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A NEW GENUS AND FOUR NEW SPECIES
OF FOSSIL DIPTERA FROM MONTANA
AND COLORADO

BY
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MUSEUM OF PALEONTOLOGY
THE UNIVERSITY OF MICHIGAN
ANN ARBOR

CONTRIBUTIONS FROM THE MUSEUM OF PALEONTOLOGY

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A NEW GENUS AND FOUR NEW SPECIES
OF FOSSIL DIPTERA FROM MONTANA AND COLORADO

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INTRODUCTION

THE DIPTERA described in this paper are, with two exceptions, part of a large collection of fossil insects made in 1948 by Professor Claude W. Hibbard and graduate students from The University of Michigan. The fossils occur in well-stratified shale of early Miocene or late Oligocene age in the Ruby River Basin, on Peterson Creek, sec. 23, T. 7 S., R. 5 W., Madison County, Montana. At the invitation of Dr. Lewis B. Kellum, Director of the Museum of Paleontology of The University of Michigan, I undertook to study the diptera. Although much of the material is indeterminate, because essential characters are not preserved, there are, nevertheless, some very interesting species and genera. The majority of the flies belong to the family Bibionidae. Sixteen of the 38 specimens of diptera in the collection are bibionids and referred to three species. A small asilid is present and five syrphids belonging to at least three species. Six specimens belong to the family Mycetophilidae. Two parasitic wasps, one of which is well preserved, are in the collection.

Associated with the catalogued specimens received from The University of Michigan, were three unnumbered specimens not mentioned in the list that accompanied the shipment. I designated these X-12, Z-12, and Y during the investigation and they were subsequently catalogued in the

Museum of Paleontology of The University of Michigan under the numbers UMMP 35457, 35458, and 40623. All three are syrphids. One of them, No. 35458 (=Z-12), was labeled "Florissant (Stump Hill)" and is in a thin layer of brownish-gray sandy shale resembling other specimens in the Museum's collection from Florissant, Colorado. The other two have a similar lithologic character and are presumably also from Colorado. I described specimen No. 35457 (=X-12) as a new species, *Syrphus petrographicus* Hull, and identified specimen No. 35458 (=Z-12) as *Syrphus willistoni* Cockerell. The third specimen, No. 40623 (=Y), I regard as indeterminate. The two identified specimens are shown on Plates II and III.

SYSTEMATIC DESCRIPTIONS

Phylum ARTHROPODA

Class INSECTA

Subclass PTERYGOTA

Division ENDOPTERYGOTA (HOLOMETABOLA)

Order DIPTERA

Suborder CYCLORRHAPHA

Section ASCHIZA

Family Syrphidae

Archisyrphus Hull, gen. nov.

Type species.—*Archisyrphus opacus*, sp. nov.

Diagnosis.—Small flies with short, rather wide-oval, flattened abdomen. Wing has the third vein nearly straight, with a slight posterior curve as found in *Cheilisia* Meigen. Subapical cell ends with a sharply acute angle a moderate distance from the apex of the wing. Fourth vein at the end of the discal cell is scarcely bent, in fact, almost straight. Third antennal segment short-oval with the arista placed quite close to the apex. Length of body 6 mm.

Archisyrphus opacus Hull, sp. nov.

(Pl. I, Fig. A)

An opaque, dark-colored, or blackish fly; only specimen a male. Length of body 6 mm.; of wing 5 mm.

Description.—Head: The head is small, apparently considerably narrower than the thorax; first 2 segments of antenna very short, third segment short-oval, possibly orbicular with an apical or near apical arista.

Thorax: Scutellum is large, more than twice as wide as long, with uniformly subcircular margin.

Legs: Very little of the legs shows, yet sufficient to indicate that femora appear slender; tibiae about the same thickness as the femora; tarsi comparatively short with the posterior metatarsus somewhat elongate.

Wings: The wings are rather well preserved on both sides. Subcosta ends at the middle of the wing; first branch of the radius ends gradually near the point where the wing curves backward; stigmal area of the subcostal cell darker than the remainder of the wing; marginal cell open and second vein ends acutely. The third vein has a very slight, gentle curve backward, beginning near the end of the subcostal cell or stigma; in this it resembles *Cheilosia* rather than *Syrphus*. The subapical cell is long and quite acute apically and ends a rather short distance from the apex of the wing in contrast to that in *Cheilosia*. The last part of the fourth vein at the end of the discal cell is nearly straight, only slightly curved. Fourth and fifth veins are without spur or remnant veins at the lower corners. The anterior crossvein enters the discal cell near the basal fifth. Vena spuria well developed. Radial sector apparently without bristles. Villi were widely spread over the whole wing and distinctly visible.

Abdomen: The abdomen is short-oval and flattened; its width is approximately 2 mm., its length 2.6 mm.; unicolorous with only 4 segments visible, the second, third, and fourth of nearly equal length. At the end of the fourth segment there appears to have been a very short protrusion, which may represent the posterior margin of a ventral hypopygium.

Holotype.—Male, UMMP 25984, Ruby Basin, Montana.

Genus *Syrphus* Fabricius

***Syrphus petrographicus* Hull, sp. nov.**

(Pl. II, Fig. B)

A well-preserved specimen, male, showing in lateral view legs, abdomen, abdominal pattern, antenna excluding arista, and wing. Length of body 10.5 mm.; of wing 7 mm.

Description of male.—Head: The head is comparatively short and apparently strongly retreating; antenna short with the third segment oval, the arista not showing; mesonotum gently arched with a prominent, long, semicircular scutellum.

Thorax: The thorax is high with the posterior metasternum (above and behind the posterior coxae) high. The hind femur is stout, of moderate length, but not swollen. The hind tibia is slender, obliquely truncate below at the apex (shown clearly) and with a long metatarsus, and comparatively short remaining segments.

Wing: The wings are hyaline, slender, rather steeply narrowed toward the apex on the distal half; submarginal cell slightly narrowed in the middle before the end of the marginal cell as is characteristic in *Syrphus*; marginal cell open, subapical cell strongly acute distally but ending a considerable distance away from the wing apex; subapical crossvein is very slightly undulate. The last part of the fourth vein at the end of the discal cell is almost straight and with only a very slight curve backward, the remnant vein beyond is present only as a trace. Vena spuria well developed, the anterior crossvein rather strongly oblique, at least on its lower part and entering the discal cell a little before the basal fourth of the discal cell; remnant vein at the lower corner of the discal cell well developed.

Abdomen: The abdomen has 5 segments clearly visible, light in color with the posterior margins darker. Surface uniformly covered with clearly discernible, appressed or suberect setae. The hypopygium large, prominent, subglobose, and curled downward so as to become almost entirely ventral. In longitudinal profile the abdomen is strongly convex, especially on the posterior half; the dark posterior bands on the segments are considerably widened in the posterolateral corners. Ventral surface of the abdomen apparently pale and whitish, except on the fourth sternite, where there is a wide, dark, posterior band.

Holotype.—Male, UMMP 35457. Locality not given; presumably from Ruby Basin.

Syrphus willistoni Hull

(Pl. III, Fig. B)

This fly was identified as belonging to this species. I include a photograph because the detail is well preserved and adds to our knowledge of the form. The specimen is from the Florissant (Stump Hill) Miocene, Colorado.

Hypotype.—UMMP 35458.

Suborder ORTHORRHAPHA

Section BRACHYCERA

Group Heterodactyla

Family Asilidae

Genus *Holopogon* Loew

Holopogon archilestes Hull, sp. nov.

(Pl. III, Fig. A)

Dark, blackish-colored fly, with comparatively wide head and occiput increasing in thickness toward the middle of the head. The specimen, of

indeterminate sex, is preserved with the ventrolateral surface up and the sternites exposed. Length of body 10 mm.; of wing 7.5 mm.

Description.—Head: The head is comparatively wide and occiput increases in thickness toward the middle of the head. Antenna shows poorly, but is apparently represented by a long, tapered, third antennal segment with slender, terminal style of rather obscure proportions. The proboscis appears as a keel-shaped, ventral swelling at the bottom of the head, which extends forward over the remains of the antenna. It seems to terminate approximately at the end of the second antennal segment but to bear beyond a slender, bladelike extension exerted from the apex, as is often seen in asilids. This entire structure seems to be directly continued from the basal, ventral swelling.

Thorax: No details available.

Legs: The legs are completely exposed on one side. The anterior and middle femora are stout and only slightly swollen. The posterior femur is distinctly and rather uniformly swollen. The tibiae are comparatively slender at base and gradually become widened distally on all 3 pairs. Anterior basitarsus is as long as the next 2 segments. Hind basitarsus not swollen or at least considerably more narrow than the apex of the tibia and nearly as long as the next 3 segments combined. The legs are covered with dense, fine, appressed setae. Very few bristles are in evidence. The base of the anterior tibia shows 1 slender bristle and there is another anterodorsally beyond the middle. Middle tibia rather poorly preserved. What appears to be a long, slender bristle lies loose beside the hind tibia, of which only the distal half is preserved. Claws are well preserved; the middle end tarsus has well-developed pulvilli. The empodium does not show, although there is perhaps a trace of it on the anterior end tarsus.

Wings: One wing almost complete; venation generalized. Marginal cell quite widely open and ends at a sharp, acute angle. Anterior branch of third vein arising gradually, very slightly curved forward near the apex and ending well above the wing apex. The posterior branch immediately descends below the main part of third vein to a moderate extent, and ends behind the wing apex at a distance nearly as great as the anterior branch from the apex. Anterior crossvein slightly oblique, entering the discal cell a little beyond the middle. Upper part of the anterior intercalary vein distinctly oblique and not quite as long as the oblique and somewhat recurrent, medial crossvein. First posterior cell open in its maximal width. It cannot be determined whether the third posterior cell is closed or open, although the evidence favors the latter interpretation. The anal cell is obscured by the posterior legs. It appears, however, that the ambient vein is present.

Abdomen: Only 7 well-preserved segments to the abdomen can be observed. The sternites are densely covered with fine setae, the tergites likewise. Beyond the seventh segment there is a small discoloration of a rounded, posterior extension, poorly preserved, which may have constituted the eighth segment and terminalia.

Remarks.—The determination of this species is based on the asilid-type wing venation. It resembles quite closely that given by James* for *Senobasis borealis*, but differs in the narrower subcostal cell, the wider open marginal cell, the different end points for the anterior and posterior branches of the third vein, and in that the first posterior cell is not narrowed at the apex. I have assigned the specimen to the genus *Holopogon* Loew, because of the characteristic distal dilation of the tibia. It must be admitted, however, that in the genus *Holopogon* Loew the hind basitarsus is usually swollen. Point of greatest uncertainty lies in the questionable character of the proboscis. Since this is a ventrally preserved specimen, the proboscis should show to better advantage; there is a strong, ventral, keel-shaped elevation on the bottom of the head of the specimen and some indication of a continuing ridge.

Holotype.—Sex indeterminate, UMMP 25983, from Ruby Basin, Montana.

Suborder NEMATOCERA
Series Protophthalma
Family Bibionidae

Genus *Plecia* Wiedemann

Plecia inflata Hull, sp. nov.
(Pl. II, Fig. A; Pl. IV, Figs. A–B)

In available keys, this species traces to *Plecia decapitata* Cockerell but it is distinguished from that species by the essential proportions (see measurements below). The three specimens are females. Length of body of holotype 11 mm.; of wing 8 mm.

Description of female.—Maximum width of marginal cell is 464 microns; at the crossvein it is 481 microns. Distance from the origin of the second vein to radiomedial crossvein 1380 microns. Length of second vein 1328 microns. Distance of distal fork of fourth vein to the radiomedial crossvein is 415 microns; the radiomedial crossvein as aligned with the costa

* M. T. James, *A preliminary review of certain families of Diptera from the Florissant Miocene beds.* Journ. Palaeontol., Vol. 13, p. 44, Fig. 3, 1939.

appears to be directed obliquely backward. Depth of submarginal cell at end of second vein is 498 microns. Depth of first posterior cell at end of second vein 664 microns. Length of radial sector 1494 microns. Anal cell open by 664 microns. The posterior veins are less distinct. Abdomen bears black bands, which are slightly over twice the width of the white bands which are interposed. Femora are slender.

Types.—Holotype, female, UMMP 25980; paratypes, two females, UMMP 26048 and UMMP 26035. All three specimens are from the Miocene of the Ruby Basin, Montana.

Plecia sp.

(Pl. I, Fig. B)

One species of *Plecia* appears to be close to *Plecia melanderi* Cockerell. It is labeled UMMP 26053. This and a third species present in the collection will be treated in a later study. Both are from the Ruby Basin, Montana.

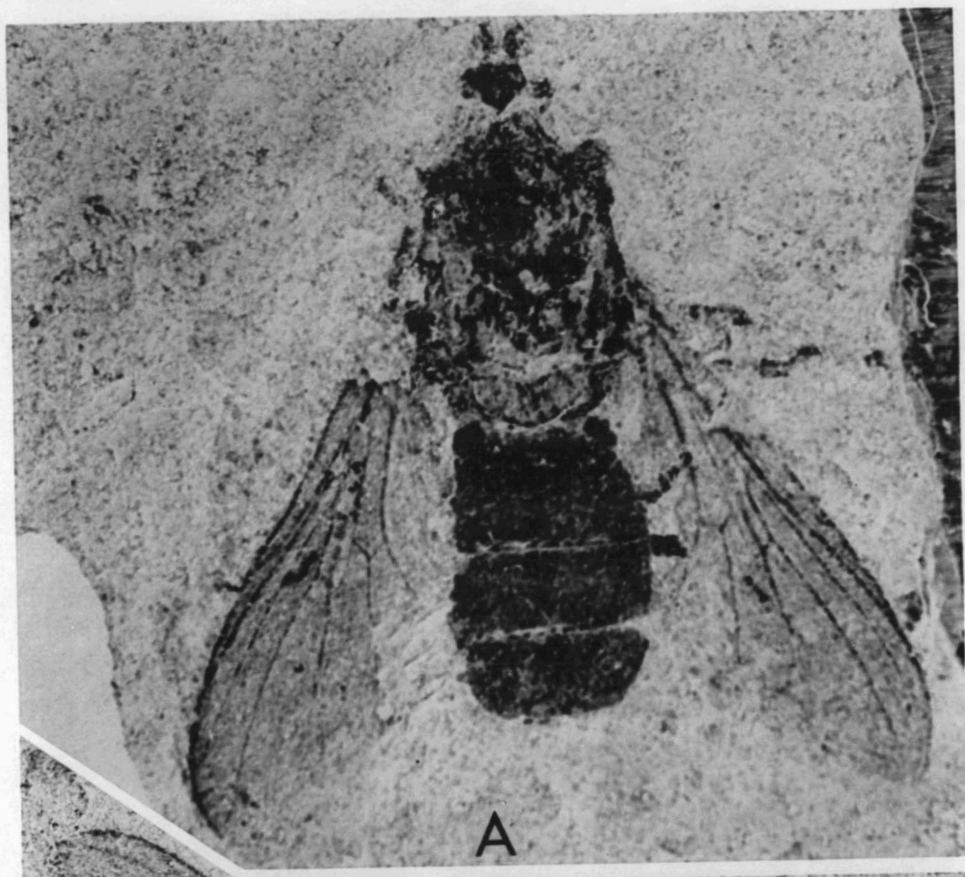
Received for publication June 15, 1959

PLATES

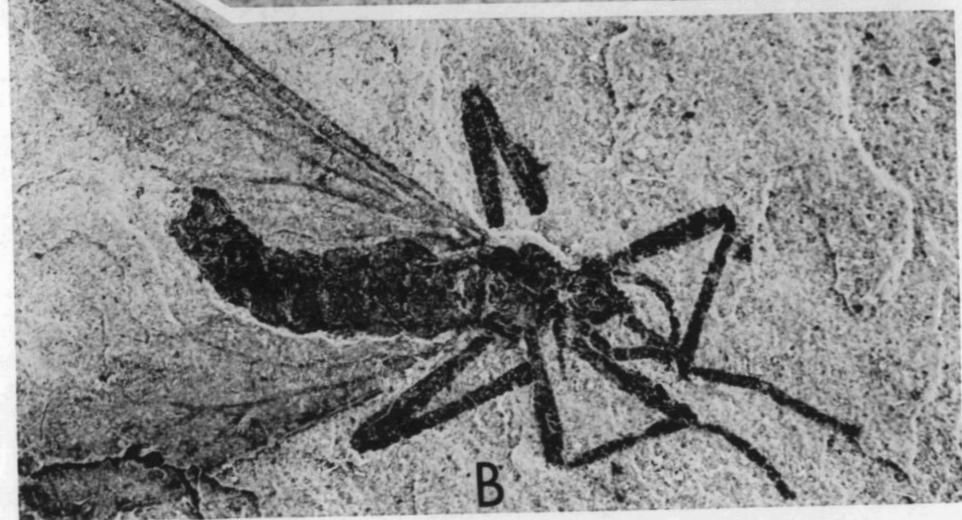
EXPLANATION OF PLATE I

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<i>Archisyrphus opacus</i> Hull, sp. nov.	270
FIG. A. Dorsal view. Holotype, UMMP 25984. Sec. 23, T. 7 S., R. 5 W., Madison County, Montana. $\times 15$.	
<i>Plecia</i> sp.	275
FIG. B. Dorsal view. UMMP 26053. Sec. 23, T. 7 S., R. 5 W., Madison County, Montana. $\times 10$.	

PLATE I

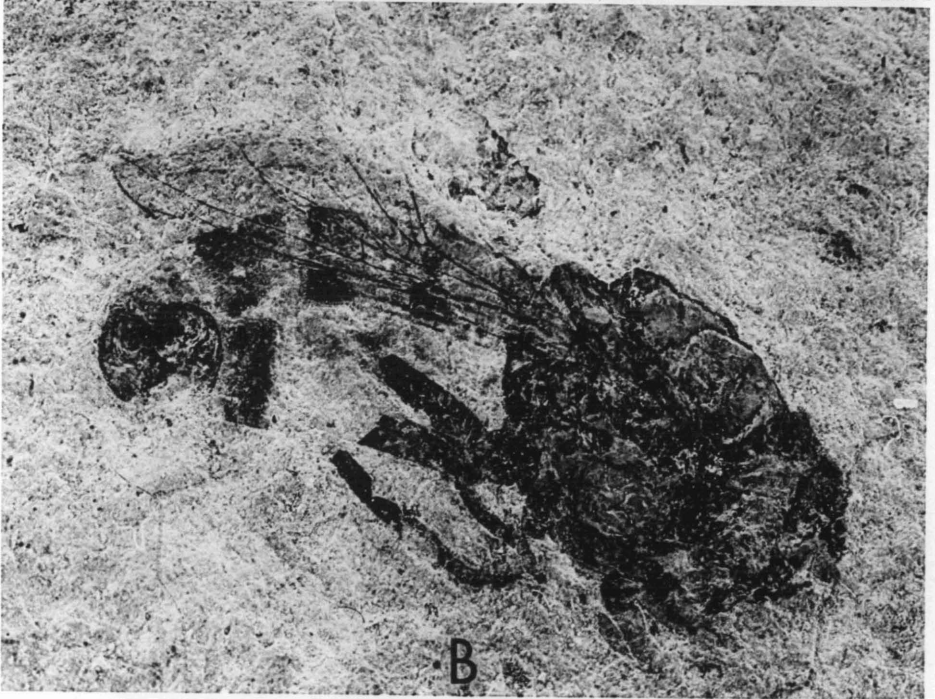
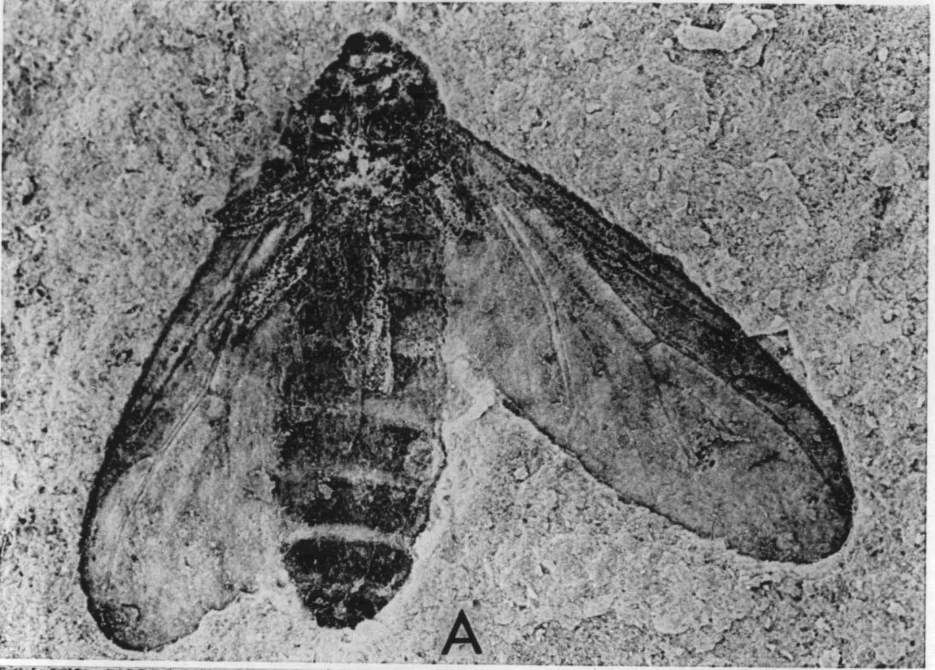


A



B

PLATE II



EXPLANATION OF PLATE II

(Both figures $\times 10$)

PAGE

Plecia inflata Hull, sp. nov. 274

FIG. A. Dorsal view. Paratype, UMMP 26048. Sec. 23, T. 7 S., R. 5 W., Madison County, Montana.

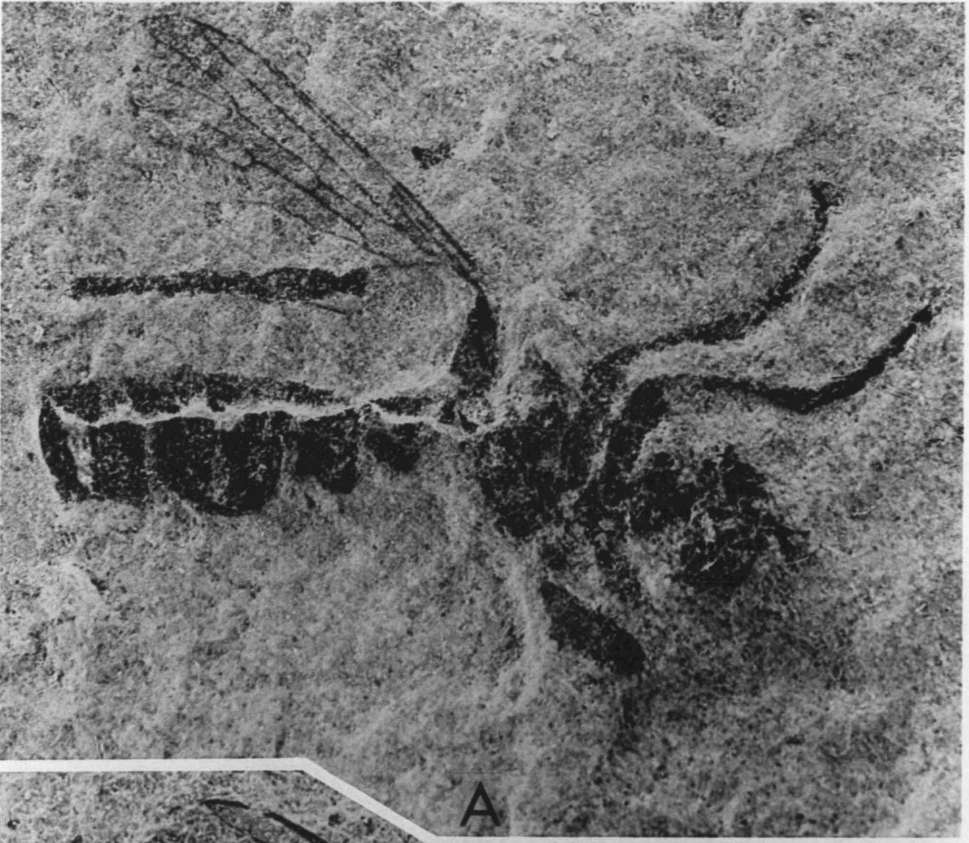
Syrphus petrographicus Hull, sp. nov. 271

Fig. B. View of right side. Holotype, UMMP 35457.

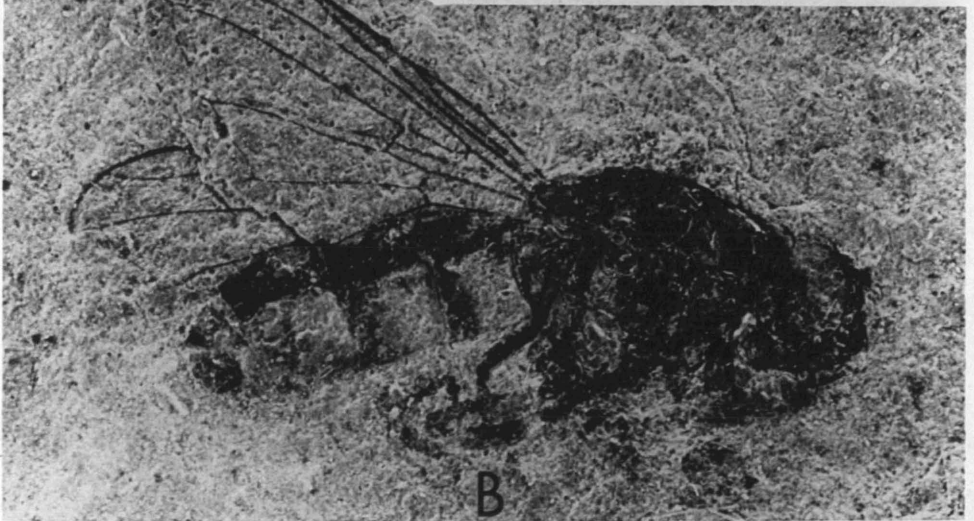
EXPLANATION OF PLATE III

	PAGE
<i>Holopogon archilestes</i> Hull, sp. nov.	272
FIG. A. View of right side. Holotype, UMMP 25983. Sec. 23, T. 7 S., R. 5 W., Madison County, Montana. $\times 10$.	
<i>Syrphus willistoni</i> Hull	272
FIG. B. View of right side. Hypotype, UMMP 35458. $\times 15$.	

PLATE III

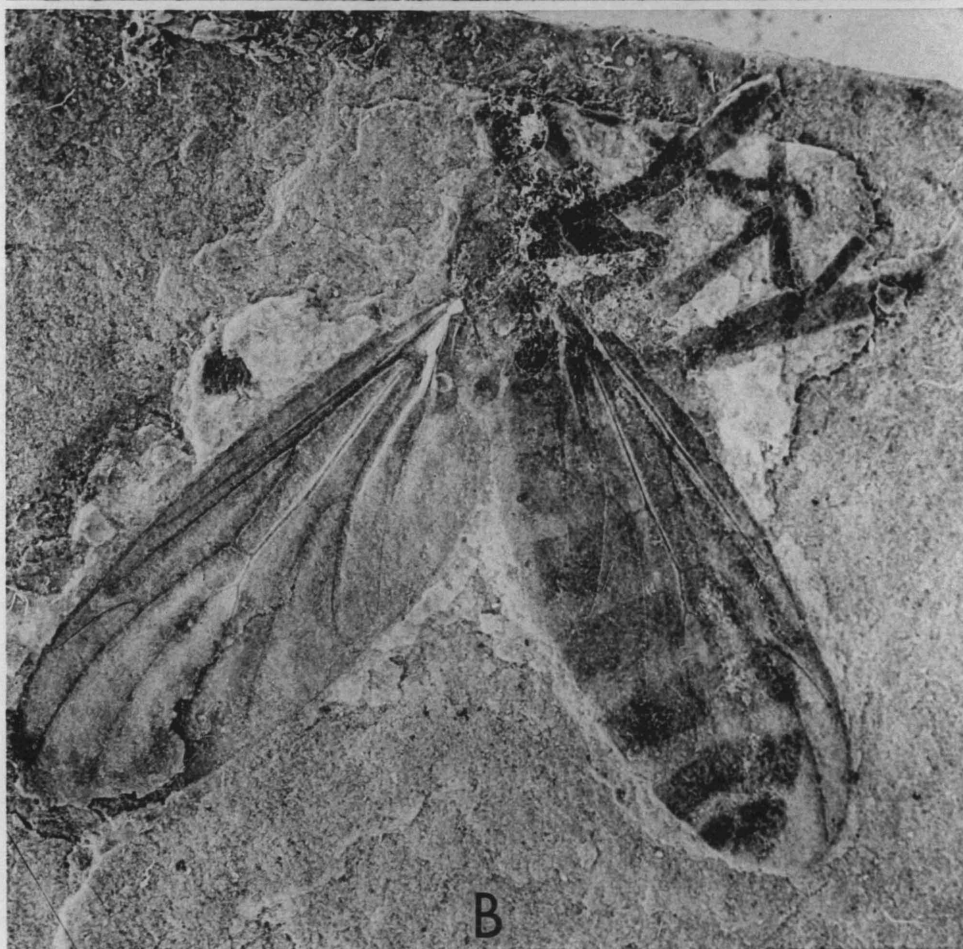
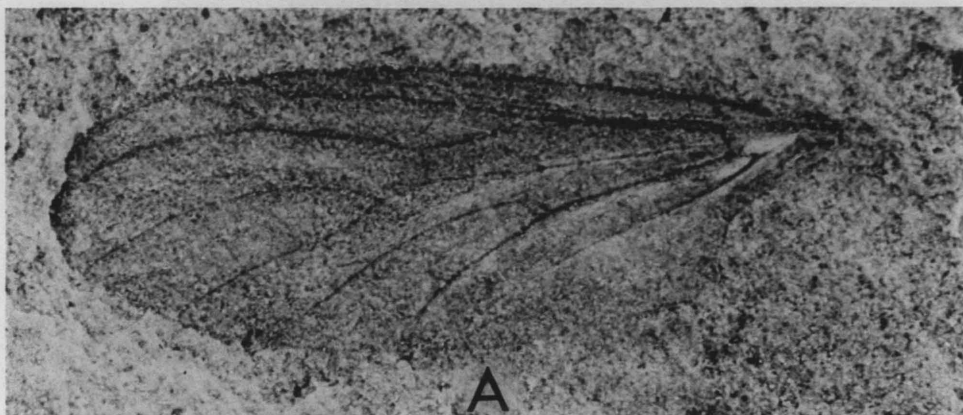


A



B

PLATE IV



EXPLANATION OF PLATE IV

	PAGE
<i>Plecia inflata</i> Hull, sp. nov.	274
FIG. A. Right wing. Paratype, UMMP 26035. Sec. 23, T. 7 S., R. 5 W., Madison County, Montana. $\times 15$.	
FIG. B. View of right side. Holotype, UMMP 25980. Sec. 23, T. 7 S., R. 5 W., Madison County, Montana. $\times 10$.	

