

KANSAS
MYRIAPODA

J. B. Norton.

1897

TABLE of CONTENTS

<u>Introduction</u>	pages 1-2.
Preliminary	" 1.
Remarks on Economic value	" 1.
" " Literature	" 2.
<u>Key to Kansas species</u>	" 3-5.
<u>Descriptive list</u>	" 5-19.
<u>Genera</u> : — Spirobolus. —	" 5.
Parajulus. —	" 6-7.
Callipus. —	" 7.
Polydesmus. —	" 8.
Septodesmus. —	" 9.
Euryurus. —	" 10.
Fontaria. —	" 11.
Geophilus. —	" 12-3.
Linotaenia. —	" 14.
Scelopendra. —	" 15-6.
Scelopocryptops. —	" 16.
Lithobius. —	" 17-8.
Scutigera. —	" 18-9.
<u>Explanation of plates</u>	" 20-1.
Plates —	" 22-4.

Kansas Myriapoda.

Last summer, while working on the collection of Myriapoda in the Kansas Agricultural College Museum, my aroused interest led to a somewhat extended collection of Riley County forms of this group. This collection, together with one from Topeka collected by C. W. Pape '95 during the past year at different times, and the species mentioned by F. W. Cragin and a few in other papers by Wood, Bollman and others, forms the basis of the descriptive list in this paper.

This division of the Arthropoda is not of great economic importance in this locality. The true myriapods - Diplopoda - are found feeding only on decayed vegetable matter and are never very numerous in any situation. They are perfectly harmless but are objectionable on account of their disagreeable odor. The Syngnatha, or centipedes of various kinds, are predaceous, living on insects, spiders etc. Perhaps, on account of their abundance, they may be of economic importance - at least as much as as the predaceous insects. All of this group have more or less developed poison glands in the claws of their prehensorial legs. The small Geophilidae can raise quite a lump by their bite in a tender spot. Wood Cragin and many other less authentic authors record authentic (?) cases of fatal results from the bite of our

common Scolopendra heros.

In working up the Myriapods I have had access to nearly all the literature on the subject by American authors; Professor E. R. Popenoe kindly loaning from his private library, those papers that were not in the library of the College. - Between the two I have been able to consult the works of Bollman, Cragin, McNeill, Wood, Cook, Mienert and others. In the classification I have followed as far as possible the arrangement given by E. H. Bollman.

The Kansas Myriapoda have been studied but little, hence the literature on them is very small. Prof. F. W. Cragin in Bull. IV. Washburn Coll. Favourable story of Nat. Hist. - Oct. 1885 - gives what he calls - the "First Contribution to a Knowledge of the Myriapoda of Kansas." - mentioning ten species and two varieties also a variety or form of Fontoria which I have considered to be new. E. H. Bollman in a letter to Prof. Popenoe Oct. 1888 mentions five species which had been sent him for identification. Wood records Scolopendra heros from Ft Riley Kansas.

This present list is very incomplete yet it adds materially to the knowledge of Kansas Myriapoda and may form a basis on which to work. Some or perhaps many additions may be made to this list in the near future.

The following artificial synoptic Table has been adapted from that of Bollman - it applies only to the known Kansas species.

A. - some or nearly all the segments with two pair of legs
Diplopoda.

B. - segments more than 30 -

C. Copulatory organs of ♂ formed from both pair of feet of seventh segment. - Julidae

D. - 3rd segment with legs - - Spirobolus

E. segments margined with red brown -

- - S. - marginatus

DD. - 3rd segment without legs. - Parajulus

E. - exterior part of ♂ copulatory organs flattened - P. - impressus

EE. exterior part of ♂ copul. - organs cylindrical - P. - venustus

EEE. - no description found - P. - caesus

CC. Copulatory organs of ♂ formed from anterior pair of feet of seventh segment

D - Only species Callipus lactarium

BB. - Segments. 20 - 21 - Polydesmidae

C. Femora not spined

D. - Back tuberculate - Polydesmus

E - only species - P. - serratus

DD. - Back smooth -

E - Back slightly convex - Euryurus

EE. Back strongly convex - Lepto dermus

F Only sp. - L. hispidipes.

CC. Femora spined - Fontaria

D. Ventral surface smooth - F. virginensis

D " " pilose F. n. var.

AA. None of segments with two pair of legs. - Syngnatha

B. Pairs of legs 21 or more.

C. Pairs of legs more than 30.

D. - Claw of prehensors with a small tooth -

Geophilus

F. - Anal legs clawed

F - Segments - 49-51 - G. cephalicus

F.F. " 57 - G. salemensis

EE Anal legs not clawed - G. bipunctipes

DD. Claw of prehensors with a large tooth -

Liniotania

E. - Coxal pores few. - S. fulva

EE- " " many S. robusta

CC. Pairs of legs. - 21-23.

D. Pairs of legs. - 23 - Sceloporus

E Only sp. S. serrapinosa

DD. Pairs of legs. 21 - Sceloporus

E. - 1st dorsal plate without a transverse sulcus. - S. moritani

EE - 1st dorsal plate with a transverse sulcus - S. heros

B.B. Pairs of legs 15.

C. Legs as long as body - - Scutigera

D. only species - - S. forceps

CC. Legs not half as long as body - Lithobius

D. Posterior angles of none of dorsal plates produced.

E. Anal legs normal

F. Spines of 1st feet - 2-2-3-2

S. tuben

F.F. Spines of 1st feet - 000-1

S. pinguis

F.F.: 3rd & 4th joints of anal legs produced into knots - S. bilabialis

D.D. - Posterior angles of 7-9-11-13th. dorsal plates produced - S. mordax.

Descriptive Notes.

1. Spirobolus marginatus (Say)

Julus marginatus Say Jour. Phil. Acad. II 105-1821.

Shawnee, Riley, Co., - common in wood land - in rotten logs - stumps etc.

Color - greenish black to very dark olive green; legs, antennae, margins of head and dorsal plates - red brown to pink. Ocelli vary from 50-70. - black in eight series. - Length ranges in adults from 75 to 120 mm. young specimens from 15 mm up. - joints of feet armed with from 0 to 3 bristles like white hairs which vary without seeming cause.

On the male the 5-7th legs have the tibiae flattened into vertical plate like organs. The coxae of the 3-5th legs are produced in both sexes. Segments 49-53 in adults. Legs - pairs - 39-45 always one less in male than female of same number of segments.

Craig's S. unicolor is probably this as there are numerous specimens of S. marginatus in the collection from Topeka.

Plate I figs. 1-a-g

2. Parajulus caesus, (Wood)

Julus caesus Wood Proc. Phil Acad. 1867 - p 43

Bollman mentions this in his letter to Prof E.A. Poffense giving a list of the myriapoda contained in a vial of Riley Co forms sent him in Oct. 1888 - I can obtain no description of it and have no specimens of Parajulus unidentified.

3. Parajulus impressus, (Say).

Julus impressus Say Jour. Phila. Acad II 102. 1821

Riley Co. - Rare on upland under stones etc.

Segments 53-55 in adults - answers exactly to Woods description of the specimen which Bollman - considers to be Say's impressus. The specimens are uniformly dark colored. The lateral spots and dorsal line being almost obsolete. The whole front of the head.

Antennae shorter and slenderer than in venustus --
 Anterior segments striate on lower side only - posterior
 striate clear around - Length - 30-35 mm. width -
 2-2.5 mm.

Plate I - fig - 3-a-b.

4. Parajulus venustus. (Wood)

Julus venustus. Wood Proc. Phil. Acad. 10 1864.

Kansas (Bollman) - Riley co. Shawnee co. common in
 low ground. woodland - in rotten logs. etc.

Segments 49-55 - color light chocolate brown
 to brown - Black dorsal lines and lateral row of spots
 distinct - a dark band connecting eyes - The main
 branch of the exterior part of the copulatory organ of
 the male, cylindrical - projecting at right angles to the
 body for a short distance. then turning in till the two of the
 pair meet - where they make a short double curve
 color wax yellow. - The interior part of it resembles
 Woods figure of it closely. The female has the ant-
 erior lobe which projects back - short and bent
 down, very filose. Length - 40-45 mm width
 3-3½ mm. Plate I - fig 2-a-m.

5. Callisus lactarius, (Say).

Julus lactarius Say Jour Phil. Acad II 104. 1821.

Lycisputalum lactarium, Pack. Am. Nat. XVII 565

Riley Co. - Shawnee Co. Common under stones on hills and in low ground; in fact anywhere - all sizes all the year round - Two very large ones from Topeka are probably two years old.

Color - light, chocolate, dirty, brown, often tinged with pink - a narrow dorsal and a lateral stripe of whitish extending the whole length of the body - Segments ridged with alternate large and small ridges which are tipped posteriorly with short stiff setae. This species gives off a very strong and lasting odor - very offensive - from its repugnatorial pores - which are situated on a prominent row of double ridges on the sides of the body. - Length 20-50 mm. - Segments 55-61.

The large ones from Topeka are probably what McNeill called. - Sysiogetalum eudasum - The chief difference in the genitalia is that in these they are longer and curved.

Plate I - figs 4-a-d.

6 Polydesmus serratus, Say

Jour. Phila. Acad. II - 106 - 1821.

Riley Co. Shawnee Co. - common under stones logs etc everywhere in all stages.

Color - dirty chocolate brown - tinged with pink. The dorsal plates are covered with broad tubercles or scalelike plates - The median plates are in three rows. Transverse - of - 2-4, 4-6, - 6-8 plates in each - smallest number

on the front row. - The number of plates vary with the position of the segment. - At the end of the three transverse rows is a large plate - On the front and sides runs an elevated ridge - The lateral carinae are broadly serrate with 3-4 teeth -

The claw of the male genitalia is long and armed near the center with 2 small thorn like processes - The tip is armed with several short hairs in a row. The basal portion is rounded and quite pilose. - The hairs are bristle like. It has a small claw on the side about one fifth of the length of the larger one.

Length - 23 mm. and less - width - 3-4 mm.

Plate II figs. 5-a-d. -

Polydesmus floridus of Craig is probably Septodesmus hispidipes - Wood.

7. - Septodesmus hispidipes, (Wood)

Polydesmus hispidipes Wood Proc. Phil Acad. 8 1864.

Riley - Shawnee - Jefferson co. - Rare, in moist localities.

Color - grayish yellow - to gray through - pinkish gray - lateral carinae - posterior margins of all the dorsal plates and anterior margin of 1st dorsal plate - and face all more or less broadly banded with pink or pinkish yellow. Mouth parts, legs, antennae - and under part of body whitish. A more or less distinct, narrow median dorsal dark band

Body almost cylindrical - lateral corinae - small horizontal - dorsal plate with transverse sulcus - Male genitalia of two parts, a broad pilose spatula shaped organ and an interior claw - fringed with long bristles on the interior and armed at the base with a curved spine -

Lengths and widths - 23.5 mm - 3.9 mm. $\pm$ 21 - 3.6; 22.5 - 3.8;
23. - 2.5 - mm Plate II - fig 6-a-d.

8 Euryurus n. sp. ?

Under pots and boards in K.A.C. greenhouse
Apr 22. - 1897 - J.P.N. - Common in all stages - probably an introduced form.

There is no United States sp. of Euryurus that this could be - it differs from the two described by having four large spine like process at the end of the male genital foot - when the others have only two
Color dark coffee brown - tinged with green or yellow - Posterior margin and lateral corinae are light yellow - The corinae are larger than those of Sefto. hispidipes. Pleural region light brown, ventral regions and appendages light - white or gray. - Dorsal plates with a distinct sulcus. -

Length - 7 - 25 mm width 1 - 4 mm.

Plate II - fig - 7-a-c

9. Fontaria virginensis, (Drury)

Julus virginensis Drury - Ins. Exot. I t. XLII p. 8 1770

Polydesmus virginensis Wood - 1865.

Riley Co. Shawnee Co. (Cragin) - Not common - in moist wooded regions under chips etc.

Agrees well with Woods description and figures - The color is quite variable - The yellow marking being almost obsolete on some and on others the brown is almost covered by the yellow margins - Dorsal plates dark brown, tinged with yellow. Carinae and posterior margins - canary yellow. Antennae brown - annulate with yellow at tips of each joint. Two brown spots on front of head between eyes. - Legs etc. - light colored. The shape of the first dorsal plate varies with the sex. Length 40 - 50 mm width 6.5 - 4.5 mm.

Plate II - III - fig - 8 - a - d.

10. Fontaria - n.sp. or var. of F. virginensis -

Riley. Shawnee - - upland under stones etc rare. Found in later summer - virginensis in Apr - June. This in July - Sept.

Color very light - almost white tinged with pink or chestnut brown - a narrow black dorsal line. - 1st dorsal plate of male resembles that of female of F. virginensis. - Copulatory organs of ♂ shorter, stouter and more hairy than those of F. virginensis. - Under side of body densely pilose.

with short white hairs - surface dull. - *T. virginensis* has a smooth shining surface with few hairs - Specimens one broader and shorter than *T. virg.* and without signs of markings on the dorsal plates - while fresh moulted specimens of *T. virginensis* show quite distinctly their characteristic markings.

11. Geophilus bipuncticeps, Wood

Proc. Phil. Acad Nat Sci 1864-10-19

Pileus - Shawnee - Jefferson - Pottawatomie - very common under stones - boards - logs etc in any locality - from river banks to tops of limestone hills.

Color - Dark orange to pale yellow or whitish - sometimes the posterior segments appear greenish - Cephalic segment dark brown. - Antennae long. last joint as long as penultimate and antepenultimate combined - but sometimes it is short and square ended. - Antennae pilose on ventral surface beyond second joint. - Frontal plate ovaloid - Basal plate narrowed anteriorly. - Prebasal plate covered - Cephalic plate as $4:5$ or $5\frac{1}{2}$, narrowed anteriorly and posteriorly, emarginate in front. - Segments 61-65 in ♂ and 67-67-♀ in . Pleural pores numerous, small on posterior part of segment. - Coxal pores normally 2 often invisible under last ventral plate - Anal pores none Anal legs $1\frac{1}{2}$ times longer than other legs. - In male they are crassate - moderately - anal legs unarmed. ♂ genital

palpi two jointed - Length - 30-60 mm. -

Plate III fig. 9-a-c.

12. Geophilus rubens - Say

Jour. Phil. Acad. II - 21. - 1821.

" cephalicus, (Wood, Jour. Phil. Acad. V - 44-62

Riley, Pottawatomie, Shawnee, - usually under bark of rotten logs. - rare.

Color. - light dirty yellow to dark orange - head dark orange - a double dorsal stripe of greenish black from near head to antepenultimate segment. - Antennae short, last joint short-abrupt. Prebasal plate exposed. Cephalic plate almost square - Prehensors short. - coxae and claw unarmed. - claw large. - Body attenuate posteriorly - ♂ Anal legs crossate covered ventrally with short hair. - Anal legs six jointed - clawed - claw rather large. Coxal pores 3 - ♂ genital palpi large two jointed last ventral plate - Segments - 49[♂] - 51[♀].

Plate III fig. 10-a

13. - Geophilus salemensis, Bollman

Entom. Amer. III '87 - p. 82.

Shawnee Co. C.W. Pape. May '97 - one specimen

Color - uniform deep orange red. - head square - frontal plate present - prebasal plate exposed, prehensors just reaching beyond head - coxae un-

armed; claw with a small tooth - Body robust
 attenuate from central part. - Pleural pores present
 Anal pores present - Coxal pores large - 15 - Two above
 the rest below - Last ventral plate broad - anal
 legs clawed - segments 5-7 - one ♀.

14. Linotaenia fulva (Sager)

Strigamia fulva. - Proc. Phil. Acad. 9. 109 - 1856

Riley Co. - Rare; on Blue mountains under stones.

Color - whitish yellow; very light - Cephalic parts orange
 frontal plate present. - antennae short - cephalic plate almost
 square - Basal plate large. - Prehensors short claw with a
 large tooth - coxae not armed. - body narrow - segments ♂ -
 49 - 57 - ♀ - 57 - 57. length 17 - 23 mm. - anal legs short.
 in ♂ crassate - clawed coxal pores 3 - 5♂ - 4♀ in collection.

15. Linotaenia robusta - (Mienert.) - ?

1885 - 2248

Scolioflanes. robustus Mienert Proc. Am Phil Soc. XXI

Riley Co! ? unlabeled specimen in collection.

Color - "fulvous - head and antennae darker"

antennae short. - cephalic plate wider than long rounded
 basal plate large - frontal plate present. - Prehensors short
 coxae shorter - wider than long, claw large with large tooth
 coxae unarmed. - body large and long segments 5-7. - Last
 coxae large inflated pores numerous - ♀ anal legs

slender armed with a rather large claw - last ventral plate small - narrow triangular - Length 55 mm
This does not answer to Bollman's description which he thinks may be robusta but corresponds more to Mienert's original description. It is this or a new species.

16. Scolopendra heros, Girard.

Moreys Red River Exf. Aff. F. 243-1863

Riley Co. - Ft Riley - Gove - Wallace - Barber - Rice - Finney - Shawnee (?) - Common here on hills under stones.

Segments. 21. - Spiracles on 3-5-8-10-12-14-16-18-20th segments. length from 80-150 mm. - Color yellow brown to orange - often greenish - segments edged posteriorly with green in some this color predominant. Head and first segments dark orange. - Pre-humeral coxae with a large tooth.

Spines on anal. coxae	on angular projection	on anal. process	prosternal teeth	antennal joints	length of body	length of anal legs
17-18	2-3	5-5	4-3	27	120 mm	18 mm
19-19	4-4	5-5	4-4	29	105 "	16 "
22-22	3-4	4-5	4-4	28	122 "	17½ "
20-20	3-3	5-5	4-4	27	103 "	17 "
18-	3-	-	-	-	70 "	15 "

The above characters are from Riley Co specimens

Plate III - fig-11-a-c.

17. Scelopendra morsitans. Sinn - (?)

Syst. Nat. I - 1863.

Berber Co. (Cragin) - one sp.

"Antennae 20 joints color: greenish blue - delicate - length about 25 mm." This species is questioned by Bollman - very probably it is a young specimen of S. heros but it would require an examination of the specimen to tell. Cragin gives no reliable data with his description.

18. Scelopocryptops sexspinosas (Say)

Cryptops sexspinosus Say, Jour. Phil Acad II 1/2

Riley. - Pottawatomie, Shawnee - common everywhere the year round.

Color dark brown to pale yellow - ventral surface and legs lighter - head and antennae darker - 23 segments - Lower part of head dark brown fronsorial sterna - 3-2 mm cephalic plate almost circular 3-3 mm attenuate toward front. - cephalic plate margined - In the eye region is an aborted eye spot with 3 series of ocelli like spots - 3-6-9 - Antennae 17 jointed 1st joint not bursate on top. Dorsal plates with five longitudinal sulci. except - 1st three and last three spiracles on - 3-5-8-10-12-14-16-18-20-22nd segment Pleural regions furcate - Last dorsal plate rectangular 2 1/2 - 3 mm margined - legs compressed - diameter $\approx 1 \frac{1}{2}$ Last pleural plate filled with pores and armed. - Coxae

of anal legs with two spines - legs armed. On inside of posterior femora of ♂ is an elliptical white area which is covered with fine appressed hairs.

Plate III - fig. - 12-a

19. Lithobius bilabiatus. Wood.

Proc. Phila Acad 1867. - 120.

Riley Co. common.

None of dorsal plates produced at posterior angles. - Color Brown Antennae - 20-23 joints pilose Prosternal teeth 2-254-4- Posterior feet short but rather swollen - claw of ♀ genitalia single stout, - coxal pores. - 3-4-4-3 to 4-5-5-4. - round in a single series. - Length 15-18 mm. -

20. Lithobius pinguis, Bollman.

Entom. Amer. IV - 7-1888.

Riley Co. - Rare. -

None of dorsal plates produced - Brown antennae - 22-24 joints - short. - ocelli - 4-6 - Prosternal teeth 2-2. Spines on 1st leg 0-0-1 - Claw of ♀ genitalia whole stout and curved. - Length - 8-10 mm -

21. Lithobius tuber, - Bollman

Proc. U.S. Nat. Museum 2 1887 - 257

Riley Co. common. - 17 -

None of dorsal plates produced - Brown - soft parts purplish - not so robust as S. bilabialis, which it resembles. - Antennae - 20. joints - prosternal teeth - 2-2. ocelli - 11-15 - Coxal pores 3-4-4-3 - 3-5-4-4; Length 10-15 mm. 3rd and 4th joints of anal legs. each armed on inside with a large knot armed with spines. -

Plate - III - fig - 14.

22. Lithobius mordax. L. Koch

Die Myriapodengattung. Lithobius. 34-1862.

Riley; Shawnee; Pottawatomie, Barber - Common

Posterior angles of dorsal plates of 7-9-11-13th segments produced - Color dark chestnut brown soft parts, blue. - Length - 30-40 mm including legs. - posterior legs over $\frac{1}{3}$ of length of body. - Prosternal teeth 5-5 to 7-7. Antennae 29-32. Posterior femora often with a longitudinal sulcus on top. - Coxal pores 4-5-5-4 - 3-7-7-6 - Claw of female genitalia - trilobed middle claw longest by far. -

23. Scutigera forceps. (Raf.).

Cermatia forceps. Wood - Jour Phil Acad V-9-62

Shawnee; Barber; - Sabette; Riley; Pottawatomie, Co.

Common in houses, cellars, woods, - and damp places generally.

All but seven of dorsal plates almost aborted

Color light brown - interior part of body shows through and gives the body a pink or blue appearance.; legs blue; antennae brown; - a dark band on back extends from head to tail - Antennae longer than body about $1\frac{1}{2}$ times - dorsal plates long - marginate on the sides and emarginate posteriorly. - Legs spinose: - varying in length; in front $\frac{1}{2}$ of body - posteriorly two times length of body. - Quick and active. - This little species is met with in all the damp places and also in dark dry corners in houses. - It is a popular object of dread. - but in all probability could not bite as its jaws are very weak - It is very beneficial - living as it does on household pests. - Acanthiidae - Blattidae and flies. etc.

Plate III fig — 13-a-b.

Explanation of Plates.

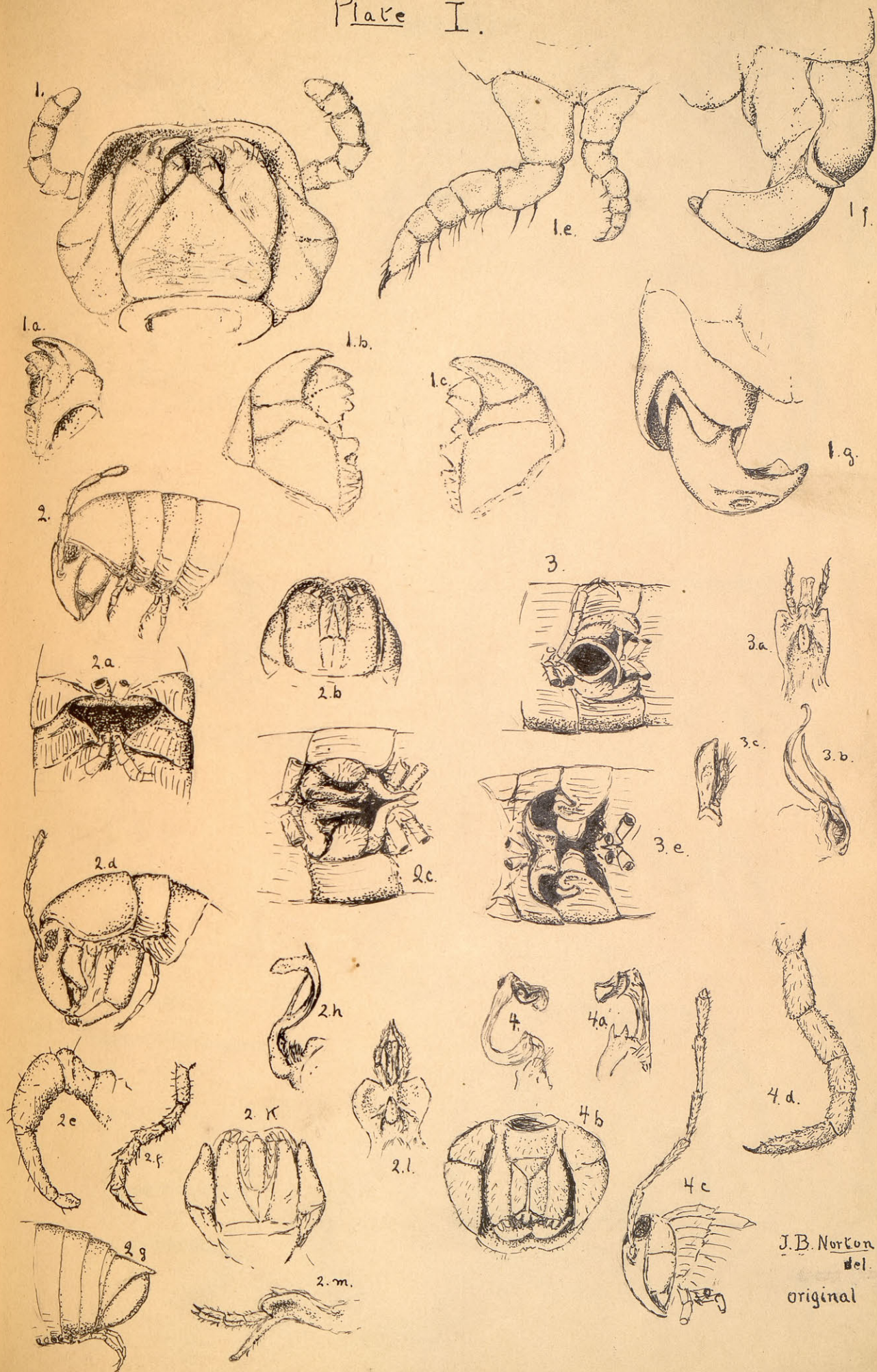
Plate I.

- 1.- Spirobolus marginatus. - ventral view of head. $\times 20$
a - exterior of mandible, $\times 9$ b - c exterior view of pair of mandibles $\times 14$ e. - 1st pair of legs of $\varnothing$ large one abnormal. $\times 9$
f - g - two views of σ^7 copulatory foot, $\times 14$.
- 2.- Parajulus venustus. - side view of head of $\varnothing$. $\times 9$ a - $\varnothing$ genital organs. $\times 14$. b. - ventral view of head of $\varnothing$. $\times 14$.
c - σ^7 genital organs. $\times 14$. d - side view of σ^7 head, $\times 9$. e leg of 1st segment of σ^7 , $\times 14$. f. - normal leg $\times 14$ g - posterior segments, $\times 9$. h. - σ^7 copulation foot. $\times 14$. k. - male mouth parts, $\times 14$. l. m. - 2nd pair of legs. $\times 14$.
3. Parajulus impressus. - σ^7 genital organs $\times 14$ a. - σ^7 and pair of legs, $\times 14$ b. - σ^7 copulation foot. $\times 14$ c. - exterior lobes of male genitalia, $\times 14$ e. - $\varnothing$ genital organs. $\times 14$.
4. Callipus lactarius, - copulation foot of large male $\times 14$. a - copulation foot of average male. $\times 28$.
b. mouthparts. $\times 28$ c side view of head $\times 14$ d - leg. $\times 28$

Plate II.

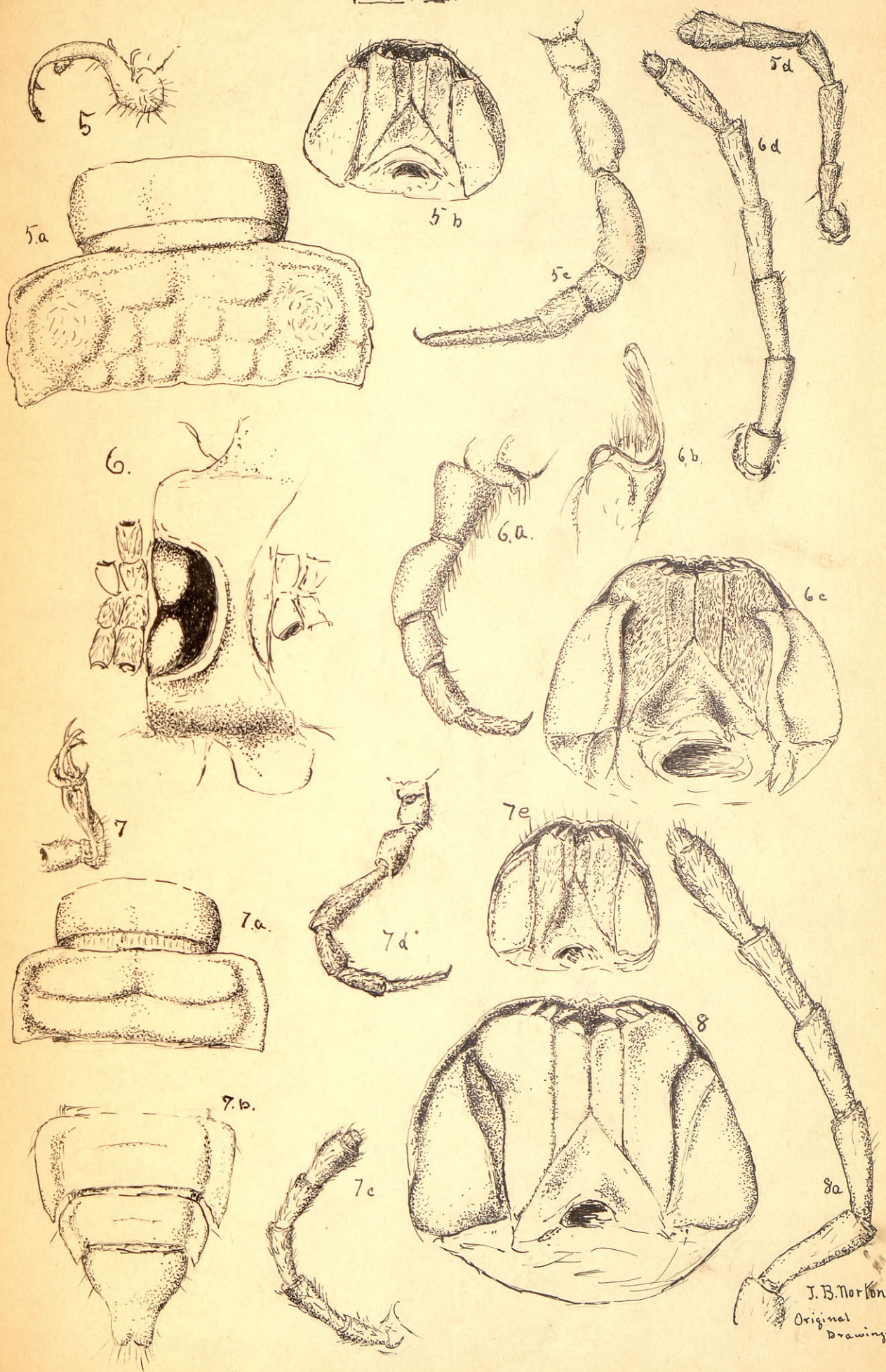
- 5.- Polydesmus serratus. - σ^7 copulation foot. $\times 30$
a. dorsal view of a segment. $\times 30$ b - mouth parts. $\times 23$
c. leg. $\times 30$ d. antenna, $\times 30$
6. Leptodesmus hispidipes, - $\varnothing$ genital organs. $\times 23$
a - leg. $\times 23$ b. σ^7 copul. foot. $\times 23$ c. mouthparts. $\times 23$
d - antenna, $\times 23$
7. Euryurus n. sp. - σ^7 copul. foot. $\times 28$ a dorsal plate $\times 23$

Plate I.



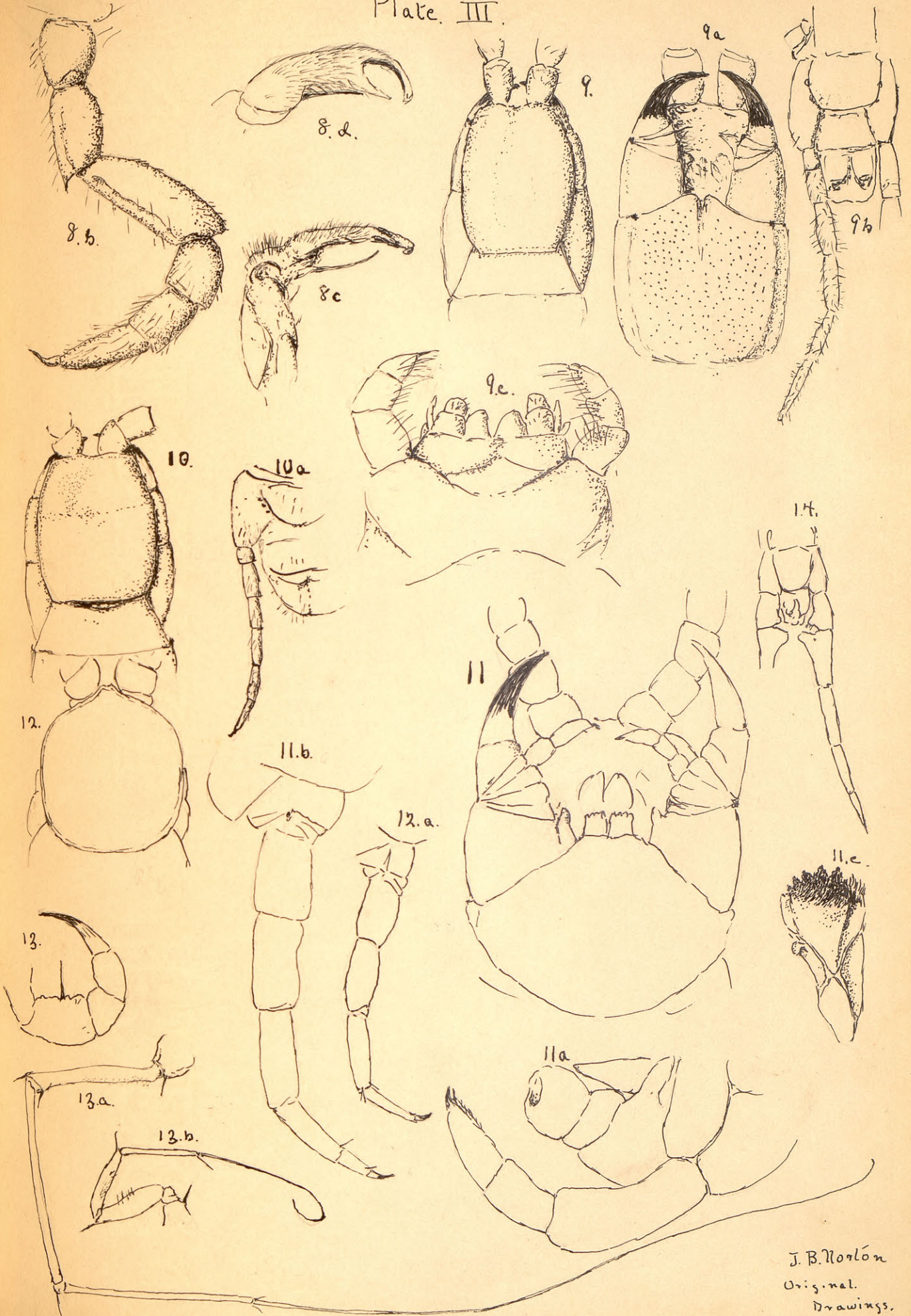
J.B. Norkon
del.
original

Plate II.



J. B. Norton
Original
Drawings

Plate. III.



J. B. Norlön
Original.
Drawings.

b. last dorsal plates. $\times 23$ c. - antenna. $\times 23$ d. leg. $\times 23$

8. Fontaria virginensis - mouth parts. $\times 23$

a. antenna $\times 23$

Plate III.

8 continued - b - leg. $\times 23$ - c - d - copulation foot. $\times 23$

9. Geophilus bipuncticeps - dorsal view of head. $\times 23$

a ventral view of head. $\times 28$ b posterior segment of

q $\times 28$ c maxillae $\times 50$.

10. Geophilus cephalicus - dorsal view of head. $\times 30$

a anal segment of q. $\times 30$.

11. Scolopendra heros. - head. - ventral view. - $\times 6$ a max-

illae - $\times 9$ b legs. $\times 6$ c mandible $\times 14$.

12. Scolopocryptops sexspinosus. - head dorsal view - $\times 9$

a - leg. $\times 6$

13. Scutigera forceps. - prehensor. $\times 14$. a - hind leg

$\times 6$ b fore leg. - $\times 6$

14. Lithobius tuber - anal legs. $\times 14$.