

The species occurred in nearly all the hauls taken with the small tow-net.

Two interesting points may be mentioned. Firstly, whereas the total plankton showed two maxima, at 11.0 A.M. and 9.30 P.M. respectively, *Diaphanosoma* was really abundant only at the latter time; secondly, this greater abundance was chiefly due to a great increase in the number of mature animals. The only other surface-haul in which adults were present was that at 3.30 P.M., when only a few were taken. This seems definitely to indicate a diurnal migration, at least of the adults, of this species—a migration such as is well known for the northern species of the genus.

Alonella diaphana (King).

1852. King, "On Australian Entomostraca," Papers & Proc. Roy. Soc. Van Diemen's Land, ii. pt. 2, p. 360, pl. viii. c.

1888. Sars, G. O., "Some Additional Cladocera raised from Australian Mud," Forh. Vidensk. Selsk. Christiania, no. 7, p. 47, pl. v. figs. 3-7.

The identification of this species is uncertain, as the only specimen (♀) found in the collections was damaged in mounting. The first antennæ seemed to be slightly shorter than in the type, and the dorsal posterior corner of the abdomen showed a slight angle, whereas in the form described by Sars under this name and identified by him with King's species the corner was quite rounded off.

The specimen occurred in a collection taken with a bolting silk hand-net close to the shore on June 2nd, 1927.

The species has been chiefly recorded from Australasia*.

Dunhevedia crassa, King, Sars.

1852. King, *loc. cit.* p. 261, pl. vii. f.

1888. Sars, G. O., *loc. cit.* p. 42, pl. v. figs. 1-4.

The two specimens of this species from Gaua agree closely with the description and figures given by Sars (1888), who separates it later (1916) † from *D. setigera* (Birge) † on the grounds of the lack of distinct sculpturing of the valves in the former.

One specimen was found in the same collection as the

* 1927, Gurney, R., "Some Australian Freshwater Entomostraca reared from Dried Mud," Proc. Zool. Soc. London, p. 74, fig. 8, c & d.

† 1916, Sars, G. O., "Freshwater Entomostraca of Cape Province.—Cladocera," Ann. S. African Mus. xv. 4, p. 343, pl. xli. figs. 3, 3a-c.

† 1877, Birge, E. A., "Notes on Cladocera," Trans. Wisc. Acad. Sci. iv. pp. 100-102, pl. i. fig. 18.

foregoing species, the other in a haul made on June 3rd, 1927, with the small tow-net "started deep"—a fact which probably accounted for the presence of this stray specimen in the plankton.

The species is fairly widely distributed, being certainly recorded from Australia and S. Africa. Gurney (1909)* gives an even wider distribution for it, but he does not separate it from the American form.

Chydorus sphaericus (O. F. Müller).

1785. Müller, O. F., 'Entomostraca seu Insecta testacea etc.', p. 71, pl. ix. figs. 7-9.

1900. Lilljeborg, W., 'Cladocera Suecicæ,' p. 561, pl. lxxvii. figs. 8-25.

The presence of this ubiquitous species is interesting if only as affording another example of the amazing powers of distribution possessed by Cladocera. The single specimen found in the collections from Gaua appeared to differ in no marked way from the type. It occurred in plankton taken with the small tow-net, weighted.

1929

XXII.—*Exotic Muscaridæ (Diptera)*.—XXVII. By J. R. MALLOCH, Bureau of Biological Survey, Washington, D.C.

Family Chloropidæ.

Genus *STENOSCINIS*, Malloch.

This genus was erected by me for the reception of *Oscinis longipes*, Loew, a North American species. In 1918 Mr. C. G. Lamb described a species from Africa which is an absolute homonym of the genotype, and peculiarly enough it belongs to the same genus. It thus falls to me, in recording the occurrence of this species in material submitted for identification, to assign to it a new name as below.

Stenoscinis arnos, nom. nov.

Oscinis longipes, Lamb, *nec* Loew, Ann. & Mag. Nat. Hist. (9) i. p. 395 (1918).

This species has the same characters as the genotype, but even more accentuated, the anal angle of the wing undeveloped so that the anal field is widest below middle of the

* 1909, Gurney, R., "Freshwater Crustacea of Algeria and Tunisia," Journ. Roy. Micr. Soc. p. 292.

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discal cell, the legs long and slender, the anterior notopleural bristle undeveloped and only one of the posterior pair evident, and the frontal triangle very broad, with a blunt extremity on anterior margin of frons. In his description Lamb indicated that the species might yet be accorded generic rank.

It is noteworthy that in my specimen the mesonotum is not totally glossy black, being grey-dusted in centre of the hind margin, as is also the centre disc of the scutellum.

Length 3 mm.

Locality.—Umtali, S. Rhodesia, 27 September (*A. Cuthbertson*).

In giving this species a new name I dedicate it to the original describer.

Genus STELEOCERUS, Becker.

This genus is readily distinguished from others in the subfamily Chloropinæ by the thickened, sword-like arista, which is almost nude, and the slender legs.

Steleocerus lepidopus, var. *apicalis*, nov.

A female agreeing very well with the description of *lepidopus*, Becker, is before me from Salisbury, S. Rhodesia, x. 1928 (*A. Cuthbertson*).

It has, however, a quite distinct brownish cloud at apex of wing in the submarginal cell; the fore tibiæ and tarsi are deep black, and there is no dark mark on the fore femur.

Length 5.5 mm.

I give to this form a varietal name, but it is possible it is a distinct species. More material is required to determine the status of the insect.

Family Drosophilidæ.

Genus LISSOCEPHALA, nov.

This genus is quite similar to *Drosophila*, Fallén, differing essentially in having the entire frons glossy, uniform in texture, and slightly projecting, eaves-like, over the bases of the antennæ. Postverticals short, all verticals well developed, ocellars long, posterior reclinate and proclinate orbitals quite strong, anterior reclinate, orbital microscopic, between the others; face carinate; arista plumose. Thorax with two pairs of postsutural dorsocentrals, no prescutellar acrostichals, four scutellars, and two sternopleurals. Wings as in fig. 1, the second vein much as in some species of the

genus *Chymomyza*, Czerny, gradually approaching costa and not curved forward at apex; no cross-vein separating posterior basal and discal cells; costa to apex of fourth vein; anal cell complete. Legs normal.

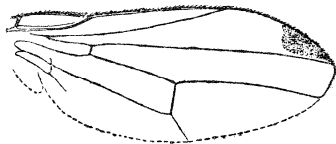
Genotype, the following species.

Lissocephala unipuncta, sp. n.

Female.—Head, thorax, legs, and halteres, shining fulvous-yellow, face a little paler; abdomen glossy blue-black, with coppery or purple reflections apically; wings hyaline, veins pale, apex of first vein and costa before that point darker, a rather large fuscous spot on costa at apex of submarginal cell extending basally about midway to apex of second vein (fig. 1).

Frons about 1.5 as wide at vertex as long in centre, slightly convex, bare; facial carina well developed, slightly

Fig. 1.



Lissocephala unipuncta, wing.

flattened; third antennal segment about twice as long as wide; eyes without evident hairs; cheek not as high as width of third antennal segment. Thorax with eight quite regular series of intradorsocentral hairs, two humerals, scutellum flattened above, slightly margined, apical bristles cruciate. Abdomen tapered to apex. Mid-tibia with one apical ventral spur.

Length 2.75 mm.

Type, Salisbury, S. Rhodesia, 18. iv. 1927, under fig-tree; one paratype, same locality, labelled "Bred figs," iv. 1927 (*A. Cuthbertson*); no. 108*f*.

Genus *ZAFRIONUS*, Coquillett.

This genus is readily distinguished from any in the family by the peculiar armature of the anteroventral surface of the fore femur in both sexes, which consists of a series of slightly flexed spines set on elevated bases.

Zaprionus vittiger, Coquillett.

This species, which is the genotype, is fulvous-yellow in colour, with a pure white line along each frontal orbit, which connects with a similar one on each side of disc of mesonotum that continues along side of scutellum to apex, and another such line along the notopleural margin, all of which lines are narrowly margined with black; sometimes there is another, but fainter, white line along the middle of the pleura. Wings hyaline.

Proclinate orbital well in front of anterior reclinate orbital, the latter usually well developed; frons narrowed in front, longer than wide, facial carina quite prominent. In other respects similar to typical species of *Drosophila*, Fallén.

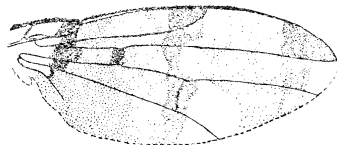
Locality.—Salisbury, S. Rhodesia, 16. i. 1922, labelled "No. 1173, fruit" (*A. Cuthbertson*).

GENUS LEUCOPHENGA, Mik.

Leucophenga cuthbertsoni, sp. n.

Male.—Pale straw-yellow, frons, dorsum of thorax and scutellum, and dorsum of abdomen, densely silvery-white dusted; legs straw-yellow, halteres white, wings greyish

Fig. 2.

*Leucophenga cuthbertsoni*, wing.

hyaline, marked as in fig. 2, a mark beyond the complete dark fascia and one in apices of first and second posterior cells whitish hyaline.

Frons fully twice as long as wide, almost parallel-sided, postverticals and ocellars short and fine; all three orbitals quite long, the anterior reclinate and proclinate bristles at same point, a few fine hairs on interfrontalia and orbits anteriorly; third antennal segment over twice as long as wide; cheeks linear; palpi slender. Venation as in fig. 2, the apical section of costa with about three minute warts on its underside.

Length 2.25 mm.

Type, Salisbury, S. Rhodesia, 27 June (*A. Cuthbertson*); no. 162.

Named in honour of the collector, who has sent me many interesting Diptera from Africa.

Family Sarcophagidæ.

I have received from Dr. G. A. K. Marshall a number of specimens of the genus *Sarcophaga* from Africa with a request for early identifications, and herein publish the desired information with some notes on other species.

But few of the species of the genus described from this continent by the old authors are identifiable, which is unfortunately also the case with species of the genus from other faunal regions, and without very careful examinations of the type-specimens, including the male hypopygia, it is impossible to recognize any but the most conspicuously differentiated forms. It is thus highly probable that some of the more recently described species may prove to be synonyms of those of earlier describers. Notwithstanding this probability, both with those just referred to and others that cannot be identified with them, it would appear imperative to describe the latter so that definite names may be available for them in literature dealing with the economy or distribution of such species. I therefore describe below two species which I have been unable to associate with any described species.

Both of the species are similar to *angelica*, Engel, described from Cape Colony*, possessing three pairs of postsutural dorsocentrals, and bristles on the basal half of upper surface of the first wing-vein. The two before me have the centre of the propleura hairy, but Engel makes no mention of this character in *angelica*, and he states that the mid-femur has a comb (apical posteroventral), which is not the case in either of the species now under discussion. All three have the hypopygia orange-red, though Engel states that the basal genital segment in his type is hidden.

In describing the new species I have used all the above characters and figured the hypopygia, at the same time making use of reproductions of those portions of Engel's figures of the hypopygium of *angelica* which show differences from those of the new species.

A number of the North American species of the genus are parasitic upon grasshoppers, which habit is recorded for the species now described from Africa.

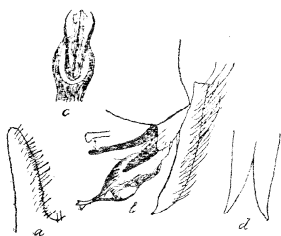
* Bull. Soc. Roy. Ent. d'Egypte, p. 334, 1924 (1925).

Sarcophaga benefactor, sp. n.

Male.—Head black, with dense pale grey dusting, that on the parafacials changeable according to the angle from which it is viewed; antennæ and palpi black. Thorax black, with dense pale grey dusting, mesonotum with five black vittæ, the median one continued over the scutellum, the outer one on each side incomplete. Abdomen black, ochreous-yellow from near base of fourth visible tergite to tip, including the hypopygium, the dusting grey at base, becoming yellowish on sides and apically. Legs black. Wings greyish hyaline. Calyptræ white. Halteres dusky yellowish.

Frons at vertex about one-fifth of the head-width, narrowed centrally, widened in front, inner verticals long, outer pair small, ocellars short and fine, each orbit with about seven anterior incurved bristles and one upper backwardly

Fig. 3.



Sarcophaga benefactor, male. *a*, fifth sternite, one side from below; *b*, hypopygium from the side; *c*, apex of penis from below; *d*, apices of superior forceps from behind.

curved bristle, the latter usually strongest; parafacial wider than third antennal segment, with one series of hairs close to eye, which become longer below. Thorax with three pairs of postsutural dorsocentrals, a fine pair of prescutellar acrostichals, sternopleurals 1:1:1, scutellum with two long bristles on each side, a short pair of apicals, and a similar pair of subapical discals. Abdomen without apical central bristles on second visible tergite, third and fourth each with apical bristles; fifth sternite as in fig. 3 *a*, hypopygium not above the average in size, as in fig. 3. Legs normal, mid-femur with the apical third of posteroventral surface lacking strong bristles; neither mid nor hind tibiæ with exceptional hairing, the former with a strong submedian ventral bristle,

the hind tibia with one or two anteroventral bristles; hind femur with two partial dorsal series of bristles centrally, the anteroventral and posteroventral bristles not closely placed, the same surfaces with some long hairs which are quite sparse. First with vein bristled on basal half above, third with short bristles from base to near the inner cross-vein on upper surface.

Female.—Similar to the male in colour, the entire apex of abdomen from base of fourth visible tergite reddish orange, and the sides and apex with the yellow tint of dusting even more pronounced than in the male.

The frons is wider than in the male, with two forwardly-directed outer orbitals on each side, and the outer vertical bristles are about half as long as the inner pair. The apical scutellar bristles are lacking, but in other respects the thorax is as in the male.

Length 7–9 mm.

Type, male, allotype, and 16 paratypes, Moshi, Tanganyika Territory, 1929 (*A. H. Ritchie*). Reared from *Schistocerca gregaria*.

Group-characters linking this species with the next one are the setulose first vein of the wing, the posteriorly haired prosternal plate, centrally haired propleura and postalar declivity, and the presence of hairs below the lower calypter on metanotum. In addition, the three pairs of postsutural dorsocentrals and lack of long fine hairs on the tibiæ may be taken as of value in minor degree.

Sarcophaga destructor, sp. n.

Male.—Very similar to the foregoing species, but the

Fig. 4.



Sarcophaga destructor, male. Lettering as in fig. 3.

dusting over all is not so decidedly whitish grey, but more yellowish grey, being more uniform on the abdomen, which latter is not so extensively yellowish at apex in the female.

Structurally the species are also very similar, being distinguishable only by the characters of the fifth abdominal sternite and hypopygia of the male (fig. 4).

Length 6-9 mm.

Type, male, Kassalla, Sudan, 11. xii. 1923 (*H. H. King*), bred from locust; allotype, one female, and two male paratypes, Khartoum, 14. viii. 1927, bred from *Schistocerca gregaria* (*H. W. Bedford*).

Sarcophaga angelicæ, Engel.

I reproduce portions of the figures of the hypopygia of Engel's species for the purpose of making comparisons only (fig. 5).

Engel states that this species has a mid-femoral comb.

Fig. 5.

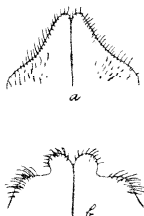


Sarcophaga angelicæ, male. *a*, penis from the side; *b*, same from below; *c*, apices of forceps from behind.

Sarcophaga taitensis, Schiner.

This species is very similar to *peltata*, Aldrich, and, if my opinion is correct, has been recorded as such from Samoa.

Fig. 6.



Sarcophaga peltata (*a*) and *taitemensis* (*b*), fifth sternite from below.

The two species agree in coloration and general structure, but there is a very considerable difference in the structure of the fifth abdominal sternite of the males, and there are

also some differences in the form of certain appendages of the hypopygium of that sex. I figure the fifth sternite of the two species to make the distinction clear (fig. 6).

Locality.—Papeete, Society Islands, vii. 1928, and Moorea, Society Islands, viii. 1928 (*A. Tonnoir*). Seven specimens.

Sarcophaga sternodontis, Townsend.

This species is one of the commonest of the parasitic species of the genus in tropical and subtropical America, extending from Florida through the West Indies to British Guiana and Peru.

I make mention of it here merely to draw attention to a peculiar character which it possesses that is not mentioned in the original description nor in Aldrich's more recent re-description of the species*.

This consists of a patch of dense decumbent black hairs on the apical third of the anterior surface of the hind femur. Similar patches, but of yellow hairs, occur on the mid-femur in *sinuata*, Meigen, and another Palearctic species.

The species does not belong to the same group as the two new African forms described in the present paper, having the first vein and centre of the propleura bare, and the hypopygium quite different. The mesonotum has the anterior one of the three pairs of postsutural dorsocentrals weaker than in the other two species, and usually a quite noticeable pair of acrostichals close to the suture that those species lack.

I have already identified, but not recorded, specimens of this species sent me by Dr. G. A. K. Marshall from British Guiana.

XXIII.—*A Comparative Study of the Otoliths of the Neopterygian Fishes* (continued). By G. ALLAN FROST.

[Plate III.]

XIX. Order SCLEROPAREI †.

Suborder SCORPENOIDEA.

Division 1. SCORPÆNIFORMES.

In *Helicolenus percoides* (Pl. III. fig. 1), of the family Scorpænidæ, the sagitta is of the Percid type, the shape being ovate and curved, with the outer side concave and the inner side convex. The dorsal rim is curved and is

* '*Sarcophaga* and Allies,' p. 265 (1916).

† The arrangement of families adopted here is that published by Regan (*Ann. & Mag. Nat. Hist.* ser. 8, xi. 1913, p. 169).