

23. A Remarkable Semi-Apterous Fly (Diptera) found in a Cave in East Africa, and representing a new Family, Genus, and Species.  
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(Text-figures 1-5.)

Apart from rare instances of modification of the organs of flight such as may be presumed to be a result of a troglodytic existence, examples of Diptera with reduced wings occur in many different families, and some species, like certain female Phoridae, which live in ants' and termites' nests, the sheep "tick" or ked (*Melophagus ovinus* L.), and the bat-parasites forming the family Nycteribiidae are entirely wingless. In two extraordinary Phycodromidae (*Apetænus litoralis* Eaton and *Calycopteryx mosleyi* Eaton, Entom. Mo. Mag. vol. xii. pp. 58-59, 1875), endemic in Kerguelen I., the wings are reduced respectively to the condition of small scales and minute gemmules, and in both cases, like those of the species described below, are useless for flight. The Ephydrid *Amalopteryx maritima* Eaton, which likewise inhabits Kerguelen, has linear vestiges of wings somewhat resembling in shape those of the subject of the present paper, but actually longer, although the fly itself is very much smaller. The Phycodromid *Anatalanta aptera* Eaton, which occurs in Kerguelen on dead birds and mammals as well as under stones, is, as stated by its describer, "completely destitute of even the vestiges of wings and halteres."

For well-nigh a century much attention has been devoted to the existing fauna of caves\*, and on the subject of cave-dwelling Diptera no one has contributed so much to our knowledge as the late Prof. Mario Bezzi. As regards cave-haunting Diptera, by far the larger portion of the work hitherto carried out is concerned with material obtained in Europe and North America. Writing in 1911 Bezzi ('Archives de Zoologie Expérimentale et Générale,' 5<sup>e</sup> sér. t. viii. p. 7) showed that, although representatives of no fewer than twenty-six families of Diptera had been found in caves, the majority were only occasional visitants. The most characteristic family was the Helomyzidae. With reference to the remarkable species about to be described, it is worthy of note that, according to Bezzi, greatly increased length of leg † is an adaptive character in connection with life in obscurity.

In 1916 Bezzi (Bull. Soc. d'Hist. Nat. de l'Afrique du Nord, t. 7, pp. 94-97, figs. 1-3, pl. 3, 1916) described, under the name *Cataliptus peyerimhoffi*, a new genus and species of Chironomidae with greatly reduced wings. Numerous males and a single female of *C. peyerimhoffi* were found in October 1915 on the walls of a swallet-hole in Algeria. In this species, which is only about 1.5 to 2 mm. in length, the wings are reduced to narrow strips in which the only distinct vein is a fairly stout subcostal, while halteres are entirely

\* Some idea of the enormous extent of the literature on this subject can readily be obtained by referring to 'Animalium Cavernarum Catalogus,' by B. Wolf (Berlin and The Hague: W. Junk), now in course of publication, of which Pars 1 appeared 10. ii. 1934, and Pars 6 21. viii. 1935.

† Bezzi also mentions elongation of the antenna, a feature which, except perhaps as regards the arista, is not exhibited by the species dealt with below.

wanting. The legs in the male are very long. At the outset of the paper in which this interesting form is characterized Bezzi remarks that, apart from the parasitic Nycteribiidæ and the curious genus *Chionea*, Diptera with atrophied wings had not been found underground. It is true that there are species like *Phora aptina* Schin., several *Limosina*, *Gymnomus troglodytes* Lw., etc., which are unable to fly, but in these cases the wings have lost their function without being greatly reduced, or even without having undergone any reduction at all.

According to Bezzi *Speomyia absoloni* Bezzi (family Borboridæ) \*, discovered by Dr. K. Absolon in a cave in Herzegovina, in August 1912, crawled about on the walls and gave the impression of a spider. In this species the head and proboscis are greatly swollen; the ocelli are wanting; the eyes are extremely small and only about as large as the third segment of the antennæ; the epistoma is remarkably prominent; the thoracic bristles are reduced; the wings are strongly truncated and narrowed; and the legs elongate. Though detailed information as to the behaviour of the subject of the present paper is unfortunately lacking, the length of its legs, coupled with the practical absence of wings, suggests that it also must present a distinctly spidery appearance in life.

As characteristic of true cave-dwelling Diptera Bezzi † mentions elongation of the arista, thickening of the proboscis, reduction of the eyes and wings, and development of the abdominal integument. With the exception of the last, all of these features are exhibited by the species now to be described, which is certainly one of the most extraordinary and unusual-looking Diptera ever discovered.

## MUSCOIDEA ACALYPTERATA.

### Family MORMOTOMYIDÆ, fam. n.

*Perhaps distantly related to the family Borboridæ as represented by an aberrant, cave-inhabiting form such as Speomyia absoloni Bezzi (vide supra), and agreeing with Speomyia to some extent in the shape of the head in profile, as also in the buccal cavity being enlarged, the proboscis swollen, the eyes extremely small and the ocelli absent; but differing, apart from the wings being vestigial, and all macrochætæ on body and legs wanting, inter alia in the exceedingly long and much more slender legs, the first segment of the hind tarsus especially being long and thin (cf. text-figs. 1 and 5) instead of short and stout.*

Typical genus *Mormotomyia* ‡, gen. n.

### Genus MORMOTOMYIA, gen. n.

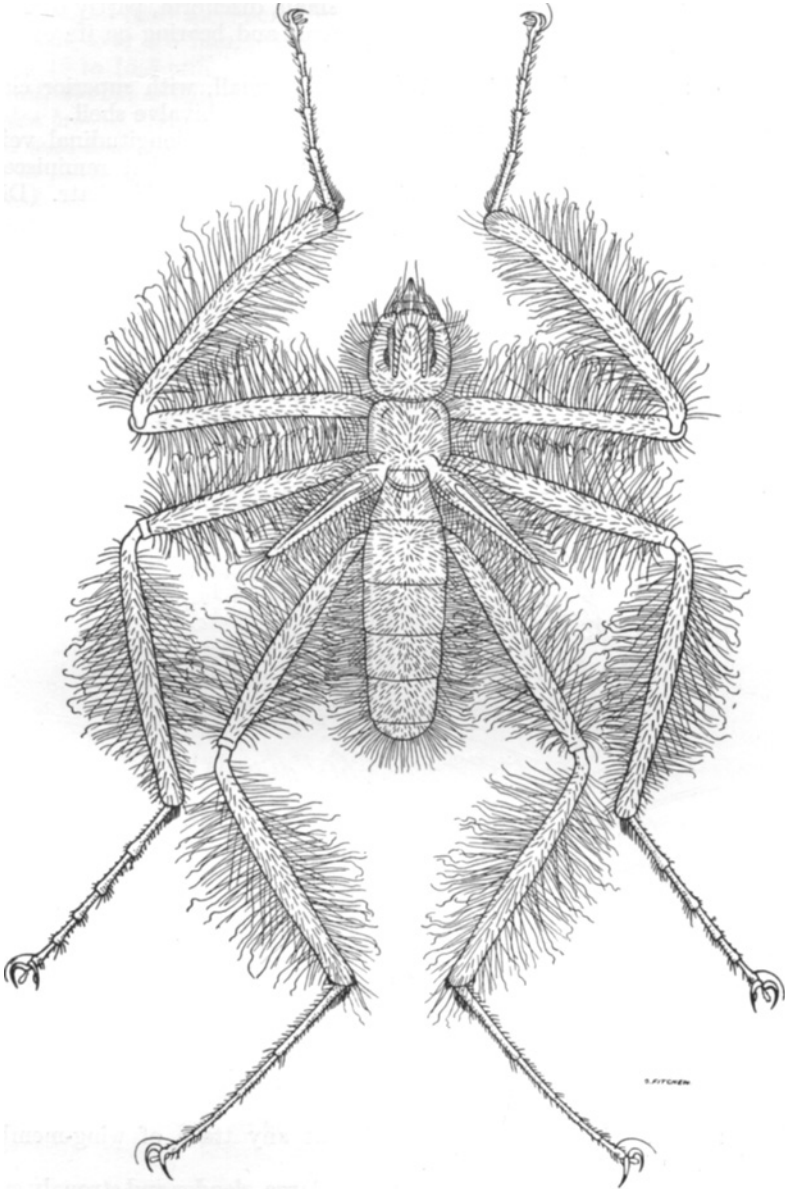
*With somewhat the appearance of a spider, or of a long-legged, semi-apterous Scatophaga, devoid of ocelli and halteres (though the latter may perhaps be represented by a pair of small sessile knobs), with exceedingly small, more or less horizontal, elliptical ovate or lozenge-shaped eyes, and entirely without macrochætæ either on head (apart from slender vibrissæ), body, or legs; wings vestigial, short, rod-like, acuminate, and useless for flight.*

\* Cf. Bezzi, "*Speomyia absoloni*, n. gen., n. sp. (Dipt.), eine degenerierte Höhlenfliege aus dem herzegowinisch-montenegrinischen Hochgebirge": Zoologischer Anzeiger, xlv. Bd., Nr. 11, pp. 504-507, figs. 1 and 2, 7 July, 1914; and Atti della Società Italiana di Sc. Nat. e del Museo Civico di Storia Naturale in Milano, vol. liii. pp. 216-220, fig. 3, 1915.

† Zool. Anzeiger, loc. cit. p. 506, 1914.

‡ *Mormotomyia* = frightful fly (μωμωτός, frightful; μύια, a fly).

Text-figure 1.



*Mormotomyia hirsuta* Austen, ♂.  
Greatly enlarged.

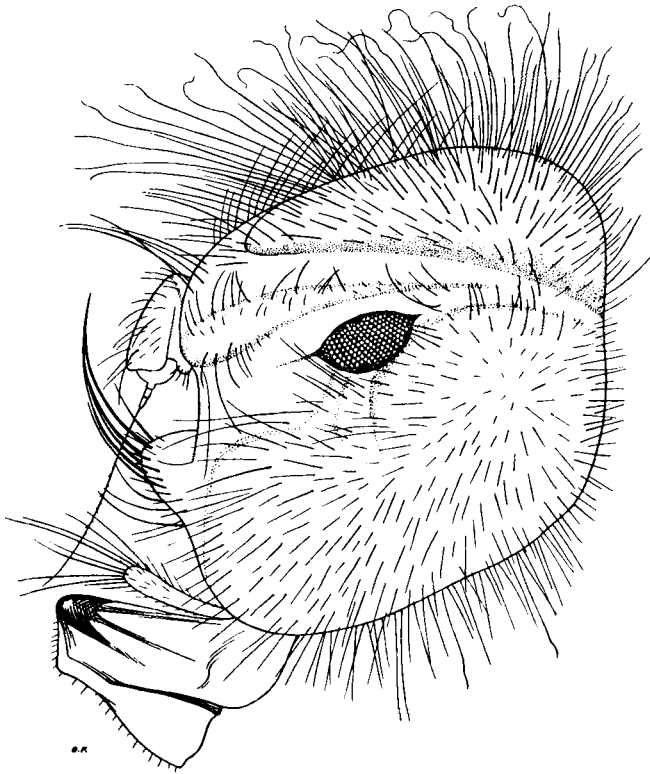
*Head* (cf. text-fig. 2) large, equal to thorax in its greatest width, and wider than abdomen; vertical triangle extending forwards nearly to anterior margin of front (frons) and ending bluntly; jowls greatly swollen; eyes longer than deep, their horizontal diameter about twice so long as the vertical one, facets

convex and relatively coarse; proboscis short, stout and swollen, palpi somewhat clavate; antennæ with third segment small, disciform, partly overlapped at base by extinguisher-shaped second segment, and bearing on its outer side a long, fine, microscopically pubescent arista.

*Abdomen*: hypopygium of ♂ (cf. text-fig. 3) small, with superior claspers outwardly convex, and resembling the two halves of a bivalve shell.

*Wings* (cf. text-fig. 4) consisting of vestiges of five longitudinal veins in addition to costa, squeezed together in a manner somewhat reminiscent of position of corresponding veins in wing of *Cratærina pallida* Latr. (Diptera

Text-figure 2.



*Mormotomyia hirsuta* Austen, ♂.  
Head in profile. Greatly enlarged.

Pupipara: fam. Hippoboscidæ), but without any trace of wing-membrane, and ending in a blunt, narrow point.

*Legs* (cf. text-figs. 1 and 5) very long; claws large, slender and strongly curved, with, at base on under side, a downwardly directed, tooth-like process, especially noticeable in case of hind pair; middle and hind claws nearly parallel to longitudinal axis of leg and not at right angles to it; pulvilli long and narrow, pointed at tips, with a row of hairs along edges of under side; empodium present, slender and styliform, pointed at tip; near distal extremity of last tarsal segment, on upper side, a long, downwardly curved hair.

Genotype: *Mormotomyia hirsuta*, sp. n.

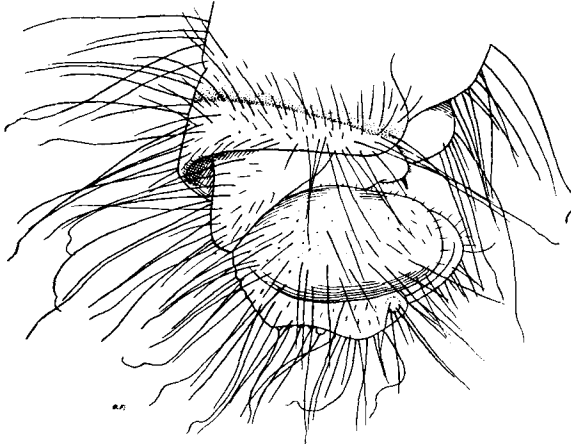
**Mormotomyia hirsuta**, sp. n. (Text-figs. 1-5.)

♂.—Length (two specimens) 7.5 to 8 mm.; width of head 1.6 mm.; length of eye just over 0.5 mm.; length of wing 2.5 mm.; approximate length of hind leg 15 to 15.5 mm.

*Head, thorax, wings, and legs raw-sienna-coloured, abdomen somewhat darker (Dresden brown)\*, entire insect (head, body, wings, and legs), except tarsi, densely clothed with long and exceedingly fine, ochraceous-buff or ochraceous-orange hair, which in places is somewhat darker.*

*Head* (text-fig. 2) somewhat square in profile, with basioccipital region rounded off, and epistoma and facial angles prominent, latter blunt at tips, and clothed with fine, long and upwardly curved, dark brown vibrissæ; vertical triangle swollen and markedly convex, with its lateral margins sharply defined; erect hair clothing anterior extremity of vertical triangle, like that on a longitudinal, eyebrow-like ridge above and in front of each eye, and like hair above

Text-figure 3.

*Mormotomyia hirsuta* Austen, ♂.

Distal extremity of abdomen: lateral view, showing hypopygium.  
(Greatly enlarged.)

base of each antenna, tending to become blackish brown; eyes (in dried specimens) reddish; proboscis raw-sienna-coloured, its swollen distal portion shaped rather like a human foot and tipped with blackish brown above; *palpi* somewhat recurved, and clothed with long hair like that on head; first and second segments of *antennæ* ochraceous-tawny, sparsely clothed above with short, stiff, blackish brown hair, second segment with prominent upper distal extremity or markedly swollen above, distal extremity of third segment cinnamon-brown.

*Thorax*: scutellum short, convex above; hair on scutellum and on upper surface of posterior half of scutum sometimes dark brown.

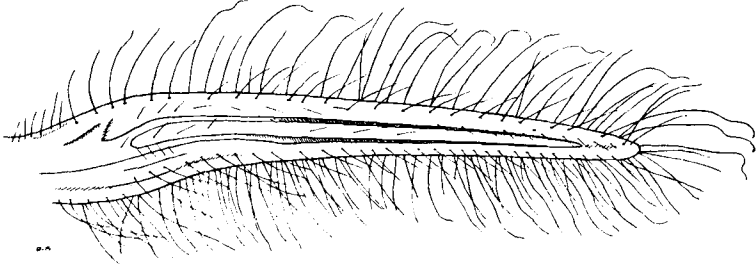
*Abdomen*: hypopygium of ♂ as described in diagnosis of genus and shown in text-fig. 3.

\* For names and illustrations of colours used for descriptive purposes in the present paper see Ridgway, 'Color Standards and Color Nomenclature' (Washington, D.C. Published by the author, 1912).

*Wings* as described in generic diagnosis and shown in text-fig. 1 and 4.

*Legs* (text-figs. 1 and 5) : extreme tips of femora, at least middle and hind pairs, narrowly mummy-brown above, tips of all tibiae mummy-brown below, those of hind pair on outer side with a row of six short, curved, black spines ; first segment of front tarsi clothed below with short mummy-brown or golden-

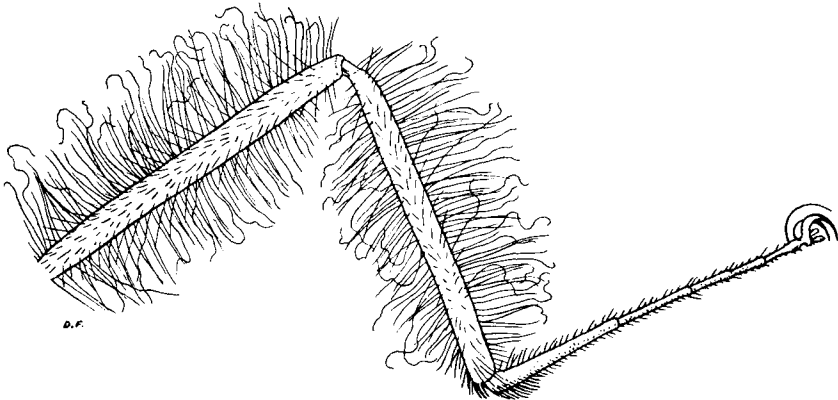
Text-figure 4.



*Mormotomyia hirsuta* Austen, ♂.  
Wing. Greatly enlarged.

brown hair, longer and more conspicuous at base ; first segment of middle tarsi excavated below in such a way that its base and tip are prominent, while former is clothed with short, stiff, blackish hairs ; first segment of hind tarsi a little longer than second and third segments taken together, narrow and

Text-figure 5.



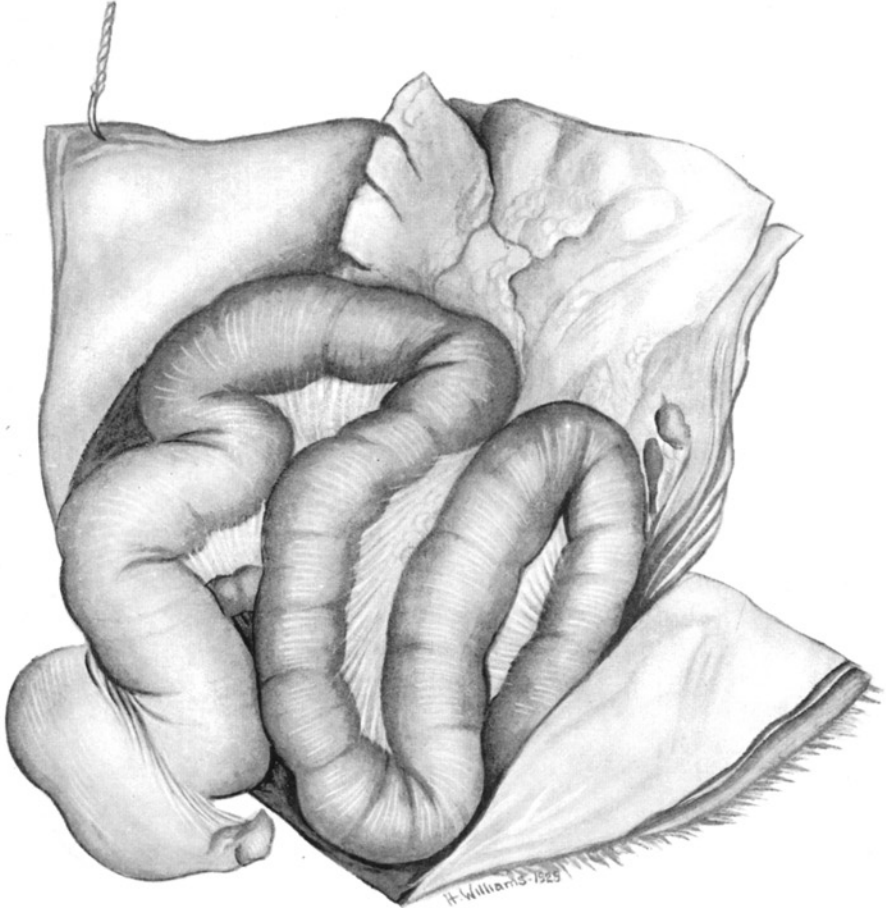
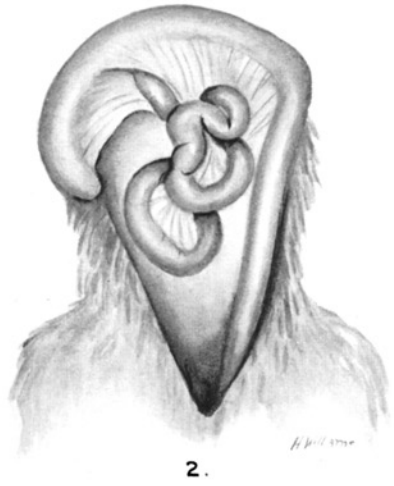
*Mormotomyia hirsuta* Austen, ♂.  
Hind leg. Greatly enlarged.

tapering, and clothed below with short, stiff, mummy-brown hairs, which are longer at base of segment, and in certain lights have an ochraceous-buff or golden sheen ; tips of all segments of hind tarsi mummy-brown.

East Africa, Kenya Colony. Holotype ♂ and one ♂ paratype, Garissa District, Ukazzi, v. 1933 (*H. B. Sharpe, D. C.* : in coll. British Museum (Natural History), presented by the Imperial Institute of Entomology), taken in a cave inhabited by bats and swifts. When the collector entered the cave a number of these extraordinary insects "came floating down from above like feathers."

## SUMMARY.

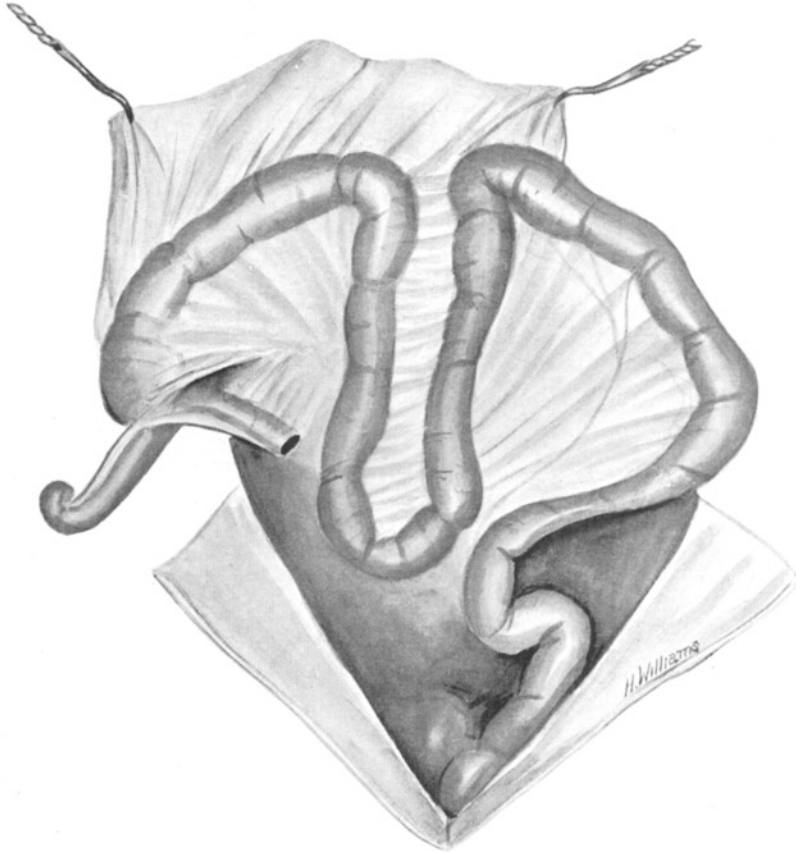
Among Diptera other than cave-dwelling species apterous or semi-apterous forms occur in many of families, and some examples of loss or modification of the wings among these insects are mentioned. Existing knowledge as regards cave-haunting Diptera relates chiefly to Europe and North America; while representatives of twenty-six families have been found in caves, the majority have been met with only occasionally, and among the existing fauna of caves the most characteristic Diptera are Helomyzidæ. On the other hand, of two species of Diptera found living underground in Algeria and Herzegovina respectively, in both of which the wings have undergone modification, one is a midge (family Chironomidæ) and the other belongs to the Borboridæ. The remarkable species described above under the name *Mormotomyia hirsuta*, gen. et sp. nov., if perhaps distantly related to the latter, cannot be assigned to any existing family, and a new family, termed Mormotomyidæ, is accordingly founded to receive it. *M. hirsuta*, one of the most extraordinary and unusual-looking Diptera ever discovered, while exhibiting most of the features stated by Bezzi to be characteristic of cave-dwelling Diptera, is noteworthy on account of the extreme hairiness of the body and its appendages, including the vestigial wings, and (apart from slender vibrissæ) the entire absence of macrochætæ.



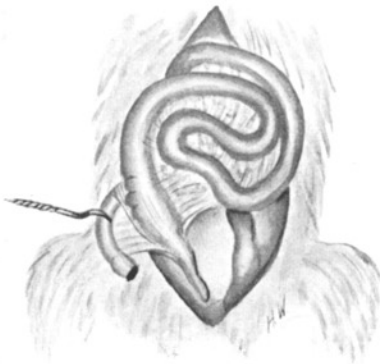
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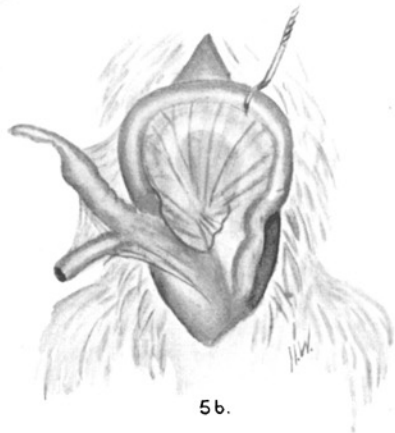




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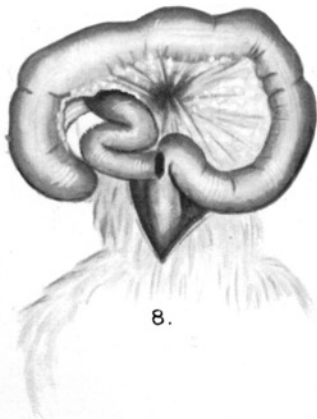
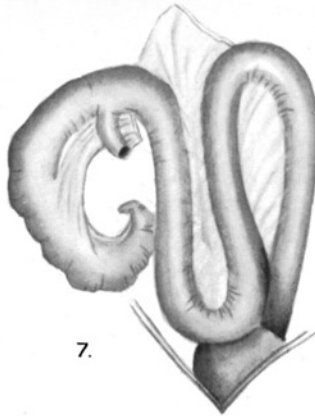
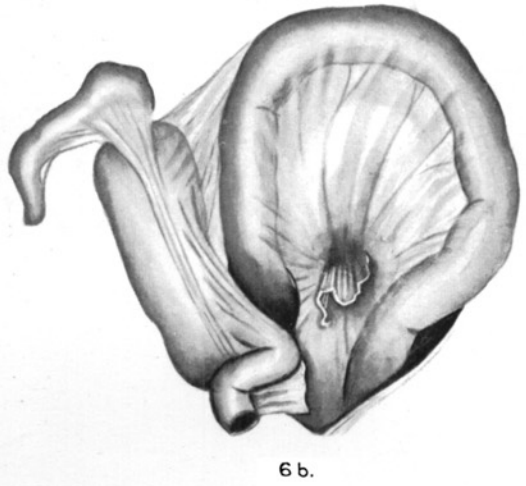
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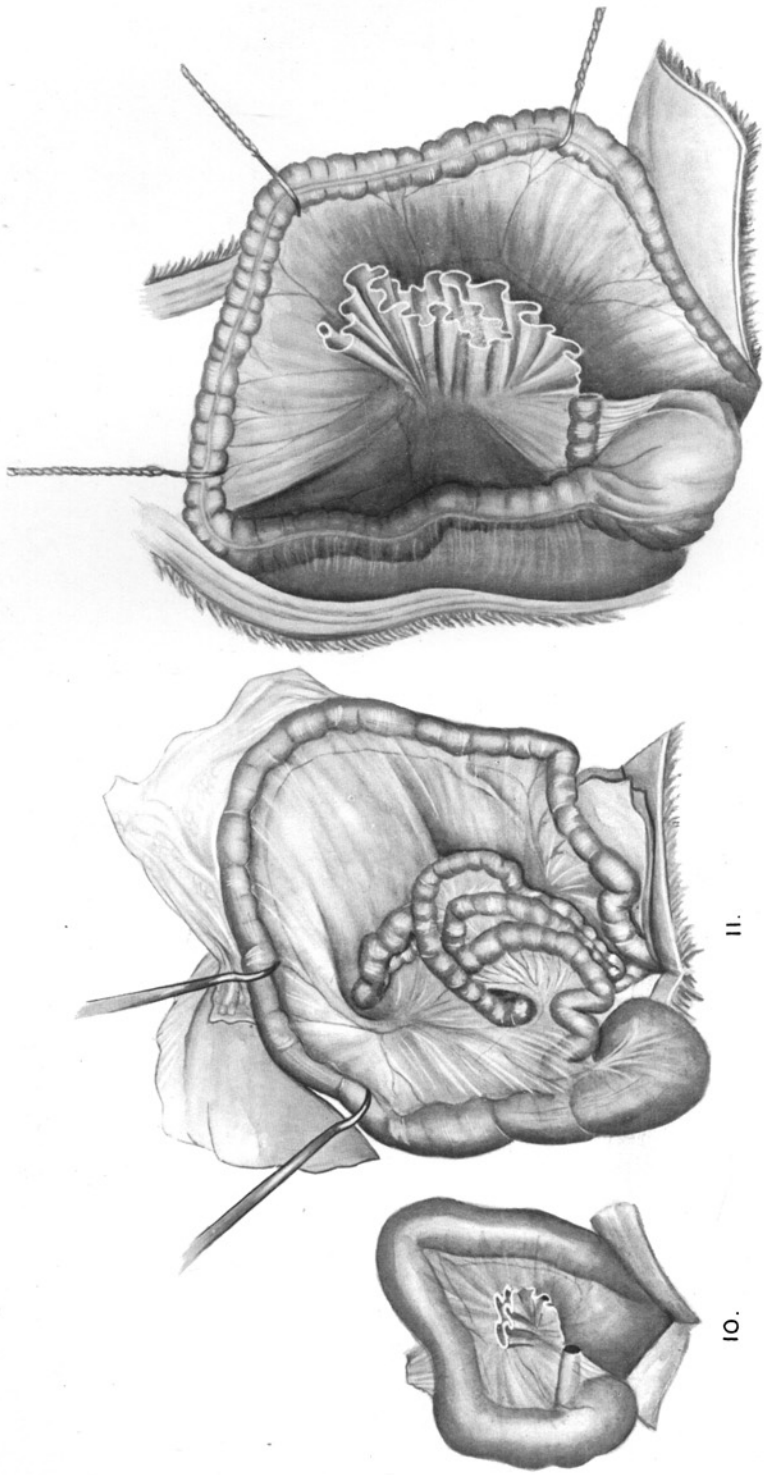
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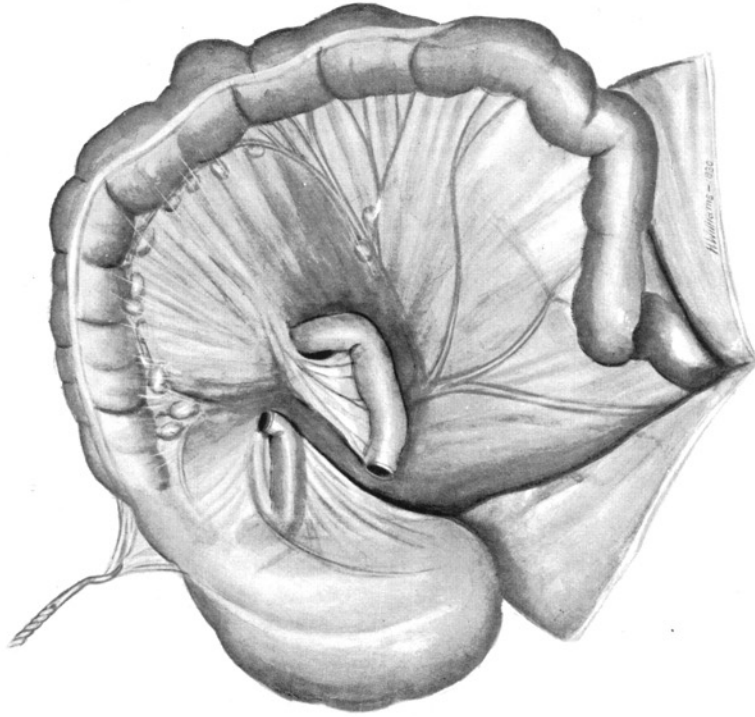
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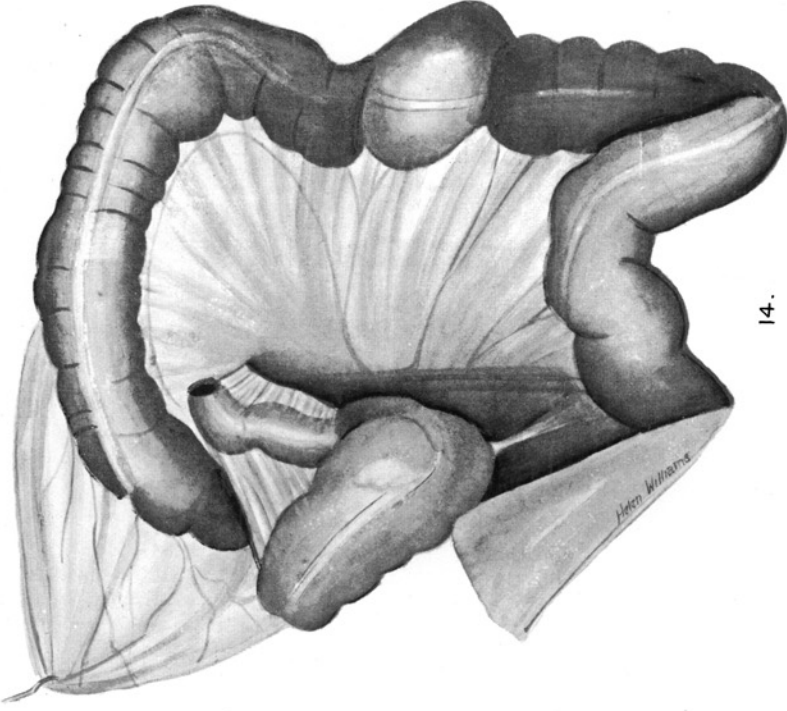
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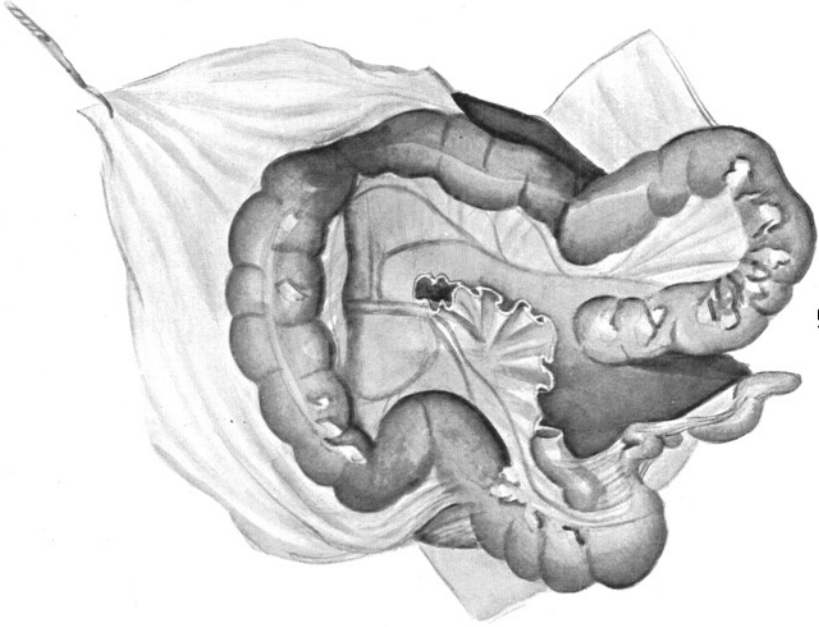
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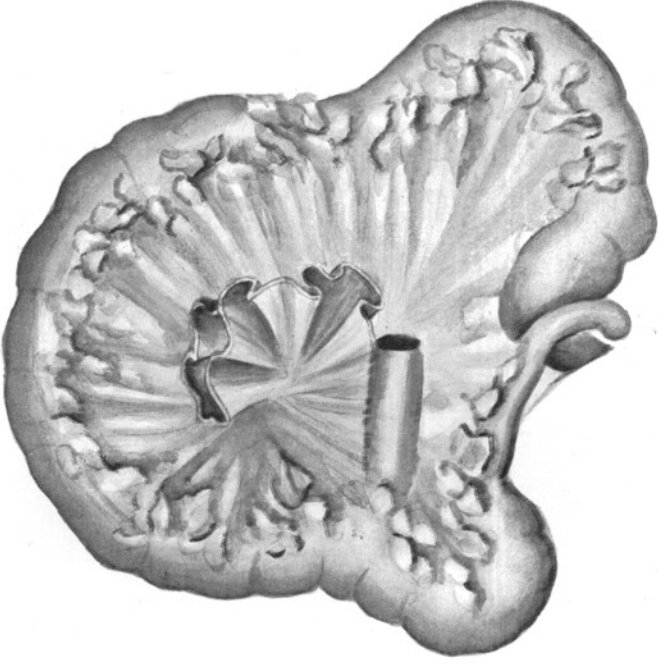
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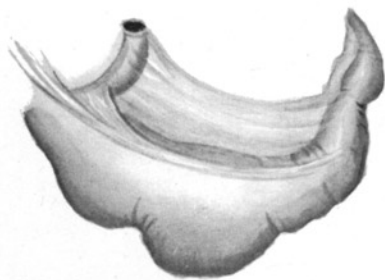


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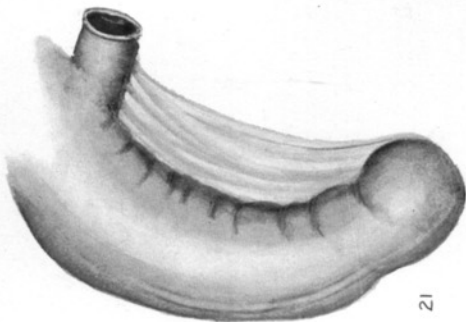
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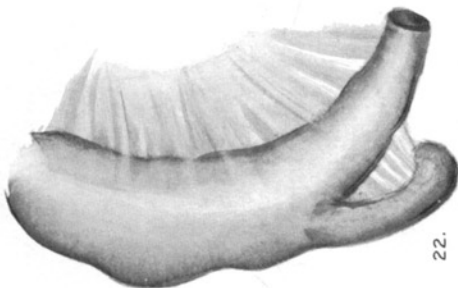
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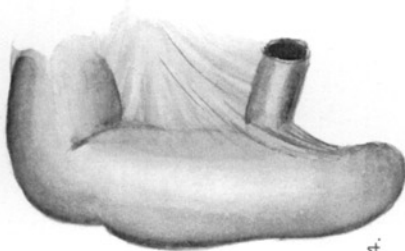
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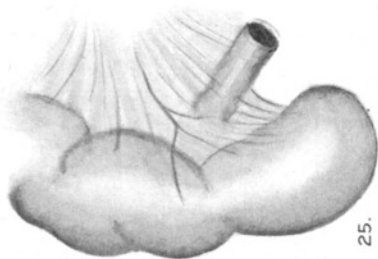
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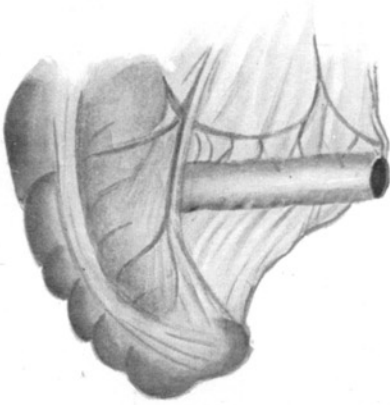


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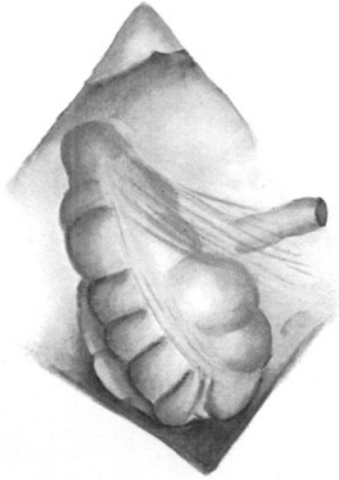


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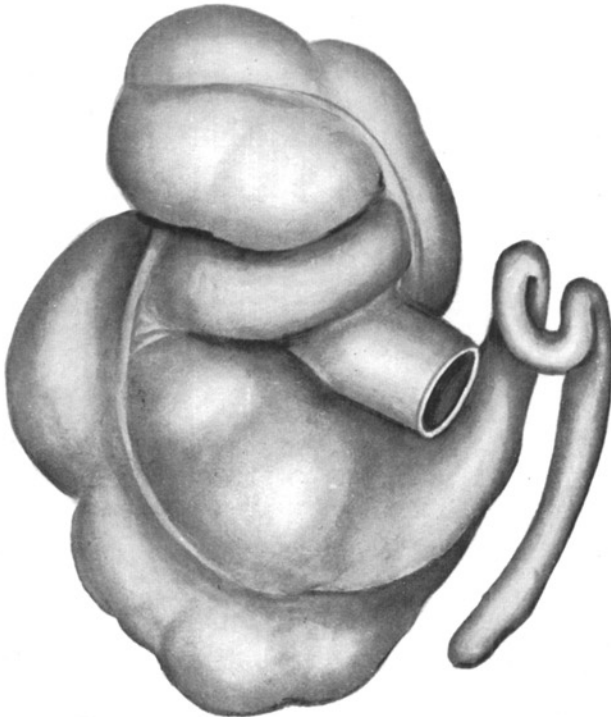
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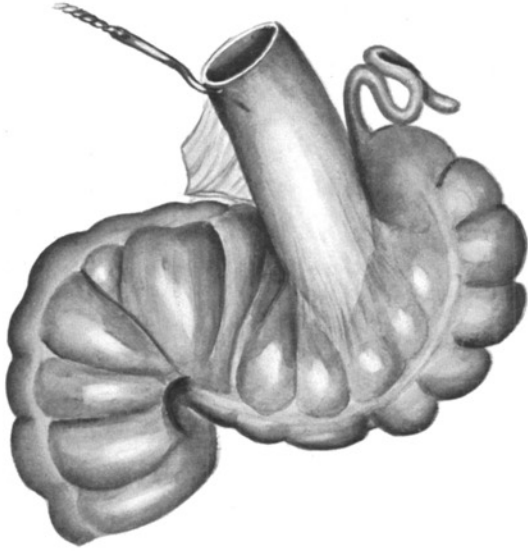


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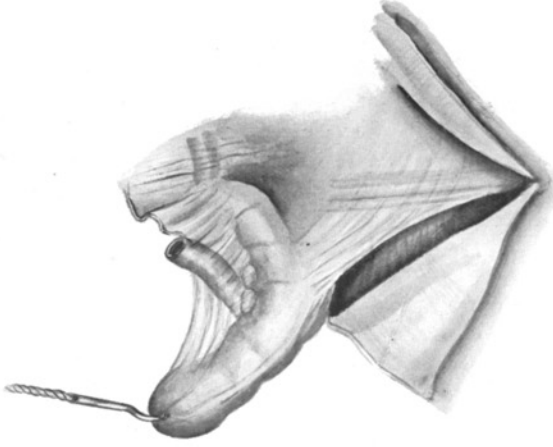
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