way to the vibrissæ, which are at the oral margin. Arista plumose a little over halfway; frontal bristles about ten, several pairs reclinate, gradually diverging, reaching to the middle of the second antennal joint. Ocellar bristles present; outer verticals absent; palpi and proboscis black; bucca one-third the eyeheight, with black hairs to metacephalic suture. Back of head with three to four rows of black hairs, a few whitish ones in the middle and below.

Thorax gray pollinose, with the usual three to five black stripes; the submedian gray stripes are divided to the suture; ps dc four; ant acr none; prsc one; stpl three; scutellum with two marginals, one preapical and one small apical.

Abdomen gray pollinose, tessellated, with median black stripe; first and second segments with only lateral bristles; third with a pair of erect median marginals and two laterals; fourth with a median marginal row of about 14; fifth sternite brown, not divaricate, the two sides touching each other to their tip the same as in *peltata*, and ending in a rather sharp point.

Hypopygium black, reddish in middle and behind, sometimes quite largely so; first segment polli-

nose, with a row of small bristles behind; second rounded, shining, not bristly; forceps blackish, rather straight, flat and bare, thin in profile, turned forward to a sharp point at tip. Viewed from behind they are slender, diverging slightly at the base and nearly parallel the remainder of the way, turning in a little at the tip. Accessory plate brown, short, the free part rounded and slightly set off from its base by a constriction; posterior clasper black, tapering and curved forward, rather sharp; anterior clasper very wide and flat, brown or black, concave on posterior side, with a small curved point at the outer edge; penis brown, basal segment shortened, inconspicuous; distal one convex, smooth and shining on its posterior and lateral surface, in shape much resembling a ventilating funnel on a steamship; front with a deep central concavity, on the basal side of which is a transverse concave brown plate; laterally this concavity is bounded by a sharp longitudinal ridge; apically there is a large spreading pair of soft, light-colored lobes, delicately covered with hair on the front side; these folds or flaps are the most conspicuous features of the organ, projecting beyond the harder parts.

Legs black; middle femur with a distinct comb on the hind side near the tip; middle tibia with two bristles on the outer front side; hind tibia not villous.

Wings hyaline; no costal spine; third costal segment rather longer than the fifth; first vein bare; third hairy nearly to the crossvein.

Female. Front .289 of head, with the usual orbitals and outer verticals; scutellum without apicals; genital segments blackish; the fifth tergite forming a broad crescent which is pollinose throughout and sometimes reddish. The fifth sternite is deeply notched in its middle, the two projecting lateral lobes black and polished. Middle femur without comb.

Length 7-10 mm.

Seven males and one female, a part of the material described by Riley as *Sarcophaga sarraceniæ*, bearing labels "Collection C. V. Riley," "342x," and

"July 15, '74." Locality given in Riley's paper is South Carolina. Reared from cups of *Sarracenia variolaris*.

Eight males, Summerville, S. C., reared by F. M. Jones from cups of *Sarracenia minor* and *flava*; emergence of adults was from July 27 to August 9, 1915. Eleven females reared in the same way probably include some of *Sarcophaga jonesi*.

Two males, Theodore, Ala., reared by F. M. Jones from cups of *Sarracenia drummondi*, June 23, 1916.

Holotype.—Male, U. S. N. M. No. 20554, from Summerville, S. C., reared August 9, 1915, from *Sarracenia minor*.

Allotype.—Female, U. S. N. M. No. 20554, from the Riley collection and bearing the labels noted above.

It was probably a mere chance that the holotype label of *sarraceniæ* was attached to the other species in the National Museum, as this was the more abundant one. The original Riley material also contained specimens of *S. jonesi*, or three species in all.

See notes on species reared from *Sarracenia*, with table, under *S. sarraceniæ*.

No. 114. *Sarcophaga jonesi* n. sp.

Male. Indistinguishable from the male of *rileyi* except by the genitalia, which show decided and constant characters. As in *rileyi*, the second segment of the hypopygium varies from black to reddish-brown.

Forceps in profile rather slender, hollowed behind on basal half, then after a slight hump curving smoothly to a sharp tip, with dense, short hair from hump to tip; from behind they are broad and shining at base and slightly concave nearly halfway, contiguous to about the middle, then widening in a narrow V, the outer edges of the arms curving inward to the sharp tips. Accessory plate brown, the distal part flat and straight; posterior clasper slender, black, curved, with slightly hooked tip; anterior

clasper black, low and wide, with a low groove on the hind side, the tip rather squarely truncate; penis dark brown, with indistinct basal segment; the distal one curves rather strongly forward and bears a distinct transverse flap at tip, the broad margin of which is thin and almost transparent, or whitish; a stout black copulatory tube bordered with whitish stands out conspicuously on the front side toward the end, and basad of this a rather wide transverse plate projects toward the base of the organ. The two contiguous lobes of the incised fifth sternite, instead of being sharp as in *rileyi*, are rounded and curved ventrad at tip in profile.

Female. Apparently not distinguishable from that of *rileyi*; see note under that species.

Seven males, Summerville, S. C., reared from *Sarracenia minor* and *flava* by F. M. Jones, July 15 to August 8, 1915.

Three males, from the Riley collection (U. S. N. M.), No. 342x, one dated July 6, 1874; these are a part of the material named *Sarcophaga sarraceniæ* by Riley.

One male, Tifton, Ga. (Hough collection).

Holotype.—Male, No. 20564, U. S. N. M., from Summerville, S. C., reared July 15 from cups of *Sarracenia minor*.

No. 115. *Sarcophaga celarata* n. sp.

Male. Like *rileyi* and *jonesi* except in the genitalia.

Forceps black, slender, not with hump behind except at extreme base next to anus, rather strongly bent forward to a sharp tip, and fringed with black hairs on the entire length behind except at extreme tip; from behind, the forceps diverge in a narrow V from the base, the outer edges distinctly drawing in to the sharp tips. Accessory plate brown, shining, the free part fingerlike and curving outward, set off by a lateral indentation from the attached part. Posterior clasper black, rather short and sharp, but little curved. Anterior clasper black, shining, low and

wide, deeply hollowed behind toward the irregularly truncate apex. Penis shining black, in side view very slender basally, not visibly divided into two segments; the apical part bears a wide transverse membrane, pale on the outer part, where it is also fringed with delicate pale hair; a very stout black copulatory tube projects from the front side of the penis near the tip; basad of this a heavy concave black plate with minutely serrated edges projects dorsad at a noticeable angle from the stalk of the penis. Fifth sternite as in *jonesi*.

Female. Not distinguishable from that of *rileyi* and *jonesi*.

Seven males, Theodore, Ala., reared by F. M. Jones from cups of *Sarracenia drummondii*, June 4 to 22, 1916.

Four females in same lot are probably the same, but the lot contained two males of *jonesi*; these females are not distinguishable from the lot reared by Mr. Jones at Summerville, S. C., mentioned under *rileyi*.

Holotype.—Male, No. 20555, U. S. N. M., reared June 9, 1916.

No. 116. *Sarcophaga servilis* n. sp.

Male. Front .164 of head (one specimen); middle stripe black, well-defined and rather wide; parafrontals and parafacials narrow, covered with gray pollen which has a slight brassy cast; frontals about 12, moderately diverging below and reaching to the middle of the second antennal joint; parafacials with the usual row of hairs; antennæ black, third joint $2\frac{1}{2}$ times the second and reaching four-fifths of the way to the vibrissæ, which are at the oral margin; arista plumose about half its length; proboscis and palpi black, ordinary; bucca one-fourth the eyeheight; facialia black below; back of head with three rows of black hairs above, dwindling to one next the lower edge of the eye; white hairs abundant and extending

well forward on the bucca; ocellars present, outer vertical absent.

Thorax with gray pollen and the usual three to five black stripes; ps dc 4, the anterior two smaller but of fair size; ant dc 2 larger; ant acr rather long but hairlike, not really differentiated; prsc smallish; stpl three on one side and four on the other in the single specimen; scutellum with the usual two marginals, one small preapical and one small apical, and in addition with a small pair before the second marginals.

Abdomen gray pollinose with median black stripe and a pair of shifting lateral ones; first and second segments with only lateral bristles; third segment with a strong erect pair of median marginals and three laterals; fourth segment with row of 12 or 14 marginals.

Hypopygium black; first segment pollinose, rather large and curved downward, with a row of small bristles behind; second segment moderately large, globose, sub-pollinose, with erect hairs; forceps black, slender, the tips broken off in the only specimen; accessory plates very large, brown, triangular, with the sides a little curved; they are not separated from the body of the second segment by a membrane in the usual way, but connect closely. Claspers blackish, slender, not much curved, the anterior ones with a row of hairs on the back; penis very slender and long, the basal segment yellow; distal segment brown, rather compact in shape, with no noticeable external parts except a recurved lobe or hook in front. Fifth sternite inconspicuous, deeply excised and V-shaped, not with brushes or stout bristles.

Legs black; middle femur not with comb; middle tibia with one bristle on the outer front side; hind tibia not at all villous.

Wing hyaline; no costal spine; third costal segment longer than fifth; first vein bare, third with coarse hairs nearly to crossvein.

Length $7\frac{1}{2}$ mm.

One male, La Fayette, Ind., Oct. 13, 1914, collected by the writer.

Holotype.—No. 20556, U. S. N. M.

GROUP H.

Four ps dc, of which the foremost ones are sometimes small; hind tibiæ of male not villous; at least the second segment of the hypopygium red.

- | | | |
|----|--|----|
| 1. | First vein hairy----- | 26 |
| | First vein bare ----- | 2 |
| 2. | Epaulet largely yellow; frontals not or but little divergent anteriorly; scutellum without a pair of small apical bristles in male (Ravinia in part)----- | 3 |
| | Epaulet black ----- | 7 |
| 3. | Palpi and legs yellow (Florida)
No. 117. <i>floridensis</i> n. sp. | |
| | Palpi and legs black----- | 4 |
| 4. | Front about as wide as one eye----- | 5 |
| | Front about half as wide as one eye, evidently narrowed below the ocelli----- | 6 |
| 5. | Yellowish pollinose, the frontal stripe of the same color as the parafrontals or nearly so (Kansas, New Mexico, South Dakota)
No. 118. <i>planifrons</i> n. sp. | |
| | Gray pollinose, frontal stripe blackish (Georgia, Louisiana, Alabama)
No. 119. <i>pectinata</i> n. sp. | |
| 6. | Parafrontals and parafacials gray pollinose; first segment of hypopygium black (very common north)
No. 120. <i>communis</i> Parker. | |
| | Parafrontals and parafacials yellow pollinose; first segment of hypopygium red (very common south)
No. 121. <i>communis</i> var. <i>ochracea</i> n. var. | |
| 7. | Vibrissæ high above oral margin (as far above as the length of the second antennal joint) and noticeably approximated to each other (Emblemasoma n. g.)----- | 8 |

- Vibrissæ not farther above the oral margin than half the length of the second antennal joint, generally not unusually approximated ----- 9
8. Palpi, femora and tibiæ red (Georgia)
 No. 17. *Emblemasoma faciale* n. sp.
 Palpi, femora and tibiæ black (Kansas, New Jersey, Brazil)
 No. 16. *Emblemasoma erro* n. sp.
9. Palpi yellow or red ----- 10
 Palpi black, at most (in *rileyi*) the tips yellow 12
10. Legs yellow, the front ones sometimes infuscated (Georgia, Alabama; Group F)
 No. 85. *deceptiva* n. sp.
 Legs black ----- 11
11. Pale hairs of beard not extending forward of the metacephalic suture (Indiana, Virginia) No. 122. *flavipalpis* n. sp.
 Pale hairs of beard conspicuous in front of suture (Florida, Georgia, Texas)
 No. 123. *bishoppi* n. sp.
12. With one or two pairs of strong erect anterior acrostichals, several times as large as adjacent hairs; ant dc also large and erect ----- 13
 Ant acr either undifferentiated or but little larger than adjacent hairs ----- 14
13. Hind tibia only half as long as its femur and bent almost at a right angle at base, closing against a prominent tubercle on the greatly thickened femur (New Mexico)
 No. 124. *incurva* n. sp.
 Hind tibia about two-thirds as long as its femur but of normal form, the femur moderately thickened and bearing a few spines at the middle below (New Mexico)
 No. 125. *insurgens* n. sp.
 Hind tibia and femur as usual; forceps with a barb-like projection behind (wide-spread)
 No. 126. *kellyi* Ald.

14. Scutellum with a pair of small apical
bristles between the large marginals----- 15
Scutellum without small apicals----- 20
15. Back of head with two rows of black hairs
behind eye ----- 16
Back of head with three rows----- 17
Back of head with three rows above, running
out to one near lower edge of eye (South-
ern Alabama to Brazil)
No. 127. *sternodontis* Tns.
16. Large, stout species without median mar-
ginals on third abdominal segment (wide-
spread south; Seattle)
No. 128. *robusta* n. sp.
Small tropical species; median marginals
present on third abdominal segment
(West Indies) No. 129. *bakeri* n. sp.
17. With a recurved, divided hook on the back
of penis near tip (Georgia, Louisiana)
No. 130. *hamata* n. sp.
Not with such hook----- 18
18. Frontal rows suddenly divergent at lower
end ----- 19
Frontal rows slightly divergent; pollen of
head, sides of thorax, and sides of abdomen
yellow (Guatemala)
No. 131. *xanthosoma* n. sp.
19. Outer vertical present; forceps with dense
erect short hair almost at tip (wide-
spread) No. 132. *utilis* Ald.
Outer vertical absent; forceps bare (Mis-
souri, Georgia, Florida)
rileyi, *jonesi* and *celarata*, in Group G
20. Front nearly as wide as one eye (New Jer-
sey) No. 133. *cistudinis* n. sp.
Front much narrower ----- 21
21. Fifth sternite with stout arms diverging V-
shaped (Indiana) No. 134. *galcata* n. sp.
Fifth sternite with the sides not diverging-- 22

22. Forceps in back view decidedly diverging
at tip ----- 23
Forceps in back view contiguous to tip---- 25
Forceps in back view separated but parallel,
wide, the tips broadly rounded (Central
and South America)
No. 135. *australis* n. sp.
23. Forceps quite large; hind tibiae with short
but quite distinct villosity (West Indies;
Group F) No. 103. *peltata* n. sp.
Forceps very small; hind tibiae not at all vil-
lous ----- 24
24. Anterior claspers very short and stout
(Guatemala) No. 136. *timida* n. sp.
Anterior claspers long, not very stout (wide-
spread) No. 137. *assidua* Walk.
25. Posterior claspers when viewed from behind
very broad at tip with a hook on outer side
(New York, Pennsylvania)
No. 138. *cingarus* n. sp.
Posterior claspers slender (Porto Rico)
No. 139. *culminata* n. sp.
26. Second segment of hypopygium very large,
flat behind, giving the abdomen a trun-
cated appearance; forceps minute (Cen-
tral America) No. 140. *fissa* n. sp.
27. Second segment of hypopygium ordinary-- 27
Accessory plate very long and slender, al-
most as long as the forceps (Jamaica)
No. 131. *fimbriata* n. sp.
Accessory plate not very long----- 28
28. Forceps not at all divergent, very long,
slender, curved, black from the base
(Texas) No. 142. *texana* n. sp.
Forceps divergent, shorter----- 29
29. Lateral vertical bristles generally present
(widespread) No. 144. *latisetosa* Park.
Lateral vertical bristles absent----- 30

30. Stalk of penis very long, on the front side just before tip with a flat yellow transverse plate projecting forward (wide-spread

No. 143. *quadrissetosa* Coq.

- Stalk of penis rather long, the tip constricted and then globular, not with such plate

No. 145. *globulus* n. sp.

No. 117. *Sarcophaga floridensis* n. sp.

Male. Front .190 of head (average of five,—.184, .188, .190, .192, .195). The species resembles *communis*, differing principally in having red coxae, femora and tibiae; the first segment of the hypopygium is also red, and the palpi are red on the apical half, but more or less darkened basally; middle femur with comb behind but not in front; structure of the penis about the same as in *ochracea*.

Female. Front .328 of head (average of two,—.324 and .333). The red color is more widely extended, reaching up from the legs to the lower parts of the pleurae and even the humeri, but is evidently quite variable in extent.

Six males and two females: Two of each sex from Miami, Fla. (C. H. T. Townsend and Mrs. Townsend, collectors), in the National Museum; one from St. Augustine, Fla., and two from Tifton, Ga., in the Hough collection; one from Key West, Fla., collected by A. H. Sturtevant.

Holotype and allotype.—Male and female, No. 20557, U. S. N. M.

No. 118. *Sarcophaga planifrons* n. sp.

Male. Front very wide, .344 of head (average of five,—.316, .331, .345, .364, .364); parafrontals and parafacials silvery pollinose with a distinct yellowish tinge, the latter with a few rather scattered hairs; frontal stripe very wide, in most of the specimens pollinose like parafrontals, but in some the pollen is thin anteriorly so that the dark color shows through;

the front is noticeably flat and quite prominent, ocellars large; frontal bristles 8, not divergent below, reaching to the middle of the second antennal joint; outer verticals absent; antennæ reddish brown, third joint somewhat darker and $2\frac{1}{2}$ times as long as the second, reaching five-sixths of the way to the vibrissæ, which are just above the oral margin; palpi and proboscis black, ordinary; bucca nearly half the eye-height, with rather small black hairs; back of head with three rows of black hairs and rather abundant whitish ones in the middle and below, which do not extend in front of the metacephalic suture.

Thorax yellowish cinereous, the stripes faintly marked; ps dc four; ant acr well developed; prsc one; stpl three; scutellum with two large marginals, one smaller preapical and no apicals; the second pair of marginals are a little closer together than in many species.

Abdomen densely cinereous pollinose with yellowish tinge, tessellated, with indistinct median black stripe; the first and second segments have only laterals; the fourth has a marginal row of about 12; fifth sternite black, with short black brushes very distinct, the remainder of the sternite not visible.

Hypopygium rather large; first segment black, pollinose, reddish on the lower angles, with a row of stout black bristles behind; second segment red (rarely almost black) subshining, with a few scattered small bristles; forceps red, the tips black, widely divergent, rather straight and evenly tapering, not very long; posterior claspers strongly hooked, brown, slender, with two or three teeth just before the hook; anterior claspers long, reddish brown, slender, not hooked; accessory plate minute, reddish; penis one-jointed, reddish brown in color, slender and simple almost to the tip; in profile the back edge extends forward at the apex into a blunt lobe, in front of which there is a second lobe not quite so much produced; in front of this and somewhat toward the base is attached an irregular transverse plate, the sides of

which bend up toward the apex; one angle of this plate is strongly chitinized, black and shining and lies against the second lobe just mentioned, at the top of the penis; looking at the penis from the end there is a hollow without any perceptible internal organs; viewed from behind it widens rather noticeably just before the tip and is not notched.

Legs black; middle femur with comb; middle tibia with two bristles on outer front side; hind tibia not villous.

Wing hyaline; veins mostly yellow; no costal spine; third costal segment distinctly shorter than fifth; third vein with a few hairs.

Female. Front very wide, .393 of head (average of five,—.380, .389, .392, .393, .409) with the usual orbitals and outer verticals well developed. Frontal stripe almost covered, as in the male, with pollen concolorous with the rest of the front.

Abdomen broad, marginal bristles of third segment rather feebly developed; genital segment gray pollinose with a horseshoe-shaped opening behind, within which the sclerites are red and shining. Middle femur without comb.

Length 6-7 mm.

Nine males and seven females: five males and four females are from Morton County, Kans., 3200 feet altitude, F. H. Snow, collector, in Kansas collection (one dated June, 1902); one male Socorro, N. M. (Williston); one male Alamogordo, N. M., May 5, 1902; one male and two females, Koehler, N. M., W. R. Walton; one male, Aberdeen, S. D. (Bishopp No. 5178), July 29, 1915.

Holotype.—Male, No. 20558, U. S. N. M., from Alamogordo, N. M.

Allotype.—Female, No. 20558, U. S. N. M., Morton County, Kansas.

No. 119. *Sarcophaga pectinata* n. sp.

Male. Front wide, .341 of head (average of five,—.333, .335, .338, .350, .351); parafrontals and para-

facials grayish white, the latter with the usual row of small hairs; ocellars distinct; outer verticals present; frontal stripe blackish, wide, slightly pollinose above; frontal bristles 6 to 8, slightly diverging below, reaching to about the middle of the second antennal joint; antennæ blackish, the third joint fully twice the second, reaching three-fourths of the way to the vibrissæ, which are at the oral margin; arista plumose on basal half; palpi and proboscis black, ordinary; bucca about half the eyeheight, with black hairs; back of head with three rows of black hairs, the whitish hairs at the middle and below do not extend in front of the metacephalic suture.

Thorax gray pollinose, with three black stripes when viewed from in front; ps dc four; ant acr very large; prsc one; stpl three; scutellum with two marginals, one large preapical and no apicals.

Abdomen gray pollinose with three black stripes, the outer ones changeable; fifth sternite forming two short ridges which bear short black brushes, the rest not visible.

Hypopygium: first segment red, pollinose, with an interrupted row of stout bristles behind; second segment globose, red, somewhat pollinose, with several scattered bristles, of which about a half dozen are large; forceps short and straight, widely divergent, red with black tips; accessory plate yellow, small, depressed; posterior clasper black, erect, strongly hooked, with several teeth on the front edge; anterior clasper blackish, long, slender, straight near the apex, lying close against the penis; penis with a single segment, brown, polished, the middle large, somewhat globose, with two terminal lobes not very distinctly separated from each other; in front of the globose portion arise two flattened diagonal plates which are attached by their middle; one end extends almost to the apices of the lobes of the penis; the other extends about an equal distance in front of the organ.

Legs black; middle femur with a short but very stout comb behind; middle tibia with two bristles on the outer front side; hind tibia not villous.

Wings subhyaline; no costal spines; third costal segment distinctly shorter than the fifth; first vein bare; third hairy nearly to the crossvein.

Female. Front, .395 of head. Abdomen broad; genital segment red with the same structure as in *communis*; middle legs broken off from specimens.

Length 6-7 mm.

Six males, one female. One male from Opelousas, La., in the Hough collection; three from Tifton, Ga., in Hough collection; one Alabama (C. F. Baker; one La Fayette, Ind. (Aldrich); the single female is from Arizona in the Hough collection.

Holotype.—Male, No. 20559, U. S. N. M., from La Fayette, Ind.

Allotype.—Female, No. 20559, U. S. N. M.

No. 120. *Sarcophaga communis* Park.

Parker, Proc. Boston Soc. Nat. Hist. vol. 35, p. 55, pls. 1 to 5, male.

Mr. Parker has discussed this species exhaustively, using it as a type for illustrating the anatomy of the group.

Male. Front .212 of head (average of five,—.206, .207, .208, .217, .221); parafrontals and parafacials gray pollinose, with reflections that are rather brownish than yellow; parafacials with the usual bristles below near the eye; ocellars present; outer verticals absent; frontal stripe broad, blackish; frontal bristles about ten, the rows gradually diverging a little anteriorly, but not to a striking extent, reaching almost to the middle of the second antennal joint; antennæ blackish, the third joint twice the second, reaching four-fifths of the way to the vibrissæ, which are at the oral margin; palpi and proboscis black, ordinary; bucca almost half the eyeheight, with black hairs to and even behind the suture; back of head with three rows of black hairs.

Thorax gray pollinose, with the usual three to five stripes not very distinct; ps dc four, rather large; ant aer very large; prsc one large; stpl three; scutellum with two or three marginals; one pair preapicals; no apicals.

Abdomen gray pollinose, tessellated, with a median dark stripe; first and second segments with only lateral bristles; third with a pair of median marginals and sometimes a feeble row; fourth with a marginal row of about ten; fifth sternite not very widely divergent, its edges elevated and covered with a dense short brush, very conspicuous; it is but little developed laterally from these brushes.

Hypopygium rather large; first segment pollinose, mostly black in ground color, but sometimes considerably reddish on the sides, with an interrupted row of bristles behind; second segment globose, subshining, with a few erect scattered small bristles; forceps red, the tips black, widely divergent near the base and slightly converging at the tips; in profile sharp and rather strongly curved forward apically; accessory plate small, yellow, depressed; posterior claspers blackish, erect, very strongly hooked at tip, before which on the front side is an excision and two or three minute teeth; anterior claspers reddish brown, rather wide at base but rapidly becoming narrow, the tips slender, bent forward but not decidedly hooked; penis blackish, one-jointed, slender and simple nearly to the tip, where it is suddenly enlarged, polished and shining, ending in two rounded knobs separated by a deep groove. In the middle on the front side there is attached to a widened part a transverse erect plate, deeply notched at the apex, brown with pale margin; on each side of this, somewhat diagonally placed, is a partially collapsed process or plate which behind runs out in a point almost to the terminal knobs and in front ends in a wrinkled and rounded lobe.

Legs black; middle femur with combs in front and behind; middle tibia with two bristles on the outer front side; hind tibia not villous.

Wings slightly brownish, no costal spine; third costal segment slightly longer than the fifth; first vein bare; third with a few hairs.

Female. Front .368 of head (average of five,—.343, .361, .361, .376, .400); rows of frontal bristles not divergent, even approximated below, with the usual orbitals and outer verticals developed.

Abdomen broad; genital segment pollinose, reddish in ground color with an oval opening enclosing a red terminal segment; middle femur not with comb.

Length 6.5—12 mm.

Several hundred specimens of both sexes from East Eddington, Me., to Kanaka Bay, San Juan Island, Wash.; Marshall Pass, Colo., altitude 10,856 feet; Mono Lake, Cal., 6,300 feet; Pine Lake, Cal. (C. F. Baker); one male, District of Columbia, issued August 12, 1889, bred from cow dung (collection C. V. Riley No. 4285-6). This is a very abundant scavenger species in the north. Parker states that it is often found feeding or larvipositing on human excrement. The typical form seems to become rare southward at about the latitude of Washington and the Ohio river. Farther south it is replaced by the variety *ochracea*.

Several typical specimens in Mr. C. W. Johnson's collection are from the Bermuda Islands.

Holotype.—In the collection of the Massachusetts Agricultural College; a paratype is in the National Museum (No. 18424).

No. 121. *Sarcophaga communis* var. *ochracea* n. var.

Male. Front .209 of head (average of five,—.192, .198, .215, .216, .222); parafrontals and parafacials and front half of bucca with a strongly ochraceous tinge, which also extends along the hind orbit of the eye. Thorax with yellowish gray pollen and rather distinct stripes. Abdomen with yellowish pol-

len. First segment of hypopygium red; penis similar to that of *communis* but more gradually widened toward the apex; also the lateral lobes in front are generally more chitinized and the tip of the posterior claspers are not so strongly hooked. Otherwise as in *communis* except that it usually has a more robust form.

Female. Less distinct from *communis*, but showing the yellow color to a considerable extent.

Seventy-five specimens of both sexes. District of Columbia, bred from cow dung, issued August 13, 1889 (collection of C. V. Riley No. 4285-7); Eufala, Ala., Hough collection; Opelousas and Palmetto, La., Hough collection; Hamburg, Miss. (Bishopp) and a large number from various parts of Texas (Bishopp); Puerto Barrios and San Jose in Guatemala (Prof. Hine).

I identified this variety for correspondents in a few cases as *Sarcophaga trivialis* Van der Wulp, but on further study have become convinced that the latter species cannot be identified without an examination of the type specimen in London.

Holotype.—Male, No. 20560, U. S. N. M., from Hamburg, Miss.

Allotype.—Female, No. 20560, U. S. N. M., from Dallas, Tex.

No. 122. *Sarcophaga flavipalpis* n. sp.

Male. Front .204 of head (average of two.—.201 and .207); parafrontals and parafacials yellowish pollinose, the latter with irregular row of hairs, the lower quite bristly; frontal stripes black; frontal bristles about ten, the rows abruptly diverging below, reaching to the middle of the second antennal joint, the lowest arise from changeable spots in the pollen; ocellars well developed, outer verticals absent; antennæ reddish brown; third joint blackish, $2\frac{1}{2}$ times the second, reaching four-fifths of the way to the vibrissæ, which are at the oral margin and quite far apart; arista long and slender, plumose a little over

halfway; palpi yellow, rather long and stout; proboscis black; bucca one-third the eyeheight, with black hair in front of the suture, whitish behind; back of head with three rows of black hairs.

Thorax with rather glaucous pollen, with three to five black stripes; ps dc four; ant aer distinctly developed; prsc one; stpl three; scutellum with two or three marginals, one rather large preapical and one rather large apical.

Abdomen gray pollinose, tessellated; first and second segments with only lateral bristles, the third with median marginal pair and one lateral; fourth slightly red on hind margin with a row of about a dozen decreasing on the sides; fifth sternite large and distinct; near the base with two prominent brown lobes, which have a brush of black bristles on the inner hind side; beyond these lobes the organ is cut out in a semicircle in profile and the brush continues along the inner edge of this semicircle, but is not visible in profile; there is a rounded lobe beyond the excision.

Hypopygium red, rather large; first segment pollinose above, tessellated, with a row of strong bristles behind; second segment globose, subshining, with abundant erect hair; forceps reddish brown, slender, tapering, tips black; viewed from behind they stand somewhat apart from each other basally and this space is suddenly widened about the middle; on the outer side near the base there is a deep oblique notch. In profile the free part bends strongly backward for about half its length, then becomes slender and curves gradually forward to a sharp point. Accessory plate very slender, almost finger-like, yellow; posterior clasper small, yellow except the tip, which is curved forward and divided into two points; anterior clasper minute, with black, one-sided tip; penis moderately small, brown, basal joint distinct but short, the distal segment with a keel-like hind margin which extends in a curve over the tip into a pronounced free hook turned forward; the basal part of the segment is triangular in cross section, being flat in front; from

the middle part two broad diagonal irregular thin plates extend forward, which in profile hide a pair of stout, shining black hooks, which also extend forward between the plates.

Legs black; middle femur with comb behind; middle tibia with two bristles on the outer front side; hind tibia with a few rather erect hairs on inner mesial side, but not strictly villous.

Wings hyaline; no costal spine; third costal segment slightly longer than the fifth; first vein bare; third with several hairs.

Female. The only specimen has lost its abdomen. Front .291 of head. Orbitals and outer verticals present; the dark yellow palpi are rather strikingly long and broad, projecting nearly half their length in front of the epistoma; middle femur without comb.

Length 9 mm.

Two males and one female. One male from La Fayette, Ind., July 11, 1914 (Aldrich); one male, one female, Enola, Va., reared May 1, 1915, by Sara Reynolds from a myriapod (*Sparobolus* sp.).

Holotype.—Male, No. 20561, U. S. N. M., from Enola, Va.

Allotype.—Female, No. 20561, U. S. N. M., from Enola, Va.

No. 123. *Sarcophaga bishoppi* n. sp.

Male. Front .323 of head (average of three,—.302, .314, .353); parafrontals and parafacials silvery pollinose; frontal stripe brown, rather indistinct above; parafacials with the usual row of hairs; frontals about 12, the rows far apart, rapidly diverging below, reaching almost to the middle of the second antennal joint; ocellars distinct and outer verticals large and strong, almost equalling the inner; antennæ reddish, third joint twice the second, reaching four-fifths of the way to the vibrissæ, which are at the oral margin; palpi yellow, large and rather thickened, proboscis black, ordinary; bucca nearly one-

half the eyeheight, covered with gray pollen, its hairs largely whitish; back of head with two rows of black hairs, the whole central part and below with whitish hair.

Thorax yellowish gray pollinose, with three to five brown or black stripes; the submedian gray stripes divided for three-fourths of their length; only two of the ps dc are distinct, the hindmost ones, the remainder very small; ant acr none; prsc one; stpl three; scutellum with the usual two marginals, one preapical and a small pair of apicals; the second scutellar marginal is very strong.

Abdomen gray pollinose, tessellated, with blackish median stripe and a shifting lateral one each side; fourth segment broadly red at tip; first and second segments with only lateral bristles; third with a median marginal pair and two laterals; the fourth with a row of about 16, diminishing at the sides. Fifth sternite brown at base, with conspicuous smooth yellow plate-like bare arms, which however have a prominent lobe on the inner side near the base, bearing a tuft of small hairs.

Hypopygium yellow, first segment rather pollinose, with only small hairs along the hind margin; second segment shining, globose; forceps red, brownish at tip, with long hair on the attached part; the free part is comparatively short, with a flat, concave plate on the outer side forming the tip. This plate is polished in the center and fringed with reddish hairs around the margin, which is elevated and strongly set off from the remainder of the forceps. Accessory plate large, its hind edge next the forceps thin and drawn out into a yellow flat hook at the apex; posterior clasper blackish, rather straight and slender; anterior clasper red at base, black at tip, rather low and straight, rapidly tapering. Near the base on the inner front side is a long thumb-like process, very characteristic. Penis yellow, with large basal segment, the apical one very complex, considerably like that in *utilis*. There is a large anterior

division which may be more or less closely applied to the central mass. In both specimens the penis is covered with a gelatinous substance, making the details difficult to see.

Legs black; middle femur with stout but not comblike bristles below; middle tibia with two bristles on outer front side; hind tibia not villous.

Female. Front .353 of head, with the usual orbitals and outer verticals the same as in the male. Palpi yellow, somewhat thickened at tip; bucca with black hairs almost to the suture. Hairs on parafrontals and parafacials noticeably coarse. Scutellum without apicals. Genital segment red, shining except below; orifice vertical with stout bristles above; outer front side of middle tibia with a row of stout bristles.

Length 14 mm.

Three males, one female. One male from Crystal City, Texas, July 31, 1914 (Bishopp No. 3547); one Texas (Melander); one Tifton, Ga. (Hough collection). The female is from Ormond, Fla. (U. S. N. M.). Professor Melander's male has the front as wide as that of the female. The Georgia male and the female were both erroneously included by me in the type material of *utilis* (Jour. Econ. Ent., vol. 8, p. 152), the locality of the latter appearing as Orlando, Fla.

Holotype.—Male, No. 20562, U. S. N. M., from Crystal City, Tex.

Allotype.—Female, No. 20562, U. S. N. M., from Ormond, Fla.

No. 124. *Sarcophaga incurva* n. sp.

Male. Front .260 of head; parafrontals and parafacials silvery, the former with a slight yellow tinge, the latter with a few scattered hairs near the eye; ocellars and outer verticals present; frontal stripe black, not very well defined, as the pollen of the sides more or less covers it; frontal bristles eight, the lower ones strongly divergent, reaching about to the middle of the second antennal joint; antennæ

blackish, the third joint twice the second, extending three-fourths of the way to the vibrissæ, which are at the oral margin; arista with rather short plumosity for half its length; palpi and proboscis black, ordinary; bucca slightly over half the eyeheight, with black hairs which extend behind the metacephalic suture; only a few pale hairs around the neck, back of head otherwise covered with black hair.

Thorax with gray pollen and the usual three to five black stripes, the middle one of which is quite narrow; the submedian gray stripes are divided for two-thirds of their length; ps dc four; ant acr two very large pairs; prsc one; stpl three; scutellum with two marginals, one rather large preapical; upon the apex are several long hairs, but they do not appear to be arranged like the usual small apical bristles.

Abdomen apparently tessellated but not in very good condition to describe. First and second segments with only laterals; third segment with a pair of depressed marginals; fourth with the usual marginal row of about a dozen; fifth sternite widely excised, not distinctly visible in the specimen; first segment of hypopygium red, its base blackish, of peculiar shape, being turned under at the apex so as to have a pronounced hump beyond the middle; it has numerous long erect hairs, rather stout; second segment red, subshining, with rather coarse erect hairs; forceps minute, shining red, not divergent, straight, not tapering, inclined backward at an appreciable angle, the apex obliquely truncate so as to be shorter on the front side, where there is a minute point; accessory plate comparatively large, so that it has to be removed in order to get a side view of the remaining organs; it is excised at the apex, having two rather sharp points. The shape is indicated by dotted lines in the sketch. Posterior clasper yellow, rather wide at base, broadly excised on front side toward apex, which is long and curved and very slender, a stout hair arises from the basal part of the excision; anterior claspers yellow, slender, the tip with an accessory point below;

penis yellow, basal segment indistinct but slender, distal segment suddenly widening behind into a globose mass, which is rather open apically, where there are some small black organs; in profile the apex is nearly truncate and at the front edge a slender flat process bends toward the base.

Legs black; middle tibia slightly reddish, with two bristles on outer front side; middle femur without comb; hind femur greatly thickened from the base with a pronounced projection below a little beyond the middle, from the outer side of which, extending half way to the apex, there is a dense brush of short, black spines; the tibia is even more remarkable in shape, as it is bent close to the base almost at a right angle; is very stout and only about half the length of the femur, evidently closing against the femoral brush to form a grasping organ. On its outer side there are 8 or 10 long bristles; hind tarsi of ordinary structure.

Wing subhyaline; no costal spine; third costal segment about equal to the fifth; first vein bare; third hairy nearly to the crossvein.

Length 10 mm.

One male, Jemez Mountains, N. M., July 25, 1914, presented by Mr. H. S. Harbeck to the National Museum.

Holotype.—Male, No. 20562, U. S. N. M.

No. 125. *Sarcophaga insurgens* n. sp.

Male. Front .280 of head. Like *incurva* in every detail except the following: The hind tibia instead of being bent at right angles, very short and stout, is in this species only a little curved, about two-thirds as long as the femur; the hind femur is only a little thickened, not more than in some other species; it has on the under side just beyond the middle about a half dozen closely placed stubby spines, upon a slight, almost imperceptible elevation. The genitalia are strikingly similar to those of *incurva*, almost identical, in fact, but are not very well spread and the

shape of the penis in particular cannot be satisfactorily made out. On this account I have not attempted to figure these characters; forceps and accessory plate are exactly the same as in *incurva*. The first segment of the hypopygium is rather blacker at the base than in the other species.

Length 8 mm.

One male, Jemez Mountains, N. M., July 25, 1914, presented by Mr. H. S. Harbeck to the National Museum.

Holotype.—Male, No. 20563, U. S. N. M.

No. 126. *Sarcophaga kellyi* Ald.

Aldrich, Journal of Agric. Research, ii, 443, pl. xl.—Kansas to Arizona and Manitoba; bred from grasshoppers.

Kelly, *ibidem*, 435, habits.

Male. Front .218 of head (average of five,—.204, .207, .210, .225, .243); parafrontals and parafacials with smooth silvery pollen, slightly yellow above; frontal stripe blackish, narrow, not sharply defined; frontal bristles only about 8, widely diverging below, reaching nearly to the middle of the second antennal joint; ocellar bristles large; outer verticals not developed; parafacials with the usual row of bristles below, of moderate size; antennæ black, the third joint twice as long as the second, reaching three-fourths of the way to the vibrissæ, which are at the oral margin; arista plumose to the middle; palpi and proboscis black; bucca one-fourth the eyeheight, with rather fine black hairs as far back as the suture; back of head with three distinct rows of black hairs, in the middle and below with whitish ones.

Thorax with grayish pollen and the usual three to five black stripes; submedian gray stripes divided for three-fourths of their length; ps dc four, all rather large; ant acr well developed; prsc one pair; stpl, three; scutellum with two marginals, one smallish preapical and one still smaller apical.

Abdomen whitish gray pollinose, tessellated, with three quite distinct longitudinal black stripes; first

three segments with only lateral bristles; fourth with a marginal row of about 10; fifth sternite reddish brown, deeply incised in the middle; each of the sides again incised so that there is a long lobe on each side of the middle projecting backward, clothed with short black hairs. The whole structure is soft and readily shrivels.

Hypopygium: First segment black, pollinose and tessellated, with a row of stout bristles behind; second segment yellow, globose, subshining, not bristly; forceps long, slender, brown at base, the rest shining black; in profile convex on front side almost to tip; on hind side deeply concave for half their length, where there is a prominent angle; from this to apex nearly straight, the tip turned forward in a slender point. The outer side of the forceps, except the basal third, bears numerous short stubby erect hooklets. Accessory plate yellow, very small, the free part slightly pointed. Both pairs of claspers blackish, small and nearly straight, standing up opposite the base of the penis. Penis with very short yellow basal segment; distal segment long and narrow, shining black or brown, divided apically into two flat plates, but little diverging and curved forward; on the front side are a pair of long and wide plates of rather soft consistency and brownish color lying lengthwise of the organ.

Legs black; middle femur with a short comb; middle tibia with two bristles on outer front side; hind tibia not at all villous.

Wings hyaline; no costal spines; third costal segment slightly longer than fifth; first vein bare; third hairy nearly to crossvein.

Female. Front .347 of head (average of five,—.332, .333, .345, .356, .367), with the usual orbitals and outer verticals distinct, of nearly uniform width almost to the antennæ. Palpi distinctly clavate. Scutellum without apicals; third abdominal segment without median marginals. Genital segment red, orifice transverse; the red genital tergite has on the upper

side two distinct concavities, side by side, which appear to be very characteristic of this species. Middle femur without comb.

Length 6.5-7.5 mm.

At the place of original description I have listed several hundred specimens of this species examined at that time. They were largely reared from grasshoppers in various parts of the west. Since the publication of that article I have seen four females in the University of Kansas, reared by H. B. Hungerford at Kinsley, Kans., from adults of *Plectrodera scalator*, the large Cerambycid borer in cottonwood. Mr. Hungerford states that 90 per cent. of the beetles were parasitized. I have also received for identification two males and a female reared by Prof. H. F. Wickham from *Asida* sp. at La Junta, Col. (Webster No. 15505).

No specimens have been seen from localities east of Central Kansas.

Holotype.—Male, No. 18250, U. S. N. M., from Wellington, Kans.

No. 127. *Sarcophaga sternodontis* Towns.

Townsend, Journal Institute Jamaica i, 105 (*Sarcodexia*)

Jamaica, bred from *Sternodontes danicornis*, a Cerambycid beetle; and in the same journal Dec., 1892, bred from *Centrurus edwardsii*, a scorpion.

Brauer u. Bergenstamm, Zweifl. Kais. Mus. vi, 193, "According to the description a *Sarcophaga*."

Male. Front .235 of head (average of five,—.213, .223, .237, .246, .257); parafrontals and parafacials silvery to golden pollinose, the latter with a few small hairs in a row near the eye; frontal stripe black, rather sharply defined; frontal bristles about 10, the two uppermost pairs quite strong and reclinate, the lower widely but not suddenly diverging, reaching a little below the middle of the second antennal joint; ocellars present; outer verticals absent; antennæ black, third joint twice as long as second, reaching four-fifths of the way to the vibrissæ, which are at the oral margin; arista plumose for about two-

thirds its length; palpi and proboscis black, the former slender; bucca one-fifth the eyeheight, clothed mostly with pale hairs; back of head with three rows of black hairs above, narrowing to one opposite the lower part of the eye; the middle part and below clothed with whitish hair.

Thorax grayish white pollinose, with three to five very black stripes, the middle one narrowed in front; the submedian gray stripes undivided; ps dc four, successively smaller; ant acr about 3 pairs, one quite large pair just before the suture; prsc one; stpl three; scutellum with two marginals, both long, preapicals scarcely perceptible, one pair smallish apicals.

Abdomen subshining in some lights, strongly tessellated in others, with a median black shining stripe and two lateral shifting ones; first and second segments with only lateral bristles; third with one pair median marginals and three or four laterals, forming an interrupted row; the fourth with a marginal row of about a dozen. Fifth sternite very much retracted, practically invisible.

Hypopygium with first segment rather small, subshining, black, without bristles; second segment globose, shining red, without bristles; forceps yellow throughout their entire length, very wide in profile, the apical part turned forward, ending in a broadly truncate form; in profile the front edge has almost a right angle where it turns near the end, while the posterior edge is rather broadly and uniformly curved; from behind the broad tips are divergent. Accessory plate yellow, comparatively narrow, rather long; posterior clasper long and nearly straight, slender, the tip blackish; anterior clasper shorter, sharp and somewhat hooked at the tip, entirely yellow. Penis with a very short yellow basal segment; distal segment globose at its beginning, wholly yellow, diverging apically into two long lateral processes which bear a connecting margin or plate between them.

Legs black; middle femur without comb; middle

tibia with two stout bristles on the front side; hind tibia not villous.

Wings hyaline, no costal spines; third costal segment longer than the fifth; first vein bare; third hairy nearly to crossvein.

Female. Front .280 of head (average of five,—.260, .274, .278, .293, .294), with the usual orbitals and outer verticals developed. Frontal stripe narrower than parafrontals; scutellum without apicals, but second pair of marginals are somewhat approximated as if to take their place. Genital segment golden pollinose, apparently red in ground color with a rounded orifice.

Fifty-eight specimens of both sexes. Four from Miami, Fla., collected by Mrs. C. H. T. Townsend and Frederick Knab; one Mayaguez, Porto Rico, R. H. Van Zwalenburg; one Gainesville, Fla., reared by R. N. Wilson from maggots that issued from a specimen of grasshopper, *Schistocerca americana*, after it had been killed, pinned and placed in the box (Webster No. 13945); three from Monticello, Fla., reared by John D. Gill from *Citheronia regalis* (Quaintance No. 9148); twenty-seven from Fellsmere, Ritta and Greensboro, Fla., reared from the large lubber grasshopper, *Dictyophorus reticulatus*, by R. N. Wilson (Gainesville Nos. 16466, 16515, 16588, 16623).

All of the preceding material from the Bureau of Entomology and the National Museum. I also have two specimens from Havana and Cayamas, Cuba, collected by C. F. Baker; three specimens from Jamaica in the Hough collection and two from the same in C. W. Johnson's; and 19 specimens from Brazil (Chapada, Corumba and Obrilongo) collected by H. H. Smith and given me by Prof. Williston; in most of the Brazilian material the pollen of the head is more or less yellow to golden, in the rest quite silvery.

I examined the type specimen in the University of Kansas and was permitted to spread its genitalia.

Type.—In the University of Kansas collection.

No. 128. *Sarcophaga robusta* n. sp.

Male. Front .231 of head (average of five,—.223, .226, .234, .235, .236); parafrontals and parafacials together with face and bucca covered with smooth, white pollen having a slight yellowish cast; frontal stripe reddish, not sharply defined; frontal bristles about 11, several very weak below the uppermost one, the rows diverging moderately below and reaching to the middle of the second antennal joint; parafacials with a few hairs, none very large; antennæ reddish brown, the third joint three times the second and reaching three-fourths of the way to the vibrissæ, which are at the oral margin; arista plumose for half its length; ocellars large; outer verticals absent; palpi and proboscis black, ordinary, bucca one-third the eyeheight, clothed with fine black hairs which gradually blend with the pale ones before the metacephalic suture. Back of the head with two rows of black hairs, its middle part covered with whitish ones, which are conspicuous below.

Thorax yellow, gray pollinose, with the usual three to five black stripes, the sub-median gray stripes divided to the suture. Ps dc 4 or 5, only the hind ones very large; ant acr barely distinguishable from the hairs surrounding them; prsc one; stpl two to four; scutellum with the usual two large marginals, one small preapical and one larger apical.

Abdomen light gray pollinose, tessellated, with three somewhat shifting dark stripes; fourth segment considerably red behind. In profile the abdomen is uncommonly deep toward the apex. First three segments with only lateral bristles; fourth with a marginal row of about 10; fifth sternite yellow, near the base on each side with a black, bare, elevated surface, behind which is a yellow expansion clothed with a black brush.

Hypopygium yellow; first segment large, pollinose, sometimes a little infuscated; at its hind margin with a row of stout bristles; second segment globose, subshining, with a few scattered erect stout hairs,

some bristly. Forceps of unique structure, their attached part being drawn out into a pair of yellow pointed organs very much like the forceps of the other species; in front of this, however, the organ is in profile deeply excised, then suddenly curves backward into a pair of strong black-tipped hooks lying close against the penis. In the back view the yellow points are not divergent, the black ones are cut out so as to leave a square opening, into which the distal part of the penis fits when tilted back. Accessory plate drawn forward out of its usual position so that it lies against the side of the penis; it is yellow and rather slender. The claspers are very small, black-tipped plates lying against the basal segment of the penis. Penis with a short yellow basal segment; the distal segment rather spoon-shaped, narrow at base, widening in a broad, curved plate at each side which joins a keel along the back. The keel is yellow, bordered with black and the black color also extends along the apex of each of the lateral plates. On the front of the distal segment near the tip is a round, blunt black tube.

Legs black; middle femur with comb behind; middle tibia with rather long dense hair on the inner side toward the tip, but not strictly villous; on its outer front side bearing a single bristle; the hind femur stout with short stubby bristles below in irregular rows; the hind tibiae are noticeably shorter than their femora and are not usually villous although sometimes near the tip on the inner side there are some rather long hairs, on account of which I have included the species in my table in Group F also.

Wings hyaline; no costal spines; third costal segment as long as the fifth and sixth together; first vein bare; third hairy halfway to the crossvein.

Female. Front .339 of head (average of five,—.332, .333, .335, .344, .349). The usual orbitals and outer verticals well developed; scutellum without apicals; third abdominal segment without median marginals; fourth yellow at tip. Genital segment yellow

with rounded aperture; sixth sternite shining yellow, sinuously excised at tip; middle femur without comb and slender; middle tibia with two bristles on the outer front side; hind femur not thickened, with only a few bristles near the base below; hind tibia not villos, slightly shorter than the femur.

Length 9-14 mm.

A large series of specimens from Texas collected and reared from carrion by F. C. Bishopp and associates. In the Hough collection there are several specimens from Texas collected by Schaupp. Specimens from other regions are as follows:

One from San Jose del Cabo, Cal. (Hough collection); one from Coronado Ids., Lower California (Professor Cockerell); three Pasadena and three San Gabriel Mts., Cal. (Grinnell); one Williams, Ariz. (National Museum); one Yuma, Ariz. (Professor Hine); three Nassau, Bahamas, December 12 and 13, 1912, collected by Frederick Knab (National Museum); three Cuba, near Pinar del Rio, September, 1913 (Amer. Mus. Nat. Hist); one Mayaguez, Porto Rico, collected by C. W. Hooker (Nat'l Mus.); one Seattle, Wash. (Hough collection); one specimen (National Museum) bearing the Bureau of Entomology label "No. 5477 issued June 1, 1892."

Holotype.—Male, No. 20566, U. S. N. M., from Victoria, Texas, bred from decaying meat.

Allotype.—Female, No. 20566, U. S. N. M., from same place.

Mr. Bishopp says in regard to the habits (in a letter), "A number of lots were bred from carcasses of animals and exposed beef."

No. 129. *Sarcophaga bakeri* n. sp.

Male. Similar to *assidua* but with the following differences:

Front .216 of head (average of five,—.209, .210, .215, .217, .227); parafrontals and parafacials gray pollinose, without a tinge of yellow; scutellum with a pair of rather small apical bristles.

Abdomen gray pollinose, tessellated; fourth segment largely black, only the apical third to half red; forceps dark yellow, tips blackish; viewed from behind they are somewhat widely separated and taper to a sharp point; viewed from the side they are rather straight, the terminal part quite thin, with a sharp tip bending slightly forward; accessory plate yellow, large, subtriangular, but the basal angles considerably rounded; posterior clasper yellow, slender, erect, hooked forward at tip; anterior clasper very stout at base, yellow with brownish tip which is rather wide and thin, sharp, but not much hooked; penis yellow, the apical part brown; its structure is quite simple except for the striking and characteristic modification of the transverse front plate. In this case the plate, arising near the middle of the front side, bends apically and divides, the two tips curving toward the base and widely diverging, and bordered all the way along the front by a very distinct fringe of short spines; thus in the side view the plate is something the shape of S but when viewed from in front it is more like a W. The fifth sternite is dark yellow, deeply cleft, not divergent, but the arms do not stand out prominently as in most of the species of this group.

Legs black.

Female. Front .303 of head (average of five,—.296, .300, .304, .307, .310); parafrontals and parafacials gray, the former with a slight tinge of yellow. Scutellum without apical bristles; middle femur without comb; genital segment red.

Length 5-7 mm.

Fifteen males and seven females. Twelve males and all the females are from Havana, Cuba, collected by Professor C. F. Baker (Aldrich); one male from Nassau, Bahamas, December 14, 1912, collected by Frederick Knab (U. S. N. M.); one male Chapada, Brazil, collected by H. H. Smith and presented to me by Professor Williston; one male, Ecuador, collected by H. A. Parish, in my collection.

Named in honor of Charles Fuller Baker, Professor in the University of the Philippines, whose prodigious industry in collecting is equaled only by the generosity with which he places his material in the hands of specialists throughout the world.

Holotype and allotype.—Male and female, No. 20567, U. S. N. M., from Havana, Cuba.

No. 130. *Sarcophaga hamata* n. sp.

Male. Front .198 of head (average of three,—.191, .193, .211); parafrontals and parafacials gray pollinose with a tinge of yellow, especially below; the former are rather uniformly covered with coarse hairs, the latter with a considerable number of small bristles, irregularly placed, which extend upon the transverse impression; frontal stripe blackish; frontal bristles about 15 in number, abruptly and very widely divergent below, reaching below the base of the second antennal joint; ocellars well developed; outer verticals wanting; antennæ blackish, third joint barely twice the second, reaching three-fourths of the way to the vibrissæ, which are a little above the oral margin; facialia forming prominent ridges, hairy nearly halfway above the vibrissæ; palpi and proboscis black, ordinary; bucca nearly one-half the eyeheight, with black hairs extending behind the suture; back of head with three to four rows of black hairs, the middle part and below with whitish ones.

Thorax gray pollinose with the usual three to five black stripes; submedian gray stripes divided for more than half their length; ps dc two large and two small; ant acr distinct but not very striking; prsc one large; stpl three or four; scutellum with two or three pairs of marginals, one pair rather large preapicals and one pair medium sized apicals.

Abdomen yellowish-gray pollinose, tessellated, with a median dark stripe; fourth segment reddish along the hind edge; first and second segment with only lateral bristles; third with a median marginal pair; fourth with the usual marginal row, about 16;

fifth sternite yellowish-brown, not widely divergent, with rather dense black hairs on the opposing surfaces.

Hypopygium small, yellow; first segment retracted, with a row of slender bristles behind; second segment rather flat, shining, with erect black hairs; forceps shining, blackish brown, the free part standing at right angles to the attached base, smooth and shining, but with a few minute granulations behind. Viewed from behind they are separated from the base nearly to the apex by a uniform space, then obliquely truncate; in profile they are nearly straight almost to the tip, where they make a rather sharp bend forward to an acute point. Accessory plate shining brownish-black, rather boat-shaped, straight; in the figure this plate is viewed obliquely, hence seems narrower than it really is. Posterior claspers small, brown, rapidly tapering, with a small semi-circular excision in front just before the tip; anterior claspers smaller and more curved, also brown; penis with prominent brown basal joint; distal segment shining brownish black, rather boat-shaped, straight on the front margin; near the apex on the hind side a long erect recurved hook arises, the tip of which is divided into two laterally divergent parts; this hook arises from a deep emargination in the tip of the back plate. On the front side just before the tip there is a tubular prolongation bordered by a somewhat double curved flap which bears minute hooklets upon its surface.

Legs black; middle femur with comb; middle tibia with two bristles on outer front side; hind tibiae rather strongly ciliate on the outer hind edge, not villous.

Wings subhyaline; no costal spine; third costal segment longer than fifth; first vein bare; third bristly halfway to crossvein.

Length 8.5-14 mm.

Three males; two from Opelousas, La., and one from Tifton, Ga., all in the Hough collection.

Holotype.—In the Hough collection; paratype male, No. 20570, U. S. N. M., from Tifton, Ga.

The relationships of this species are evidently with Nos. 47, 51, 56, all of which have the recurved hook on the back of the penis.

No. 131. *Sarcophaga xanthosoma* n. sp.

Male. Like *assidua* except in the following characters: Parafrontals and parafacials, posterior orbit of eye and front of bucca golden pollinose, the same color on the pollen above and below the lateral suture of the thorax, and on the sides of the second, third and fourth abdominal segments. Scutellum with a pair of small marginal bristles; fifth sternite standing up prominently, divided but not divergent, with a slender yellow point on each side of the division at hind angle, bearing a few small black hairs: from the base of these points the lateral parts are wide, yellow, and quite conspicuous.

Hypopygium red with yellow pollen; first segment with a row of long bristles behind; forceps yellow, straight, tapering, with shining black tips. Viewed from behind they are rather uniformly separated in all their length, obliquely truncate, with a minute angle on the outer side, the inner side longest; accessory plate triangular, the free angle slightly drawn out; posterior clasper brownish, somewhat stout at the base, the tip considerably hooked forward; anterior clasper yellow, erect, stout, the apex turned forward, thin and straight; penis with a single segment, reddish in color, apex brownish; the back plate has on each side near the base a conspicuous lobe pointing forward, characteristic of the *assidua* group; the transverse plate on the front is bent toward the apex and extends about as far as the tip of the organ; on the two sides near the apex it gives off a branch extending forward and with tips bending toward the base. The front side of this is covered with scattered spines suggesting the structure in *bakeri*.

Legs black; middle and hind tibiae a little piceous; middle femur with a comb of only four or five conspicuous flattened spines below near the tip; middle tibia with one bristle on outer front side; hind tibia not villous.

Length 7 mm.

One male, Los Amates, Guatemala, February 18-28, 1905, collected by Professor Hine.

Holotype.—In the collection of Professor Jas. S. Hine.

No. 132. *Sarcophaga utilis* Ald.

Aldrich, Jour. Econ. Ent., viii, 1915, 151, fig.—Logansport, Ind., etc.; bred from pupa of *Allorhina nitida* by D. E. Fink, at Norfolk, Va.

Male. Front .283 of head (average of five,—.273, .276, .281, .286, .300); parafrontals and parafacials silvery, the latter with a slight tinge of yellow and bearing the usual hairs, which are somewhat coarse. Opposite the base of the antennae the pollen has a changeable dark spot. Frontal stripe wide and black; frontal bristles about 10, widely diverging below and reaching below the middle of the second antennal joint; antennae black, the third joint $2\frac{1}{2}$ times the second, reaching three-fourths of the way to the vibrissae, which are at the oral margin; ocellars distinct; outer verticals strongly developed, nearly as large as the inner; palpi and proboscis black, ordinary. Bucca fully one-half the eyeheight, with black hair as far as the metacephalic suture. Back of head with three rows of black hairs, rather irregular, the middle part and below with whitish beard.

Thorax with gray or somewhat glaucous pollen and three to five black stripes. The submedian gray stripes are narrowly divided; ps dc four or five, only the hindmost two large; ant acr none; prsc one; stpl three; scutellum with the usual two marginals, one preapical and one small apical.

Abdomen grayish pollinose, strongly tessellated, with a black median stripe and a shifting black stripe

each side; the hind edge of the fourth segment decidedly red; first two segments with only lateral bristles; the third with median marginal pair and one lateral; the fourth with a marginal row of about 16; fifth sternite brown at base, with yellow, smooth, bare plate-like sides, the bases angulated and bearing a few black hairs, the opening V-shaped but somewhat rounded at the bottom.

Hypopygium red; first segment more or less brownish, pollinose; generally without bristles behind; second shining yellow, globose, not bristly; forceps red, tips black, clothed with black hairs on the attached part, around the tips with a very characteristic cluster of short erect brownish or reddish hairs. The tip is bent forward in a small hook but the general shape of the forceps is straight. Accessory plate yellow, the edge next the forceps thin, shining, drawn out into a flat hook. Both pairs of claspers black, shining, rather straight or only moderately hooked; penis brown or reddish, very complex and almost invariably covered with a gelatinous substance making its parts difficult to discern; the basal lobe is red and of medium size, the distal one is large, mostly reddish, bearing on the front side a long, complicated subdivision which sometimes stands out very distinctly and in other cases is closely applied.

Legs black; femora stout; middle femur with almost comblike bristles below; middle tibia with two stout bristles on the outer front side; hind tibia not villous.

Wings subhyaline; no costal spine; third costal segment longer than the fifth; first vein bare; third with a few hairs; apical cell widely open a considerable distance before the tip of the wing.

Female. Front .321 of head (average of five,—.294, .317, .317, .322, .357), with the usual orbitals; outer verticals as in male. Scutellum without apical bristles. Genital segment red, shining, the opening

in an inverted V shape, with a strong row of bristles each side of the upper part.

Length 11 to 14 mm.

Twelve males, four females. Five males and one female are from Logansport and La Fayette, Ind. (Aldrich); two males, Germantown and Wernersville, Pa. (Harbeck); one male Agricultural College, Mich.; one male Kushla, Ala. (Sturtevant); two males and one female, Tifton, Ga. (Hough collection); one female Brookings, S. D. (Hough collection); one female Pullman, Ill.; one male Beltsville, Md., reared by W. R. Walton from a dead specimen of *Geotrupes splendidus*.

Two males and two females of the typical material have already been deposited in the National Museum and are not here included. Some specimens in the typical lot have been ascertained to belong to *bishoppi* (q. v.) and are not included; the difference is most readily seen in the distinctly yellow palpi of the latter species.

Other females are no doubt at hand, but it is difficult to separate them from those of *sarracenioides*, bred females of which seem to have every character of those of *utilis*; *impar* is also very much the same in the female.

Type.—Male, in U. S. N. M., from Logansport, Ind.

Note.—A male received later was reared by F. M. Jones from a larva in the cup of *Sarracenia* at Theodore, Ala.; in common with Mr. Sturtevant's male from Kushla, Ala., it shows a varietal difference in having the palpi yellowish at tip and the forceps in profile with a deep, rounded notch behind. If further collection shall show these differences constantly associated with the habit of breeding in *Sarracenia* cups, as seems probable, this form will be well worthy of a varietal name.

No. 133. *Sarcophaga cistudinis* n. sp.

Male. Front .281 of head in holotype, but this is slightly shrunken; the other male gives .323, which is normal. Parafrontals and parafacials gray pollinose, with changeable spot opposite the antennæ; frontal stripe dark red, rather broad; frontal bristles about 13 in number, short, scarcely divergent anteriorly and only reaching as far as the base of the second antennal joint; ocellar bristles distinct, with a considerable series of coarse hairs upon and behind the ocellar triangle; outer vertical bristles slightly differentiated; parafacials with only a few inconspicuous hairs; antennæ brownish black, the third joint less than twice the second, reaching three-fourths of the way to the vibrissæ, which are at the oral margin; arista notably short, especially the bare tip, which hardly projects beyond the long plumosity; palpi and proboscis black, ordinary; bucca one-half the eye-height, with black hairs, including most of those behind the suture; back of head with several rows of black hairs and a few pale ones around the neck and below it.

Thorax with rather glaucous pollen and the usual three to five black stripes; ps dc two large; ant acr hardly differentiated; prsc one large; stpl three or four; scutellum with three marginals; one pre-apical and no apicals.

Abdomen gray pollinose, tessellated, with median dark stripe; fourth segment entirely yellow in ground color, including the sides and below; first and second segments with only lateral bristles; third with a dense marginal row of rather short bristles, more than 20; fourth with a row of about 18, which are placed a little away from the hind margin; fifth sternite yellow, the sides not very divergent, with rounded lobe on each side, which is of the same color and not strikingly hairy.

Hypopygium small; first segment yellow, quite retracted, with a row of rather strong bristles along the hind margin; second segment yellow, with rather

dense black hair; forceps brown, small; from behind they are uniformly divergent and tapering to a point; in profile they curve gently forward, tapering to a point; accessory plate swollen, yellow, with a prominent pointed free end; posterior clasper rather slender, strongly curved, with blunt tip; anterior clasper a little lighter in color, stout at base, with a very slender sharp tip, which is strongly curved downward; penis with simple slender brown basal joint, the distal one swollen, rather globose, very simple, with a pair of lobes in front, the tips of which are curved toward the apex of the segment; the basal part of the distal segment is almost transparent.

Legs black; front femur with a comb below on the apical half of the anterior side; middle femur with comb both in front and behind on the lower side; hind femur also with strong rows of bristles below, hardly forming combs; middle tibia with three bristles on the outer front side; hind tibia without villosity.

Wings hyaline; no costal spine; third costal segment shorter than fifth; first vein bare, third with a few hairs at base.

Female: Front .398 of head (average of two,—.392 and .405). Orbitals and outer verticals present; third antennal joint quite short and rounded; genital segments entirely yellow, no specialized larvipositor present; femur without comb although with rather numerous small bristles.

Length 8-10 mm.

Two males and two females. One male, the holotype, received from Wm. T. Davis with the following label "From larva bred in sore in side of box turtle, Plainfield, N. J., hatched June, 1912. W. DeW. Miller, col."

One male, two females, in the Hough collection without label.

Holotype and allotype.—Male and female, in collection of Wm. T. Davis.

Regarding the occurrence of *Sarcophaga* larvæ in swellings in the skin of box turtles (*Cistudo*) the

following literature is in existence but no species has ever been determined.

1882. Packard, A. S. Bot fly larvae in a turtle's neck. Amer, Nat., xvi, 598, figs.
 1890. Wheeler, Wm. M. A species of bot fly, parasite of the box turtle. Psyche, vii, v, 403.
 1904. Emerton, J. H. A dipterous parasite of the box turtle. Psyche, vol. xi, 34.
 1912. Kepner, Wm. A. The larva of *Sarcophaga*, a parasite of *Cistudo carolina* and the histology of its respiratory apparatus. Biological Bulletin 22, 163-170, 2 pls.

No. 134. *Sarcophaga galeata* n. sp.

Male. Front .180 of head (average of two,—.170 and .190); parafrontals and parafacials golden yellow pollinose, which color extends to the front part of the bucca but does not include the hind margin of the eye; frontal stripe narrow and sharply defined, dark brown; frontal bristles about 11, moderately but not abruptly divergent below, reaching to the middle of the second antennal joint; ocellars present, outer verticals absent; the hairs next the eye on the parafacials are present but slender; antennæ black, the third joint nearly three times the second, reaching four-fifths of the way to the vibrissæ, which are at the oral margin; arista plumose for about two-thirds of its length; palpi and proboscis black, shining; bucca one-fourth the eyeheight, with black hairs which extend well behind the suture; back of head with three rows of black hairs, the middle part bearing whitish ones which are not very distinct below.

Thorax gray pollinose, with three to five very distinct black stripes; ps dc two large and two small; ant acr hardly differentiated; prsc one small; stpl three; scutellum with three marginals (intermediate small), one small preapical and no apicals.

Abdomen gray pollinose, tessellated, with median black stripe; fourth segment red except at base; first and second segments with only lateral bristles; third with a pair of median marginals rather

poorly developed; fourth with a marginal row of about 20; fifth sternite yellow, conspicuous, broadly V-shaped, the tips of the divergent arms bearing minute blackish bristles.

Hypopygium yellow; first segment yellow pollinose, with a conspicuous hump near the base and a row of black bristles at the hind margin; second segment with yellow pollen and erect black hairs, two of which are bristlelike; forceps reddish except the extreme tip and outer margin; viewed from behind they are not at all divergent but seem to form almost a single organ coming to a sharp tip, rather crenulate on the edge; in side view they are approximately straight but the crenulation is still distinct; the extreme tip is hooked slightly forward; accessory plate rather broadly rounded, yellow, the edge next the forceps thin and semitransparent, a little expanded; posterior clasper yellow, bordered with black, erect, with a semicircular excision under the tip; anterior clasper very stout, the apical half black, the tip straight and sharp, cut away obliquely beneath to a second point, from which the outline curves sharply to the base; viewed from behind there is a prominent hump or ridge at about the middle of the outer side. Penis large and complicated, its basal joint short and not distinguishable, the distal segment yellow basally, mostly brown toward the apex. The back plate is deeply split into two divergent lobes apically; between these a keel arises from which, toward the tip, a pale membrane spreads out each way, its attachment extending forward upon the protuberant front part. The extreme apex is in the form of a round rim encircling a deep hole; on the front side of the segment near its base there is a concave transverse plate, seemingly undivided, of which the lateral edge is prolonged each way into a point curving backward and apically.

Legs black; middle femur with short comb; middle tibia with one bristle on outer front side; hind tibia not villous.

Wings subhyaline; no costal spine; third costal segment almost equal to the fifth; first vein bare; third vein hairy almost to the crossvein.

Length 7.5 mm.

Five males, La Fayette and Crawfordsville, Ind. (Aldrich); one male, Miami, Fla. (C. W. Johnson).

Holotype.—Male, No. 20568, U. S. N. M., from La Fayette, Ind.

No. 135. *Sarcophaga australis* n. sp.

Male. Front .208 of head (average of five,—.197, .201, .202, .210, .229). Very similar to *assidua* except in the following particulars: Parafrontals and parafacials very deep golden pollinose, which extends to the front half or more of the bucca; behind the eye is a narrow pollinose border which has a yellowish tinge; the pollen of the abdomen noticeably yellow, on the fourth segment deep golden, and apparently the ground color of this segment is yellow; both segments of the hypopygium yellow and densely pollinose; the forceps viewed from behind are moderately separated but not divergent, at the tip broadly rounded with a slight angle at the outer edge, which projects backward more than laterally. The forceps are broad and not narrowed toward the tip; they are yellow except for a narrow space at the apex; viewed in profile the front side is nearly straight; accessory plate yellow, large, rounded, the margin rather thin; posterior clasper black at tip, straight, erect and excised on the front side at the apex; anterior clasper very stout, yellow except the apical third, which is shining black and tapers suddenly to a slender, straight, sharp point; penis apparently single jointed, yellow except the apex and some of the appendages. The back plate is developed into a prominent, erect lobe on the middle line close to the apex and near its base on each side it extends forward in a conspicuous angle; the transverse plate attached to the front of the organ near its middle has a very complex form, the principal feature being a pair of thin, curved arms

each of which extends forward into a sharp point near the middle line, thence continues backward in a wide curve with a serrated edge toward but not reaching the subapical lobe of the back plate. The hind part of this plate is lighter colored but still has a dark margin. The apex of the organ is rather truncate and on its acute front angle bears a few small teeth.

Legs black.

Length 8-9 mm.

Seven males. One from San Jose, Costa Rica, and one from Panama, collected by Mr. Sturtevant; four specimens from Peru, S. A., collected by H. A. Parish (Aldrich), and one from Colombia, S. A., collected by Charles Wilhelm (Aldrich).

Holotype.—Male, No. 20569, U. S. N. M., from Peru.

No. 136. *Sarcophaga timida* n. sp.

Male. Front .188 of head; parafrontals and parafacials golden yellow pollinose, with smooth, satiny appearance and almost devoid of hairs, although there are a few in the usual place on the parafacial; frontal stripe red below and black above, very sharply defined, rather narrow; frontal bristles about 11, not much divergent below but reaching about to the middle of the second antennal joint; ocellars distinct; outer verticals absent; antennæ blackish, third joint $2\frac{1}{2}$ times the second, reaching four-fifths of the way to the vibrissæ, which are at the oral margin; arista long-plumose for nearly two-thirds of its length; facialia black; middle of face gray; palpi and proboscis black, ordinary; bucca one-third the eye-height, its front half golden pollinose, hairs black to the suture; back of head with apparently three rows of black hairs, in the middle with yellowish ones which extend below on the bucca as far as the metacephalic suture; eyes bordered behind with a narrow band of yellow pollen.

Thorax gray pollinose, with three to five black stripes, the three intermediate ones sharply defined

when viewed from behind; ps dc two large and two small; ant acr barely differentiated from the coarse hairs around them; prsc one medium; stpl three; scutellum with three pairs of marginals (intermediate one small), one preapical, rather small, and no apicals.

Abdomen whitish-gray pollinose with conspicuous tessellation; fourth segment almost entirely red in ground color; first and second segments with only lateral bristles; third with a median marginal pair; fourth with a marginal row of about a dozen, diminishing on the sides; fifth sternite in the form of two erect narrow lobes standing out from the abdomen, not divergent, fringed with only moderate hairs, yellowish-brown in color.

Hypopygium yellow; first segment rather large, yellow pollinose, with a row of 6 or 8 stout bristles behind; second segment also with yellow pollen, globose, not very hairy; forceps reddish at base, the tips becoming black; viewed from behind they are slightly divergent at the tips only and obliquely truncate, with the inner side longest; in profile they are nearly straight, widening a little near the tip and slightly angulated on the hind edge, the apex turned slightly forward; accessory plate yellow, of moderate size, almost equilateral; posterior clasper slender, rather straight, yellow at base with black tip; the figure shows it turned to the side, a position which it naturally assumes when the penis is protruded as far as possible; anterior clasper much stouter, black, flat, rounded, the tip turned outward, below it a rather deep notch; penis with a very short basal segment which would ordinarily be invisible; the distal segment long and complicated; its base is thick, then deeply cut in on the front side and bearing laterally a pointed flap at the narrowest place; beyond this is a wide, complex transverse plate, apparently undivided, of which the middle part forms a distinct black point projecting forward; at some distance laterally from this there is on each side a slender, sharp black

point arising from the front edge of the plate; still further to the side there is a winglike paler diagonal expansion of the plate, the back edge of which comes in contact with the body of the segment; the apical part of the segment is simple and rounded.

Legs black; middle femur with short but distinct comb below; middle tibia with one bristle on the outer front side; hind tibia not villous, but still bearing on the outer front edge three or four little suberect hairs.

Wings hyaline, no costal spine; third costal segment longer than fifth; first vein bare; third hairy almost to the crossvein.

One male, Puerto Barrios, Guatemala, March 5, 1905, collected by Professor Hine.

Length 8.5 mm.

Holotype.—Male, in collection of Professor Jas. S. Hine.

No. 137. *Sarcophaga assidua* Walk.

Walker, Dipt. Saunders., 328.—U. S.

Howard, Proc. Wash. Acad. Sci., ii, 566, figs. and life history; bred from human excrement.

Morgan, Bull. 30, n. ser., Div. Ent., 1901, 25, figs. Bred from *Melanoplus differentialis* in Mississippi; determined by Coquillett.

Herns, Jour. Exp. Zoology, iv, 45-83. Biology; larvæ feed on dead fish on the shore of L. Erie.

Pratt, Can. Ent., xlv, 181, bred from cow manure.—Texas.

Johnson, Bull. Amer. Mus. Nat. Hist, xxxii, 75, occurs in Fla.

Johnson, Annals Ent. Soc. Amer., vi, 447, occurs in Bermuda.

Male. Front .199 of head (average of five,—.190, .196, .198, .202, .208); parafrontals and parafacials golden yellow, the same color extending upon the front part of the bucca but not behind the eye; frontal stripe blackish, well defined; frontal bristles divergent moderately, but not abruptly in front, reaching about to the middle of the second antennal joint; ocellar bristles distinct; outer verticals not developed; antennæ black, third joint $2\frac{1}{2}$ times the

second, reaching five-sixths of the way to the vibrissæ, which are at the oral margin; arista long-plumose for about two-thirds of its length; facialia black, middle of face gray or slightly yellow; palpi and proboscis black, ordinary; bucca one-fourth the eye-height, with black hairs, which distinctly extend back of the metacephalic suture; back of head with three rows of black hairs, a few whitish hairs in the middle, not conspicuous below.

Thorax densely gray pollinose, with the usual three to five black stripes; ps dc two large and two small; ant aer distinctly developed; prsc one pair medium; stpl three; scutellum with three marginals (intermediate small) one preapical of moderate size and no apicals.

Abdomen gray pollinose, tessellated, with a median black stripe; fourth segment red in ground color except along the base; first and second segments with only lateral bristles; third with median marginal pair and fourth with marginal row of about 14, diminishing on the sides; fifth sternite yellow, the sides not divergent, forming a pair of tapering and pointed tips which stand up conspicuously, each bearing a few black hairs apically.

Hypopygium yellow; basal segment covered with yellow pollen, bearing a subapical row of bristles; second segment also with yellow pollen and bearing a few hairs, of which one pair are bristly; forceps yellow, becoming black near the tips; viewed from behind the free part is narrow and necklike at the base, diverging and widening rapidly further on, ending in a rather blunt point. Viewed from the side there is a rather distinct angle behind, a little before the tip and one in front still nearer; accessory plate yellow, triangular, the hind margin thin and semi-transparent; posterior clasper brown toward the tip, straight, bearing a moderate hook at the apex; anterior clasper long, erect, yellow, strongly bent near the middle, the tip black, flat, straight, sharp in profile; penis apparently single-jointed, yellow, the basal

part globose in front, with a distinct hump behind, beyond this slender, with a lateral sharp lobe pointing forward at each side; the back plate, during the remainder of its course, is comparatively simple, rather keel-like toward the apex, which is slightly notched longitudinally. At about the middle of the front side of the penis there is a complicated concave transverse plate which bears apically two black roughened processes expanding laterally like wings. This structure is shown in the figure standing out almost at right angles to the body of the penis, but it is jointed at the base and frequently lies more or less against the front surface.

Legs varying in color from black to red; the tarsi, however, and usually the entire front legs are black; middle femur with a very short but distinct comb; middle tibia with a single bristle on the front side; hind tibia not villous.

Wings hyaline; no costal spine; third costal segment about equal to the fifth; first vein bare; third with coarse hairs almost to the crossvein.

Female. Front .298 of head (average of five,—.279, .288, .294, .299, .312), with the usual orbitals and outer verticals. The median marginal bristles of the third abdominal segment are often weak or wanting. Genital segment yellow, pollinose above, generally folding together so as to cover the remaining parts which show no visible special structure.

Length, 6.5-7.5 mm.

Numerous males and females, mostly belonging to the National Museum. One series of 11 specimens from the C. V. Riley collection, Nos. 4285-8 and 4285-9, were reared from cow manure, August, 1889, at Washington, D. C.

The material was mostly collected around Washington, D. C., and La Fayette, Ind. There are, however, a male from Mexico City, January 4, 1915, R. H. Van Zwahlenburg, in the National Museum collection, and a female from Lockbourne, Ohio, from Professor Hine. A long series from Texas (C. F.

Bishopp), some bred from cow manure, horse manure and straw.

It is possible that some of the references cited at the beginning of the description may not refer to this species, as it belongs to a group which are closely related and have not hitherto been separated. The rearing from a grasshopper, unless from a dead and decaying one, looks unlikely.

Walker's description seems fairly applicable to this species, especially as he mentions the red-legged form.

The series of species including *galeata*, *australis*, *timida*, *assidua*, *cingarus*, *culminata*, *peltata*, *xanthosoma* and *bakeri* form what may be called the *assidua* group, closely related species, mostly southern, which appear to be readily separable on genitalic characters. One of these, *peltata*, has perceptible villosity on the hind tibiae; two of them, *bakeri* and *xanthosoma*, have a small pair of apical bristles on the scutellum. The South American material in the writer's collection shows still other members of this group, and it is very probable that further collecting will add to the number in tropical parts of North America. It will be a matter of considerable time and care to correctly associate the females with these various species.

No. 138. *Sarcophaga cingarus* n. sp.

Male. Front .172 of head (average of three,—.171, .170 and .175). Like *assidua* except as follows: Parafrontals and parafacials more deep golden pollinose, which color extends to the front part of the bucca; fifth sternite with two narrow yellow lobes, parallel but rather far apart, with short tips covered with short black hairs; forceps viewed from behind not at all separated from each other; tips truncate obliquely; in profile nearly straight, with a small point a little back of the apex on the outer edge; accessory plate yellow, triangular, rather large; posterior clasper brown, rather straight, stout; when

viewed from behind the wide apex is deeply excised on the inner side, the outer angle remaining hooklike; anterior clasper yellow on the basal half, the rest black, closely applied to the basal part of the penis, their tips diverging laterally, not much elongated, not with distinct point; penis single-jointed, brown with black apex and front plate; the back plate is deeply channeled on the middle line, its sides forming two high ridges which bend considerably forward; the front plate is thick and swollen and shining black on the sides with concave middle and a recurved, yellowish, smooth horn projecting out at each side of its apex; tip of penis is considerably tilted forward with a rather long snoutlike end, and is distinctly divided on the median line.

Legs black.

Female. Golden pollen of front and face as in male. Legs black. Otherwise closely resembling female of *assidua*.

Length $7\frac{1}{2}$ mm.

Five males, two females. One of each sex from Natrona, Pa. (Aldrich); one of each sex Columbia, S. C. (Dr. F. A. Coward); one male Greene County, New York (Carnegie Museum); one male Riverton, N. J. (C. W. Johnson); one male La Fayette, Ind. (Aldrich).

Holotype.—Male, No. 20569, U. S. N. M., from Natrona, Pa.

Allotype.—Female, No. 20569, U. S. N. M., from Columbia, S. C.

No. 139. *Sarcophaga culminata* n. sp.

Male. Front .178 of head. Like *assidua* except in the following characters: Parafrontals and parafacials deep golden, which extends behind the eye and on the front half of the bucca.

Abdomen gray pollinose, the fourth segment red on the hind margin. Legs black.

Hypopygium red, pollinose; first segment rather large, with a conspicuous hump in profile and a half

dozen stout bristles in a row behind; forceps red, the apical part shining black; viewed from behind they are not at all divergent, the free part is narrower at the base, widening with an angle on the outer side; the apices sharp and close together. In profile the free part bends back considerably to the point of angulation behind, then slightly forward to the apex; just back of the extreme tip but not extending to the hind angle there is a striking tuft of small black erect hairs; accessory plate yellow, large, triangular, with angles rounded; posterior clasper reddish, the tip blackened, rather straight, not much hooked; anterior clasper red at base, the tip black, stout, strongly curved forward but not very long, rather flat at apex; penis one-jointed, reddish brown, the back plate moderately grooved along its middle, and near the base with a conspicuous point extending forward on each side; the transverse front plate which is so characteristic in this group is rather yellow at base, bending in an angle toward the apex, its sides developed into a thin and somewhat rolled-up margin; its apical part forming two widely divergent black lobes; fifth sternite very inconspicuous, not diverging and not provided with noticeable hairs.

Length 8.5 mm.

One male, Mayaguez, Porto Rico, June 24-29, 1914.

Holotype.—In American Museum of Natural History, New York City.

No. 140. *Sarcophaga fissa* n. sp.

Male. Front .300 of head (average of two,—.298 and .303); parafrontals and parafacials wide, silvery, with a slight yellowish tinge, the latter with a few small hairs near the eye, the former nearly bare; ocellars long; outer verticals present; frontal stripe narrow, not very sharply defined; frontal bristles about 8, not diverging in front, reaching to the base of the second antennal joint; two or three of the uppermost frontals are stout and reclinate; antennæ

blackish, the third joint $2\frac{1}{2}$ times the second, reaching three-fourths of the way to the vibrissæ, which are at the oral margin; arista plumose for about two-thirds its length; palpi and proboscis black, ordinary; bucca one-third the eyeheight, pollinose with a yellowish tinge in front, covered with mostly pale hairs; back of head with two rows of black hairs behind the eye, both of which run out before they reach the lower edge of the eye; the rest of the area covered with pale hairs, which are conspicuous below.

Thorax yellowish gray pollinose, with 3 to 5 black stripes; ps dc four, of which the foremost two are small and one of them hardly larger than a hair; ant acr none; prsc small or almost absent; stpl three; scutellum with two large marginals, one smallish sub-apical and no apicals.

Abdomen very large behind and truncate on account of the peculiar shape of hypopygium, tessellated, with yellowish gray pollen, no distinct median stripe; fourth segment and sides of the others rather reddish in ground color; first and second segments with only lateral bristles; third with median marginal pair; fourth with a marginal row of which only about 8 are large, the others diminishing below; fifth sternite rather large, reddish brown, the median part shining, hardly at all divided, with only a slight notch at the tip, on each side of which is a little swelling.

Hypopygium reddish brown, pollinose, first segment large, reddish in color and pollinose and flat behind, with a row of delicate bristles along the hind edge; second segment smaller, pollinose, a little blackish on the sides; forceps very minute, entirely reddish-yellow; viewed from behind they are moderately separated but not distinctly divergent; in profile they bend strongly backward and have a small hook forward at the tip; accessory plate very minute, triangular; there is a prolongation of the wall of the second segment of the hypopygium which nearly occupies the usual position of the accessory plate, but the plate itself is just at the tip of this structure; both

claspers entirely yellow, the hind one erect, nearly straight, with a stout hair in front near the apex; the front one rather low, the apical part straight. Penis yellow, the apical part black; no distinct basal segment; in profile it is very narrow, near the base widening rapidly behind; the body of the organ quite minute; viewed from behind it is seen to be divided on the median line almost down to the narrow basal part.

Legs black; middle femur with a comb near the tip; middle tibia with one stout bristle on the outer front side; hind tibia not villous.

Wings hyaline, with a minute costal spine; third costal segment about as long as the fifth; fourth vein ending considerably before the apex; first and third veins each with a row of hairs.

Female. Front .362 of head. Orbitals distinct. In the single specimen there is one smallish median marginal bristle on the second segment, its mate, however being scarcely larger than a hair; genital segment yellow, retracted, inconspicuous. Middle femur without comb; middle tibia with two stout bristles on outer front side.

Length 9-9½ mm.

Two males and one female. The males from Pt. Cortez, Honduras, March 23, 1905 (holotype) and Gualan, Guatemala; the female (allotype) is from San Jose, Guatemala; all collected by Professor Hine.

Holotype and allotype.—In collection of Professor Jas. S. Hine, from Pt. Cortez and San Jose.

Paratype.—Male, No. 20572, U. S. N. M., from Gualan.

No. 141. *Sarcophaga fimbriata* n. sp.

Male. Front .187 of head (average of two,—.177 and .197); parafrontals and parafacials with golden pollen, which extends to the front of the bucca and posterior orbit of the eye; both parafrontals and

parafacials have very few and delicate hairs; frontal stripe black, sharply defined; frontal bristles about seven, rather stout, two or three pairs, partly reclinate, the rows moderately but not abruptly divergent below; ocellar bristles present, slender; outer verticals not differentiated; antennæ black, third joint nearly three times the second, reaching five-sixths of the way to the vibrissæ, which are at the oral margin; arista plumose for two-thirds of its length; palpi and proboscis black, ordinary; bucca one-fourth the eye-height, with black bristles, including some of those behind the suture; back of head with three rows of black hairs, those on the middle part pale and covering most of the metacephalon.

Thorax with bluish-gray pollen and the usual three to five stripes; ps dc four, the foremost two small; ant acr none; prsc small; stpl three; scutellum with two large marginals and a smallish subapical pair, but no apicals.

Abdomen tessellated, with bluish-gray pollen; fourth segment mostly red; first and second segments with only lateral bristles; third with a large, erect median marginal pair; fourth with marginal row of about 8; fifth sternite mostly concealed, at the base excised but not divergent for a short distance, then rather U-shaped.

Hypopygium yellow; first segment pollinose, with only a few bristles behind; second segment rather small, with one pair of noticeable bristles; forceps quite long and nearly straight; viewed from behind they are hardly at all divergent and taper to a point; from the side they curve very little forward and taper uniformly; accessory plate yellow, very long, and rather straight; the front side narrowed toward the tip, which is rounded and bears minute spines on the front side; posterior clasper yellow, rather flat and sinuous in shape, with a long hair arising near the middle; anterior clasper large, yellow, strongly hooked; penis very small, the basal joint, however, of ordinary size, yellow; the distal segment is some-

what bell-shaped with the rim cut open in front where there is a small black rounded group of minute organs. On the apex on each side there is a long, pale yellow, thin margin, bearing a heavy fringe of reddish hairs.

Legs black; middle femur without comb; middle tibia with one stout bristle on the outer front side; hind tibia somewhat piceous, without villosity.

Wings subhyaline, no costal spine; third costal segment shorter than the 5th; first and third veins each with a row of hairs.

Length 7 mm.

Two males, Portland, Jamaica, collected by C. W. Johnson (Hough collection).

Holotype.—In Hough collection.

Paratype.—Male, No. 20573, U. S. N. M.

No. 142. *Sarcophaga texana* n. sp.

Male. Front .232 of head (average of three,—.224, .231, .240); parafrontals and parafacials silvery, the former with a slight tinge of yellow, the latter with a long row of quite distinct and almost bristly hairs; frontal stripe black, rather narrow, not very distinct above; frontal bristles about eight, the lower one moderately divergent; reaching almost to the middle of the second antennal joint; ocellar bristles strong; outer verticals distinctly developed; antennæ brownish black, the third joint a little over twice the second, reaching four-fifths of the way to the vibrissæ, which are at the oral margin and slightly approximated; arista with rather short and dense plumosity for half its length; palpi and proboscis black, ordinary; bucca nearly one-third the eyeheight, with mostly pale hairs; back of head with two rows of black hairs behind the eye, both of which run out along the lower orbit.

Thorax gray pollinose, with three to five black stripes, the middle one slender; ps dc four, the foremost very small; ant acr not differentiated; prsc smallish; stpl three stout; scutellum with three pairs

of marginals, the intermediate rather small; one pair smallish subapicals and no apicals. The edge of the scutellum on each side bears a striking patch of dense short yellowish white hairs (compare *S. melampyga*).

Abdomen densely gray pollinose, tessellated, with an indistinct median stripe; fourth segment almost wholly red in ground color; second and third segments also with a tinge of red; first and second segments with only lateral bristles; third with a stout median marginal pair; fourth with a marginal row of about 16, of which the upper 10 are noticeably stout at base and almost parallel, the intervening space partly filled in with a row of hairs along the two margins which face each other.

Hypopygium red; first segment retracted, pollinose, with about six small bristles along the hind margin; second segment globose, shining red, with erect hairs, of which a few are somewhat bristly; forceps shining black, long, slender, tapering and strongly curved forward toward the tip. Viewed from behind they are scarcely at all divergent. Accessory plate short, rounded, blackish; posterior clasper shining black, suddenly narrowed on the front side at about the middle, and with a slight notch on the outer side near the tip; they are erect and the back edge nearly straight; anterior clasper small, short and almost straight, shining black; penis unusually complex; the basal segment almost invisible, the distal segment with the back edge curved almost in a semi-circle over the tip; the front edge inflated near the base and almost transparent; beyond this at about the middle it is deeply notched in front and from the notch arises a round, smooth curved process with a flat and somewhat transparent apex; the curved apical portion of the segment is wide and flat and within its arc there is a thin median brown septum, on each side of which at its base arises a long lateral process developing into an irregular membrane. These processes are very conspicuous when viewed from behind as shown in figure 142a. Moreover, in the back view

there is a small but distinct black hook underneath each of them.

Legs black; middle femur with a very distinct comb behind; middle tibia with two bristles on the outer front side; hind tibia not villous.

Wing hyaline; a small costal spine present; third costal segment as long as the fifth and sixth together; first posterior cell ending quite far before the tip of the wing. First and third veins each with a row of hairs.

Female. Front .347 of head (average of three, —.320, .336, .384); orbitals and outer verticals strong; the patch of yellowish hairs on the edge of the scutellum at each side is as distinct as in the males, affording an excellent character for distinguishing this female.

Fourth abdominal segment almost entirely red, its posterior edge closing together in all three of the specimens so that the genital segments are entirely concealed. Middle femur without comb; middle tibia with two stout bristles on outer front side.

Length 7-11 mm.

Four males and three females, from Uvalde, Victoria and Catula, Texas (Bishopp Nos. 2489, 3489, 3546 and 4121). Regarding the larval habits, Mr. Bishopp writes, "A number of lots bred from carcasses of animals and exposed beef at Uvalde, Texas, by D. C. Parman."

Holotype and allotype. Male and female, No. 20574, U. S. N. M., from Uvalde, Texas.

No. 143. *Sarcophaga quadrisetosa* Coq.

Coquillett, Ent. News, xii, 17 (*Helicobia*).—Md., Va., D. C.

Howard, Proc. Wash. Acad. Sci., ii, 568, note on habits, —breeds in human excrement; Canad. Ent., xxxiii, 44, oc. in Va., breeding in cow manure (id.).

Baker, Inv. Pacif., i, oc. Ormsby Co., Nev., and at Stanford Univ., Cal. (id.).

Pratt, Canad. Ent., xlv, 181 (id.). Dallas and Victoria, Texas, very common, breeding in cow manure.

Greene, Ent. News, xxii, 384 (id.), oc. Wenonah, N. J.

Hunter, Pratt and Mitchell, Bull. 113, Bur. Ent., 49 (id.),
oc. Corpus Christi, Texas.

Johnson, Dipt. Fla., 1913 (id.), oc. Jacksonville, Fla.

Parker, Proc. Bost. Soc. N. H., xxxv, 60, pl. iv, f. 27;
pl. vii, f. 46 (*Ravinia*).—Conn. to Cal.; Porto Rico,
Bermuda, St. Vincent.

Male. Front broad, .288 of head (average of five,—.276, .280, .292, .296, .298); parafrontals and parafacials yellowish gray pollinose, rather glistening below, the latter with a minute row of hairs; frontal stripe broad and blackish; frontal bristles about seven, somewhat diverging below, reaching to the middle of the second antennal joint; orbital bristles distinct; outer verticals wanting; antennæ blackish, third joint fully twice the second, reaching five-sixths of the way to the vibrissæ, which are at the oral margin; arista plumose about halfway; palpi and proboscis black, ordinary; bucca one-third the eyeheight, with rather short black hairs, none pale before the suture; back of head with three rows of black hairs and a few pale ones in the middle and below.

Thorax yellowish-gray, pollinose, with three to five black stripes, which are decidedly brown when viewed from in front; ps dc four; ant acr well developed; prsc one smallish; stpl three; scutellum with two pairs of marginals, one smaller pair subapical and no apical.

Abdomen gray pollinose, tessellated, with black median line; first and second segments with only lateral bristles; third with a median marginal pair and some smallish, making out a weak marginal row; fifth sternite brown, diverging in the form of a wide V, the tips of which stand out prominently and are clothed with short black hairs.

Hypopygium rather large; first segment blackish, pollinose, with a row of small bristles behind; second segment usually red, subshining, with a few bristly hairs behind; forceps yellow about halfway, the tips shining black. In profile they are straight, rather slender, evenly tapering to a small hook at the tip; viewed from behind they are broadly divergent

from the extreme base, the tips strongly converging so as to give an elliptical outline. Accessory plate yellow with rounded end, not very prominent; posterior clasper straight, erect, yellowish, with a pronounced hook at the tip; anterior clasper very long, nearly straight, the tip rather suddenly bent forward and more slender, but not hooked; penis with a single segment, very long and almost cylindrical, yellowish changing to brown, the apical part bearing a transverse divided plate pointing forward and just beyond this on each side a shining black process which has a point projecting forward along the plate and another projecting outward to the apex, where it almost meets a corresponding black hooded point arising from the back plate. Viewed from behind the penis is narrow nearly to the apex, then suddenly expands to about twice its former width.

Legs black; middle femur with a pronounced comb of flattened spines; middle tibia with a single bristle on the outer front side; hind tibia without villosity.

Wing subhyaline, no costal spine; third costal segment shorter than the fifth; first and third veins each with a row of hairs.

Female. Front .348 of head (average of five,—.333, .342, .344, .345, .375); orbitals and outer verticals well developed; frontal stripe very wide; genital segment red, with rounded orifice guarded by a few bristles; middle femur without comb.

Length 6-7½ mm.

Numerous males and females, Pennsylvania, South Dakota, Kansas, West Virginia, Georgia, Florida, Texas. The Hough collection contains about 1,500 specimens of this and the following species. As indicated by the bibliography, this is a very common excrement-feeding species.

Holotype.—Male, No. 5395, U. S. N. M.

No. 144. *Sarcophaga latisetosa* Park.

Parker, Proc. Bost. Soc. N. H. xxxv, 63, pl. iv, f. 26; vii, f. 46 (*Ravinia*).—Mass., Conn., N. Y., N. J., Pa., Ill., Canada.

This species so closely resembles *quadrisetosa* that a brief mention of the differences will suffice.

The outer vertical bristles are well developed in the males. The forceps when viewed from behind begin to diverge at about half their extreme length instead of near the base, and the tips are but little convergent or even parallel; the posterior clasper is much longer; the anterior clasper is bent forward almost at the base and is more slender along the middle, with a broader tip. The transverse plate near the end of the penis in front forms a more acute angle with the body of the organ; the two shining black processes arising just beyond this plate are much shorter and the terminal hooks arising from the back plate are larger, with a cleft apex. The fifth sternite is generally shining black, somewhat more broadly excised than in the other species.

Female. There seem to be no tangible differences separating the female from that of *quadrisetosa*.

Numerous males and females, Massachusetts; New Jersey; Ohio; Indiana; Illinois; Tennessee; Moscow, Ida.; Palatka, Fla.

Holotype.—Male, in collection of Massachusetts Agricultural College.

This is perhaps only a variety of *quadrisetosa*; like the latter, it is an excrement-feeding form.

No. 145. *Sarcophaga globulus* n. sp.

Male. Front .203 of head (average of five,—.194, .200, .202, .204, .217); parafrontals and parafacials grayish yellow pollinose, the latter with a row of delicate hairs below near the eye; frontal stripe rather broad, blackish; frontal bristles about eight, moderately divergent below; orbitals distinct; outer verticals not developed; antennæ brown, the third

joint three times the second, reaching five-sixths of the way to the vibrissæ, which are at the oral margin; arista long-plumose for about three-fifths of its length; palpi and proboscis black, the former rather short and clavate; bucca one-fourth the eyeheight, with only black hairs before the suture; back of head with two or three partly irregular rows of black hairs and a few pale ones in the middle and below; the posterior orbit of the eye with decidedly yellow pollen.

Thorax yellowish gray pollinose, with the usual three to five black stripes, which are brown when viewed from in front; the submedian gray stripes are divided to the suture by a narrow dark line, which appears light on a dark ground when viewed from in front; ps dc four, all quite large; ant aer well developed, three or four pairs; prsc one pair; stpl three; scutellum with three marginal pairs, the intermediate ones small; one subapical which might in this case be called subdiscal, and the apicals represented only by minute hairs.

Abdomen gray pollinose, tessellated, with three dark stripes not very changeable; first and second segments with only lateral bristles; third with a median marginal pair and sometimes a few smallish ones forming a weak marginal row; fourth segment hardly at all red on the hind margin, with the usual marginal row of bristles; fifth sternite blackish on the exposed part, broadly excised in the shape of a U, the tips of the arms slightly turned out from the body but not with noticeable brush or bristles.

Hypopygium yellow, first joint more or less infuscated at the base, pollinose, with a few scattered bristles near the apex; second segment subshining, without bristles; forceps reddish yellow except the tips, which are shining black. Viewed from behind they are widely divergent near the base and then almost parallel; viewed from the side they curve rather evenly forward, tapering to a sharp point. Accessory plate small, yellow, the apex rounded; both claspers entirely yellow, erect at base and strongly curved for-

ward to the flat tip; the anterior clasper has a process in front near the base, beyond which it bends forward very strongly and is elongated and nearly straight, with a thin margin below near the apex simulating a second point; the penis is of a single joint, of which the basal part is long, cylindrical and shining yellow; beyond the middle it is constricted and then expands into a globular tip which bears a small plate on the front edge turned back toward the base and closely applied to the body of the segment; at its apex there are a few small pointed plates directed forward.

Legs black; middle femur with comb; middle tibia with one bristle on outer front side; hind tibia without villosity.

Wing subhyaline; no costal spine; third costal segment shorter than the fifth; first and third veins with a row of hairs.

Female. Front .294 of head (average of five,—.282, .282, .300, .300, .304). Orbitals and outer verticals distinct. Thorax marked as in the male. The bristles of the third abdominal segment are appressed and not very distinct. Genital segment red, without any peculiar characters; middle femur without comb.

Length 4-6½ mm.

Twenty-three specimens of both sexes, Havana, Cuba. All collected by Professor C. F. Baker and donated to the writer many years ago.

Holotype and allotype.—Male and female, No. 20575, U. S. N. M.

POSTSCRIPT.

When my work was nearly printed, I received permission from Professor Hine and from the authorities of the University of Chicago to deposit in the National Museum the holotypes from their collections. Mr. Harbeck and Mr. Sturtevant had given the same permission at an earlier date, and I had made my manuscript conform to this; but in depositing the Hine and Hough (University of Chicago) material I am contradicting the statement in the text in about ten cases. It is, perhaps, needless to commend the public spirit of all who have so generously contributed to keep this great collection of type material almost intact.

Dr. R. R. Parker's work on the Sarcophagidae of New England was in two parts, of which the first was published in the Proceedings of the Boston Society of Natural History, as mentioned on page 6; the second and larger one, containing several new species, proved too large for early publication and was much delayed on this account. Dr. Parker was finally obliged to divide it, but succeeded in placing the more important sections in the entomological journals. These delays had the unfortunate effect of bringing two of his parts into print too late for me to change the names I had adopted for the corresponding species in my work. So my *Thelodiscus indivisus* is antedated by his *Sarcophartia ravinia* (Psyche, xxiii, 131-139, figs.); and my *Sarcophaga larga* by his *S. pachyprocta* (Jour. N. Y. Ent. Soc., xxiv, 171-175). My principal regret in this matter is that his excellent work could not have been printed in its entirety.

European specimens of *Sarcophaga scoparia* in Dr. Parker's collection, recently seen by me, indicate that our North American form is entitled to a varietal name, which will be bestowed by Dr. Parker in a forthcoming paper.

The peculiar habit in several Sarcophagas of attacking grasshoppers on the wing for larviposition is mentioned in the First Report of the U. S. Entomological Commission (Washington, 1878), pp. 319-322, although there attributed to a Tachina. Mr. J. R. Parker, at Huntley, Mont., Aug. 12, 1910, captured the following species attacking flying grasshoppers in this way: *Sarcophaga sinuata*, *hunteri*, *kellyi*, *davidsoni*, and two undetermined. Prof. R. A. Cooley made the same observation.

EXPLANATION OF PLATES

and

LIST OF SPECIES.

In every case the description of the species bears the same serial number as the figure of it. As almost every species and variety is figured, the explanation of the plates becomes a complete list, by simply including the five unfigured forms with the explanation "not figured."

Magnification is not uniform. Many of the figures were made with camera lucida and others with projection apparatus, but these aids do not work well with genitalia, and most of the drawing was free-hand.

In each case the figure shows the male genitalia drawn out and viewed from the left side, unless otherwise indicated. Hairs on forceps and accessory plate are generally omitted for simplicity, unless very distinctive.

PLATE 1.

1. *Phrissopodia praeceps* Wied.
2. *Wohlfahrtia meigenii* Schiner; 2a, dorsum of abdomen.
3. *Wohlfahrtia vigil* Walk., dorsum of abdomen.
4. *Johnsonia elegans* Coq.
5. *Johnsonia setosa* n. sp., head of male.
6. *Camptops unicolor* n. gen. and sp.; 6a, head of male.
7. *Sarothromyia femoralis* Schiner; 7a, head of male.
- [8.] Same, variety *simplex* n. sp. (not figured).
9. *Sarcophagula occidua* Fabr.; 9a, wing; 9b, head of male.

PLATE 1

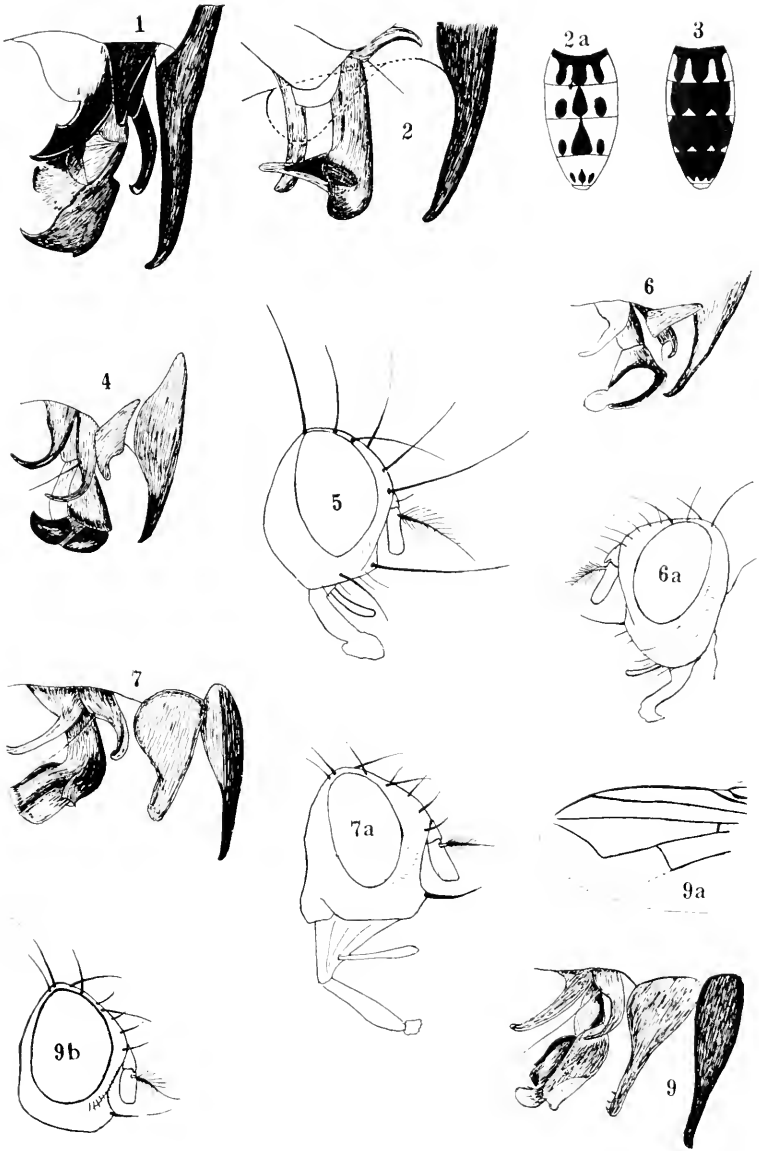


PLATE 2.

10. *Camptopyga aristata* n. gen. and sp.; 10a, apical part of abdomen of male, side view; 10b, front of head of male.
11. *Agria affinis* Fall.; 11a, apical part of abdomen of male, side view.
12. *Harbeckia tessellata* n. sp. gen. and sp.
13. *Hypopelta scrofa* n. gen. and sp.
14. *Notochaeta subpolita* n. gen. and sp.
15. *Notochaeta plumigera* Van der Wulp.
16. *Emblemasoma erro* n. gen. and sp.; 16a, front of head of male; 16b, next plate.

PLATE 2

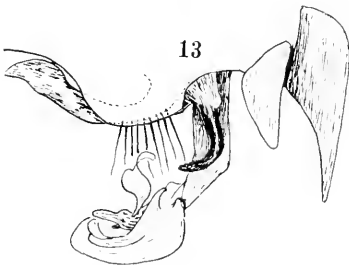
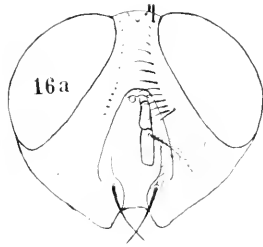
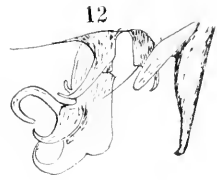
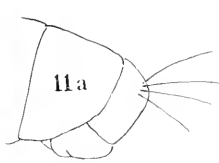
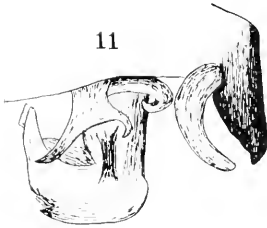
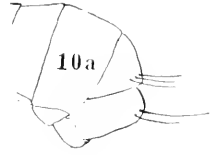
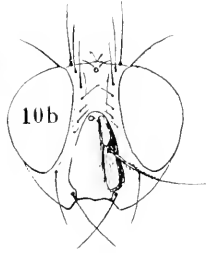
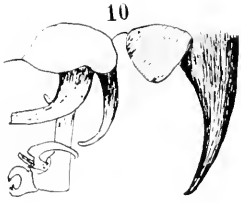


PLATE 3.

- 16b. *Emblemasoma erro* n. sp., side view of head of male.
17. *Emblemasoma faciale* n. sp.
18. *Sthenopyga globosa* n. gen. and sp.
19. *Harpagopyga diversipes* n. gen. and sp.
20. *Thelodiscus indivisus* n. gen. and sp.
21. *Sarcophaga simuata* Meig., with back view of penis in outline.
22. *Sarcophaga cockerellae* n. sp.
23. *Sarcophaga hinei* n. sp.
24. *Sarcophaga pulla* n. sp.
25. *Sarcophaga tarsata* n. sp.
26. *Sarcophaga latisterna* Parker.
27. *Sarcophaga parkeri* n. sp.

PLATE 3

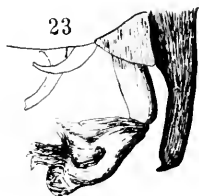
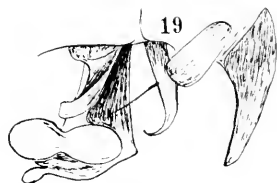
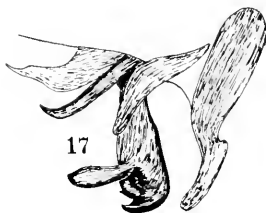
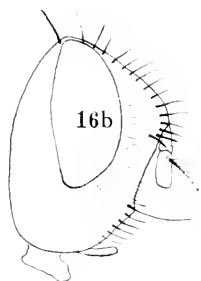


PLATE 4.

28. *Sarcophaga cimbeis* Townsend.
29. *Sarcophaga bisetosa* Parker.
30. *Sarcophaga taurus* n. sp.
31. *Sarcophaga cessator* n. sp.
32. *Sarcophaga sarraceniæ* Riley.
33. *Sarcophaga tetra* n. sp.
34. *Sarcophaga idonea* n. sp.
35. *Sarcophaga sima* n. sp.
36. *Sarcophaga pervillosa* n. sp.; 36a, first segment of hind tarsus of male.
- [37.] Same, variety *inchoata*, n. var. (not figured).
38. *Sarcophaga fletcheri* n. sp., with back view of anterior clasper.
39. *Sarcophaga davidsoni* n. sp.
40. *Sarcophaga atlanis* n. sp.

PLATE 4

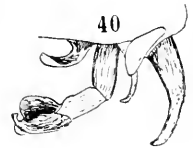
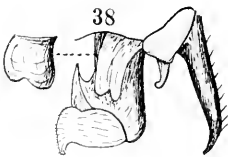
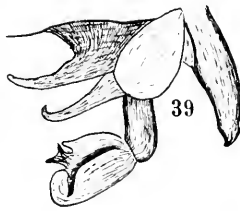
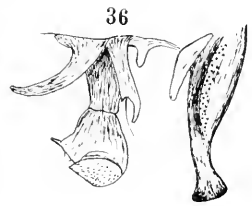
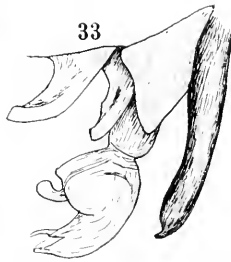
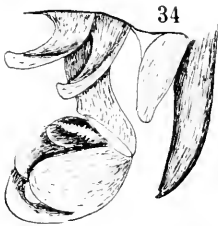
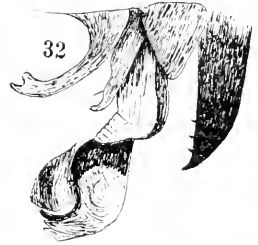
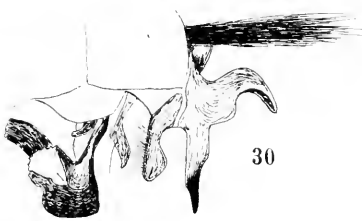
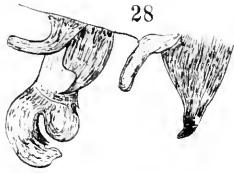


PLATE 5.

41. *Sarcophaga hunteri* Hough.
42. *Sarcophaga spatulata* n. sp.: 42a, larvipositor of female from side, with dorsal view in outline.
43. *Sarcophaga melampyga* n. sp., with back view of penis in outline.
44. Same, variety *alata* n. var., penis and back view of its terminal part.
45. *Sarcophaga chaetopygialis* Will.
46. *Sarcophaga albisignum* n. sp.
47. *Sarcophaga magna* n. sp.
48. *Sarcophaga opifera* Coq.
49. *Sarcophaga peniculata* Parker.
50. *Sarcophaga parallela* n. sp.
51. *Sarcophaga rudis* n. sp.

PLATE 5

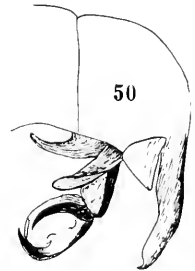
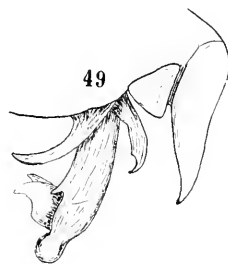
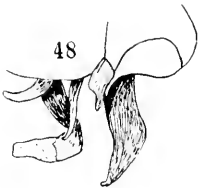
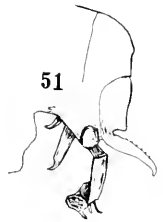
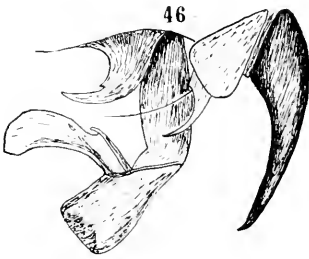
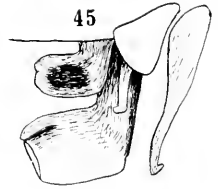
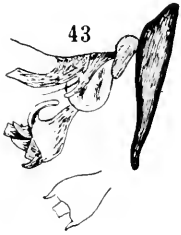
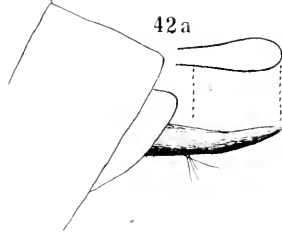
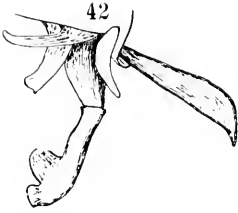


PLATE 6.

52. *Sarcophaga excisa* n. sp.
53. *Sarcophaga eleodis* n. sp.
54. *Sarcophaga masculina* n. sp., with end view of penis.
55. *Sarcophaga alcedo* n. sp.
56. *Sarcophaga prohibita* n. sp.
57. *Sarcophaga reversa* n. sp.
58. *Sarcophaga marginata* n. sp.
59. *Sarcophaga falciformis* n. sp.
60. *Sarcophaga setigera* n. sp., with back view of penis.
61. *Sarcophaga coloradensis* n. sp.; 61a, side view of head of female; 61b, abdomen of female from side, to show larvipositor; 61c, next plate.

PLATE 6

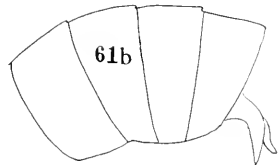
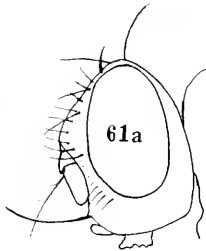
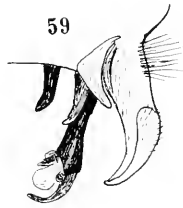
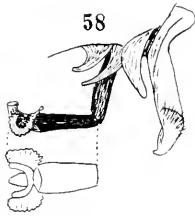
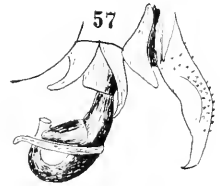
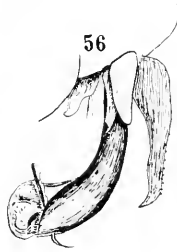
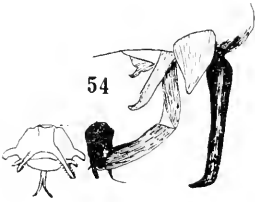
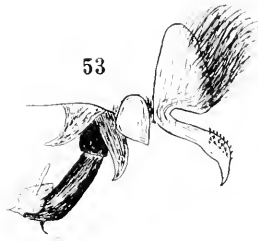


PLATE 7.

- 61c. *Sarcophaga coloradensis* n. sp., larvipositor of female, more enlarged.
62. *Sarcophaga websteri* n. sp.
63. *Sarcophaga angustifrons* n. sp., with back of penis in outline.
64. *Sarcophaga aculeata* n. sp.
65. Same, variety *gavia*, n. var., with back view of penis more enlarged.
66. Same, variety *taediosa* n. var.
67. *Sarcophaga flavipes* n. sp.
68. *Sarcophaga larga* n. sp.: 68a, male abdomen from side.
69. *Sarcophaga rufiventris* Wied.
70. *Sarcophaga ampulla* n. sp.

PLATE 7

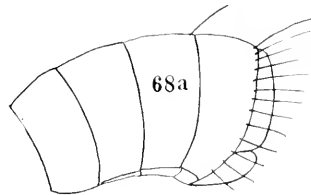
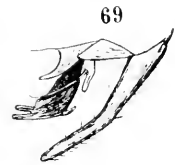
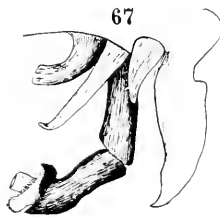
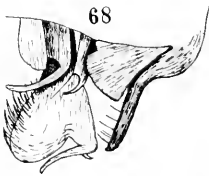
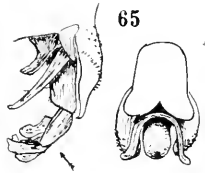
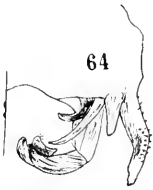
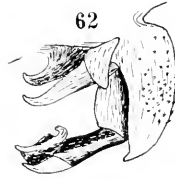
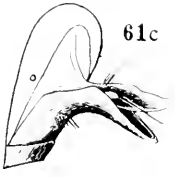


PLATE 8.

71. *Sarcophaga biseriata* n. sp.
72. *Sarcophaga surrubea* Van der Wulp.
73. *Sarcophaga hospes* n. sp.
74. *Sarcophaga helicis* Townsend.
75. *Sarcophaga johnsoni* n. sp.
76. *Sarcophaga uliginosa* Kramer.
77. *Sarcophaga aldrichi* Parker.
78. *Sarcophaga houghii* n. sp.
79. *Sarcophaga tuberosa* Pand., var, *harpax*
Pand., with two forms of forceps.
- [80.] *Sarcophaga villipes* Van der Wulp (not fig-
ured).
81. *Sarcophaga cabensis* n. sp., with tips of for-
ceps from behind.
82. *Sarcophaga pedata* n. sp.

PLATE 8

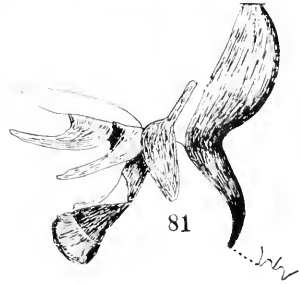
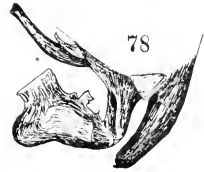
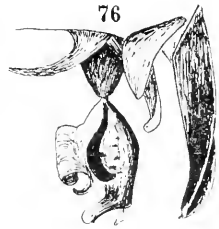
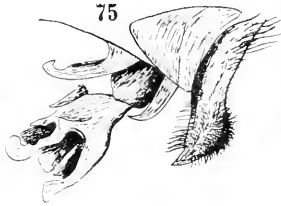
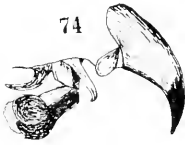
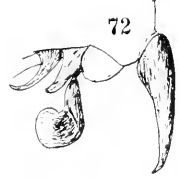
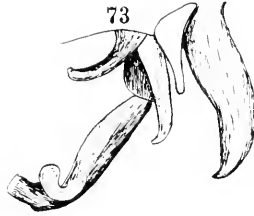
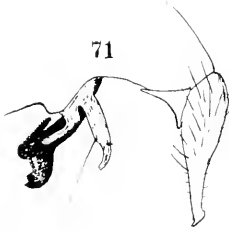


PLATE 9.

83. *Sarcophaga fulvipes* Macq.
84. *Sarcophaga singularis* n. sp.: 84a, forceps
from behind.
85. *Sarcophaga deceptiva* n. sp.
86. *Sarcophaga cotyledonea* n. sp.: 86a, side
view of abdomen of male.
87. *Sarcophaga haemorrhoidalis* Fall.
88. *Sarcophaga chrysostoma* Wied.

PLATE 9

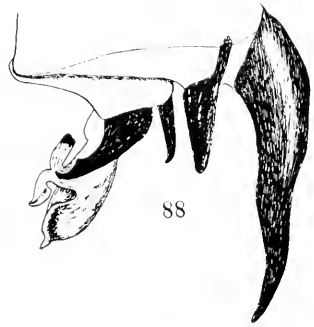
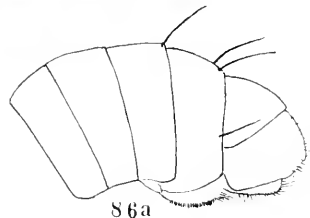
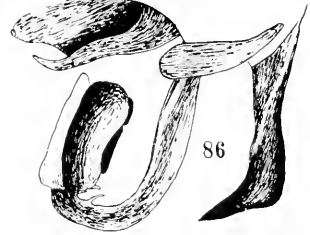
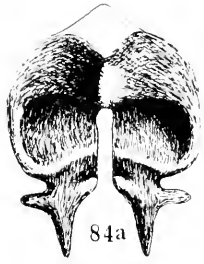
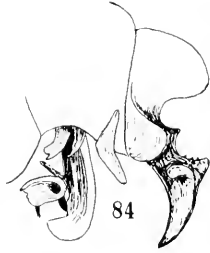
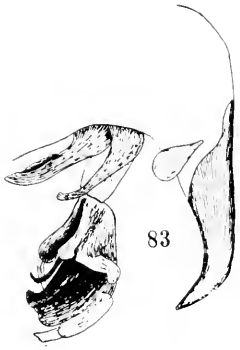


PLATE 10.

89. *Sarcophaga thatuna* n. sp.
90. *Sarcophaga elongata* n. sp.
91. *Sarcophaga occidentalis* n. sp.
92. *Sarcophaga juliaetta* n. sp.; a. outer front
plate of distal segment of penis in another
specimen.
93. *Sarcophaga perspicax* n. sp.
94. *Sarcophaga gracilis* n. sp.
95. *Sarcophaga securifera* Villeneuve.
96. *Sarcophaga falculata* Pand.

PLATE 10

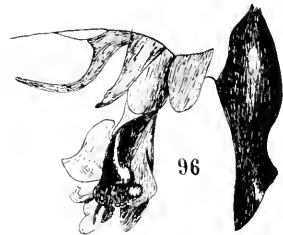
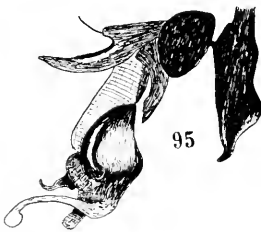
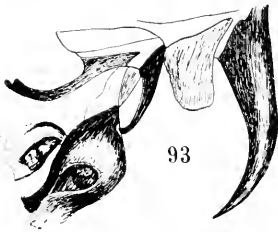
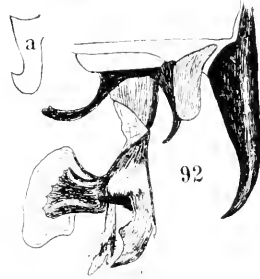
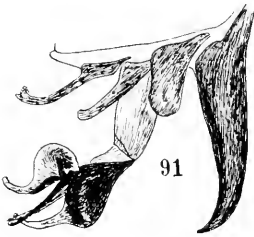
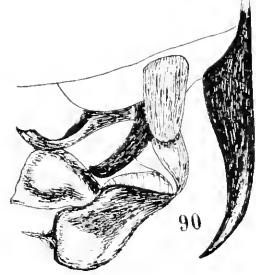
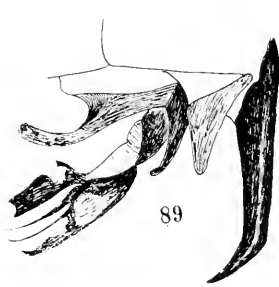


PLATE 11.

97. *Sarcophaga amoena* n. sp.
98. *Sarcophaga capitata* n. sp.
99. *Sarcophaga hillifera* n. sp.; 99a, abdomen with hypopygium drawn out; 99b, fifth sternite and adjacent parts.
100. *Sarcophaga spectabilis* n. sp.
101. *Sarcophaga otiosa* Williston.
102. *Sarcophaga scoparia* Pand.
103. *Sarcophaga peltata* n. sp.

PLATE II

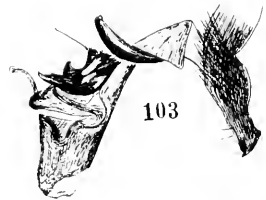
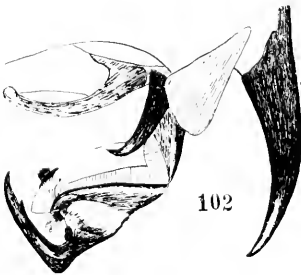
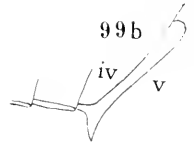
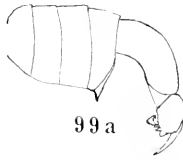
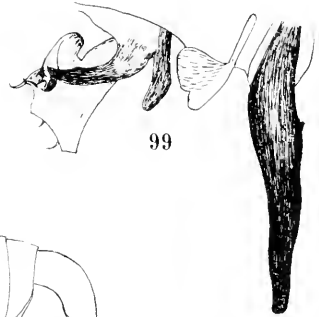
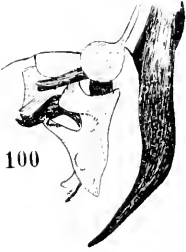
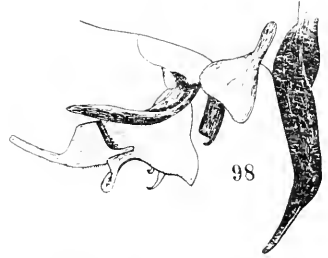
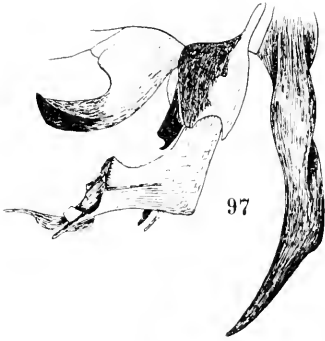


PLATE 12.

- 104. *Sarcophaga subdiscalis* n. sp.
- 105. *Sarcophaga impar* n. sp.; 105a, back of penis.
- 106. *Sarcophaga sulcata* n. sp., the accessory plate indicated by dotted line; 106a, side view of male abdomen.
- 107. *Sarcophaga cooleyi* Parker.
- 108. *Sarcophaga tuberosa* Pand., var. *sarracenioides* n. var.
- [109.] *Sarcophaga tuberosa* var. *exuberans* Pand. (not figured).
- 110. *Sarcophaga bison* n. sp.
- 111. *Sarcophaga libera* n. sp.

PLATE 12

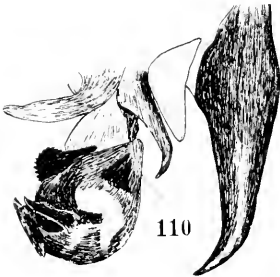
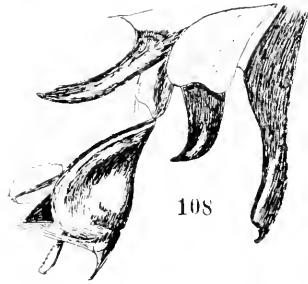
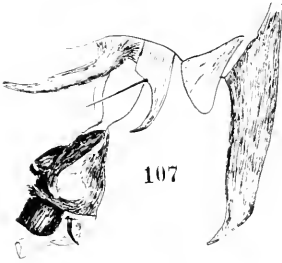
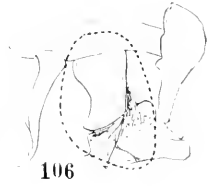
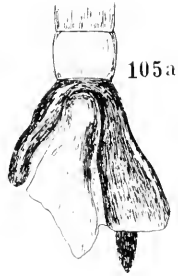
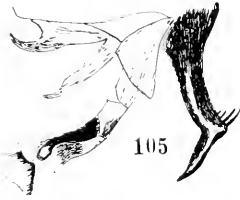
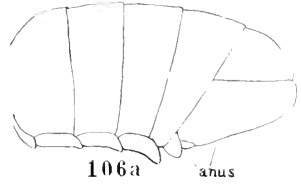
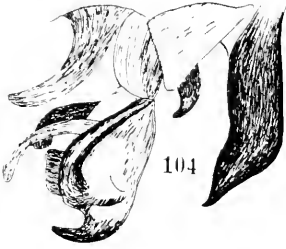


PLATE 13.

- 112. *Sarcophaga salva* n. sp.
- 113. *Sarcophaga rileyi* n. sp.
- 114. *Sarcophaga jonesi* n. sp.
- 115. *Sarcophaga celarata* n. sp.
- 116. *Sarcophaga servilis* n. sp.
- 117. *Sarcophaga floridensis* n. sp.
- 118. *Sarcophaga planifrons* n. sp.
- 119. *Sarcophaga pectinata* n. sp.
- 120. *Sarcophaga communis* Parker: 12a, outline
of penis from behind.
- 121. Same, var. *ochracea* n. var., outline of penis
from behind.

PLATE 13

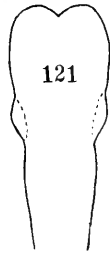
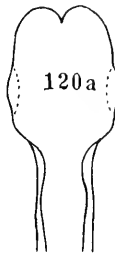
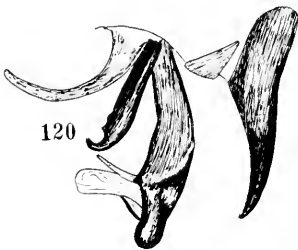
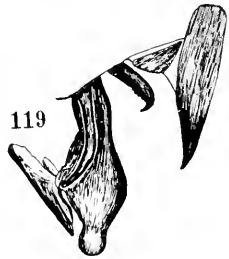
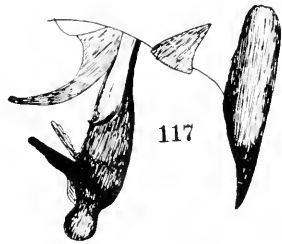
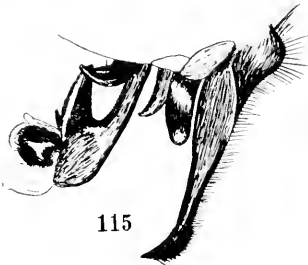
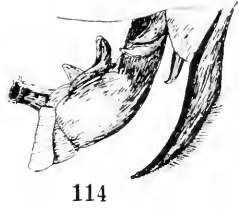


PLATE 14.

- 122. *Sarcophaga flavipalpis* n. sp.
- 123. *Sarcophaga bishoppi* n. sp.
- 124. *Sarcophaga incurva* n. sp.; 124a, hind femur
and tibia of male.
- [125.] *Sarcophaga insurgens* n. sp. (not figured).
- 126. *Sarcophaga kellyi* Aldrich.
- 127. *Sarcophaga sternodontis* Townsend.
- 128. *Sarcophaga robusta* n. sp.
- 129. *Sarcophaga bakeri* n. sp.; a, outline of for-
ceps from behind.
- 130. *Sarcophaga hamata* n. sp.

PLATE 14

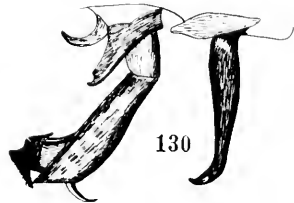
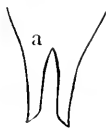
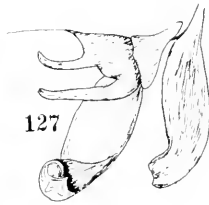
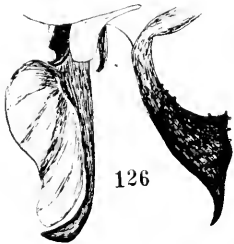
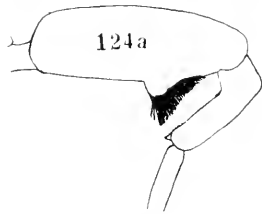
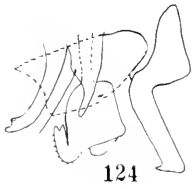
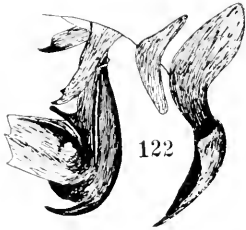


PLATE 15.

- 131. *Sarcophaga xanthosoma* n. sp.
- 132. *Sarcophaga utilis* Aldrich.
- 133. *Sarcophaga cistudinis* n. sp.
- 134. *Sarcophaga galeata* n. sp.; a, outline of forceps from behind.
- 135. *Sarcophaga australis* n. sp.; a, outline of forceps from behind.
- 136. *Sarcophaga timida* n. sp.
- 137. *Sarcophaga assidua* Walker: 137a, outline of forceps from behind, more enlarged.
- 138. *Sarcophaga cingarus* n. sp.; a, tip of right anterior, and b, of right posterior, clasper from behind.

PLATE 15

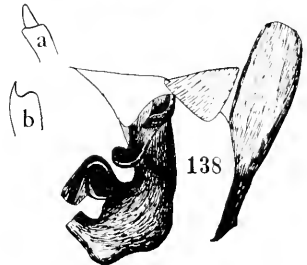
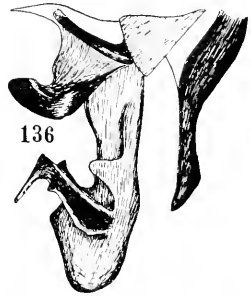
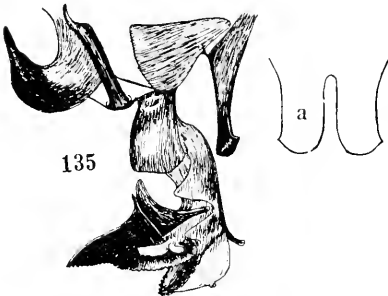
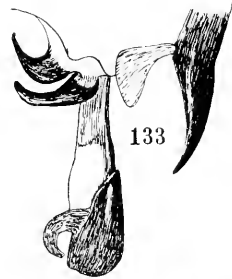
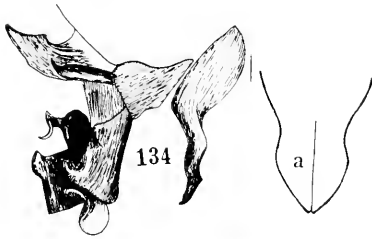
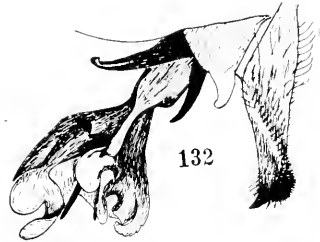
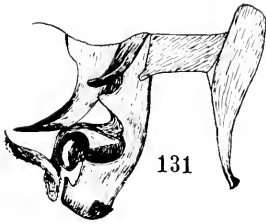
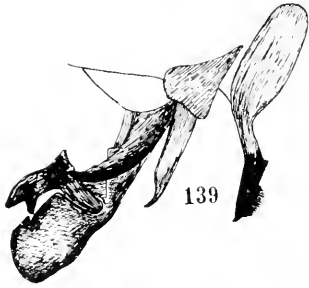


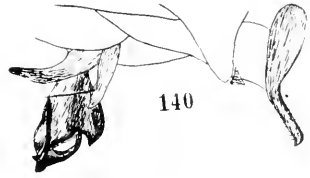
PLATE 16.

139. *Sarcophaga culminata* n. sp.
140. *Sarcophaga fissa* n. sp.
141. *Sarcophaga fimbriata* n. sp.
142. *Sarcophaga texana* n. sp.; 142a, outline of penis from behind.
143. *Sarcophaga quadrisetosa* Coq.
144. *Sarcophaga latisetosa* Parker.
145. *Sarcophaga globulus* n. sp.
146. Diagram of choracic chaetotaxy in *Sarcophaga* and allies; the dots represent the bristles, larger or smaller, while the broken lines connect them in rows. Explanation:
HUM, humeral, three or four in a curved row.
PHUM, posthumeral, one or two behind the humerus.
ANT ACR, anterior acrostichal, usually two or three in a longitudinal row, but often small or indistinguishable from adjacent hairs.
ANT DC, anterior dorsocentrals, two or three before the suture.
PRS, presutural, one large, sometimes an adjacent small.
NPL, notopleural, usually four, alternating small and large.
SA, supra-alar, usually two.
PS DC, posterior dorsocentral, a continuation of the ant dc row, behind the suture; usually three or four (in *Notochaeta* only two).
INTA, intra-alar, usually two.
PA, postalar, always two.
PRSC, prescutellar, one, usually small (the indicating line should extend to the two small dots just in front of the middle of the scutellum).
MARG, marginal of scutellum, two or three.
SAP, subapical of scutellum, usually one small.
AP, apical of scutellum, one small, absent in some males and nearly all females.
STPL, sternopleural (not shown) are on the side of the thorax, above the middle coxa, usually three, sometimes two or four; they are more variable than most of the bristles.

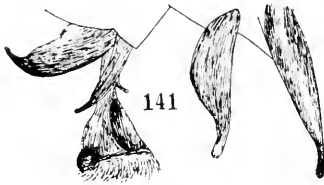
PLATE 10



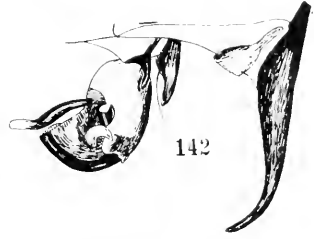
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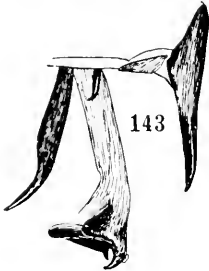
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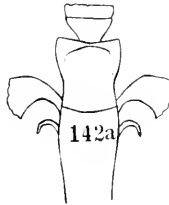
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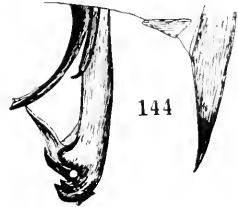
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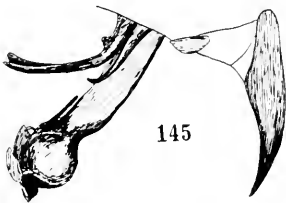
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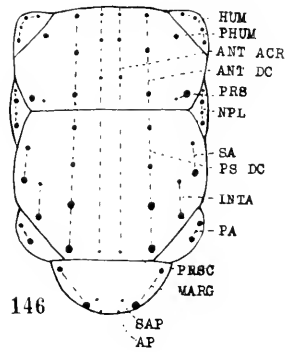
142a



144



145



146

HUM
PHUM
ANT ACR
ANT DC
PRS
NPL
SA
PS DC
INTA
FA
PRSC
MARG
SAP
AP

INDEX.

Generic names begin with capital, specific with small letter; synonyms in italics.

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HISTORICAL SKETCH

of the

THOMAS SAY FOUNDATION

At the Atlanta meeting of the Entomological Society of America, in the business session on Dec. 31, 1913, the Secretary read the following communication from Nathan Banks:

"Inasmuch as there is no independent society in this country able to publish large works on Entomology, and since there are even now manuscripts awaiting printing, and with time there will be more, I suggest that the Entomological Society of America found such a society. This Society to be known as 'The Thomas Say Society.' Its object to publish catalogues, revisions, and monographs of North American Insects. That it be authorized to solicit and collect money for a permanent fund, the interest on which shall be for the printing of said works. That the Society shall be controlled by a board of five entomologists, chosen by the Executive Committee of the Entomological Society of America. Each member to serve five years, the first board to have one member for one, two, three, four, and five years, thereafter one selected each year. That all money received for the sale of publications be added to the permanent fund. That said board of control shall select whatever officers they deem necessary and have authority for accepting articles for printing and disbursement of funds."

On motion the President was directed to appoint a committee of three to consider ways and means for the establishment of such a society. The President appointed the following Committee:—Nathan Banks, chairman; H. H. Lyman, and Morgan Hebard.

At the Philadelphia meeting of the Entomological Society of America, in the business session held Dec. 31, 1914, a report was received from Nathan Banks and Morgan Hebard (Mr. Lyman having died

within the year), in which the project was further outlined, and a constitutional amendment covering the main feature was proposed, to be voted on a year later. The name was changed to "The Thomas Say Foundation." The following members were named on the Committee for 1915: Alex. D. MacGillivray, editor; Morgan Hebard, treasurer; Nathan Banks, J. M. Aldrich, E. P. Duzee. An appropriation of fifty dollars for preliminary expenses was allowed.

At the Columbus meeting of the Entomological Society of America, in the business session held Dec. 30, 1915, the Committee reported that ten-dollar advance subscriptions to the publications of the Foundation had been solicited, which had brought in \$170; there was an unexpended balance of \$40.88 from the appropriation of the previous year. The Society adopted the Constitutional amendment relating to the Foundation, as follows:

ARTICLE VIII.

SECTION 1. *Name*—There is hereby established a standing committee of the Society under the name of "The Thomas Say Foundation."

SEC. 2. *Purpose*—The purpose of this Foundation is for the publication of works of a monographic or bibliographic character on the insects of North America.

SEC. 3. *Publication*—Each publication shall be a volume complete in itself and numbered consecutively.

SEC. 4. *Committee*—This committee shall consist of six members, four of them to be elected by the Executive Committee of the Society, two of them retiring annually, and an Editor and a Treasurer, to be designated by the Executive Committee.

SEC. 5. *Powers*—This committee is empowered to determine all matters concerning the publication.

SEC. 6. *Funds*—They are also empowered to solicit, hold, invest, and expend funds committed to their care; only the interest of any endowment to be available.

SEC. 7. *Responsibility*—The Society shall be in no way responsible for debts contracted by the Foundation, unless previously authorized by the Executive Committee.

SEC. 8. *Reports*—The Editor and Treasurer shall present a report of their operations and expenditures to the Executive Committee at each Annual Meeting, and the accounts of the Treasurer shall be audited by the Auditing Committee of the Society. These reports shall be published as a part of the proceedings of the Executive Committee.

The following members were appointed on the Thomas Say Foundation in pursuance of the Constitutional provisions:

P. P. Calvert, editor.

Morgan Hebard, treasurer.

Nathan Banks.

A. D. MacGillivray.

J. M. Aldrich.

E. B. Williamson.

Dr. Calvert subsequently withdrew from the editorship, and the Executive Committee elected J. M. Aldrich to the position.

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