FINE STRUCTURE OF SOME LOWER METAZOA

VOLUME TWO

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Plate No: 1:1

Diagram of a section through a cell of generalised structure. (Reproduced by kind permission of Dr E. H. Mercer).
Plate No: 1:2

Diagrams of three specialised cells.

(Reproduced by kind permission of Dr E. H. Mercer).

(a) A protein secreting cell
   (e.g. exocrine pancreatic cell).

(b) A protein retaining cell
   (e.g. an embryonic erythrocyte).

(c) A mucus secreting cell.
Plate No: 2:2

Graph of the increase in relative viscosity of heated Araldite (Ciba) mixtures. The relative viscosity is proportional to the time taken for a small glass ball to fall 20 cm. through the mixture.
+10% acetone at 20°
Plate No: 2:3

Histogram of the relative quantities of Araldite which will diffuse across a given interface at the temperature shown, during the period in which the viscosity of the mixture is less than the viscosity of fresh mixture at 20°C.
Plate No: 3:1

Photomicrograph of living specimen of *P. roseola*, taken with electronic flash and dark ground illumination.

Neg. x 70,000  
Enl. x 8  
Total x 560.
Plate No: 3:2

Simplified diagram of *P. roseola* based on photomicrographs similar to Pl. 3:1.
head

corona
cerebral ganglion
eye-spot
buccal tube
mastax
trophi
sub-cerebral gland
stomach
protonephridial tubule
flame bulb

trunk

ovum
germovitellarium

foot

intestine
bladder
pedal glands
pedal gland ducts

0.1 mm

spurs
Plate No: 3:3

Photomicrograph of *P. roseola* swimming.
Taken with electronic flash and phase contrast optical system.

Neg. x 70        Enl. x 8        Total x 560
Plate No: 3:4

Photomicrograph of *P. roseola* creeping, using the rostral and pedal organs of attachment.

Neg. x 70          Enl. x 8          Total x 560
protonephridial tubule

cerebral ganglion

mastax

eye-spot

rostrum

foot

protonephridial tubule

0.1 mm
Plate No: 3:5

Photomicrograph of the rotifer foot, showing the pedal glands, ducts, toes and spurs.
cd, cell duct,
d, straight portion of duct,
gc, gland cell,
sp, spur,
t, toe.

Neg. x 187
Enl. x 8
Total x 1,500
Plate No: 3:7a.

Photomicrograph of the trophi in the mastax. The jaws have been photographed while open. Taken with electronic flash and phase contrast optics.

bt, buccal tube, u, uncus.

Neg. x 165 Enl. x 8 Total x 1,320

Plate No: 3:7b.

Photomicrograph of the same animal as in the above micrograph, with the jaws closed. All details are the same as in Pl. 3:7a.

stl, stomach lumen.

Neg. x 165 Enl. x 8 Total x 1,320

Plate No: 3:7c.

Photomicrograph of the jaws of P. roseola digested out in 1 N KOH. Phase contrast optics.

Neg. x 266 Enl. x 6 Total x 1,600

Plate No: 3:7d.

Photomicrograph of jaws of P. roseola, from the same specimen as Pl. 3:7c. The hinge between the rami is prominent.

r, rami.

Neg. x 133 Enl. x 12 Total x 1,600
Plate No: 3:8

Simplified diagram of T.S. of trophi in *P. roseola*, showing the relationship of the unci, rami and manubria.

h, hinge,
ma, manubrium,
mac, manubrium cell,
ra, ramus,
rac, ramus cell,
u, uncus,
uc, uncus cell.
Plate No: 3:9a

Diagram of the buccal tube and its opening into the mastax cavity.

bt, buccal tube,
c, cilia,
m, mitochondria,
mu, muscle cell,
pav, pharyngeal valve.

Mag. x 3,000

Plate No: 3:9b

Diagram of relationship of the buccal tube to the anterior part of the mastax.

mas, mastax lumen.
Other abbreviations as above.
Mag. x 3,000

Plate No: 3:9c

Diagram of anterior part of mastax.
Abbreviations as above.
Mag. x 3,000

Plate No: 3:9d

Diagram of a transverse section passing through the anterior part of the mastax and the anterior tips of the trophi.

gl, gland cell, t, teeth,
ma, manubrium, u, uncus,
mac, manubrium cell, uc, uncus cell.

Mag. x 3,000.
Plate No: 3:10a

Diagram of a section passing through the centre of the mastax and trophi (*P. roseola*).

c, cilia,
gl, gland cell,
ma, manubrium,
mac, manubrium cell,
mas, mastax lumen,
mu, muscle cell,
n, nucleus,
ra, ramus,
rac, ramus cell,
t, tooth.

Mag. x 3,000

Plate No: 3:10b

Diagram of a t.s. passing through the posterior of the mastax and the posterior tips of the trophi.

mso, mastax sense organ,
Other abbreviations as for Pl. 3:10a.

Mag. x 4,000
Plate No: 3:11

Section of the tegument in the vicinity of an epidermal nucleus (*P. roseola*).

bm, basement membrane,
cut, cuticle,
er, ergastoplasm,
g, Golgi complex,
m, mitochondrion,
n, nucleus,
nl, nucleolus,
nm, nuclear membrane,
np, nuclear pore,
p, pore,
pm, plasma membrane,
pv, pore-associated vesicle,
r, ribosomes,
sv, small vesicle,
ts, tegumental shield.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000   Enl. x 4   Total x 40,000
Plate No: 3:12a
Section of tegument near the foot, where the
tegumental shield is quite thin.
cut, cuticle, pg, pigment granule,
p, pore, ts, tegumental shield.
Anaesthetic: Xylocaine.
Fixation: glutaraldehyde, OsO₄ and
uranyl acetate.
Stain: lead citrate.
Neg. x 20,000 Enl. x 4 Total x 80,000.
Plate No: 3:12b
From a longitudinal section of the animal.
The layers of the fibres are indistinct.
cut, cuticle, sv, small vesicle,
ppv, pore-associated ts, tegumental shield.
Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 10,000 Enl. x 3 Total x 30,000.
Plate No: 3:12c
Micrograph of a tegumental shield.
dl, dense layer, g, gap,
f, fibres, pm, plasma membrane.
Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 40,000 Enl. x 3 Total x 120,000.
Plate No: 3:12d
Micrograph of a tegumental shield.
p, pore.
Other abbreviations as above.
Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 10,000 Enl. x 3 Total x 30,000.
Plate No: 3:13

Diagram of the appearance of the fibres in the tegumental shield.
Chromatograph of *P. roseola* hydrolysate.

Whole rotifers were hydrolysed with 4N HCl and the resulting hydrolysate was chromatographed in an alkaline acetyl acetone solvent. Glucosamine and galactosamine were used as controls.

gal, galactosamine spot,
gluc, glucosamine spot,
X, rotifer hydrolysate,
A, was sprayed with Elson Morgan reagent,
B, was sprayed with ninhydrin.
Plate No: 3:15a

Section of one of the cilia-bearing cells of the corona.
c, cilia,
cc, coronal cell,
cr, ciliary rootlets,
d, desmosome,
g, Golgi complex,
m, mitochondrion,
mi, muscle insertion,
mu, muscle,
n, nucleus,
ne, nerve,
nl, nucleolus,
sy, synapse.

Fixation: OsO₄, uranyl acetate.
Stain: lead citrate.
Neg. x 10,000 Enl. x 4 Total x 40,000

Plate No: 3:15b

Photographic enlargement of a portion of the above plate.

Abbreviations, fixation and staining as for Pl. 3:15a.

Neg. x 10,000 Enl. x 10 Total x 100,000
Plate No: 3:16

Section of the lower portion of a ciliary cell in the corona.

er, ergastoplasm,
g, Golgi complex,
m, mitochondrion,
mc, muscle cell contact,
mu, muscle cell,
n, nucleus,
nl, nucleolus,
nm, nuclear membrane,
np, nuclear pore,
pm, plasma membrane,
r, ribosomes.

Fixation: OsO₄ and uranyl acetate.

Stain: lead citrate.

Neg. x 5,000  Enl. x 4  Total x 20,000
Plate No: 3:17a

High power micrograph of a septate desmosome connecting a ciliary cell to the epidermis.

d, desmosome,
fil, filaments,
pm, plasma membrane,
s, septa.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 20,000 Enl. x 4 Total x 80,000

Plates 3:17b and 3:17c

Photographic enlargements of portion of Pl. 4:17a.

Neg. x 20,000 Enl. x 8 Total x 160,000
Plate No: 3:18

Bases of the coronal cilia in P. roseola.

af, axial fibres,
ag, axial granule,
bb, basal body,
bh, basal cup,
bp, basal plate,
cr, ciliary rootlets,
m, mitochondrion,
p, pore,
pm, plasma membrane,
pf, peripheral fibres.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.

Stain: lead citrate.

Neg. x 10,000          Enl. x 10       Total x 100,000
Plate No: 3:19a

Ciliary rootlets in *Synchaeta stylata*. The major light and dark bands are obvious. The darker lines within the major light and dark bands may also be seen. Pl. 3:20 is a diagram of the unit of structure.

db, dark band,
lb, light band.

Fixation: *OsO₄* and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000 Enl. x 12 Total x 120,000

Plate No: 3:19b

Ciliary rootlets in *P. roseola*.

Fixation: *OsO₄* and uranyl acetate.
Stain: lead citrate.

Neg. x 20,000 Enl. x 6 Total x 120,000
Plate No: 3:20

Diagram of the pattern of light and dark bands in the ciliary rootlets of *Synchaeta stylata*.
The shaded longitudinal band represents the width of a single longitudinal filament.
Plate No: 3:21

T.S. of cilia at their origin in a coronal cell
(P. roseola).

af, axial fibre,
ag, axial granule,
bb, basal body,
bc, basal cup,
bp, basal plate,

ag, axial granule,
bb, basal body,

bc, basal cup,
bp, basal plate,

af, axial fibre,
ag, axial granule,
bb, basal body,
bc, basal cup,
bp, basal plate,

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 20,000 Enl. x 5 Total x 100,000
Plate No: 3:22a

T.S. of shafts of cilia, illustrating the pattern of the longitudinal fibres, and their interconnections.

af, axial fibres,
bc, basal cup,
cf, connecting filaments,
pf, peripheral fibres,
pm, plasma membrane,
sfa, subfibre A,
sfb, subfibre B.

Fixation: OsO₄, uranyl acetate.
Stain: lead citrate.
Neg. x 20,000     Enl. x 5     Total x 100,000

Plate No: 3:22b

T.S. through tips of coronal cilia, illustrating the reduction in the number of fibres which occurs, and the reduction of the double peripheral fibres to single fibres.

Abbreviations, fixation and staining as for Pl. 3:22a above.

Neg. x 20,000     Enl. x 5     Total x 100,000
Plate No: 3:23a

Residue of a sonicated culture of *P. roseola* which has been negatively stained with phosphotungstic acid (PTA) solution. The basal body of a cilium with the fibres springing from it is illustrated. Only nine fibres have survived the treatment.

bb, basal body;
ft, fibre tip.

Stain: neutralised PTA.

Neg. x 20,000  Enl. x 3  Total x 60,000

Plate No: 3:23b

High power picture of a specimen similar to that illustrated above. Five longitudinally arranged subfibres are present across the width of each fibre.

Stain: neutralised PTA.

Neg. x 40,000  Enl. x 10  Total x 400,000
Unstained section of animal (*P. roseola*), which was treated with Wachstein and Miesel's (1957) adenosine triphosphatase (ATPase) medium before fixation. Where the reaction product deposits are small, they are observed to be located in nine discrete spots in a position corresponding to the inner edges of the peripheral fibres of the cilia.

ep, epidermis,

rp, reaction product.

**Fixation:** glutaraldehyde before incubation; OsO$_4$ afterwards.

**Unstained section.**

Neg. x 10,000  Enl. x 5  Total x 50,000

Plates No: 3:24b, 3:24c and 3:24d

Section of a different specimen to that in Pl. 3:24a. Lead staining has rendered very fine deposits hard to see, but it has made the ciliary fine structure more obvious.

rp, reaction product.

**Fixation:** glutaraldehyde before incubation, OsO$_4$ afterwards.

**Stain:** lead citrate.

Neg. x 20,000  Enl. x 3  Total x 60,000

Plate No: 3:24e

Section of the same specimen as Pl. 3:24b showing ATPase activity in the "whip lash" tips of the cilia.

Abbreviations for fixation, staining and magnification as for Pl. 3:24b.
Plate No: 3:25a

Section of the cell body of a sub-cerebral gland.

er, ergastoplasm,
g, Golgi complex,
m, mitochondrion,
mu, muscle cell,
n, nucleus,
mm, nuclear membrane,
pm, plasma membrane,
vs, vesicles containing gland secretion.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.

Stain: lead citrate.

Neg. x 5,000  Enl. x 3  Total x 15,000

Plate No: 3:25b

Section of pedal gland. The two types of gland can not be distinguished from each other by their structure.

Abbreviations are the same as above.

Anaesthetic: Xylocaine

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.

Stain: lead citrate.

Neg. x 2,500  Enl. x 6  Total x 15,000
Plate No: 3:26

Section showing the fine structure of the pedal gland.

er, ergastoplasm,
erc, ergastoplasm connected to nuclear envelope,
g, Golgi complex,
gr, dense granules in nucleoplasm,
m, mitochondrion,
mu, muscle cell,
n, nucleus,
nla, amorphous region of nucleolus,
nlg, granular region of nucleolus,
mm, nuclear membrane,
np, nuclear pore,
pm, plasma membrane,
vs, vesicles containing cell secretion.

Anaesthetic: Xylocaine.
Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000    Enl. x 4    Total x 40,000
Plate No: 3:27a

High power micrograph of the secretory apparatus in a pedal gland.

c, apparent connection between Golgi complex and ergastoplasm,
er, ergastoplasm,
g, Golgi complex,
pm, plasma membrane,
vs, vesicle containing cell secretion.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 20,000 Enl. x 4 Total x 80,000

Plate No: 3:27b

Ducts from the subcerebral glands opening at the tip of the rostrum.

bc, body cavity,
c, cilium,
d, desmosome,
do, duct opening to exterior,
du, duct,
mt, microtubule,
mu, muscle cell,
ne, nerve,
vs, vesicles containing secretion.

Anaesthetic: Xylocaine
Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000 Enl. x 3 Total x 30,000
Plate No: 3:28a

T.S. of a duct running from the pedal gland to the toes.

bc, body cavity,
ep, epidermis,
m, mitochondrion,
mu, muscle cell,
ne, nerve cell,
pm, plasma membrane of gland cell,
vs, vesicle of secretion,
vsm, membrane surrounding a vesicle of secretion.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000      Enl. x 4      Total x 40,000

Plate No: 3:28b

High power micrograph of the wall of a pedal gland duct.

mt, microtubule,
mta, microtubule attached to duct wall,
Other abbreviations as above.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 40,000      Enl. x 6      Total x 240,000
Plate No: 3:29a

Ducts of pedal glands opening at the tip of the foot (*P.* roseola).

d, desmosome,
do, duct opening to exterior,
du, duct,
mt, microtubules,
mu, muscle cell,
s, secretion which has been released,
vs, vesicles containing secretion.

Anaesthetic: Xylocaine.
Fixation: glutaraldehyde, *OsO*$_4$ and uranyl acetate.
Stain: lead citrate.
Neg. x 10,000    Enl. x 3    Total x 30,000

Plate No: 3:29b

High power micrograph of the opening of a duct, showing a vesicle passing out.

d, desmosome,
me, trilaminar membrane which has been expelled,
pm, plasma membrane of gland cell,
vs, membrane enclosing secretory vesicle.

Anaesthetic: Xylocaine.
Fixation: glutaraldehyde, *OsO*$_4$ and uranyl acetate.
Stain: lead citrate.
Neg. x 20,000    Enl. x 4    Total x 80,000
Plate No: 3:30a

T.S. of buccal tube (*P. roseola*)

c, cilia,
ep, epithelium,
mu, muscle cell,
uc, undifferentiated cell.

Fixation: OsO$_4$ and uranyl acetate.
Stain: lead citrate.

Neg. x 2,000  Enl. x 3  Total x 6,000

Plate No: 3:30b

Sagittal section (SS) of buccal tube.

bt, buccal tube,
c, cilia,
coc, coronal cilia,
cr, ciliary rootlets,
ep, epithelium,
mx, mastax lumen,
mu, muscle cell,
pav, pharyngeal valve.

Fixation: glutaraldehyde, OsO$_4$ and uranyl acetate.
Stain: lead citrate.

Neg. x 2,000  Enl. x 3  Total x 6,000
Plate No: 3:31a

Section of buccal tube epithelium.

bb, basal body,
c, cilia,
cr, ciliary rootlets,
d, desmosome,
mu, muscle cell.

Fixation: 0sO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 2,000  Enl. x 10  Total x 20,000

Plate No: 3:31b

Tips of cilia in the buccal tube. The cilia have "whip lash" tips similar to the tips of the corona cilia, but much shorter.

af, axial fibres,
pf, peripheral fibres,
t, tips of cilia.

Fixation: 0sO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 20,000  Enl. x 3  Total x 60,000
Plate No: 3:32a

Section of buccal tube which shows a gland cell emptying into the lumen of the tube (P. roseola).

bep, epithelium of buccal tube,
bt, buccal tube lumen,
c, cilia,
cr, ciliary rootlets,
d, desmosome,
du, gland cell duct,
gc, gland cell,
m, mitochondrion,
mu, muscle cell,
vs, secretory vesicle.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 4,000  Enl. x 3  Total x 12,000

Plate No: 3:32b

Section of a buccal tube gland cell.

g, Golgi complex,
m, mitochondrion,
n, nucleus,
nl, nucleolus,
nm, nuclear membrane,
r, ribosomes,
vs, vesicle of secretion.

Fixation and staining as above.
Neg. x 10,000  Enl. x 3  Total x 30,000
Plate No: 3:33a

Section of the buccal tube showing the duct of a gland cell where it opens into the lumen of the tube (P. roseola).

c, c ilium,  
cr, ciliary rootlets,  
d, desmosome,  
pm, plasma membrane of gland cell,  
vs, secretory vesicle.

Fixation: OsO$_4$ and uranyl acetate.  
Stain: lead citrate.  
Neg. x 10,000  
Enl. x 3  
Total x 30,000

Plate No: 3:33b

Detail of a gland cell duct opening into the buccal tube lumen.

Abbreviations as for Pl. 3:33a.

Fixation: OsO$_4$ and uranyl acetate.  
Stain: lead citrate.  
Neg. x 20,000  
Enl. x 3  
Total x 60,000
Plate No: 3:34a

Section of the buccal tube where it opens into the mastax.

bt, buccal tube lumen,
bep, buccal tube epithelium,
c, cilia,
cr, ciliary rootlets,
m, mitochondrion,
mx, mastax lumen,
mc, mastax cilia,
mep, mastax epithelium,
mu, muscle cell,
n, nucleus,
pav, pharyngeal valve.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 2,600 Enl. x 3 Total x 7,800.

Plate No: 3:34b

Detail of the origin of the pharyngeal valve in the wall of the buccal tube epithelium.

Abbreviations as above.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 4,000 Enl. x 6 Total x 24,000
Section of the mastax epithelium showing the additional trilaminar membrane which covers the cell surface and the cilia.

bb, basal body, mx, mastax cavity,
bc, basal cup, om, additional trilaminar membrane,
d, desmosome, mep, mastax epithelium, pm, plasma membrane.

Fixation: glutaraldehyde, OsO_4 and uranyl acetate.
Stain: lead citrate.
Neg. x 23,000 Enl. x 3 Total x 69,000.

Plate No: 3:35b

High power micrograph of the cilia in the mastax and part of the pharyngeal valve.

af, axial fibre, om, additional membrane,
c, cillum, pav, pharyngeal valve,
ct, tip of cillum, pf, peripheral fibre,
mx, mastax cavity pm, plasma membrane.

Fixation and staining as above.
Neg. x 20,000 Enl. x 6 Total x 120,000.

Plate No: 3:35c

Photographic enlargement of part of Pl. 3:35b.
Abbreviations, fixation and staining as above.
Neg. x 20,000 Enl. x 10 Total x 200,000.
T.S. of *P. roseola* through the centre of the trophi. The diagram shows the approximate plane of the section through the animal (X - X).

c, cilia,

gc, gland cell,
m, mitochondrion,
am, manubrium,
amc, manubrium cell,
mso, mastax sense organ,
mu, muscle cell,
mx, mastax lumen,
ra, ramus,
rac, ramus cell,
u, uncus,
uc, uncus cell.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.

Stain: lead citrate.

Neg. x 2,600 Enl. x 3 Total x 7,800
A section of *P. roseola* which has cut the trophi more longitudinally than transversely. Diagram shows the approximate plane of the section (Y - Y).

al, algal cell,
fo, food particles,
ma, manubrium,
mac, manubrium cell,
mu, muscle cell,
mx, mastax lumen,
pav, pharyngeal valve,
pr, projections of mastax wall,
ra, ramus,
t, tooth,
u, uncus,
uc, uncus cell.

Fixation: OsO₄ and uranyl acetate.

Stain: lead citrate.

Neg. x 2,000  Enl. x 4  Total x 8,000
Plate No: 3:38

Section passing through tips of trophi. The section is from the series which includes section X - X (Pl. 3:36).

c, cilia,
gc, gland cell,
ama, manubrium,
mac, manubrium cell,
mu, muscle cell,
mx, mastax lumen,
t, tooth,
u, uncus,
uc, uncus cell.

Fixation: glutaraldehyde, $\text{OsO}_4$ and uranyl acetate.

Stain: lead citrate.

Neg. x 2,000      Enl. x 5      Total x 10,000
Plate No: 3:39a

Section of the manubrium and manubrium cell.

d, desmosome,
f, fibres,
gm, granular material,
ma, manubrium,
mac, manubrium cell,
mx, mastax lumen,
r, ribosomes,
tu, tubules in manubrium,
u, uncus,
uc, uncus cell.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.

Stain: lead citrate.

Neg. x 10,000  Enl. x 3  Total x 30,000.

Plate No: 3:39b

Section close to the section in Pl. 3:36 passing through the plane of the manubrium so as to cut the tubules longitudinally.

Abbreviations, fixation and staining as above.

Neg. x 10,000  Enl. x 3  Total x 30,000.
Plate No: 3:40a

Detail of the structure of the manubrium in *P. roseola*.

fib, fibrils,

 gm, granular material,

 mv, microvillus,

 tc, tubule core,

 tu, tubule.

Fixation: *OsO$_4$* and uranyl acetate.

Stain: lead citrate.

Neg. x 10,000               Enl. x 4               Total x 40,000.

Plate No: 3:40b

High power micrograph of an area in the plate above.

Abbreviations, fixation and staining as above.

Neg. x 20,000               Enl. x 3               Total x 60,000.
Plate No: 3:41a

Section of the manubrium cells in *P. roseola*.

- f, fibres
- gm, granular material
- m, mitochondria
- ma, manubrium
- mac, manubrium cell
- mu, muscle cell
- mx, mastax lumen
- n, nucleus
- pm, plasma membrane
- uc, uncus cell
- v, vesicles

**Fixation:** OsO<sub>4</sub> and uranyl acetate.

**Stain:** Lead citrate.

Neg. x 4,000  Enl. x 3  Total x 12,000

Plate No: 3:41b

Detail of Pl. 3:41a showing the relationship of the granular material to the manubrium.

- fib, fibrils
- tm, membrane surrounding tubule core
- tc, material in the cores of tubules

Other abbreviations, fixation and staining as above.

Neg. x 20,000  Enl. x 3  Total x 60,000
Plate No: 3:42a

T.S. of ramus, showing its tubular construction (similar to the manubrium), teeth, and the base of the projection which hinges with the other ramus.

ch, channel,
mx, mastax lumen,
pr, projection,
ra, ramus,
rac, ramus cell,
t, tooth,
tc, tubule core,
tm, tubule membrane,
tu, tubule.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000 Enl. x 3 Total x 30,000

Plate No: 3:42b

High power micrograph of an area from the plate above.

Abbreviations, fixation and staining as above.

Neg. x 40,000 Enl. x 3 Total x 120,000
Plate No: 3:43a

Detail of an area in Plate 3:37 showing the teeth on the rami and the structure of the region which supports them.

ch, channel, 
fo, food particle, 
mat, matrix of jaw, 
pm, plasma membrane, 
ra, ramus, 
rac, ramus cell, 
t, tooth, 
tc, tubule core, 
tu, tubule.

Fixation: OsO₄ and uranyl acetate. 
Stain: lead citrate.
Neg. x 10,000 Enl. x 3 Total x 30,000

Plate No: 3:43b.

High power micrograph of area in Pl. 3:43a.

Abbreviations, fixation and staining as above.

Neg. x 20,000 Enl. x 3 Total x 60,000
Plate No: 3:44a

T.S. of ramus showing further details of the structure (*P. roseola*).

ch, channel,
mat, matrix,
me, membrane covering teeth,
ml, multilayered membrane lining tubules,
mx, mastax cavity,
t, tooth,
tu, tubules,
tc, tubule core.

Anaesthetic: Xylocaine.
Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000 Enl. x 4 Total x 40,000

Plate No: 3:44b

Detail of the relationship between a ramus and its attendant cell.

fib, fibrils on the outer surface of the jaw,
fm, fibrous material filling the gap which separates the jaw from its cell,

ga, gap,
mv, microvillus,
ra, ramus,
rac, ramus cell,
tu, tubules in jaw,
v, vesicle in cell.

Fixation and staining as above.

Neg. x 10,000 Enl. x 4 Total x 40,000
Plate No: 3:45

Low power electron micrograph of the ramus cells.

er, ergastoplasm,
fib, fibrous material,
g, gap,
m, mitochondrion,
mac, manubrium cell,
muscle cell,
mv, microvillus,
n, nucleus,
ra, ramus,
rac, ramus cell,
v, vesicle.

Fixation: $\text{OsO}_4$ and uranyl acetate.

Stain: lead citrate.

Neg. x 2,000  Enl. x 6  Total x 12,000
Plate No: 3:46a

Longitudinal section of the trophi which has cut tangentially through the curved anterior surface of the unci.

c, cilia,
is, inner surface of jaw,
mu, muscle,
mx, mastax cavity,
os, outer surface of jaw,
t, tooth,
u, uncus.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 2,000  Enl. x 4  Total x 8,000

Plate No: 3:46b

Higher power micrograph of a tangential section of an uncus.

cb, chevron shaped bands,
fib, fibrils,
is, inner surface of jaw,
mv, microvillus,
mx, mastax cavity,
os, outer surface of jaw,
t, tooth.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000  Enl. x 3  Total x 30,000
Plate No: 3:47a

Section through the unci, in which the teeth have been cut transversely.

mat, matrix,  
mi, muscle insertion,  
mu, muscle cell,  
mv, microvillus,  
mx, mastax lumen,  
pm, plasma membrane,  
ri, ridges on wall of tooth,  
t, tooth.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.  
Stain: lead citrate.  
Neg. x 10,000 Enl. x 3 Total x 30,000

Plate No: 3:47b

High power micrograph of a smaller tooth and the fibres of a muscle insertion, which are attached to it.

me, membrane covering tooth.

Other abbreviations as for Pl. 3:47a.

Anaesthetic: Xylocaine.  
Fixation: OsO₄ and uranyl acetate.  
Stain: lead citrate.  
Neg. x 40,000 Enl. x 3 Total x 120,000
Micrograph of an uncus cell, and a manubrium. The gap separating the uncus from its cell is prominent, and microvilli from the cell can be seen extending across the gap to the teeth.

\[ \text{g, Golgi complex, } \text{mv, microvillus,} \]
\[ \text{ga, gap, } \text{mx, mastax lumen,} \]
\[ \text{is, inner surface of jaw, } \text{r, ribosomes,} \]
\[ \text{m, mitochondrion, } \text{t, tooth,} \]
\[ \text{ma, manubrium, } \text{u, uncus,} \]
\[ \text{mac, manubrium cell, } \text{uc, uncus cell,} \]
\[ \text{mu, muscle cell, } \text{v, vesicle.} \]

Fixation: glutaraldehyde, OsO\(_4\) and uranyl acetate.
Stain: lead citrate.
Neg. x 5,000  Enl. x 3  Total x 15,000.

Plate No: 3:48b

High power electron micrograph showing the relationship between the microvilli of the uncus cell, and the teeth in the jaw.

\[ \text{is, inner surface of jaw, } \text{pm, plasma membrane,} \]
\[ \text{mv, microvilli, } \text{ri, ridges penetrating teeth,} \]
\[ \text{mx, mastax, } \text{t, teeth.} \]

Fixation: OsO\(_4\) and uranyl acetate.
Stain: lead citrate.
Neg. x 12,000  Enl. x 8  Total x 96,000.
Plate No:  3:49

Very low power electron micrograph of a section through the oesophagus, which connects the mastax to the stomach. Stomach tissue and gastric glands surround the oesophagus.

bc, body cavity, ed, epidermis,  
gd, gland duct, gg, gastric gland,  
n, nucleus, o, oesophagus,  
st, stomach tissue, ts, tegumental shield,  
vf, food vacuoles, vs, secretion vesicles in gastric gland.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.

Stain: lead citrate.

Neg. x 1,000  Enl. x 4  Total x 4,000
Plate No:  3:50

Micrograph of a gastric gland. Ergastoplasm and the deeply staining secretion vesicles are the two prominent features of the cytoplasm.

bc, body cavity,  
ed, epidermis,  
er, ergastoplasm,  
g, Golgi complex,  
mu, muscle cell,  
n, nucleus,  
nl, nucleolus,  
nm, nuclear membrane,  
ts, tegumental shield,  
vs, vesicles enclosing the cell secretion.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.  
Stain: lead citrate.

Neg. x 4,000  Enl. x 4  Total x 16,000
Plate No: 3:51a

Detail of the cytoplasm of a gastric gland.

er, ergastoplasm,
m, mitochondrion,
n, nucleus,
nl, nucleolus,
mm, nuclear membrane,
vs, vesicle containing cell secretion.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000  Enl. x 4  Total x 40,000

Plate No: 3:51b

Detail of the gastric gland duct opening into the oesophagus.

c, cilium,
d, desmosome,
er, ergastoplasm,
g, Golgi complex,
gd, gland duct,
oep, oesophageal epithelium,
ol, oesophageal lumen,
vs, vesicles of cell secretion.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000  Enl. x 4  Total x 40,000
Plate No: 3:52

Low power electron micrograph of a T.S. through the centre of the trunk of P. roseola.

bc, body cavity,
ed, epidermis,
fv, food vacuole,
m, mitochondria,
mu, muscle cell,
n, nucleus,
ov, ovary,
st, stomach syncytium,
stl, stomach lumen,
vg, vitelline gland.

Fixation: OsO₄ and uranyl acetate.

Stain: lead citrate.

Neg. x 2,000          Enl. x 5          Total x 10,000
Plate No: 3:53

Section of syncytial stomach of \textit{P. roseola}.

bc, body cavity, 
bm, basement membrane,  
dm, double membrane,  
er, ergastoplasm,  
f, fibrous material,  
fv, food vacuole,  
g, Golgi complex,  
m, mitochondrion,  
n, nucleus,  
 nl, nucleolus,  
nm, nuclear membrane,  
np, nuclear pore,  
r, ribosomes,  
 vs, small vesicle.

Fixation: OsO$_4$ and uranyl acetate. 
Stain: lead citrate.

Neg. x 6,000     Enl. x 4     Total x 24,000
Plate No: 3:54

High power micrograph of the basement membrane covering the surface of the stomach bordering on the body cavity.

bc, body cavity,
bm, basement membrane,
er, ergastoplasm,
pm, plasma membrane,
v, cytoplasmic vesicle.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 41,000    Enl. x 4    Total x 164,000.
Plate No: 3:55

Micrograph of the lining of the stomach lumen.

c, cilium,
ch, channel,
cl, collar,
er, ergastoplasm,
f, fibres,
fu, fuzzy layer,
m, mitochondrion,
pm, plasma membrane,
stl, stomach lumen,
tw, terminal web.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 20,000    Enl. x 4    Total x 80,000
Plate No: 3:56a

Section of the stomach in an animal which was fed on colloidal gold sol before fixation.

bc, body cavity,
bm, basement membrane,
c, cilium,
ch, channel,
fv, food vacuole,
go, gold particles,
stl, stomach lumen.

Fixation: OsO₄ and uranyl acetate.

Unstained section.

Neg. x 8,000 Enl. x 3 Total x 24,000

Plate No: 3:56b

Micrograph of a similar specimen to the one in Pl. 3:56a at higher power.

tw, terminal web,

Other abbreviations as above.

Fixation: OsO₄ and uranyl acetate.

Unstained section.

Neg. x 10,000 Enl. x 3 Total x 30,000
Section of an animal which was incubated in Gomori's (1952) medium for the histochemical detection of acid phosphatases. The reaction product (rp) is concentrated in the food vacuoles (fv) (particularly near the membranes surrounding them), in some small vesicles (v), and on the plasma membrane of muscle cells (mu).

er, ergastoplasm,  
fv, food vacuole,  
fvm, membrane enclosing food vacuole,  
g, Golgi complex,  
m, mitochondrion,  
mu, muscle cell,  
n, nucleus,  
rp, reaction product,  
v, cytoplasmic vesicle.

Fixation: glutaraldehyde before incubation and OsO₄ after incubation.
Unstained section.

Neg. x 5,900  Enl. x 3  Total x 17,700

Plate No:  3:57b.

Higher power micrograph of the large food vacuole in plate Pl. 3:57a. All details are the same as above.

Neg. x 12,500  Enl. x 3  Total x 37,500
Plate No: 3:58a

Longitudinal section of intestinal cillum
in *P. roseola* showing sleeve (sl).
Neg. x 10,000 Enl. x 4 Total x 40,000

All specimens illustrated in the montage were fixed in OsO₄ and uranyl acetate, and were stained with lead citrate.

Plate No: 3:58b

Transverse sections of intestinal cilia arranged in a series.
Neg. x 20,000 Enl. x 4 Total x 80,000

Plate No: 3:58c

Section of shaft showing point of commencement of sleeve (arrowed).
Neg. x 40,000 Enl. x 3 Total x 120,000

Plate No: 3:58d

Basal body and commencement of shaft.
Neg. x 40,000 Enl. x 3 Total x 120,000

Plate No: 3:58e

Longitudinal section of cillum tip.
Neg. x 40,000 Enl. x 3 Total x 120,000

Plate No: 3:58f

Section of a cillum near the commencement of the sleeve.
Neg. x 40,000 Enl. x 3 Total x 120,000

af, axial fibre, bp, basal plate,
ai, alga in intestine, ep, intestinal epithelium,
b, basal body, pf, peripheral fibre,
bc, basal cup, pm, plasma membrane,
sl, sleeve.
Plate No: 3:59

Diagram of the spiral sleeve in *P. roseola* showing five fibrils spiralling about a single remaining fibre from the fibrous complex of the cilium.
Plate No: 3:60

Mosaic of low power micrographs illustrating the anatomy of the intestine in *P. roseola*.

bc, body cavity,  
c, cilium,  
cut, cuticle,  
ed, epidermis,  
il, intestinal lumen,  
iw, intestinal wall,  
mu, muscle cell,  
 pn, protonephridial tubule,  
st, stomach,  
ts, tegumental shield.

Fixation: OsO₄ and uranyl acetate.

Stain: lead citrate.

Neg. x 2,000  Enl. x 3  Total x 6,000
Plate No: 3:61

Transverse section of the intestine and bladder in *P. roseola*.

bc, body cavity,
bl, bladder,
c, cilium,
cut, cuticle,
ed, epidermis,
il, intestinal lumen,
iw, intestinal wall,
m, mitochondrion,
mu, muscle cell,
n, nucleus,
pg, pedal gland.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 1,500  Enl. x 6  Total x 9,000
Plate No: 3:62a

Section of the intestinal epithelium of *P. roseola*.

bb, basal body, pm, plasma membrane, 
bc, body cavity, pr, projection of the 
c, cilium, intestinal plasma membrane, 
m, mitochondrion, sl, spiral sleeve in 
n, nucleus, a cilium. 
nm, nuclear membrane, 

Fixation: OsO₄ and uranyl acetate. 
Stain: lead citrate. 
Neg. x 10,000 Enl. x 3 Total x 30,000

Plate No: 3:62b

Section through the cloaca of *P. roseola*. 
The intestinal epithelium is attached to the 
epidermis, recognisable by the pores, by 
septate desmosomes. 

cl, cloacal orifice, n, nucleus, 
ed, epidermis, p, epidermal pore, 
iep, intestinal epithelium, sd, septate desmosome, 
m, mitochondrion, ts, tegumental shield. 
mu, muscle cell, 

Fixation: glutaraldehyde, OsO₄ and 
uranyl acetate. 
Stain: lead citrate. 
Neg. x 5,000 Enl. x 3 Total x 15,000
Plate No: 3:63

Micrograph of an algal cell in the intestine of *P. roseola*.

cp, chloroplast,
cw, cellulose wall,
ic, intestinal cilia,
il, intestinal lumen,
m, mitochondrion,

pm, plasma membrane,
s, starch granule,
v, vacuole.

Fixation: glutaraldehyde, *OsO₄* and uranyl acetate.

Stain: lead citrate.

Neg. x 10,000  Enl. x 4  Total x 40,000
Plate No: 3:64a

T.S. through free end of a flame bulb in *P. roseola*, showing the beginning of the slits in the bulb wall and the basal bodies of the cilia.

be, beaded material, f, fibres,
bb, basal body, m, mitochondrion,
bc, body cavity, sl, slits.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 20,000    Enl. x 3    Total x 60,000

Plate No: 3:64b

T.S. through the middle of a flame bulb, showing the slits in the wall, supporting rods in the wall, and the cilia in the centre of the bulb.

c, cilia, ro, rods in the wall.

pm, plasma membrane,

Other abbreviations as above.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 20,000    Enl. x 2    Total x 40,000

Plate No: 3:64c

Photographic enlargement of part of Pl. 3:64b.
All details as above.

Neg. x 20,000    Enl. x 4    Total x 80,000
Plate No: 3:65a

L.S. of flame bulb in *P. roseola*.

bb, basal body,
bc, body cavity,
c, cilia,
m, mitochondrion,
pm, plasma membrane,
ro, rods in bulb wall.

Fixation: **OsO₄** and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000 Enl. x 3 Total x 30,000

Plate No: 3:65b

L.S. of a flame bulb in an unidentified Bdelloid rotifer.

c, cillum, ed, epidermis,
bb, basal body, m, mitochondrion,
bc, body cavity, pn, protonephridial tubule,
cr, ciliary rootlet, ts, tegumental shield,
cut, cuticle, ro, rod in bulb wall,

Fixation: **OsO₄** and uranyl acetate.
Stain: lead citrate.

Neg. x 5,000 Enl. x 4 Total x 20,000
Plate No: 3:66a

T.S. of a flame bulb in unidentified rotifer (the same as Plate 65b).

bb, basal body, pm, plasma membrane, 
bc, body cavity, ro, rod in bulb wall, 
c, cilium, sl, slit in bulb wall.

Fixation: OsO₄ and uranyl acetate. 
Stain: lead citrate.

Neg. x 20,000 Enl. x 4 Total x 80,000.

Plate No: 3:66b

Micrograph of a protonephridial tubule in P. roseola.

bc, body cavity, du, ducts, 
co, connections between m, mitochondrion, 
ducts, n, nucleus.

Fixation: OsO₄ and uranyl acetate. 
Stain: lead citrate.

Neg. x 4,000 Enl. x 3 Total x 12,000.
Plate No: 3:67a

High power micrograph showing the details of the connections between ducts in a protonephridial tubule (*P. roseola*).

bc, body cavity; du, ducts;

cm, beta-cytomembrane; m, mitochondrion;

co, connection between ducts;

Fixation: *OsO*$_4$ and uranyl acetate.

Stain: lead citrate.

Neg. x 20,000  Enl. x 3  Total x 60,000

---

Plate No: 3:67b

Further detail of the beta-cytomembranes in the protonephridial tubule.

Abbreviations as above.

Fixation: *OsO*$_4$ and uranyl acetate.

Stain: lead citrate.

Neg. x 20,000  Enl. x 3  Total x 60,000
Section of the bladder, which is surrounded by pedal glands and the intestine (*P. roseola*).

bc, body cavity,
bep, bladder epithelium,
bl, bladder lumen,
il, intestinal lumen,
pg, pedal gland.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 1,500 Enl. x 10 Total x 15,000
Plate No: 3:69a

Section through the germovitellarium (*P. roseola*).

bc, body cavity,
ed, epidermis,
ov, ovocytes,
st, stomach,
vg, vitellarium,
vn, vitellarium gland nucleus,
vnu, vitellarium gland nucleolus.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 3,000       Enl. x 3       Total x 9,000

Plate No: 3:69b

Cytoplasm in the vitellarium.

er, ergastoplasm,  r, ribosomes,
m, mitochondrion,  v, vesicle.

pm, plasma membrane,

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 5,000       Enl. x 8       Total x 40,000
Plate No: 3:70a

Portion of the nucleus and nucleolus of the vitellarium, and some ovocytes (*P. roseola*).

m, mitochondrion, vg, vitellarium, ov, ovocyte, vn, vitellarium nucleus, pm, plasma membrane, vnu, vitellarium nucleolus.

Fixation: OsO₄ and uranyl acetate.

Stain: lead citrate.

Neg. x 3,000 Enl. x 10 Total x 30,000

---

Plate No: 3:70b

Nucleus and portion of the cytoplasm of the cell which surrounds the ovocytes and vitellarium.

bc, body cavity, nl, nucleolus, cm, beta-cytomembrane, pm, plasma membrane, m, mitochondrion, v, vesicle, n, nucleus, vg, vitellarium.

Fixation: OsO₄ and uranyl acetate.

Stain: lead citrate.

Neg. x 10,000 Enl. x 3 Total x 30,000
Plate No: 3:7la

Section of the egg shell of *P. roseola*.

bc, body cavity,
cm, beta-cytomembrane,
m, mitochondrion,
oc, ovum cytoplasm,
pm, plasma membrane of ovum,
sh, shell,
sm, superficial membrane.

Fixation: Oso$_4$ and uranyl acetate.
Stain: lead citrate.

Neg. x 20,000  Enl. x 3  Total x 60,000.

Plate No: 3:7lb

High power micrograph of the egg shell.
Abbreviations, fixation and staining as above.

Neg. x 40,000  Enl. x 4  Total x 160,000.
Plate No: 3:72a

Section of a muscle cell. The myofilaments are cut longitudinally. \( (P.\_roseola) \).

bc, body cavity, n, nucleus,  
cut, cuticle, nl, nucleolus,  
ed, epidermis, pm, plasma membrane,  
mf, myofilaments, r, ribosomes  
(or possibly glycogen).

Fixation: \( \text{OsO}_4 \) and uranyl acetate.  
Stain: lead citrate.  
Neg. x 10,000 Enl. x 3 Total x 30,000.

Plate No: 3:72b

T.S. of muscle cell.  
Abbreviations, fixation and staining as above.  
Neg. x 10,000 Enl. x 4 Total x 40,000.

Plate No: 3:72c

High power micrograph of the sarcolemma and a flattened vesicle containing dense granules.  
bc, body cavity, pm, plasma membrane,  
gr, granule, v, vesicle.  
mu, muscle cell,  
Fixation: \( \text{OsO}_4 \) and uranyl acetate.  
Stain: lead citrate.  
Neg. x 20,000 Enl. x 10 Total x 200,000.
Plate No: 3:73a

L.S. of a muscle cell in which dense bodies are present amongst the myofilaments and on the sarcolemma. (P. roseola).

bc, body cavity,
db, dense body,
er, ergastoplasm,
m, mitochondrion,
mf, myofilaments,
pm, plasma membrane.

Fixation: glutaraldehyde, Oso₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 10,000  Enl. x 4  Total x 40,000.

Plate No: 3:73b

Micrograph of a section which includes a muscle cut transversely and another cut longitudinally. One dense body spans the longitudinally sectioned cell, and others are present among the myofilaments in the transversely sectioned cell.

Fixation: glutaraldehyde, Oso₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 20,000  Enl. x 3  Total x 60,000.
Plate No: 3:74a

High power micrographs of longitudinal sections of muscle, showing the relationship between the myofilaments and the dense bodies. \( P. \text{roseola} \).

bc, body cavity,
db, dense body,
mf, myofilament,
pm, plasma membrane.

Fixation: glutaraldehyde, OsO\(_4\) and uranyl acetate.
Stain: lead citrate.

Neg. x 20,000  Enl. x 6  Total x 120,000.

Plate No: 3:74b

Micrograph of another portion of the same specimen as Pl. 3:73a.
Abbreviations, fixation and staining as above.

Neg. x 20,000  Enl. x 6  Total x 120,000.
Plate No: 3:75a

T.S. of muscle. Two classes of myofilaments are packed in a regular hexagonal array. The larger myofilaments have unstained cores. (P. roseola).

m, mitochondrion,
mfl, coarse myofilament,
mf2, fine myofilament,
v, vesicle,
vg, vesicle containing dense granules.

Fixation: OsO4 and uranyl acetate.
Stain: lead citrate.
Neg. x 10,000  Enl. x 4  Total x 40,000.

Plate No: 3:75b

High power micrograph of the myofilaments in T.S. Fine cross-linkages connect the fine to the coarse myofilaments.

Abbreviations, fixation and staining as above.

Neg. x 40,000  Enl. x 5  Total x 200,000.
Plate No: 3:76

Very high power micrograph of the myofilaments in L.S. The coarse myofilaments are apparently constructed of a number of fine fibrils. *(P. roseola).*

fib, fibrils,
pm, plasma membrane.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.

Stain: lead citrate.

Neg. x 40,000    Enl. x 10    Total x 400,000.
Plate No:  3:77a

Micrograph of the insertion of a muscle into the tegumental shield. (*P. roseola*).

cem, intercellular cement,  mu, muscle cell,
cut, remnants of cuticle,  pm, epidermal plasma membrane,
ed, epidermis,
fil, filaments,  sl, sarcolemma,
mf, myofilaments,  ts, tegumental shield.

Fixation:  *Oso*$_4$ and uranyl acetate.
Stain:  lead citrate.
Neg. x 20,000  Enl. x 4  Total x 80,000.

Plate No:  3:77b

Micrograph of a muscle insertion into the uncus.

fil, filaments,  sl, sarcolemma,
mu, muscle cell,  t, tooth,
pm, plasma membrane of uncus cell,
uc, uncus cell.

Fixation:  glutaraldehyde, *Oso*$_4$ and uranyl acetate.
Stain:  lead citrate.
Neg. x 30,500  Enl. x 3  Total x 91,500.
Plate No: 3:78a

Muscle insertion into a coronal cell in _P. roseola._

cc, coronal cell,  
cem, intercellular cement,  
mu, muscle cell,  
pm, plasma membrane of coronal cell,  
cr, ciliary rootlet,  
fil, filaments,  
m, mitochondrion,  
sl, sarcolemma.

Fixation: OsO_4 and uranyl acetate.  
Stain: lead citrate.

Neg. x 20,000  
Enl. x 3  
Total x 60,000.

Plate No: 3:78b

Detail of the intercellular contact between the muscle cell and coronal cell in the above micrograph.

Abbreviations, fixation and staining as above.

Neg. x 40,000  
Enl. x 3  
Total x 120,000.
Plate No: 3:79

Mosaic of low power micrographs of a T.S. through the cerebral ganglion of P. roseola.

ax, nerve axons, p1, type 1 perikaryon,
bt, buccal tube, p2, type 2 perikaryon,
ed, epidermis, ri, cell rind.

gd, duct of subcerebral gland,
mu, muscle cell,

Fixation: glutaraldehyde, OsO$_4$ and uranyl acetate.
Stain: lead citrate.

Neg. x 2,000  Enl. x 2  Total x 4,000.
Sagittal section through the cerebral ganglion of P. roseola.

bc, body cavity, nep, neuropile,
c, cilium-like bodies, pl, type 1 perikaryon,
eye, eye-spot, p2, type 2 perikaryon,
gd, duct of subcerebral gland, ri, cell rind,
mu, muscle cell,

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 2,000   Enl. x 4   Total x 8,000.
Plate No: 3:81a

Micrograph of a type 1 perikaryon. (P. roseola).

dv, vesicle containing dense granule,
er, ergastoplasm,
m, mitochondrion,
mt, microtubules,
n, nucleus,
mm, nuclear membrane,
pl, type 1 perikaryon,
p2, type 2 perikaryon,
pm, plasma membrane,
r, ribosomes,
v, vesicles with lightly stained contents.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 10,000  Enl. x 3  Total x 30,000.

Plate No: 3:81b

Detail of a portion of the cytoplasm and nucleus of a type 1 nerve cell body.

gd, duct of subcerebral gland.

Other abbreviations, fixation and staining as above.

Neg. x 20,000  Enl. x 3  Total x 60,000.
Plate No: 3:82a

Portion of the cell rind containing type 2 perikarya. (P. roseola).

bc, body cavity, n, nucleus,
dv, vesicle containing nm, nuclear membrane, dense granule,
er, ergastoplasm, r, ribosomes,
m, mitochondrion, v, vesicles with lightly stained contents.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 10,000 Enl. x 3 Total x 30,000.

Plate No: 3:82b

Micrograph of type 2 perikaryon at greater magnification than above.

Abbreviations as above.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 10,000 Enl. x 4 Total x 40,000.
High power micrograph of a sagittal section through the neuropile in *P. roseola*. There are three main types of axon, distinguished by their contents.

- dv, vesicle containing dense granule,
- lv, vesicle with lightly stained contents,
- m, mitochondrion,
- mt, microtubule,
- t1, type 1 axon,
- t2, type 2 axon,
- t3, type 3 axon.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000  Enl. x 4  Total x 40,000.
Plate No: 3:84a

T.S. of nerve in *P. roseola*. Two types of axon are present, and a fine duct from the subcerebral gland accompanies the nerve.

ax1, type 1 axon, gd, duct from subcerebral gland,
ax2, type 2 axon,
dv, vesicle containing mt, microtubule,
dense granule, v, vesicle with lightly stained contents.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 10,000 Enl. x 4 Total x 40,000.

Plate No: 3:84b

L.S. of nerve to the rostral sense organs.
Both types of axon are present, and a small duct from a subcerebral gland accompanies the nerve.

Abbreviations as above.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 10,000 Enl. x 3 Total x 30,000.
Plate No: 3:85a

Neuromuscular junction (NMJ) in *P. roseola*.

ax, axon,
dv, vesicle containing dense granule,
m, mitochondrion,
mu, muscle cell,
ml, neurilemma,
sl, sarcolemma,
syv, synaptic vesicles.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000  Enl. x 3  Total x 30,000.

Plate No: 3:85b

High power micrograph of the NMJ illustrated above.

ax, axon,
sl, sarcolemma,
m, mitochondrion, sy, synaptic cleft,
mu, muscle cell, syv, synaptic vesicles.
ml, neurilemma,

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 40,000  Enl. x 3  Total x 120,000.
Plate No: 3:86

Sagittal section through the eye-spot of \textit{P. roseola}.

ax, nerve axon,  
eye, eyespot,  
m, mitochondrion,  
mw, whorl of membrane,  
n, nucleus,  
p2, type 2 perikaryon.

Fixation: $\text{Os}_4\text{O}_4$ and uranyl acetate.  
Stain: lead citrate.

Neg. x 10,000  
Enl. x 4  
Total x 40,000.
Plate No: 3:87a

Micrograph of eye-spot showing details of the membrane whorls. (*P. roseola*).

ax, nerve axon,
mm, membrane whorl,
pm, plasma membrane.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 20,000  Enl. x 3  Total x 60,000.

Plate No: 3:87b

High power micrograph of a membrane whorl.
Abbreviations, fixation and staining as above.

Neg. x 40,000  Enl. x 3  Total x 120,000.
Plate No: J:88a

Micrograph of sensory organs on the rostrum of *P. roseola*.

*ax*, nerve axon,
*coc*, coronal cilia,
*cso*, coronal sense organ,
*ed*, epidermis,
*sso*, spherical sense organ.

**Fixation:** OsO₄ and uranyl acetate.
**Stain:** lead citrate.

*Neg. x 1,430*  
*Enl. x 7*  
*Total x 10,000.*

Plate No: J:88b

High power micrograph of the spherical sense organ.

*ax*, nerve axon,
*bb*, basal body of cilium,
*c*, cilia.

**Fixation and staining as above.**

*Neg. x 5,000*  
*Enl. x 7*  
*Total x 35,000.*
Plate No: 3:89

Section of the coronal sense organ in *P. roseola*.

ax1, type 1 axon, c, cilium,
ax2, type 2 axon, m, mitochondrion,
bb, basal body, sd, septate desmosome.

Fixation: glutaraldehyde, OsO$_4$ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000 Enl. x 4 Total x 40,000.
Plate No: 3:90a

Low power micrograph of the mastax sense organ located on the posterior wall of the mastax behind the trophi. (P. roseola).

ax, axon, n, nucleus,
c, cilium, r, ramus,
mso, mastax sense organ, u, uncus,
mx, mastax lumen,

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 2,000 Enl. x 3 Total x 6,000.

Plate No: 3:90b

Section of mastax sense organ. A nerve cell axon, which bears cilia at its tip, is attached to the mastax epithelium by desmosomes.

ax, nerve axon, m, mitochondrion,
c, cilia, mep, mastax epithelium,
d, desmosome, mt, microtubule,
dv, vesicles containing dense granules, mu, muscle cell,
fib, fibres, mx, mastax lumen,
n, nucleus.

Fixation and staining as above.
Neg. x 4,000 Enl. x 3 Total x 12,000.

Plate No: 3:90c

Detail of the ending of an axon in the mastax sense organ.

Abbreviations, fixation and staining as above.
Neg. x 10,000 Enl. x 3 Total x 30,000.
Plate No: 3:91a
Tegument of a desiccated rotifer (P. roseola).
Long fixation has preserved the cytoplasm but has dissolved the cuticle.
b.c., body cavity, p., pore, ed., epidermis, ts., tegumental shield.
m., mitochondrion,
Fixation: OsO$_4$ 6 hrs and uranyl acetate.
Stain: lead citrate
Neg. x 10,000   Enl. x 3   Total x 30,000.

Plate No: 3:91b
Tegument of a desiccated rotifer. The short fixation in OsO$_4$ has preserved the cuticle.
cut., cuticle.
Other abbreviations as above.
Fixation: OsO$_4$ 1 hr and uranyl acetate.
Stain: lead citrate
Neg. x 10,000   Enl. x 3   Total x 30,000.

Plate No: 3:91c
Tegumental shield in the desiccated animal at high magnification.
pm., plasma membrane.
Fixation: OsO$_4$ 6 hrs and uranyl acetate.
Stain: lead citrate
Neg. x 40,000   Enl. x 3   Total x 120,000.

Plate No: 3:91d
Epidermal pore in desiccated animal at high magnification. A dense plug is present in the lumen of the pore and the vesicle underlying the pore is collapsed.
dp., dense plug, pv., pore vesicle.
Other abbreviations as above.
Fixation: OsO$_4$ 6 hrs and uranyl acetate.
Stain: lead citrate
Neg. x 40,000   Enl. x 3   Total x 120,000.
Plate No: 3:92a

Nucleus in desiccated animal. The overall density is greater than in a normal nucleus (Pl. 3:92b) and the nucleoplasm more homogenous. (P. roseola).

ch, chromatin,
ms, stacked nuclear membrane.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 40,000 Enl. x 3 Total x 120,000.

Plate No: 3:92b

Normal hydrated nucleus.

ch, chromatin,
g, granular component of nucleoplasm,
nm, nuclear membrane.

Fixation and staining as above.

Neg. x 10,000 Enl. x 3 Total x 30,000.

Plate No: 3:92c

Nucleus recovering from desiccation. The fine structure is almost identical to the structure in the normal nucleus.

Abbreviations as in b.

Fixation and staining as above.

Neg. x 10,000 Enl. x 3 Total x 30,000.
Plate No: 3:93a

Gut wall in desiccated animal (P. roseola).
Some expansion of the tissue has occurred in fixation. Normally the gut lumen would be entirely occupied by the cilia.
c, cilia, r, ribosomes,
ch, channels leading into cytoplasm,
m, mitochondrion, v, vesicle from which the contents have been leached.

Fixation: OsO$_4$ 6 hrs and uranyl acetate.
Stain: lead citrate.
Neg. x 10,000 Enl. x 4 Total x 40,000.

Plate No: 3:93b

Endoplasmic reticulum in a secretory cell of a normal animal.
cs, cisterna, r, ribosomes.
me, membrane,
Fixation: OsO$_4$ and uranyl acetate.
Stain: lead citrate.
Neg. x 10,000 Enl. x 6 Total x 60,000.

Plate No: 3:93c

Endoplasmic reticulum in secretory cell of dried animal.
ml, multilayered membrane
ms, membrane stack,
formed by two trilaminar membranes separated by a 30Å space,
r, ribosomes.

Fixation: OsO$_4$ 6 hrs and uranyl acetate.
Stain: lead citrate.
Neg. x 40,000 Enl. x 3 Total x 120,000.
Plate No: 3:94a
Golgi complex in hydrated animal. (P. roseola).
Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 10,000 Enl. x 4 Total x 40,000.

Plate No: 3:94b
Golgi complex in desiccated animal.
ml, multilayered membrane.
Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 20,000 Enl. x 6 Total x 120,000.

Plate No: 3:94c
Mitochondrion in hydrated rotifer.
cx, cristata, mat, matrix.
de, double envelope,
Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 40,000 Enl. x 3 Total x 120,000.

Plate No: 3:94d
Mitochondrion in desiccated animal.
Double layers of unit membrane appear as five layered sheets.
Abbreviations as above.
Fixation: OsO₄ 6 hrs and uranyl acetate.
Stain: lead citrate.
Neg. x 20,000 Enl. x 8 Total x 160,000.

Plate No: 3:94e
Mitochondrion in revived animal.
Abbreviations as above.
Fixation: OsO₄ and uranyl acetate. Stain: lead citrate.
Neg. x 20,000 Enl. x 3 Total x 60,000.
Plate No: 3:95a

Cilia in the flame bulb of a desiccated animal (P. roseola). It is difficult to distinguish individual fibres and only the pale staining centres of the fibres may be seen.

af, axial fibre, pf, peripheral fibre.
mc, contact between membranes of adjacent cilia,

Fixation: OsO₄ 6 hrs and uranyl acetate.
Stain: lead citrate.
Neg. x 20,000 Enl. x 8 Total x 160,000.

Plate No: 3:95b

Muscle cell in desiccated rotifer.

db, dense body, mf, myofilaments,
m, mitochondrion, ms, stack of folded membranes,
sl, sarcolemma.

Fixation: OsO₄ 6 hrs and uranyl acetate.
Stain: lead citrate.
Neg. x 10,000 Enl. x 4 Total x 40,000.

Plate No: 3:95c

Photographic enlargement of Pl. 3:95b.
All details as above.
Neg. x 10,000 Enl. x 10 Total x 100,000.

Plate No: 3:95d

Desiccated nerve.
mc, contact between membranes, my, myelin figure.

Fixation: OsO₄ 6 hrs and uranyl acetate.
Stain: lead citrate.
Neg. x 20,000 Enl. x 4 Total x 80,000.

Plate No: 3:95e

Nerve in revived animal.
Fixation: OsO₄ and uranyl acetate. Stain: lead citrate.
Neg. x 2,500 Enl. x 4 Total x 10,000.
Plate No:  3:96a

Line diagram of a folded membrane in a dried specimen of *P._roseola*.

Plate No:  3:96b

Graph of centre to centre distance between coarse myofilaments in hydrated (curve A) and desiccated (curve B) muscle in *P._roseola*. 
Plate No: 4:1

Light micrograph of living specimen of *Lepidodermella squamatum*. Phase contrast optical system and electronic flash.

Neg. x 170  Enl. x 9  Total x 1,530.
Plate No: 4:2

Diagram of the anatomy of *L. squamatum*
based on Plate 4:1 and other light micrographs.
oral bristles
nerve
tactile cilia
brain
nerve
pharynx
protonephridium
stomach — intestine
developing ovum
ovocytes
pedal gland
anus
toe
Low-power electron micrograph of a sagittal section of the tegument of *L. squamatum*.

cut, cuticle,
ed, epidermal cytoplasm,
le, leading edge of scale,
m, mitochondrion,
u, muscle cell,
n, nucleus,
pg, pigment granule,
pm, plasma membrane,
sc, scale,
sm, remnants of superficial membrane.

Fixation: glutaraldehyde, $\text{OsO}_4$ and uranyl acetate.
Stain: lead citrate.

Neg. $\times 10,000$  
Enl. $\times 4$  
Total $\times 40,000$. 
Plate No: 4:4a

High power micrograph of the cuticle of *L. squamatum*.

cut, cuticle, pm, epidermal plasma membrane.
ed, epidermis,
Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 40,000 Enl. x 4 Total x 160,000.

Plate No: 4:4b

Section of a scale.
le, leading edge of scale,
m, mitochondrion,
u, muscle cell,
sc, scale,
sm, superficial membrane.

Other abbreviations, fixation and staining as above.
Neg. x 20,000 Enl. x 3 Total x 60,000.

Plate No: 4:4c

Portion of a scale from a T.S. through the animal's body.
fl, fibrillar layer.

Other abbreviations, fixation and staining as above.
Neg. x 20,000 Enl. x 5 Total x 100,000.

Plate No: 4:4d

High power micrograph of a scale.
us, upper surface of scale.

Other abbreviations, fixation and staining as above.
Neg. x 40,000 Enl. x 4 Total x 160,000.
Plate No: 4:5a

Tangential section through scales of *L. squamatum*. The thickness of the section includes the scale plate and the under surface of the scale with its pattern of parallel light and dark fibrils.

fl, fibrillar layer,
sc, scale plate,
sm, superficial membrane,
us, upper surface of scale.

Fixation: *OsO$_4$* and uranyl acetate.
Stain: lead citrate.
Neg. x 20,000 Enl. x 3 Total x 60,000.

Plate No: 4:5b

High power micrograph of a tangential section through a scale.

Abbreviations, fixation and staining as above.

Neg. x 40,000 Enl. x 4 Total x 160,000.
Plate No: 4:6a

Micrograph of the tegument of *L. squamatum*.

cut, cuticle,
dl, dense layer in scale plate,
er, ergastoplasms,
le, leading edge of scale,
m, mitochondrion,
u, muscle cell,
n, nucleus,
pm, plasma membrane,
sc, scale plate.

Fixation: glutaraldehyde, OsO$_4$ and uranyl acetate.

Stain: lead citrate.

Neg. x 10,000  Enl. x 3  Total x 30,000.

Plate No: 4:6b

Same area as in Pl. 4:6a at greater magnification.

ms, stack of membranes,
v, vesicles.

Other details as above.

Neg. x 20,000  Enl. x 3  Total x 60,000.
Plate No: 4:7

An organelle of an apparently novel type, found in the epidermis of *L. squamatum*.

*cm*, connection between outer and inner membranes in the organelle,
*co*, connection between epidermal plasma membrane and the ergastoplasm,
*cut*, cuticle,
*er*, ergastoplasm,
*gs*, granular substance,
*im*, inner membrane of organelle,
*m*, mitochondrion,
*ms*, stack of membrane,
*om*, outer membrane of organelle,
*pm*, plasma membrane.

Fixation: *OsO₄* and uranyl acetate.

Stain: lead citrate.

Neg. x 40,000  Enl. x 4  Total x 160,000.
Plate No: 4:8a

Frontal section through a lobe of the head of *L. squamatum*.

c, cilium,  
cs, sensory cilium,  
ed, epidermis,  
mu, muscle cell,  
mv, microvillus,  
ne, nerve cell,  
rc, ridged cuticle,  
sp, subcuticular space.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.  
Stain: lead citrate.  
Neg. x 10,000  
Enl. x 3  
Total x 30,000.

Plate No: 4:8b

High power micrograph of the ridged cuticle.  
cut, cuticle,  
ri, ridges,  
sm, superficial membrane.  
Other abbreviations, fixation and staining as above.  
Neg. x 40,000  
Enl. x 3  
Total x 120,000.
Plate No: 4:9a

Section of the region in which the ordinary cuticle gives way to the ridged cuticle. \( \text{(L. squamatum)} \).

cut, cuticle,
ed, epidermis,
mt, microtubules,
mv, microvillus,
ri, ridged cuticle,
sd, septate desmosome,
sp, subcuticular space.

Fixation: glutaraldehyde, \( \text{OsO}_4 \) and uranyl acetate.
Stain: lead citrate.

Neg. x 20,000  Enl. x 3  Total x 60,000.

Plate No: 4:9b

Section of the head lobe. The cells underlying the ridged cuticle give rise to the microvilli in the subcuticular space.
er, ergastoplasm,
n, nucleus.

Other abbreviations, fixation and staining as above.

Neg. x 20,000  Enl. x 3  Total x 60,000.
Line diagram of the skeleton of the buccal capsule with the oral bristles attached to it (*L. squamatum*).
Plate No: 4:11

Frontal section of the buccal capsule and oral bristles in *L. squamatum*. The skeletal elements in both capsule and bristles are composed of microtubules.

bca, a skeletal element of the buccal capsule,

mt, microtubules,

ob, oral bristle,

oc, oral cavity,

sm, superficial membrane.

Fixation: OsO$_4$ and uranyl acetate.

Stain: lead citrate.

Neg. x 10,000      Enl. x 4      Total x 40,000.
Plate No: 4:12

Parasagittal section through the buccal capsule of *L. squamatum*.

*bc*, buccal capsule skeleton,
*bbb*, cell associated with capsule skeleton,
*ob*, oral bristles,
*sm*, superficial membrane.

Fixation: *OsO₄* and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000       Enl. x 4       Total x 40,000.
Plate No. 4:13a

Parasagittal section of *L. squamatum* serial to that in Pl. 4:12.

The skeletal elements have upturned tips.

bca, buccal capsule skeleton,
c, cilium,
mu, muscle cell,
ob, oral bristle,
oc, oral cavity,
ri, ridged cuticle.

Fixation: OsO$_4$ and uranyl acetate.
Stain: lead citrate.

Neg. x 5,000  Enl. x 4  Total x 20,000.

Plate No. 4:13b.

Frontal section serial to the section illustrated in Pl. 4:11. The skeletal elements have a U shaped profile in transverse section.

Abbreviations, fixation and staining as above.

Neg. x 10,000  Enl. x 4  Total x 40,000.
High power micrograph of the capsular skeleton in a sagittal section of *L. squamatum*. The elements of the skeleton are constructed of cross-linked microtubules.

bca, buccal capsule skeleton,
bcc, cell associated with the skeleton,
ga, gaps, probably artefacts of the fixation and embedding processes,
mt, microtubules,
pm, plasma membrane.

Fixation: Oso$_4$ and uranyl acetate.
Stain: lead citrate.

Neg. x 40,000  Enl. x 4  Total x 160,000.
Plate No: 4:15

High power micrograph of the same area illustrated in Pl. 4:13a. Some of the individual microtubules are at least 1.0µ long (*L. squamatum*).

bca, buccal capsule skeletal element,
bcc, cell associated with element,
ob, oral bristle,
sm, superficial membrane.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 20,000  Enl. x 4  Total x 80,000.
Plates Nos: 4:16a and 4:16b

Photographic enlargements of Pl. 4:14 to show the details of the packing and cross linking of the microtubules (L. squamatum).

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 40,000  Enl. x 10  Total x 400,000.

Plate No: 4:16c

Section of cell associated with the capsular skeleton. The cell is attached to the epidermis by septate desmosomes.

bca, buccal capsule skeletal element,
bcc, cell associated with buccal capsule,
enr, endoplasmic reticulum (smooth membranes),
er, ergastoplasm (ribosome covered membrane),
oc, oral cavity,
sd, septate desmosome.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate,
Stain: lead citrate.

Neg. x 20,000  Enl. x 3  Total x 60,000.
Plate No: 4:17

Longitudinal section of the syncytium that gives rise to the locomotory cilia (*L. squamatum*).

bb, basal body,
bp, basal plate,
c, ciliary shaft,
cr, ciliary rootlet,
cut, cuticle,
m, mitochondrion,
n, nucleus in syncytium,
pm, plasma membrane,
sm, superficial membrane.

Fixation: OsO$_4$ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000  Enl. x 4  Total x 40,000.
Plate No: 4:18

T.S. of ciliary syncytium and associated structures (L. squamatum).

bb, basal body,
c, ciliary shaft,
cr, ciliary rootlets,
cut, cuticle,
ed, epidermis,
m, mitochondrion,
mu, muscle cell,
n, nucleus,
ne, nerve axon,
pm, plasma membrane,
sd, septate desmosome,
sm, superficial membrane,
sv, synaptic vesicles.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000 Enl. x 5 Total x 50,000.
Plate No: 4:19a

Section of the ciliary syncytium. Where the rootlets arise in the basal body they are hollow, but as they run posteriorly, they taper and the inner cavity is obliterated (L. squamatum).

bb, basal body,
cr, ciliary rootlet,
db, dense band in rootlet,
lb, light band in rootlet,
m, mitochondrion.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 20,000  Enl. x 3  Total x 60,000.

Plate No: 4:19b

Photographic enlargement of a portion of Pl. 4:19a.

Abbreviations, fixation and staining as above.

Neg. x 20,000  Enl. x 6  Total x 120,000.
Plate No: 4:20a

L.S. through shaft and base of a single locomotory cilium (*L. squamatum*).

af, axial fibres,
bb, basal body,
bc, basal cup,
bp, basal plate,

cr, ciliary rootlet,
cut, cuticle,
m, mitochondrion,
pf, peripheral fibre,

pm, plasma membrane.

Fixation: **OsO_4** and uranyl acetate.
Stain: lead citrate.
Neg. x 40,000 Enl. x 4 Total x 160,000.

Plate No: 4:20b

Section cutting several cilia transversely at different levels. Nine triplet fibres are present around the periphery of the basal body. Each triplet becomes a doublet as it passes through the basal plate.

Abbreviations, fixation and staining as above.
Neg. x 20,000 Enl. x 3 Total x 60,000.
Plate No: 4:21a

Low power micrograph of a section through pedal gland, the duct of which passes down the centre of the toe (L. squamatum).

gd, gland duct, pg, pedal gland, 
m, mitochondrion, sc, scale plate, 
mi, muscle insertion, sm, superficial membrane, 
mt, microtubules, t, toe, 
mu, muscle cell, vs, vesicles of secretion. 

Fixation: glutaraldehyde, OsO₄ and uranyl acetate. 
Stain: lead citrate. 
Neg. x 5,000       Enl. x 3       Total x 15,000.

Plate No: 4:21b

Section of pedal gland. The cell secretion is homogenous and stains strongly with lead stain.

ed, epidermis, mt, microtubules, 
er, ergastoplasm, n, nucleus, 
g, Golgi complex, vs, vesicles of secretion. 
m, mitochondrion, 

Fixation and staining as above. 
Neg. x 10,000       Enl. x 3       Total x 30,000.
Plate No: 4:22

High power micrograph of an area in Pl. 4:21b, showing the details of the secretory apparatus. The Golgi complex appears to contain small granules of the cellular secretion (*L. squamatum*).

er, ergastoplasm,
ge, Golgi complex,
m, mitochondrion,
n, nucleus,
nm, nuclear material,
pm, plasma membrane,
r, free ribosomes,
vs, vesicles of secretion.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 20,000  Enl. x 4  Total x 80,000.
Plate No: 4:23a

L.S. of a bundle of microtubules in a pedal gland (*L. squamatum*).

mt, microtubules,
r, ribosomes,
vs, vesicle of secretion.

Fixation: glutaraldehyde, *OsO*$_4$ and uranyl acetate.
Stain: lead citrate.

Neg. x 40,000  Enl. x 5  Total x 200,000.

Plate No: 4:23b

T.S. of a bundle of microtubules in a pedal gland.
Abbreviations, fixation and staining as above.

Neg. x 40,000  Enl. x 5  Total x 200,000.
Plate No: 4:24

Frontal section of the pharynx of *L. squamatum*.

br, brain,
c, cilium,
cs, ciliary syncytium,

gc, gland cell,
gd, gland duct,
i, intestine,
mu, longitudinal musculature of the body,
pl, pharyngeal lumen,
pam, pharyngeal muscle,
sc, scale,
sm, superficial membrane,
teg, tegument.

Fixation: $\text{OsO}_4$ and uranyl acetate.
Stain: lead citrate.

Neg. x 2,000        Enl. x 3        Total x 6,000.
Plate No: 4:25a

T.S. of pharynx in *L. squamatum*.

c, cilium,
cm, circular muscle,
cs, ciliary syncytium,
gd, gland duct,
lm, longitudinal muscles,
ne, nerve cell,
pl, pharyngeal lumen,
pam, pharyngeal musculature,
sc, scale.

Fixation: glutaraldehyde, *OsO₄* and uranyl acetate.
Stain: lead citrate.

Neg. x 3,000  Enl. x 3  Total x 9,000.

Plate No: 4:25b

High power micrograph of an area in Pl. 4:25a.

Abbreviations, fixation and staining as above.

Neg. x 5,000  Enl. x 3  Total x 15,000.
Plate No: 4:26

T.S. of pharynx in *L. squamatum*. At this magnification the different cells in the wall can readily be identified.

- **cm**: circular muscle,
- **gd**: gland duct,
- **m**: mitochondrion,
- **mi**: muscle insertion,
- **n**: nucleus,
- **ne**: nerve cell,
- **pl**: pharyngeal lumen,
- **pam**: pharyngeal muscle,
- **sd**: septate desmosome.

**Fixation**: glutaraldehyde, OsO₄ and uranyl acetate.

**Stain**: lead citrate.

Neg. x 10,000  
Enl. x 4  
Total x 40,000.
Plate No: 4:27a

L.S. of pharynx in *L. squamatum*. The pharyngeal lumen is lined by a dense cuticle, into which the pharyngeal muscles are inserted.

gc, gland cell,
lc, cuticular lining of pharynx,
mi, muscle insertion,
pam, pharyngeal muscle,
pl, pharyngeal lumen.

Fixation: *OsO₄* and uranyl acetate.
Stain: lead citrate.
Neg. x 10,000   Enl. x 3   Total x 30,000.

Plate No: 4:27b

Detail of the section in Pl. 4:27a.

In order to resolve the detail in the dense cuticle lining the pharynx, the rest of the plate has been underexposed. The cuticle has six layers in it.

Abbreviations, fixation and staining as above.

Neg. x 40,000   Enl. x 4   Total x 160,000.
Plate No: 4:28a

Micrograph of a gland cell in the pharyngeal wall of *L. squamatum*.

cm, circular muscle surrounding pharynx, er, ergastoplasm, g, Golgi complex, m, mitochondrion, n, nucleus, pam, pharyngeal muscle, vs, vesicle of secretion.

Fixation: *OsO₄* and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000      Enl. x 3       Total x 30,000.

Plate No: 4:28b

L.S. of gland duct in the pharyngeal wall.
Abbreviations, fixation and staining as above.

Neg. x 20,000      Enl. x 3       Total x 60,000.
Plate No: 4:29

T.S. through the intestine of *L. squamatum* just posterior to the pharyngeal opening. In this region the intestinal wall contains secretory cells in addition to absorptive cells.

ab, absorptive cell,
fv, food vacuole,
il, intestinal lumen,
mu, muscle cell,
mv, microvilli,
n, nucleus,
sec, secretory cell,
teg, tegument,
vs, vesicles of secretion.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.

Stain: lead citrate.

Neg. x 3,000  Enl. x 4  Total x 12,000.
Plate No: 4:30a

Micrograph of a secretory cell in the anterior portion of the intestine of *L. squamatum*.

er, ergastoplasm, mv, microvilli,
g, Golgi complex, n, nucleus,
il, intestinal lumen, pm, plasma membrane,
m, mitochondrion, r, free ribosomes,
mu, muscle, vs, vesicles of secretion.

Fixation: glutaraldehyde, *OsO*$_4$ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000 Enl. x 3 Total x 30,000.

Plate No: 4:30b

High power micrograph of secretory vesicles in an intestinal cell.

mf, myelin figures.

Other abbreviations and staining as above.

Neg. x 20,000 Enl. x 3 Total x 60,000.
Plate No: 4:31

T.S. of intestine of *L. squamatum* in a region where the wall contains absorptive cells only.

c, cilium,
cs, ciliary syncytium,
fv, food vacuole,
il, intestinal lumen,
mv, microvilli,
n, nucleus,
ne, nerve,
 pn, protonephridium,
sc, scale,
teg, tegument.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.

Stain: lead citrate.

Neg. x 2,000  Enl. x 4  Total x 8,000.
Micrograph of an absorptive cell in the intestine of *L. squamatum*.

er, ergastoplasm,  
fv, food vacuole,  
il, intestinal lumen,  
m, mitochondrion,  
mv, microvilli,  
n, nucleus,  
mm, nuclear membrane,  
piv, pinocytotic vesicle,  
pm, plasma membrane,  
r, free ribosomes,  
sd, septate desmosome,  
sv, secretory vesicles.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.  
Stain: lead citrate.

Neg. x 10,000  
Enl. x 4  
Total x 40,000.
Plate No: 4:33a

Micrograph of the two types of vesicle found in the absorptive cell (*L. squamatum*).

*er*, ergastoplasm,  *r*, free ribosomes,  
*fv*, food vacuole,  *sv*, secretory vesicle.

**Fixation:** glutaraldehyde, *OsO₄* and uranyl acetate.  
**Stain:** lead citrate.  
**Neg. x 20,000**  **Enl. x 3**  **Total x 60,000.**

Plate No: 4:33b

Micrograph of the luminal surface of an absorptive cell.

*gr*, granule in tip of microvillus,  *piv*, pinocytotic vesicle,  
*il*, intestinal lumen,  *sd*, septate desmosomes,  
*mv*, microvillus,  

**Fixation and staining as above.**  
**Neg. x 20,000**  **Enl. x 3**  **Total x 60,000.**

Plate No: 4:33c

High power micrograph of the coelomic surface of an absorptive cell.

*bm*, basement membrane,  
*pm*, plasma membrane,  
*fi*, filament in basement membrane.  

**Other abbreviations, fixation and staining as above.**  
**Neg. x 40,000**  **Enl. x 3**  **Total x 120,000.**
Plate No: 4:34a

Contact between two absorptive cells in the intestinal wall of *L. squamatum*.

er, ergastoplasm, 
fv, food vacuole, 
il, intestinal lumen, 
m, mitochondrion, 
pm, plasma membrane, 
r, ribosomes, 
sd, septate desmosome.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.

Stain: lead citrate.

Neg. x 20,000 Enl. x 3 Total x 60,000.

Plate No: 4:34b

High power micrograph of the cell contact in Pl. 4:34a.

Abbreviations, fixation and staining as above.

Neg. x 40,000 Enl. x 3 Total x 120,000.
Plate No: 4:35a

T.S. of flame bulb and protonephridial tubule in _L. squamatum_.

bc, body cavity, f_b, flame bulb,
c, cilium, m, mitochondrion,
c_o, connection between the n, nucleus,
protonephridial plasma pm, protonephridial
membrane and trilaminar plasma membrane,
membrane surrounding the ro, supporting rods
flame bulb, in flame bulb
du, duct in protonephridial wall.
tubule,
ed, epidermis,

Fixation: glutaraldehyde, OsO_4 and uranyl acetate.
Stain: lead citrate.
Neg. x 10,000 Enl. x 4 Total x 40,000.

Plate No: 4:35b

High power micrograph of a T.S. through the
flame bulb near its free end.

f_m, fenestrated membrane, sp, space containing
fs, fibrous sheet, fibrils.

Other abbreviations, fixation and staining as above.
Neg. x 20,000 Enl. x 4 Total x 80,000.
Plate No: 4:36

T.S. of flame bulb in *L. squamatum*.

- bc: body cavity,
- co: connection between protonephridial plasma membrane and trilaminar membrane of flame bulb,
- fs: fibrous sheet,
- pm: protonephridial plasma membrane,
- ro: supporting rod,
- se: septum separating compartments,
- tm: trilaminar membrane.

Fixation: glutaraldehyde, *OsO₄* and uranyl acetate.

Stain: lead citrate.

Neg. x 40,000    Enl. x 4    Total x 160,000.
Plate No: 4:37a

T.S. of flame bulb where it is surrounded by the protonephridial tubule (*L. squamatum*).

c, cilium, m, mitochondria,
co, connection between protonephridial plasma membrane and the trilaminar membrane surrounding the flame bulb, pm, protonephridial plasma membrane,
er, ergastoplasam, se, flame bulb septum,
fs, fibrous sheet, tm, trilaminar membrane surrounding flame bulb,
v, secretory vesicle.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 20,000 Enl. x 4 Total x 80,000.

Plate No: 4:37b

L.S. of free end of flame bulb.

bb, basal body, m, mitochondrion,
bc, body cavity, ro, rod in flame bulb wall,
c, cilium,
fs, fibrous sheet, se, flame bulb septum.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 20,000 Enl. x 4 Total x 80,000.
Plate No: 4:38a

L.S. of flame bulb which shows the honeycomb pattern in the fibrous sheet. (L. squamatum).

bc, body cavity, c, cilium, fm, fenestrated membrane, fs, fibrous sheet, bc, body cavity, c, cilium, er, ergastoplasm, ro, rod in flame bulb wall, fm, fenestrated membrane, sp, space between fenestrated membrane and flame bulb wall.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 20,000  Enl. x 4  Total x 80,000.

Plate No: 4:38b

L.S. of flame bulb within the protonephridial tubule.

bc, body cavity, c, cilium, pm, protonephridial plasma membrane, ro, rod in flame bulb wall, fs, fibrous sheet, tm, trilaminar membrane of flame bulb wall.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 20,000  Enl. x 4  Total x 80,000.
Micrograph of the cytoplasm in a protonephridial tubule. (*L. squamatum*).

**Abbreviations:**
- co: connection between ducts
- du: duct
- er: ergastoplasm
- m: mitochondrion
- pm: plasma membrane
- r: free ribosomes

**Fixation:** glutaraldehyde, *OsO*$_4$ and uranyl acetate.
**Stain:** lead citrate.

**Microscopy Details:**
- Neg. x 20,000
- Enl. x 4
- Total x 80,000
Plate No: 4:40a

T.S. of *L. squamatum* through a developing ovum which is occupying most of the body cavity above and to the sides of the intestine.

er, ergastoplasm, n, nucleus,
g, Golgi complex, nl, nucleolus,
il, intestinal lumen, nm, nuclear membrane,
iw, intestinal wall, vs, vesicle of secretion.

Fixation: *OsO*$_4$ and uranyl acetate.
Stain: lead citrate.

Neg. x 5,000 Enl. x 3 Total x 1,500.

Plate No: 4:40b

Micrograph of the nucleus and nucleolus in Plate 4:40a.

ed, epidermis,
n, nucleus,
nl, nucleolus,
nl, nucleolus,
nm, nuclear membrane,
np, nuclear pore.

Fixation and staining as above.
Neg. x 2,500 Enl. x 3 Total x 15,000.
Plate No: 4:41a

Micrograph of the nucleolus in a developing ovum. (*L. squamatum*).

*ag*, agranular portions of nucleolonema,
*gr*, granular portions of nucleolonema,
*npl*, nucleoplasm.

Fixation: Oso$_4$ and uranyl acetate.
Stain: lead citrate.

Neg. x 5,000 Enl. x 8 Total x 40,000.

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Plate No: 4:41b

Micrograph of the nucleolus, nucleoplasm and part of the nuclear membrane of a developing ovum.

*nl*, nucleolus,
*nm*, nuclear membrane,
*np*, nuclear pore,
*npl*, nucleoplasm.

Fixation: Oso$_4$ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000 Enl. x 3 Total x 30,000.
Plate No: 4:42

Cytoplasm of a developing ovum in L. squamatum.

bc, body cavity, 
er, ergastoplasm, 
g, Golgi complex, 
m, mitochondrion, 
n, nucleus, 
pm, plasma membrane, 
vs, vesicle of secretion.

Fixation: OsO₄ and uranyl acetate. 
Stain: lead citrate.

Neg. x 10,000  Enl. x 4  Total x 40,000.
Plate No: 4:43a

Detail of the ergastoplasm in an ovum in *L. squamatum*.

m, membrane,  
r, ribosomes.

Fixation: *OsO₄* and uranyl acetate.  
Stain: lead citrate.  
Neg. x 20,000  Enl. x 3  Total x 60,000.

Plate No: 4:43b

Micrograph of a vesicle surrounded by Golgi complexes.  
er, ergastoplasm,  
g, Golgi complex,  
v, vesicle.

Fixation: *OsO₄* and uranyl acetate.  
Stain: lead citrate.  
Neg. x 20,000  Enl. x 3  Total x 60,000.

Plate No: 4:43c

The ova contain two types of secretion, illustrated here.  

ds, dark staining secretion,  
g, Golgi complex,  
ps, pale staining secretion.  

Fixation and staining as above.  

Neg. x 20,000  Enl. x 3  Total x 60,000.
Micrograph of undeveloped ovocyte in *L. squamatum*. The nucleus is small and the cytoplasm contains only ribosomes (or glycogen) and mitochondria.

- ch: chromatin
- cut: cuticle
- ed: epidermis
- iw: intestinal wall
- m: mitochondrion
- n: nucleus
- nl: nucleolus
- nm: nuclear membrane
- r: ribosomes
- vs: vesicles of secretion

Fixation: glutaraldehyde, OsO$_4$ and uranyl acetate. Stain: lead citrate.

Neg. x 10,000 Enl. x 4 Total x 40,000.
Plate No: 4:45a

Section of pharyngeal muscle cells. The myofilaments have been cut longitudinally. \(L. \text{squamatum}\).

cf, coarse filaments, mu, muscle attachment, 
cm, circular muscle, pc, pharyngeal cuticle, 
er, ergastoplasm, r, ribosomes (or glycogen), 
ff, fine filaments, sl, sarcoplemma, 
m, mitochondrion, sr, sarcoplasmic reticulum.

Fixation: \(\text{OsO}_4\) and uranyl acetate. 
Stain: lead citrate.

Neg. x 20,000 Enl. x 3 Total x 60,000.

Plate No: 4:45b

High power micrograph of an area similar to that in Pl. 4:45a.

Abbreviations, fixation and staining as above.

Neg. x 40,000 Enl. x 3 Total x 120,000.
Plate No: 4:46a

T.S. of a pharyngeal muscle cell in *L. squamatum*.

cf, coarse filaments,  
*e*, Golgi complex,  
er, ergastoplasm,  
m, mitochondrion,  
ff, fine filaments,  
sr, sarcoplasmic reticulum.

Fixation:  OsO$_4$ and uranyl acetate.  
Stain:  lead citrate.

Neg. x 20,000  
Enl. x 3  
Total x 60,000.

Plate No: 4:46b

High power micrograph of a T.S. of a muscle cell.

Abbreviations, fixation and staining as above.

Neg. x 12,200  
Enl. x 8  
Total x 97,600.
Plate No: 4:47a

L.S. of a longitudinal muscle and its attachment to the cuticle at the base of the toe. (L. squamatum).

cf, coarse filaments, mt, microtubules,
cut, cuticle, pg, pedal gland,
db, dense band, sr, sarcoplasmic reticulum.
ff, fine filaments,
ma, muscle attachment,

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000        Enl. x 4        Total x 40,000.

Plate No: 4:47b

Detail of the muscle attachment in Pl. 4:47a.

cf, coarse filament, pm, epidermal plasma membrane,
cut, cuticle, ed, epidermis,
ff, fine filament, sl, sarcolemma.

Fixation and staining as above.
Nos. 1-5 indicate the layers in the intercellular cement.

Neg. x 40,000        Enl. x 4        Total x 160,000.
Plate No: 4:48a

Sagittal section through the brain of *L. squamatum*.

bc, body cavity,
nep, neuropile,
ph, pharynx,
ri, cell rind.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 4,000   Enl. x 3   Total x 12,000.

Plate No: 4:48b

Frontal section through brain of *L. squamatum*.

com, commissure between halves of brain,
ed, epidermis,
nep, neuropile,
ph, pharynx,
ri, cell rind.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 3,000   Enl. x 3   Total x 9,000.
Plate No: 4:49a

Micrograph of Type 1 perikarya in the brain of *L. squamatum*.

- ch, chromatin
- dm, dense material
- er, ergastoplasm
- m, mitochondrion

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.

Stain: lead citrate.

Neg. x 10,000  Enl. x 3  Total x 30,000.

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Plate No: 4:49b

Section of Type 1 perikaryon at higher magnification than Pl. 4:44a.

- ch, chromatin
- dm, dense material
- er, ergastoplasm
- g, Golgi complex
- m, mitochondrion
- mu, muscle cell
- n, nucleus
- r, free ribosomes
- v, cytoplasmic vesicle

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.

Stain: lead citrate.

Neg. x 10,000  Enl. x 4  Total x 40,000.
Plate No: 4:50a

Micrograph of some type 2 perikarya in the brain of *L. squamatum*.

dm, dense material, nep, neuropile,
g, Golgi complex, p₁, type 1 perikaryon,
m, mitochondrion, p₂, type 2 perikaryon,
n, nucleus,

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 5,000 Enl. x 4 Total x 20,000.

Plate No: 4:50b

Micrograph of type 2 perikaryon.

ax, nerve axon, n, nucleus,
dv, dense vesicle, nm, nuclear membrane,
er, ergastoplasm, np, nuclear pore,
g, Golgi complex, p₁, type 1 perikaryon,
m, mitochondrion, p₂, type 2 perikaryon,
mt, microtubule, p₃, type 3 perikaryon.

Fixation and staining as above.

Neg. x 10,000 Enl. x 3 Total x 30,000.
Plate No: 4:51a

Type 3 perikaryon in the brain of *L. squamatum*.

ax, nerve axon,
dv, dense vesicles,
er, ergastoplasm,
m, mitochondrion,
mt, microtubule,
n, nucleus.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000 Enl. x 3 Total x 30,000.

Plate No: 4:51b

Serial section of the nerve cell body in Pl. 4:51 at higher magnification.

Abbreviations, fixation and staining as above.

Neg. x 20,000 Enl. x 3 Total x 60,000.
Plate No: 4:52

Frontal section through the neuropile in the brain of *Leptocephalus squamatum*.

axa, type A axon,
axb, type B axon,
axc, type C axon,
com, commissure connecting the two halves of the brain,
dv, dense vesicle,
m, mitochondrion,
mt, microtubule.

Fixation: glutaraldehyde, OsO$_4$, and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000     Enl. x 4     Total x 40,000.
Plate No: 4:53

Neuro-muscular junction in the pharynx of *L. squamatum*.

ax, nerve axon,
ch, chromatin,
m, mitochondrion,
mu, muscle cell,
n, nucleus,
nl, neurilemma,
sl, sarcolemma,
sy, synapse,
syv, synaptic vesicle.

Fixation: OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 20,000 Enl. x 4 Total x 80,000.
Montage of two micrographs of a lateral lobe on the head of *L. squamatum* showing the origins of the sensory cilia.

bb, basal body,
c, cilium,
cr, ciliary rootlet,
cut, cuticle,
er, ergastoplasm,
m, mitochondrion,
mu, muscle cell,
n, nucleus,
p₁, type 1 perikaryon,
ph, pharynx musculature,
sd, septate desmosome.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000  Enl. x 3  Total x 30,000.
Plate No: 4:55a

L.S. of sensory cilium on the head of *L. squamatum*.

af, axial fibre,       m, mitochondrion,  
bb, basal body,        mv, microvillus,  
bcu, basal cup,        n, nucleus,  
bp, basal plate,       pm, plasma membrane of  
c, cilium,             ciliary cell,  
cr, ciliary rootlet,   sm, superficial membrane.  
cut, cuticle,  

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.  
Stain: lead citrate.  

Neg. x 20,000  Enl. x 3  Total x 60,000.

Plate No: 4:55b

T.S. of sensory cilium.

af, axial fibres,  
cut, cuticle,  
pf, peripheral fibre,  

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.  
Stain: lead citrate.  

Neg. x 40,000  Enl. x 3  Total x 120,000.
Plate No: 5:1

Light micrograph of a specimen of
Caenorhabditis briggsae. Phase contrast
optical system.

Neg. x 62.5   Enl. x 8   Total x 500.
Plate No: 5:2

Simplified diagram of the anatomy of C. briggsae.
Plate No: 5:3

Micrograph of a T.S. of the tegument and part of a lateral longitudinal chord in C. briggsae.
The cuticle, which overlies the cellular epidermis, is made up of two fibrous layers separated by a gap. Fibrous connections cross the gap, linking the two layers. The outer cuticular layer is grooved and also forms a series of lateral projections.

bc, body cavity,
bm, basement membrane,
co, connection between outer and inner layers of the cuticle,
cut 1, outer layer of the cuticle (layer 1),
cut 2, inner layer of the cuticle (layer 2),
d, desmosome,
ed, epidermal cell,
ex, excretory duct,
ga, gap separating the two cuticular layers,
inv, invagination of the epidermal plasma membrane,
m, mitochondrion,
n, nucleus,
nm, nuclear membrane,
pr, lateral projections on the cuticle.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000, Enl. x 4, Total x 40,000.
Plate No: 5:4

Medium power micrograph of the tegument in \textit{C. briggsae}.

bm, basement membrane,
co, connections between cuticular layer 1 and layer 2,
cut 1, cuticular layer 1,
cut 2, cuticular layer 2,
dl, dense layer on the outer surface of the cuticle,
er, ergastoplasm,
ga, gap between cuticular layers 1 and 2,
inv, invagination of the subcuticular cell membrane,
m, mitochondrion,
n, nucleus,
nl, nucleolus,
nm, nuclear membrane,
pm, plasma membrane.

Fixation: glutaraldehyde, OsO$_4$ and uranyl acetate.
Stain: lead citrate.

Neg. x 20,000 Enl. x 4 Total x 80,000.
Plate No: 5:5a

Micrograph of a longitudinal section through *C. briggsae*, showing the grooves in layer 1 of the cuticle and the pattern in the fibrils of which layer 2 is composed.

co, connection between the two layers in the cuticle,
cut 1, outer cuticular layer,
cut 2, inner cuticular layer,
ga, gap between the two layers of the cuticle,
gr, grooves in the upper surface of layer 1.
Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 5,000 Enl. x 8 Total x 40,000.

Plate No: 5:5b

High power micrograph of a lateral projection of the cuticle. In this specimen the two layers of the cuticle are not separated by a gap, but layer 2 can be distinguished by the arrangement of the fibrils in it.

Abbreviations, fixation and staining as above.
Neg. x 5,000 Enl. x 8 Total x 40,000.

Plate No: 5:5c

High power micrograph of the cuticle and subcuticular plasma membrane, showing a group of ergastoplasm-like invaginations.

cut 1, cuticular layer 1, cut 2, cuticular layer 2,
ed, epidermis,
ga, gap between layers 1 and 2,
inv, invaginations of subcuticular membrane,
m, mitochondrion,
pm, subcuticular plasma membrane.
Fixation and staining as for Pl. 5:5a.
Neg. x 20,000 Enl. x 4 Total x 80,000.
Plate No: 5:6

Tangential section of the cuticle of *C. briggsae*. Layer 1 displays a grooved upper surface and the fibres within it exhibit only slight orientation in the direction of the grooves. The connections between the two layers are spaced fairly regularly in the gap. The criss cross pattern of the fibres in layer 2, which is produced by two sets of fibres oriented in the directions indicated by the arrows, is particularly clear.

c0, connection between layers 1 and 2,
cut 1, cuticular layer 1,
cut 2, cuticular layer 2,
ga, gap between the two layers,
gr, grooves in outer region of cut 1.

Arrows indicate orientation of fibrils in layer 2.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000  Enl. x 4  Total x 40,000.
Plate No: 5:7

High power micrograph of an area in Pl. 5:6. The fibrils in the cuticle have no obvious cross banding to suggest that they are collagenous.

c0, connections linking cuticular layers 1 and 2,
cut 1, cuticular layer 1,
cut 2, cuticular layer 2,
ga, gap between the two layers,
gr, groove in upper surface of layer 1.

The arrows indicate the direction in which the two sets of fibrils are oriented.

Fixation: glutaraldehyde, OsO$_4$ and uranyl acetate.
Stain: lead citrate.

Neg. x 20,000 Enl. x 4 Total x 80,000.
Plate No: 5:8a

Longitudinal section of the cuticle of the unidentified Rhabditid. Cuticular layer 1 exhibits a pattern of radial columns.

- cut 1, cuticular layer 1,
- cut 2, cuticular layer 2,
- ed, epidermis,
- gr, grooves in the upper surface of layer 1,
- m, mitochondrion,
- mat, matrix filling gaps between fibrillar layers of the cuticle,
- mu, muscle cell.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 20,000 Enl. x 3 Total x 60,000.

Plate No: 5:8b

High power micrograph of a similar section to that in Pl. 5:8a.

- pm, epidermal plasma membrane,
- sm, superficial trilaminar membrane.

Other abbreviations, fixation and staining as above.
Neg. x 40,000 Enl. x 3 Total x 120,000.

Plate No: 5:8c

Tangential section of cuticle from the same species as in Pl. 5:68a. Arrows indicate the orientation of the two sets of fibrils in layer 2.
Abbreviations, fixation and staining as above.
Neg. x 20,000 Enl. x 3 Total x 60,000.
Plate No: 5:9

Longitudinal section of the mouth and oral cavity of *C. briggsae*. The general body cuticle is continued over the lips and into the oral cavity up to the level of a deep groove, after which the oral cavity is lined by a special cuticle. Various nerves and sensory organs surround the oral cavity.

cor, cuticle lining the oral cavity,
cut, general body cuticle,
ep, epithelium of the oral cavity,
er, ergastoplasm,
fo, food particle,
li, lip,
m, mitochondrion,
mo, mouth,
uu, muscle cell,
oc, oral cavity,
t, tooth.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.

Stain: lead citrate.

Neg. x 4,000

Enl. x 4

Total x 16,000.
Plate No: 5:10a

T.S. through the oral cavity of C. briggsae. The cavity is three angled (one angle is ventral, the others dorso-lateral) and is lined by a thick cuticle. The section includes nerves and sense organs and also shows the separation of the longitudinal body muscles into four groups, separated by longitudinal chords.

cor, cuticle of the oral cavity,
ep, epithelium of the oral cavity,
er, ergastoplasm,
ga, gap produced by shrinking during fixation,
mu, muscle cells,
ne, nerves,
oc, oral cavity,
so, sensory organ,
va, ventral angle of oral cavity.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 1,800 Enl. x 7 Total x 12,600.

Plate No: 5:10b

L.S. of the cuticle and epithelium of the oral cavity.

cor, cuticle of the oral cavity,
dl, dense layer of the cuticle,
fib, fibrils in the epithelial cell,
oc, oral cavity,

pm, plasma membrane,
se, septa in the cuticle.

Fixation and staining as above.

Neg. x 20,000 Enl. x 3 Total x 60,000.
Plate No: 5:11a

L.S. through the lip of *C. briggsae*.

*cor,* cuticle of the oral cavity,
*cut,* general body cuticle,
*d,* desmosome,
*ep,* epithelium of the oral cavity,
*gr,* groove marking transition from body cuticle to oral cavity cuticle,
*li,* lip,
*oc,* oral cavity.

**Fixation:** glutaraldehyde, *OsO₄* and uranyl acetate.
**Stain:** lead citrate.
**Neg. x 10,000**
**Enl. x 4**
**Total x 40,000**

Plate No: 5:11b

L.S. through the posterior end of the oral cavity.

*cor,* cuticle of the oral cavity,
*d,* desmosome,
*ep,* epithelium of the oral cavity,
*mu,* pharyngeal muscle cells,
*oc,* oral cavity,
*t,* tooth.

**Fixation and staining as above.**

**Neg. x 3,000**
**Enl. x 7**
**Total x 21,000.**
Plate No: 5:12a

T.S. through the posterior of the oral cavity, at the level of the teeth (*C. briggsae*).

dl, dense layer of the oral cuticle, 
cor, cuticle of the oral cavity, 
ep, epithelium of the oral cavity, 
fib, fibrils in the epithelium, 
fo, food particle, 
ga, gap produced by shrinking during fixation, 
mat, matrix of the oral cuticle, 
mu, pharyngeal muscle cell, 
oc, oral cavity, 
t, tooth.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate. 
Stain: lead citrate.

Neg. x 3,000  Enl. x 7  Total x 21,000.

Plate No: 5:12b

High power micrograph of a portion of the section illustrated in Pl. 5:12a.

Abbreviations, fixation and staining as above.

Neg. x 12,200  Enl. x 7  Total x 85,400.
Plate No: 5:13

T.S. of C. briggsae at the level of the pharynx. The pharyngeal wall is muscular, and the lumen is three angled (one angle is mid-ventral, the others dorso-lateral).

er, ergastoplasm,
ep, pharyngeal epithelium,
lch, longitudinal chord,
mu, muscle cell,
ne, nerve cell,
pl, pharyngeal lumen,
teg, tegument,
va, ventral angle of the pharyngeal lumen.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 2,500  Enl. x 4  Total x 10,000.
Plate No: 5:14

T.S. of the pharynx in *C. briggsae*. Epithelium underlies the cuticular lining of the lumen only at the three angles of the lumen. Elsewhere the pharyngeal muscle cells are attached directly to the cuticle, with no cell intervening.

cut, cuticular lining of the pharynx,  
d, non-septate desmosome,  
ep, pharyngeal epithelium,  
fib, fibrils in pharyngeal epithelium,  
m, mitochondrion,  
mu, muscle cell,  
ne, nerve cell,  
pl, pharyngeal lumen,  
va, ventral angle of lumen.

Fixation: glutaraldehyde, *OsO₄* and uranyl acetate.  
Stain: lead citrate.  

Neg. x 5,000  
Enl. x 4  
Total x 20,000.
Plate No: 5:15a

Medium power micrograph of the wall of the pharynx (*C. briggsae*).

cut, cuticle lining the pharyngeal lumen,
d, non-septate desmosome,
m, mitochondrion,
ma, muscle attachment,
mu, muscle cell,
ne, nerve process,
pl, pharyngeal lumen.

Fixation: glutaraldehyde, *OsO₄* and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000  Enl. x 3  Total x 30,000.

Plate No: 5:15b

Micrograph of an angle of the lumen.

d, non-septate desmosome,
dl, dense layer of cuticular lining of the pharynx,
ep, epithelial cell beneath the muscle,
fib, fibrils in the epithelial cell,
m, mitochondrion,
mat, matrix of the pharyngeal cuticle,
mu, muscle cell,
pl, pharyngeal lumen,
pm, plasma membrane.

Fixation and staining as above.

Neg. x 20,000  Enl. x 3  Total x 60,000.
Plate No: 5:16a

Micrograph of the extensions of the pharyngeal cuticle in the middle bulb of the pharynx (*C. briggsae*).

ant, arrow indicates direction of the "head" of the worm,
cp, cuticular extension,
ep, epithelial cell,
fo, food particles,
pl, pharyngeal lumen.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 10,000 Enl. x 3 Total x 30,000.

Plate No: 5:16b

Micrograph of the structural specialisations of the pharyngeal cuticle in the centre of the posterior bulb of the pharynx.

ant, arrow indicates direction of the "head" of the worm,
cut, pharyngeal cuticle,
ep, pharyngeal epithelium,
fo, food particle,
ma, muscle attachments,
sv, secretion vesicle.

Fixation and staining as above.
Neg. x 5,000 Enl. x 3 Total x 15,000.

Plate No: 5:16c

Micrograph of the cytoplasm of a secretory cell in the pharyngeal wall near the posterior bulb.
er, ergastoplasm, mu, muscle cell,
g, Golgi complex, r, free ribosomes.
m, mitochondrion,

Fixation and staining as above.
Neg. x 10,000 Enl. x 3 Total x 30,000.
Plate No: 5:17

T.S. of the intestine. In this region two cells surround the intestinal lumen.

bc, body cavity,
cc, contact between intestinal cells,
d, non-septate desmosome,
dv, vesicle with dense contents,
er, ergastoplasm,
fo, food particles,
il, intestinal lumen,
m, mitochondrion,
mv, microvilli forming a brush border,
p, pore in terminal web,
sv, vesicles of secretion,
tw, terminal web beneath brush border.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 4,500  Enl. x 4  Total x 18,000.
Plate No: 5:18

Medium power micrograph of a T.S. of an intestinal cell, which includes brush border, terminal web, cytoplasm, and a portion of a nucleus. (*C. briggsae*).

**Abbreviations:**
- **dv**: vesicle with dense contents
- **er**: ergastoplasm
- **il**: intestinal lumen
- **m**: mitochondrion
- **mf**: myelin figure
- **mv**: microvilli
- **n**: nucleus
- **nm**: nuclear membrane
- **p**: pore in terminal web
- **sv**: vesicles of secretion
- **tw**: terminal web

**Fixation:** glutaraldehyde, OsO$_4$ and uranyl acetate.

**Stain:** lead citrate.

Neg. x 10,000  Enl. x 4  Total x 40,000
Plate No: 5:19

High power micrograph of the microvilli, terminal web, and cytoplasm in an intestinal cell.

dg, dense granule at the tip of a microvillus,
er, ergastoplasm,
il, intestinal lumen,
m, mitochondrion,
mat, matrix surrounding microvilli,
mv, microvillus,
n, nucleus,
p, pore in terminal web,
r, free ribosomes (some of these small dense particles may be glycogen),
sv, secretion vesicle,
tw, terminal web.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 20,000  Enl. x 4  Total x 80,000.
Plate No: 5:20

Very high power micrograph of the microvilli lining the intestinal lumen. Each microvillus has a number of microtubules running up its core to a dense granule on the plasma membrane at its tip.

dg, dense granule,
ic, intestinal cell,
il, intestinal lumen,
mat, matrix surrounding microvilli,
mt, microtubules,
pm, plasma membrane,
tw, terminal web.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 15,000       Enl. x 10       Total x 150,000.
Plate No: 5:21a

T.S. through the longitudinal excretory duct of *C. briggsae*. 

bc, body cavity,
ch, channels in duct cytoplasm,
du, duct lumen,
er, ergastoplasm,
m, mitochondrion,
u, muscle cell,

pm, plasma membrane of the excretory duct.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate. 
Stain: lead citrate.

Neg. x 20,000  Enl. x 3  Total x 60,000.

Plate No: 5:21b

L.S. of the longitudinal excretory duct of *C. briggsae*.

bc, body cavity,
ch, channels in duct cytoplasm,

du, duct lumen.

Fixation and staining as above.

Neg. x 10,000  Enl. x 3  Total x 30,000.

Plate No: 5:21c

Higher power micrograph of an area in Pl. 5:21b.

Abbreviations, fixation and staining as above.

Neg. x 20,000  Enl. x 3  Total x 60,000.
Plate No: 5:22a

T.S. of *C. briggsae* including intestine, ovary, and uterine storage sac containing spermatozoa.

ep, sac epithelium, ic, intestinal cell, il, intestinal lumen, mu, muscle cell, ov, ovary, sp, spermatozoa in uterine storage sac.

Fixation: glutaraldehyde, Oso4 and uranyl acetate.
Stain: lead citrate.
Neg. x 550 Enl. x 8 Total x 4,400.

Plate No: 5:22b

Section through uterine wall. The fixatives and embedding medium used have failed to penetrate the shell of the ovum within the uterus, hence the contents of the ovum have not been preserved.

bc, body cavity, om, ovum, er, ergastoplasm, sh, shell of the ovum, m, mitochondrion, ut, uterine wall, mf, myofilaments,

Neg. x 20,000 Enl. x 3 Total x 60,000.
Plate No: 5:23

T.S. of the ovary of C. briggsae. The ovocytes are small cells with few cytoplasmic organelles except the mitochondria.

Some cells are in cytoplasmic contact with each other although others appear to be quite separate.

c, cytoplasmic contact between cells,
ep, epithelium enclosing ovocytes,
m, mitochondrion,
n, nucleus,
nl, nucleolus,
nm, nuclear membrane,
om, ovum,
o, ovocytes,
sp, spermatozoan,
ut, uterine wall.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 4,000       Enl. x 4       Total x 16,000.
Plate No: 5:24

T.S. of the uterine sac containing the spermatozoa.

bc, body cavity,
d, non-septate desmosome,
ep, sac epithelium,
er, ergastoplasm,
g, Golgi complex,
m, mitochondrion,
n, nucleus,
nl, nucleolus,
sp, spermatozoan.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.

Stain: lead citrate.

Neg. x 3,600  Enl. x 4  Total x 14,400.
Plate No: 5:25a

Micrograph of a spermatozoan. They are unusual in that they appear to lack a conventional nucleus, and they have a novel structure (inv) associated with their plasma membrane.

db, dense body,
fm, fibrous material,
inv, unusual invagination of the plasma membrane,
m, mitochondrion,
mv, microvilli,
pm, plasma membrane.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 12,000 Enl. x 3 Total x 36,000.

Plate No: 5:25b

Micrograph of an ovocyte. The cytoplasm contains many ribosomes (or possibly granules of glycogen), some mitochondria, and a little ergastoplasm.

ep, ovary epithelium, nm, nuclear membrane,
m, mitochondrion, r, ribosomes (and probably glycogen).
n, nucleus,
nl, nucleolus,

Fixation and staining as above.
Neg. x 10,000 Enl. x 3 Total x 30,000.
Plate No: 5:26a

T.S. of a longitudinal chord flanked by muscle cells. (*C. briggsae*).

cut 1, cuticular layer 1,
cut 2, cuticular layer 2,
db, dense body,
ed, epidermal cell,
ga, gap separating the two layers of the cuticle,
m, mitochondrion,
mf, myofilaments,
ne, nerve axons.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 10,000 Enl. x 3 Total x 30,000.

Plate No: 5:26b

Medium power micrograph of a T.S. through a muscle cell. The contractile mechanism consists of interdigitating arrays of thick and thin myofilaments. The myofilaments are grouped into blocks by fibrous dense bands which are associated with a primitive sarcoplasmic reticulum.

cf, coarse myofilaments, fb, fibrous band,
db, dense band, ff, fine myofilament,
sr, element of the primitive sarcoplasmic reticulum.

Fixation and staining as above.

Neg. x 20,000 Enl. x 3 Total x 60,000.
Plate No: 5:27

Photographic enlargement of Pl. 5:26b to show the details of the arrangement of the myofilaments.

cf, coarse myofilaments,
cl, cross linkages between myofilaments,
db, dense band,
ff, fine myofilament.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 20,000 Enl. x 10 Total x 200,000.
Plate No: 5:28a

Longitudinal section of muscle cells in *C. briggsae*.

cf, coarse myofilament,
db, dense band,
ff, fine myofilament,
sr, sarcoplasmic reticulum

Fixation: glutaraldehyde, *OsO*$_4$ and uranyl acetate.
Stain: lead citrate.

Neg. x 20,000    Enl. x 4    Total x 80,000.

Plate No: 5:28b

High power micrograph of an L.S. through a muscle cell.

cf, coarse myofilament,
cl, cross linkage between myofilaments,
ff, fine myofilament.

Fixation and staining as above.

Neg. x 40,000    Enl. x 4    Total x 160,000.
Plate No: 5:29

L.S. of *C. briggsae*, through the nerve ring.
The ring has an outer cell rind of perikarya which surround the neuropile (Pl. 5:33b).

ap, unusual axon profile,
ne, nerve tract,
nep, neuropile,
ri, cell rind.

Fixation: glutaraldehyde, *OsO₄* and uranyl acetate.
Stain: lead citrate.

Neg. x 2,000  Enl. x 4  Total x 8,000.
Plate No: 5:30

Micrograph of the perikarya in the cell rind.

ax, nerve axons,
er, ergastoplasm,
m, mitochondrion,
n, nucleus,
nm, nuclear membrane,
v, vesicles.

Fixation: glutaraldehyde, $\text{OsO}_4$ and uranyl acetate.
Stain: lead citrate.

Neg. x 5,000  Enl. x 4  Total x 20,000.
Plate No:  5:31a

Micrograph of one of the perikarya with less compact cytoplasm.

dv, vesicles containing densely stained material,
er, ergastoplasm,
g, Golgi complex,
lv, vesicles containing lightly stained material,
m, mitochondrion,
mt, microtubule,
n, nucleus,
nm, nuclear membrane,
r, ribosomes,
v, vesicles.

Fixation:  glutaraldehyde, OsO₄ and uranyl acetate.
Stain:  lead citrate.
Neg. x 10,000  Enl. x 3  Total x 30,000.

Plate No:  5:31b

Micrograph of a perikaryon with compact cytoplasm.

Abbreviations, fixation and staining as above.

Neg. x 10,000  Enl. x 3  Total x 30,000.
Plate No: 5:32

Section of the neuropile of *C. briggsae*.

axa, type A axon,
axb, type B axon,
axc, type C axon,
dv, vesicle containing dense granule,
lv, vesicle with lightly stained contents,
m, mitochondrion,
mt, microtubule.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.

Neg. x 10,000  Enl. x 4  Total x 40,000.
Plate No: 5:33a

Micrograph of the different types of axon in the neuropile. (*C. briggsae*).

axa, type A axon,
axb, type B axon,
axc, type C axon,
dv, vesicle containing dense granules,
lv, vesicle with lightly stained contents,
m, mitochondrion,
m_{t}, microtubule.

Fixation: glutaraldehyde, OsO_{4} and uranyl acetate.

Stain: lead citrate.

Neg. x 20,000 Enl. x 3 Total x 60,000.

Plate No: 5:33b

Micrograph of an unusual axon profile.

Abbreviations, fixation and staining as above.

Neg. x 20,000 Enl. x 3 Total x 60,000.
Plate No: 5:34

Micrograph of a neuro-muscular junction in
*C. briggsae*.

ax, nerve axon,
ca, mitochondrial crista,
dv, dense vesicle,
m, mitochondrion,
mat, mitochondrial matrix,
mt, microtubule,
mu, muscle cell,
sy, synapse,
syv, synaptic vesicle.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.

Stain: lead citrate.

Neg. x 20,000  Enl. x 4  Total x 80,000.
Plate No: 5:35

L.S. through the anterior tip of *C. briggsae*. Nervous tissue and sense organs surround the alimentary canal.

ax, nerve axon,
c, cilium-like structures,
cor, cuticle lining the oral cavity,
cut, general body cuticle,
ed, epidermis,
ep, epithelium of the oral cavity,
er, ergastoplasm,
mu, muscle cell,
oc, oral cavity,
sp, sensory papilla,
t, tooth.


Neg. x 4,000 Enl. x 4 Total 16,000.
Plate No:  5:36

Medium power micrograph of the sensory papilla on the lip. (C. briggsae).

c,  cilium-like structure,
cut,  cuticle,
d,  non-septate desmosome,
fib,  fibrils,
li,  lip,
sp,  sensory papilla.

Fixation:  glutaraldehyde, OsO₄ and uranyl acetate.

Stain:  lead citrate.

Neg. x 20,000    Enl. x 4    Total x 80,000.
Plate No: 5:37a

T.S. of the anterior tip of *C. briggsae*, showing the nervous tissue and two cilium-like processes in the amphid.

ax, nerve axon, er, ergastoplasm,  
c, cilium-like process, m, mitochondrion,  
cor, cuticular lining of the oral cavity, mu, muscle cell,  
ep, epithelium of the oral cavity, pm, plasma membrane.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.  
Stain: lead citrate.

Neg. x 3,000 Enl. x 8 Total x 24,000.

Plate No: 5:37b

High power micrograph of the cilium-like processes.

c0, connections between fibres,  
con, connection between ergastoplasm and the chamber enclosing the cilium like processes,  
er, ergastoplasm,  
if, internal fibre,  
m, mitochondrion,  
pf, peripheral fibre,  
sec, secretion of amphidary gland.

Fixation and staining as above.

Neg. x 12,000 Enl. x 8 Total x 96,000.
Plate No: 5:38a

L.S. of the opening of the amphid, showing the cilium-like processes and the secretion escaping through the pore.

c, cilium-like process,
cut, general body cuticle,
mu, muscle cell,
p, pore,
sec, secretion.

Fixation: glutaraldehyde, OsO₄ and uranyl acetate.
Stain: lead citrate.
Neg. x 3,900   Enl. x 7   Total x 27,300.

Plate No: 5:38b

High power micrograph of a section in series with that illustrated above, showing the tip of the cilium-like process, and the release of secretion through the pore.

Abbreviations, fixation and staining as above.

Neg. x 5,000   Enl. x 7   Total x 35,000.