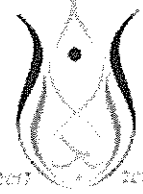


LECTURE : 1+2 Parasitology

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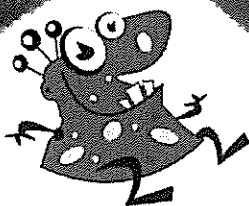
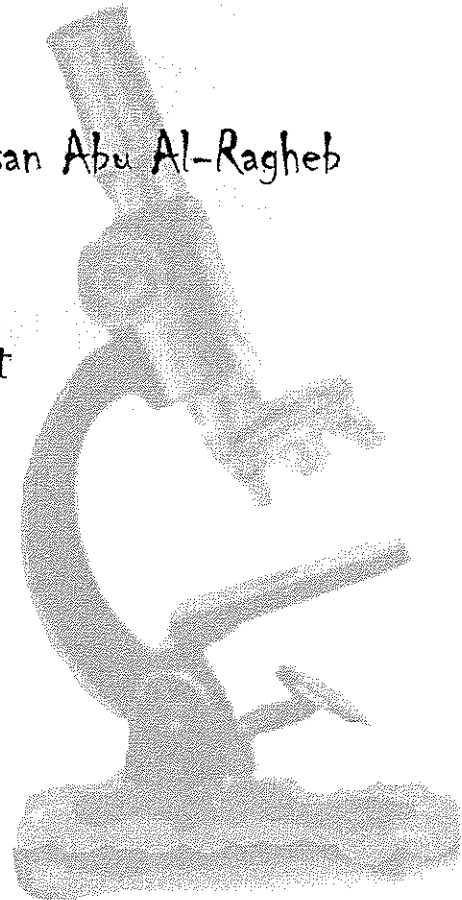
Microbiology

Title: Introduction to Parasitology

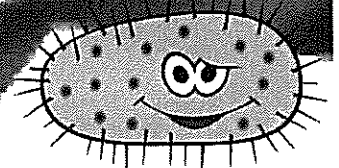
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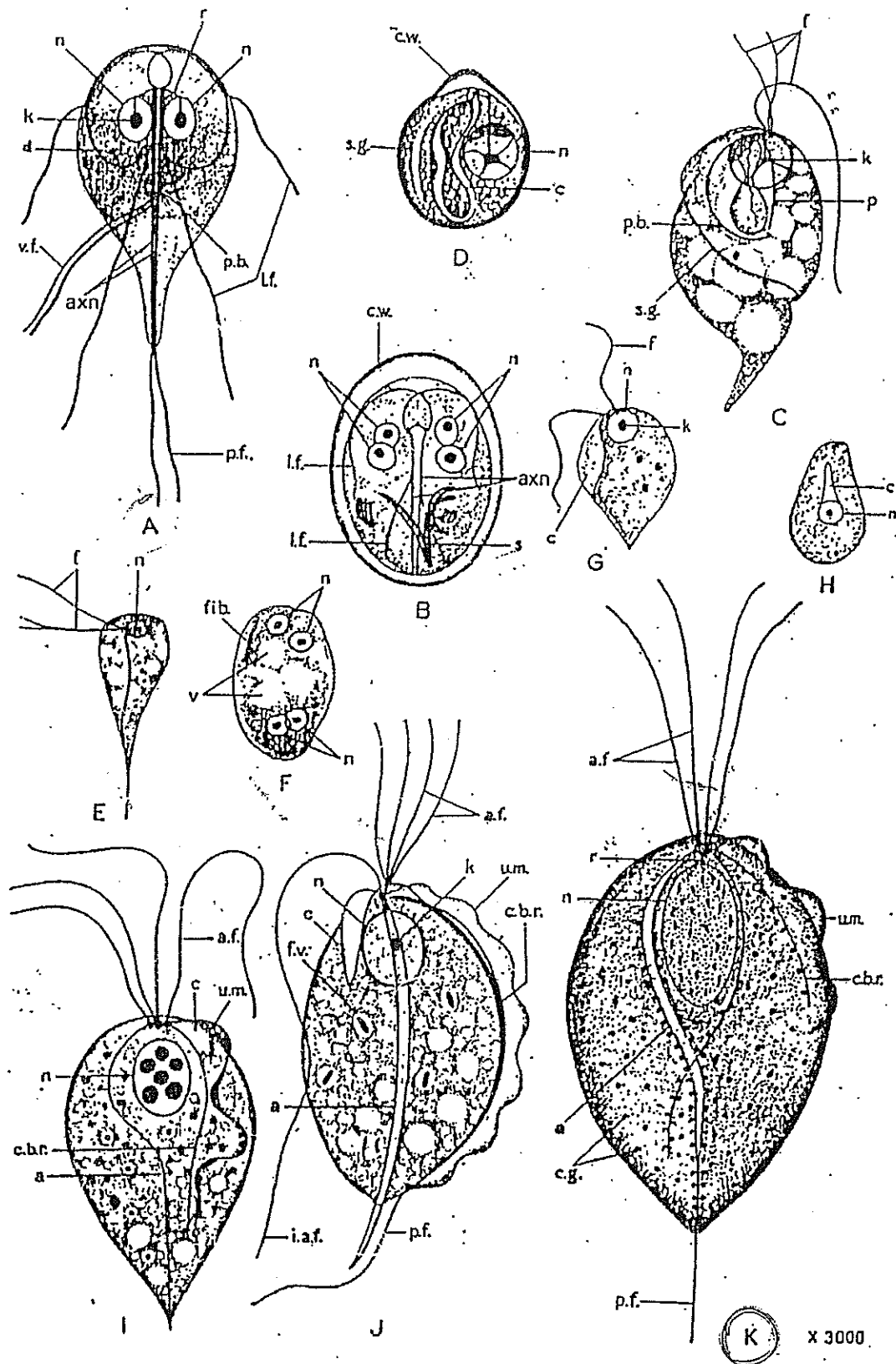


Figure 3-11. The intestinal and atrial flagellates of humans. A. *Giardia lamblia* trophozoite viewed from dorsal surface. B. *Giardia lamblia* cyst. C. *Chilomastix mesnili* trophozoite, ventral view. D. *Chilomastix mesnili* cyst, ventral view. E. *Enteromonas hominis* trophozoite. F. *Enteromonas hominis* quadrinucleated cyst. G. *Retortamonas intestinalis* trophozoite. H. *Retortamonas intestinalis* cyst. I. *Trichomonas tenax* trophozoite. J. *Trichomonas hominis* trophozoite. K. *Trichomonas vaginalis* trophozoite. a = axostyle; axn = axoneme; a.f. = anterior flagella; c = cytostome; c.b.r. = chromatoid basal rod; c.g. = chromatin granules; c.w. = cyst wall; d = sucking disk; f = flagellum; f.v. = food vacuole; fib. = fibril; i.a.f. = inferior anterior flagellum; k = karyosome; l.f. = lateral flagella; n = nucleus; p = parastyle; p.b. = parabasal body; p.f. = posterior flagellum; r = rhizoplast; s = shield; s.g. = spiral groove; u.m. = undulating membrane; v = vacuole; v.f. = ventral flagella.

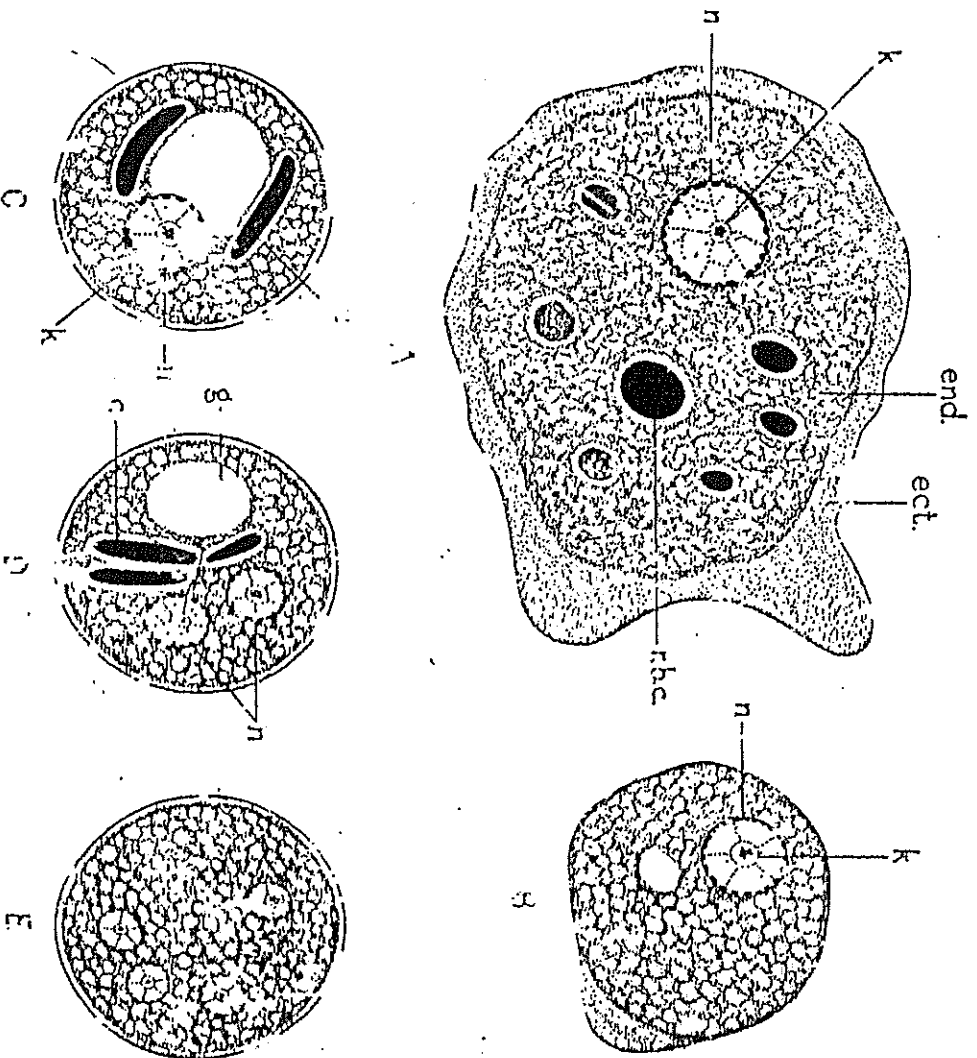


Figure 3-12. Schematic representation of *Entamoeba histolytica*. A. Trophozoite containing red blood cells undergoing digestion. B. Precystic ameba devoid of cytoplasmic inclusions. C. Young uninucleate cyst. D. Binucleate cyst. E. Mature quadrinucleate cyst. c = chromatoid bodies; ect. = ectoplasm; end. = endoplasm; g = glycogen vacuole; k = karyosome; n = nucleus; r.b.c. = red blood cells.

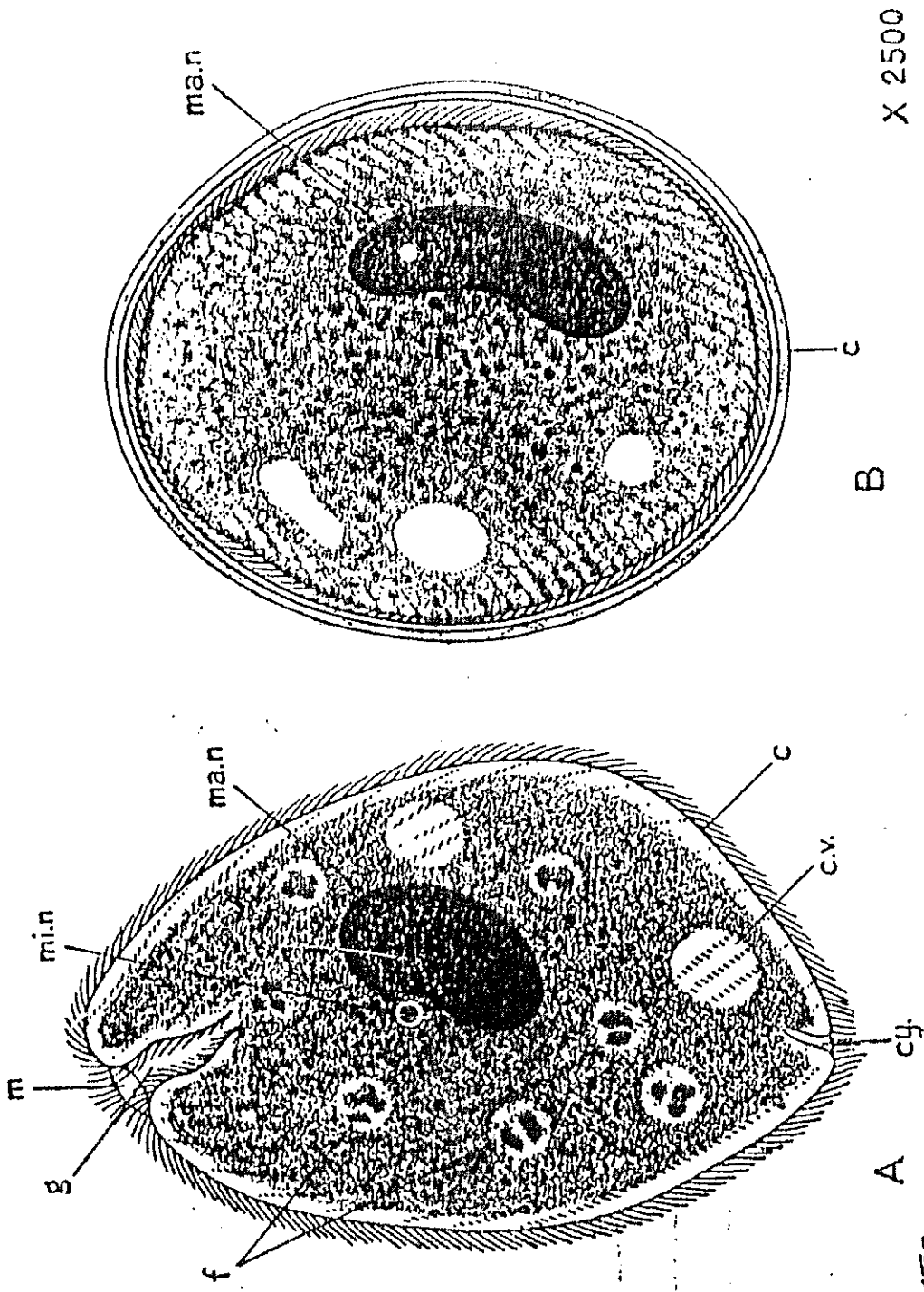


Figure 3-9. Schematic representation of *Balantidium coli*. A. trophozoite. B. Cyst. c = cilia; cy = cytophyge; c.v. = contractile vacuole; f = food vacuole; g = gullet; m = mouth; ma. n = macronucleus; mi. n = micronucleus. (Modified from Dobell and O'Connor, 1921.)

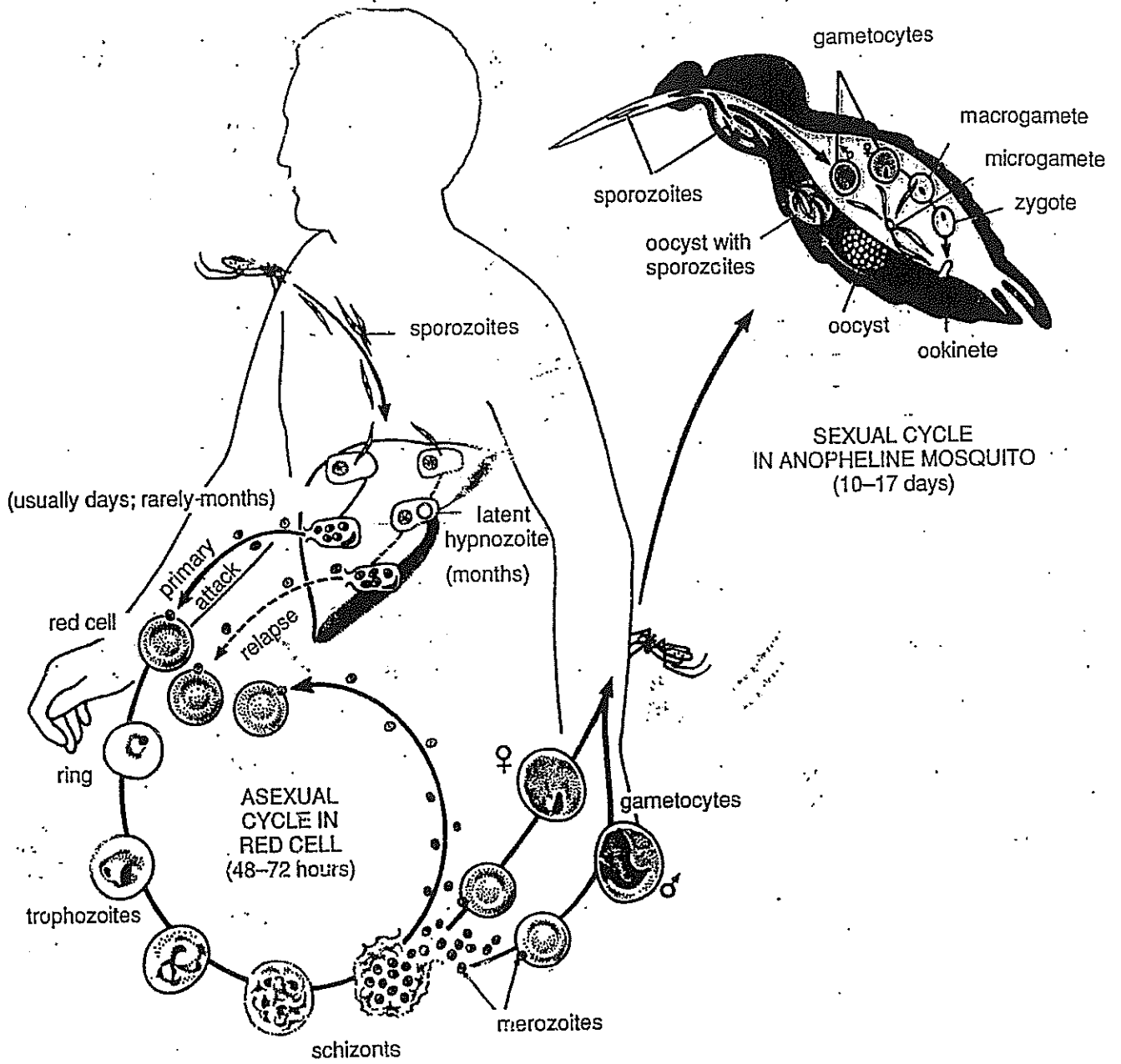


Figure 4-15. Life cycle of human malaria parasites.

Introduction to parasites :

Parasite means : one who eats at the table of another.

Differs from others bacteria and viruses in their complex life cycles, intermediate hosts and chronicity.

They have also evolved to live under totally different environments according to the developmental stage and different host tissues.

Parasitic infections cause a lot of morbidity worldwide :

- 2nd most common infectious cause of blindness.
- One billion people harbour intestinal nematodes.
- Schistosomiasis affects 200-300 million people.
- Filariae affect a similar number as well.
- Several hundred million people contract malaria every year, with the death of 1 million children every year.

Helminths are multicellular, do not multiply within the human host, can parasitise tissues and lumina, a heavy load is usually required to produce serious disease. Eggs are usually produced for spread of infection.

Protozoa are unicellular, multiply within the human host and thus can easily produce serious disease. They can be intracellular. Cysts are produced for spread of infection.

Infection tends to be chronic, and solid long lasting immunity does not exist, especially with luminal parasites..

Pathogenicity and immune responses to parasites :

Direct damage e.g. malaria, amoeba. There may be very little damage in cases.

Antigenic variation.

Immunity may develop against one stage of parasite but other stages escape : in Schistosoma infection the host may be immune against invasion by new cercariae, but the adult worm remains unaffected.

Tissue damage may be due to the immune response, to eggs in schistosomiasis, anaphylaxis in hydatid cyst.

Diagnosis :

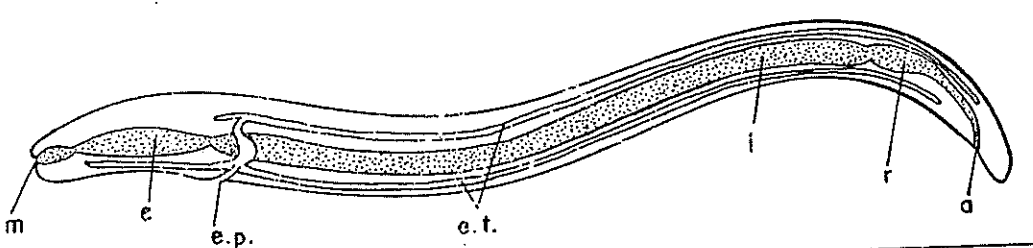
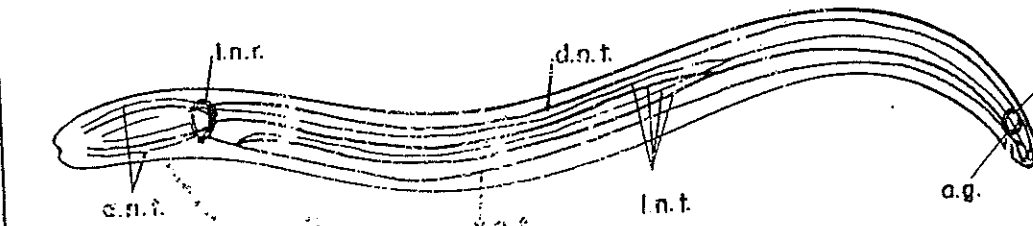
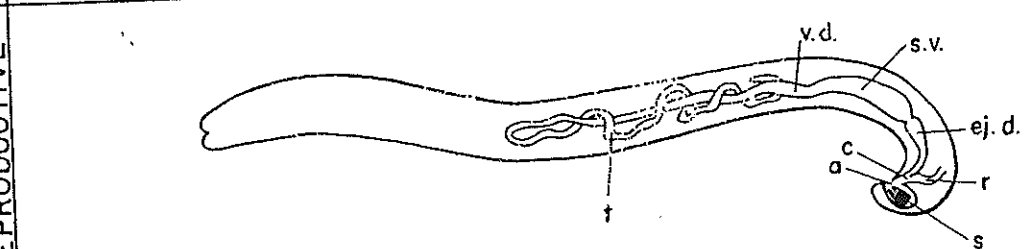
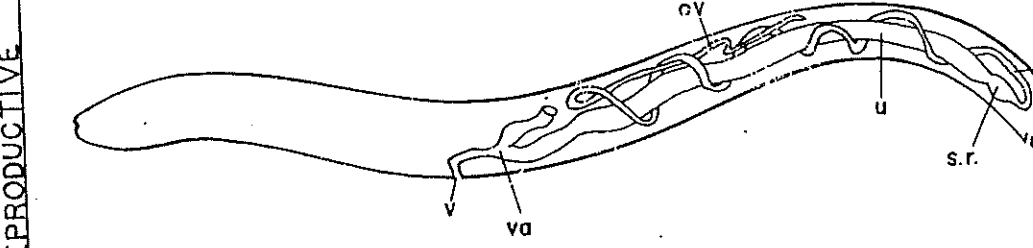
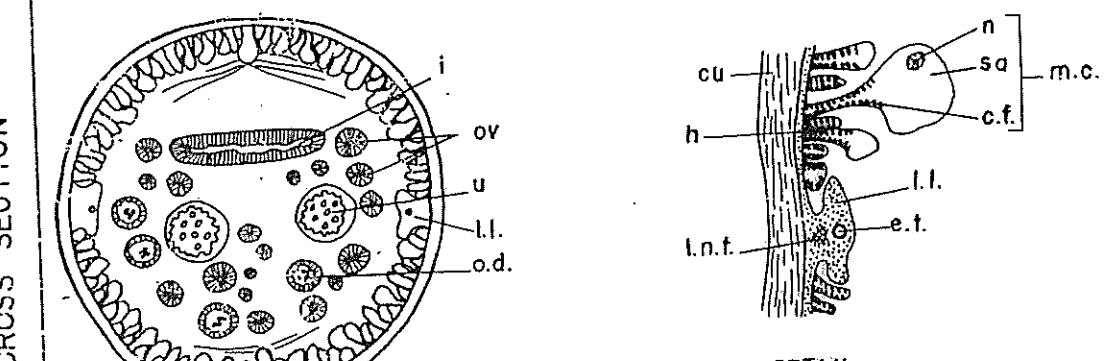
Demonstration of parasite, larva, egg or cyst.

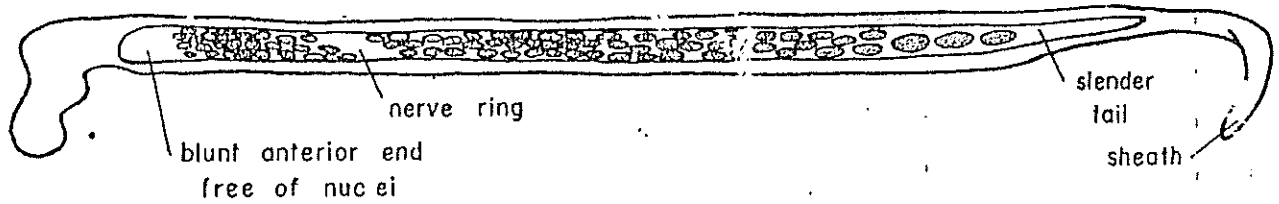
Serology may be useful where tissue invasion occurs.

Eosinophilia and raised IgE in helminth infections.

Vaccination has not been well established : reasons.

NEMATODES

DIGESTIVE & EXCRETORY	
NERVOUS	
MALE REPRODUCTIVE	
FEMALE REPRODUCTIVE	
CROSS SECTION	 <p style="text-align: center;">DETAIL</p>



SHEATHED

TAILS ONLY

UNSHEATHED

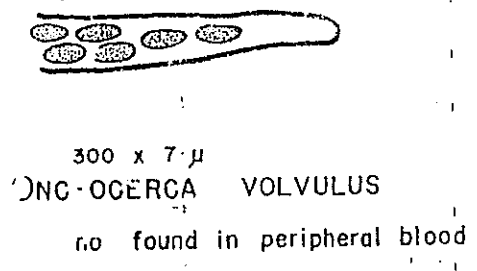
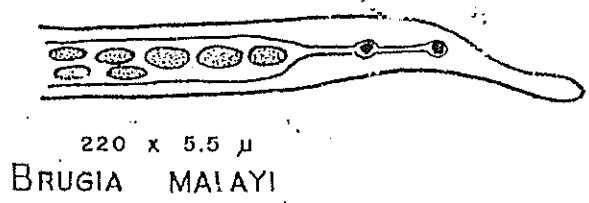
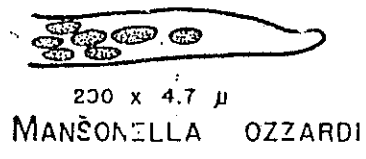
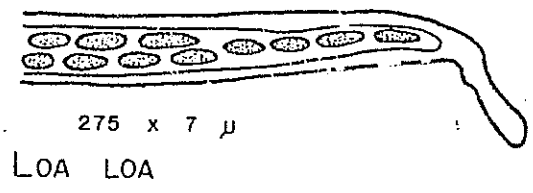
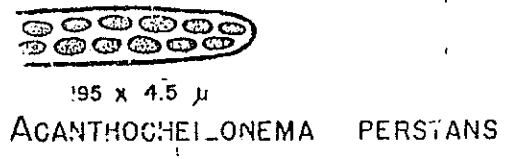
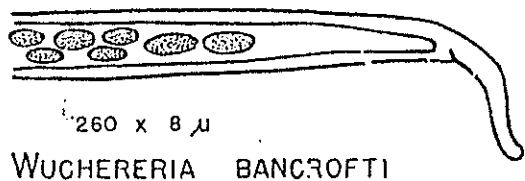
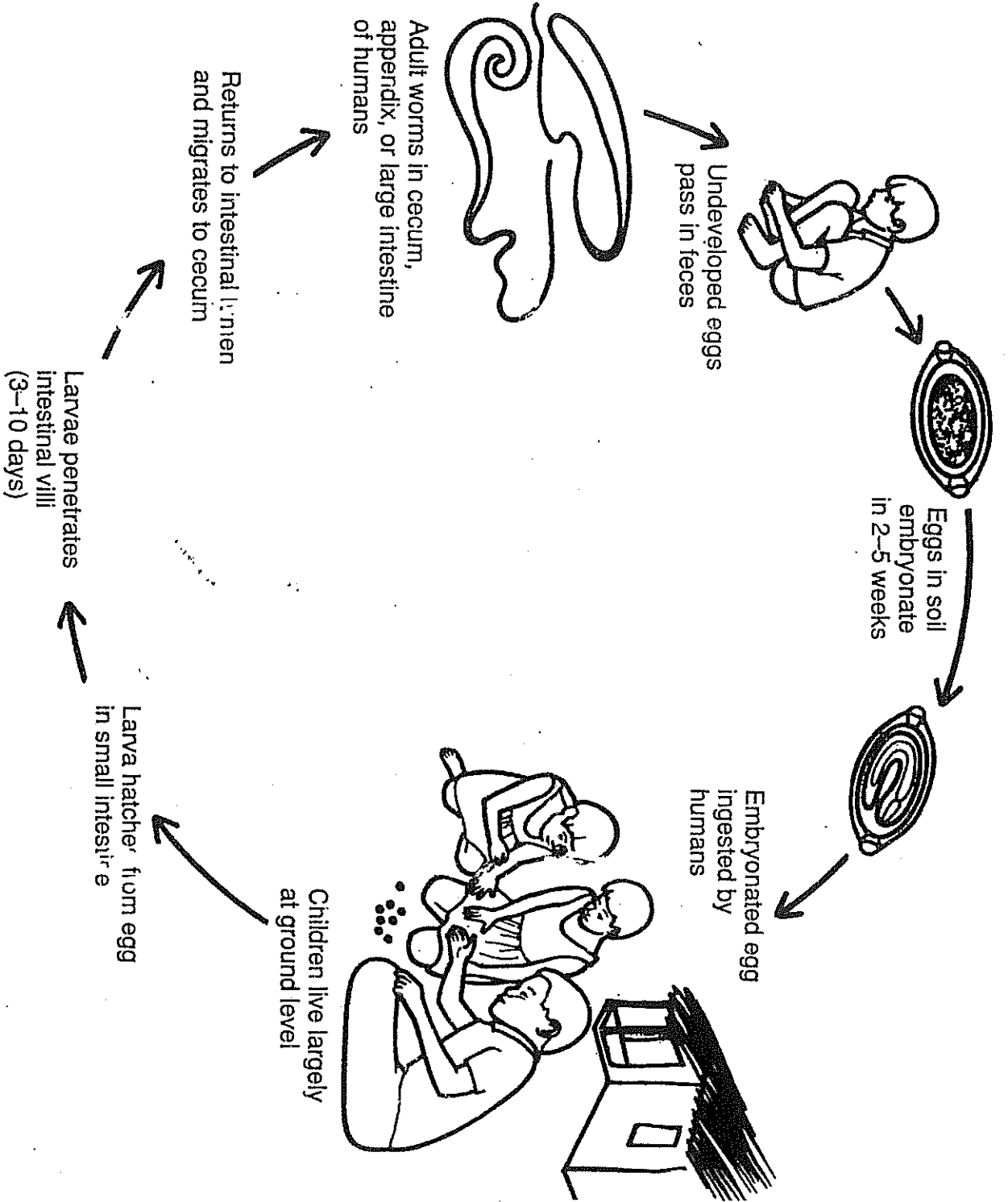


Figure 7-2. Microfilariae of humans: diagnostic characteristics.



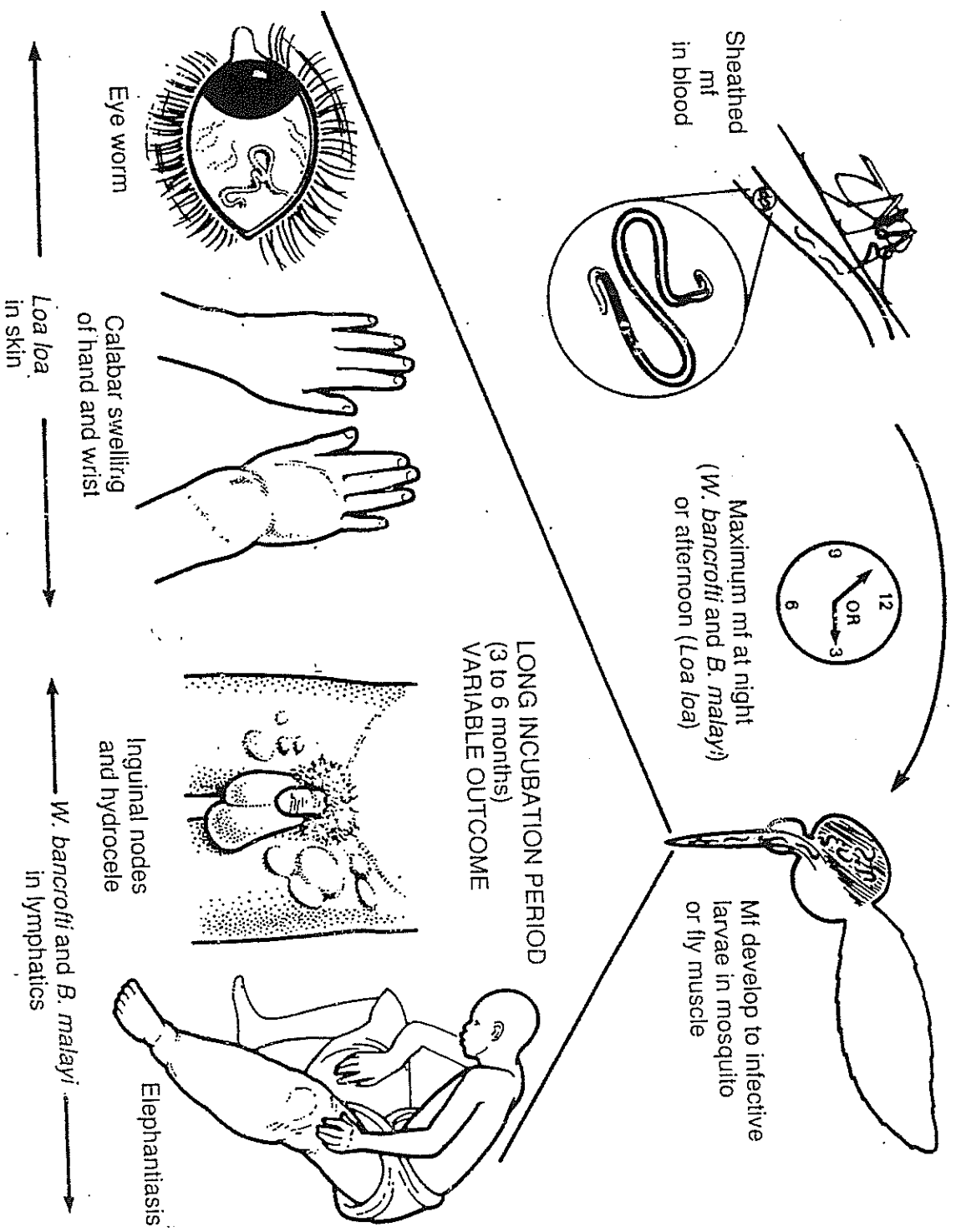
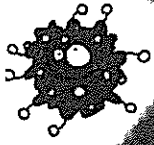
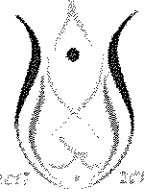


Figure 7-4. General life cycle of filarial parasites. mf=microfilariae.



LECTURE : 3 Parasitology

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Microbiology

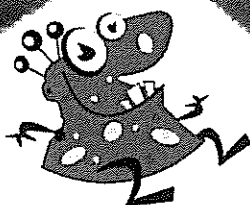
Title: Introduction to Parasitology 3

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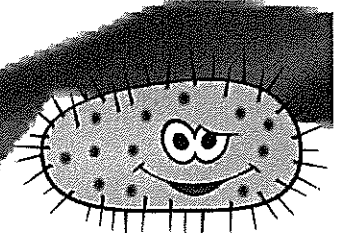
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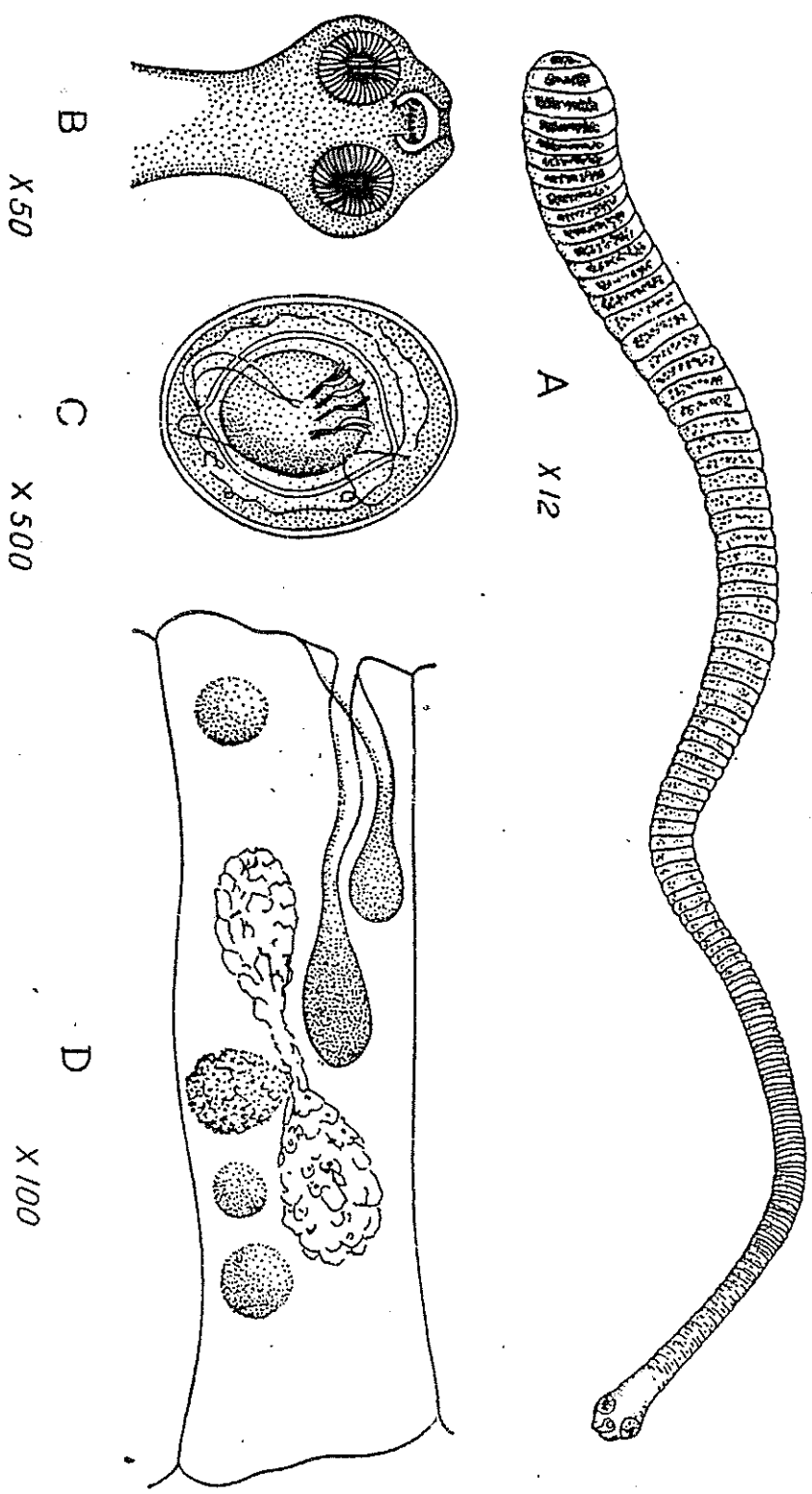


Figure 9-3. *Hymenolepis nana*. **A.** Adult worm. **B.** Scolex. **C.** Egg. **D.** Mature proglottid showing reproductive organs. (A redrawn from Leuckart, 1863. B redrawn from Blanchard, 1886. C redrawn from Stiles, 1903. D redrawn from Leuckart, 1886.)

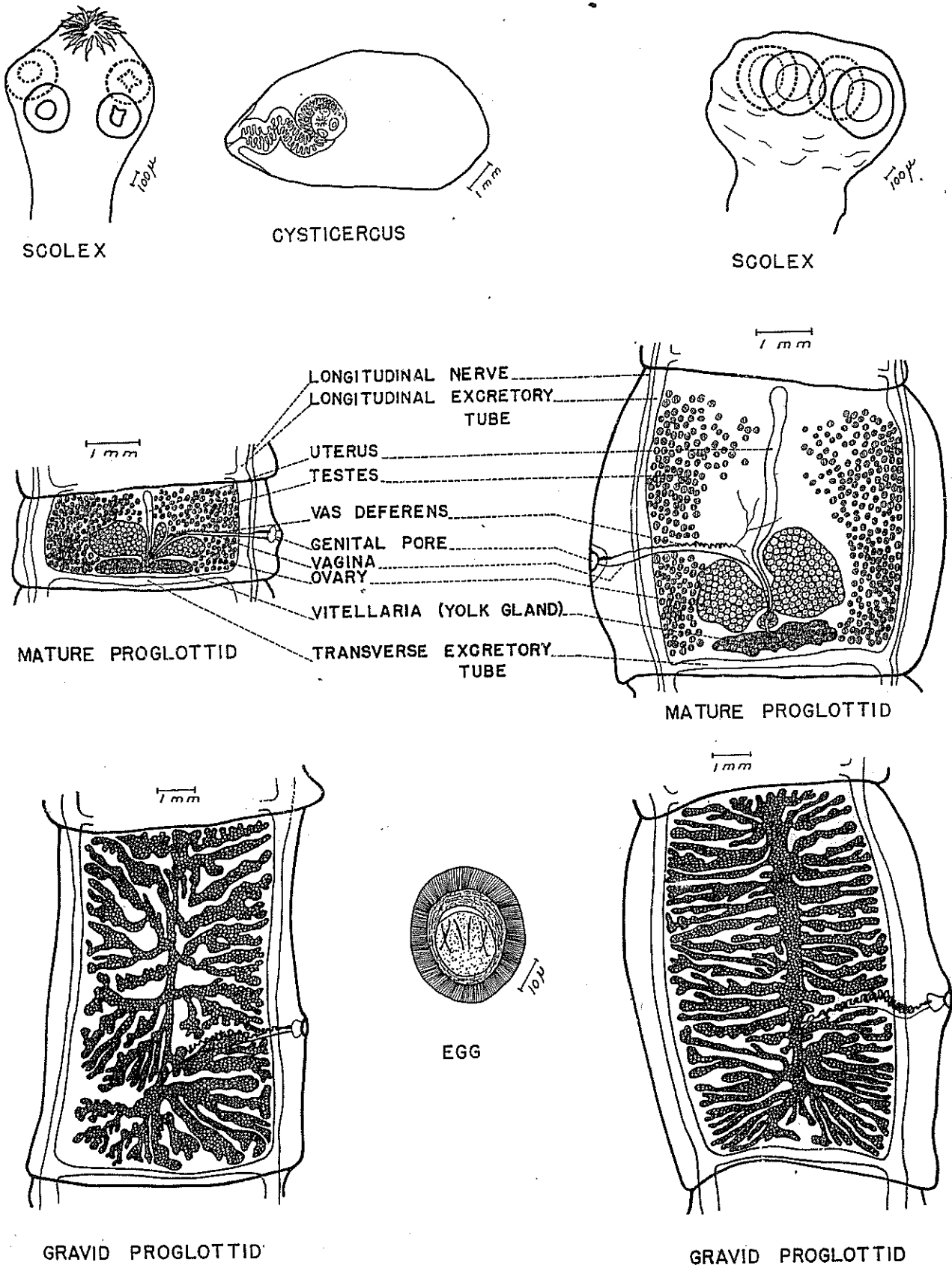


Figure 9-5. *Taenia solium* and *T. saginata*—a diagrammatic comparison.

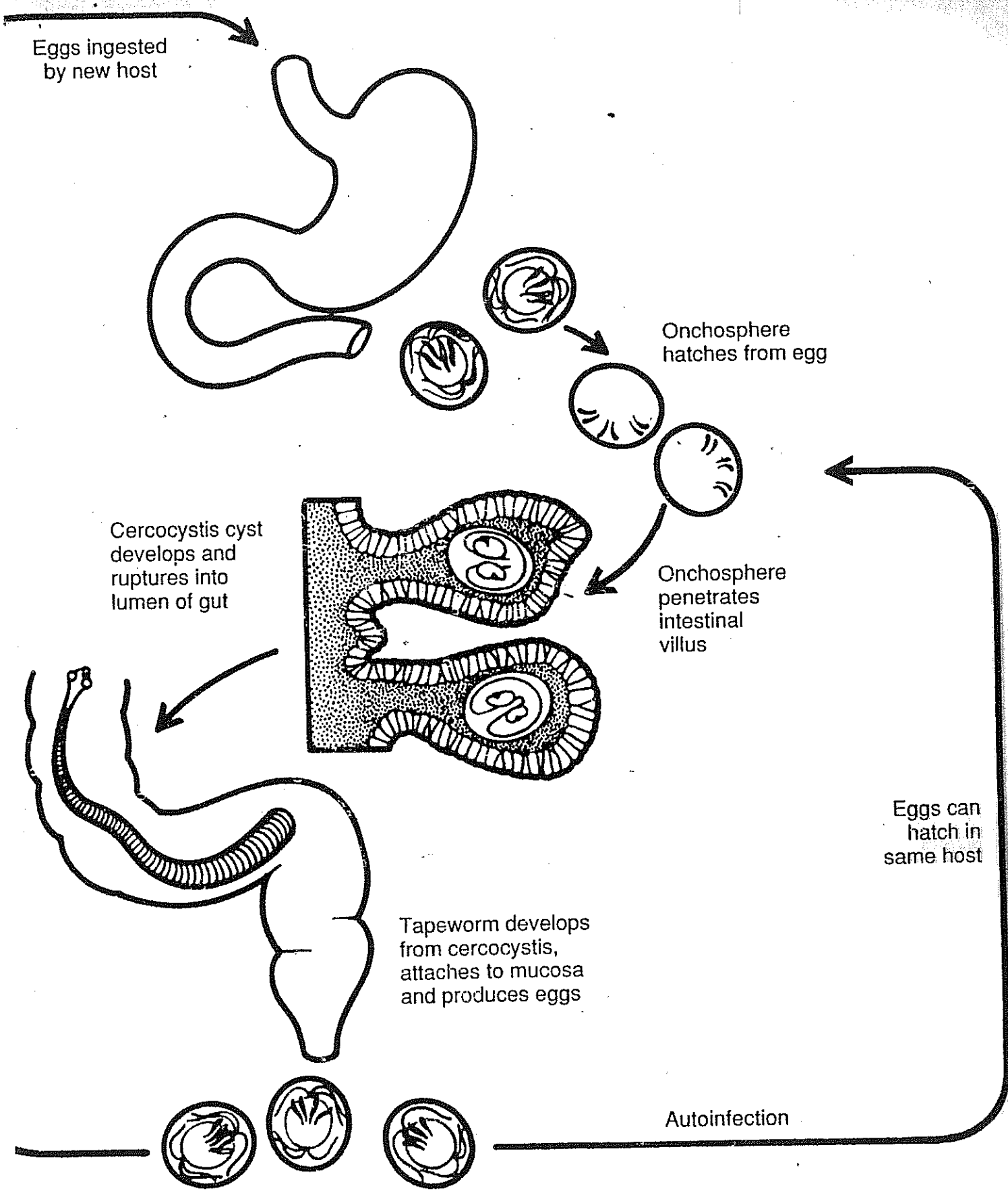


Figure 9-4. Life cycle of *Hymenolepis nana*.

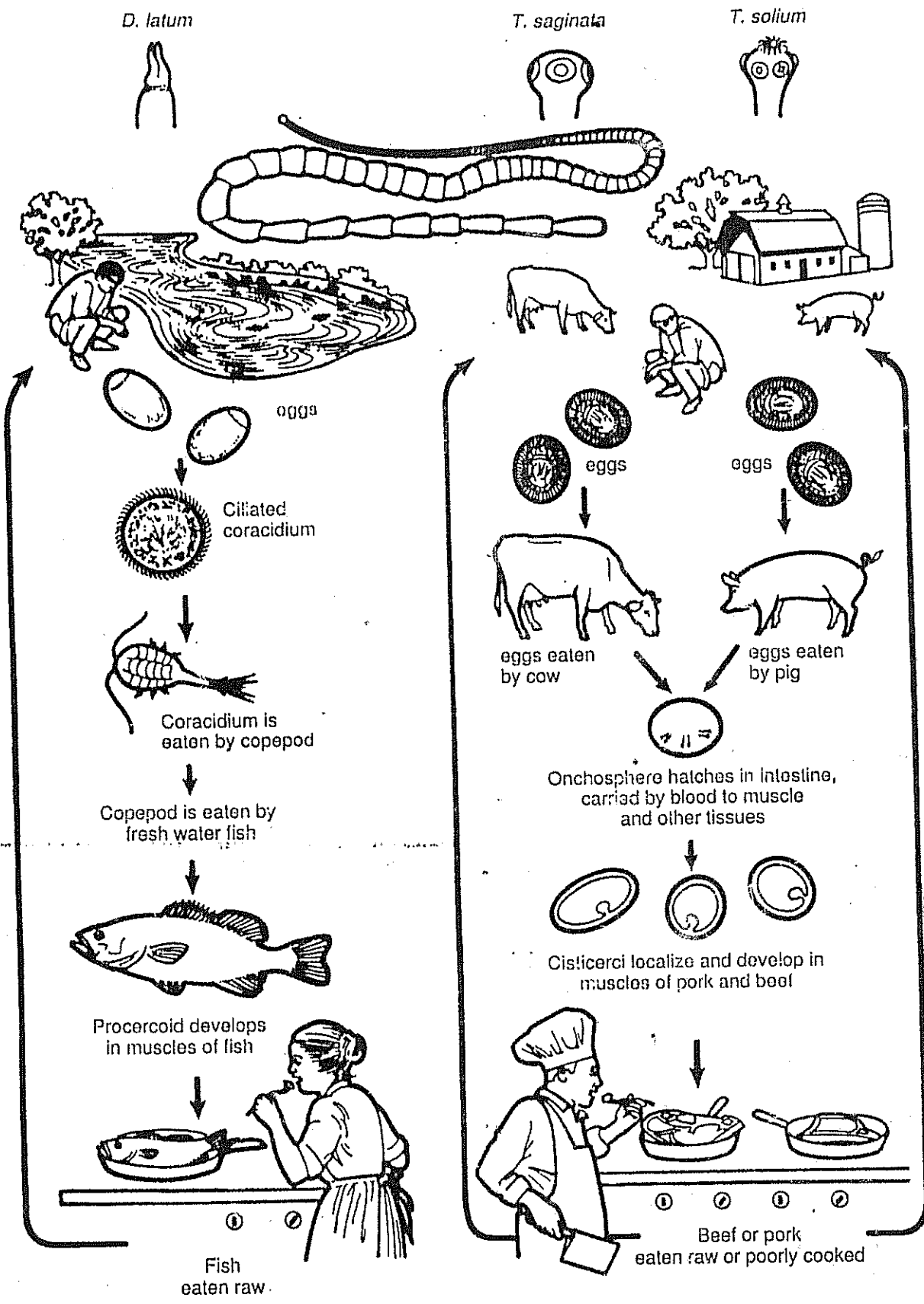


Figure 9-1. Life cycles of the 3 main human intestinal tapeworms.

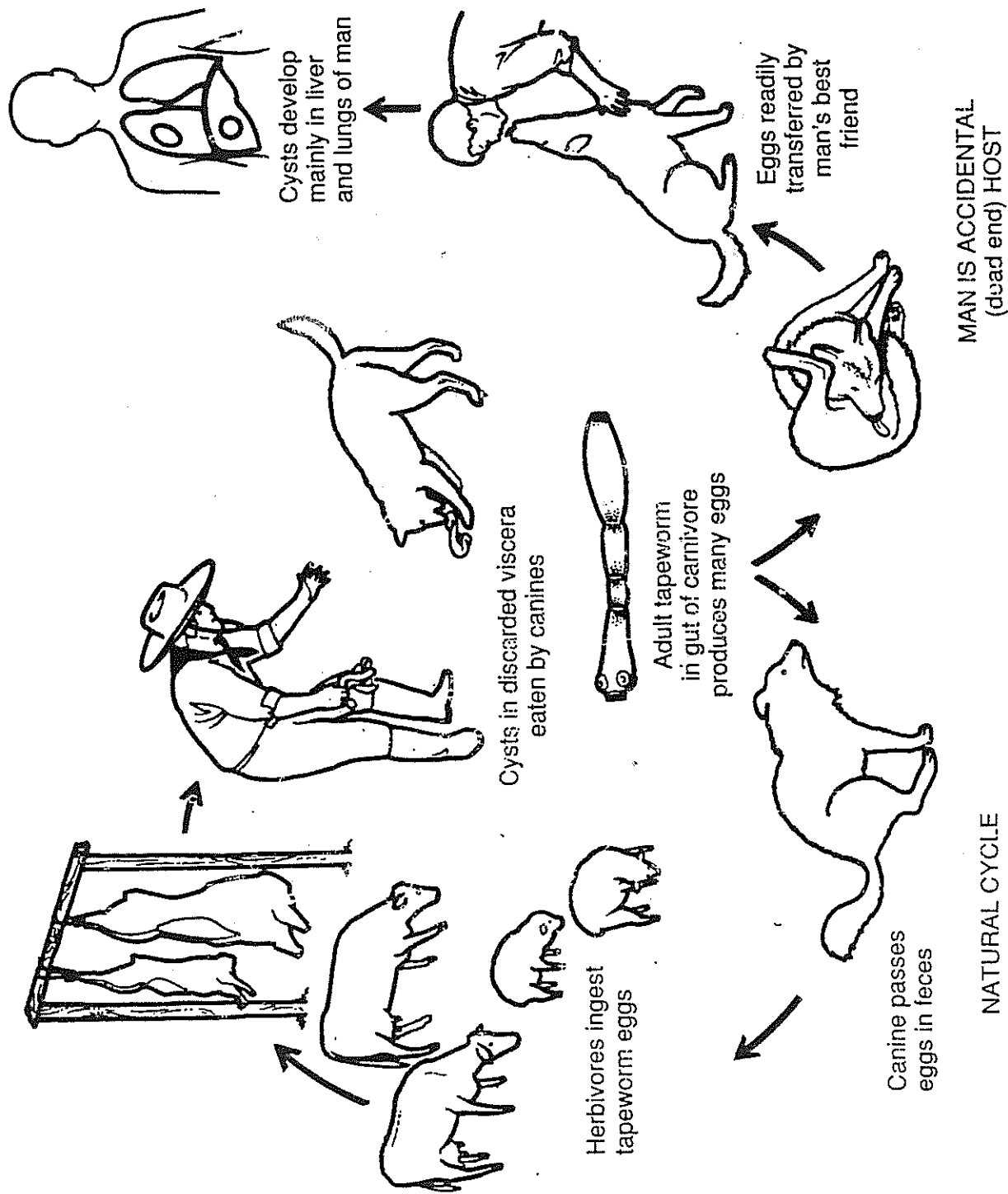


Figure 10-3. Life cycle of *Echinococcus granulosus*.

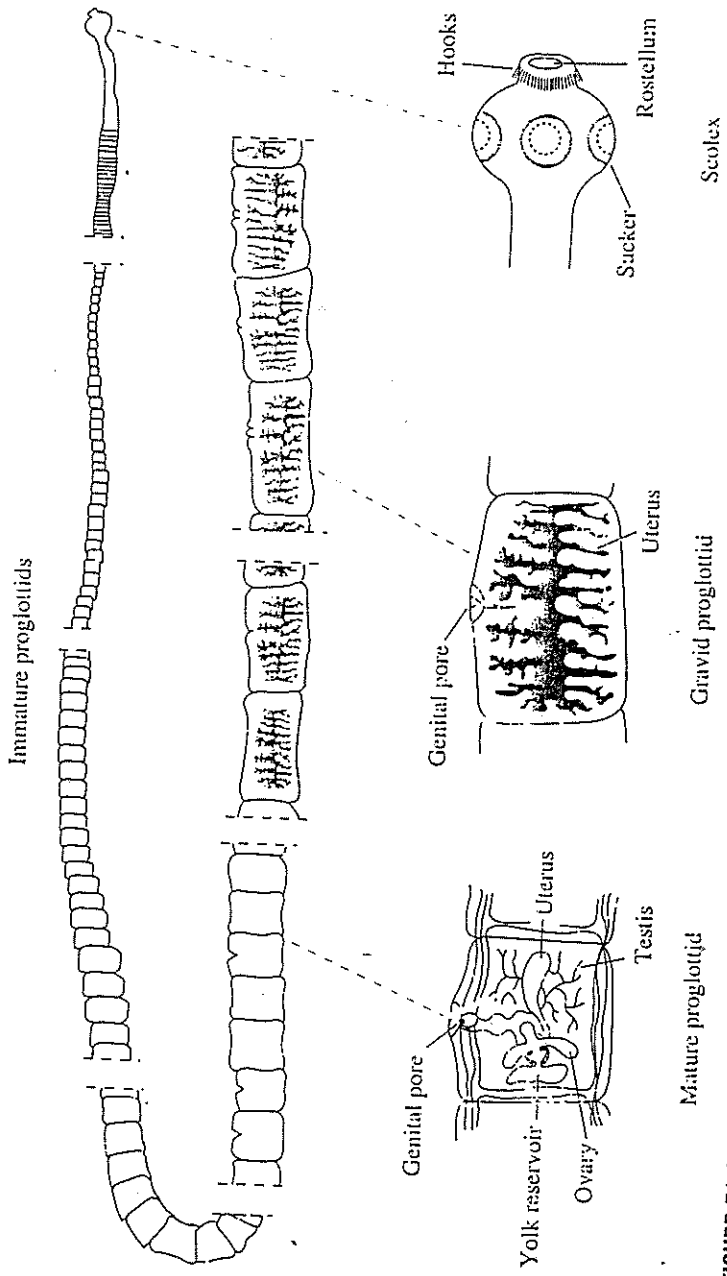
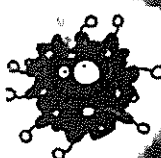
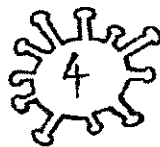


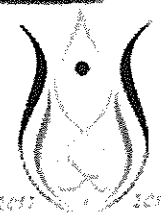
FIGURE 51-1 Major morphologic parts of an adult tapeworm.



LECTURE :



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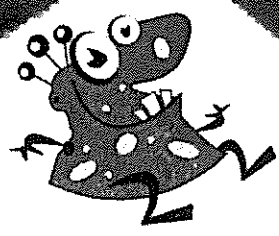
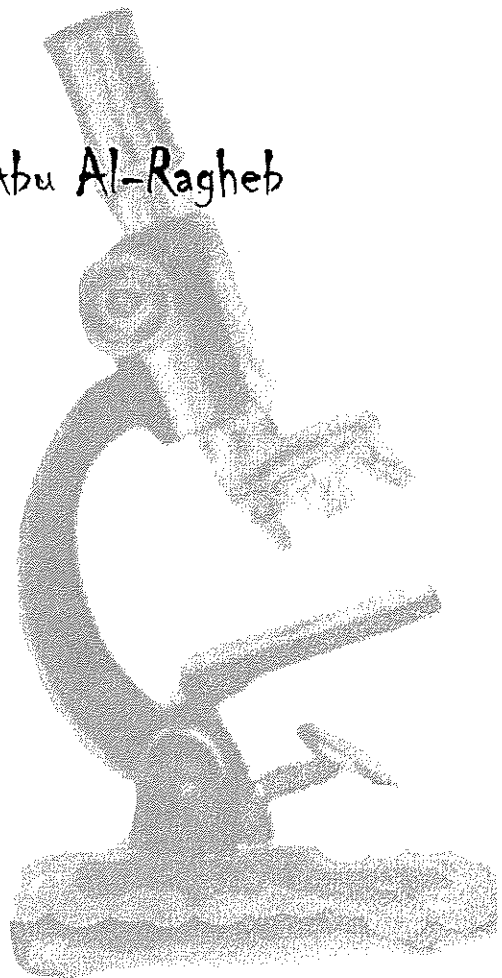
Microbiology

Title: Parasitology 4

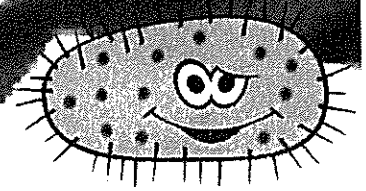
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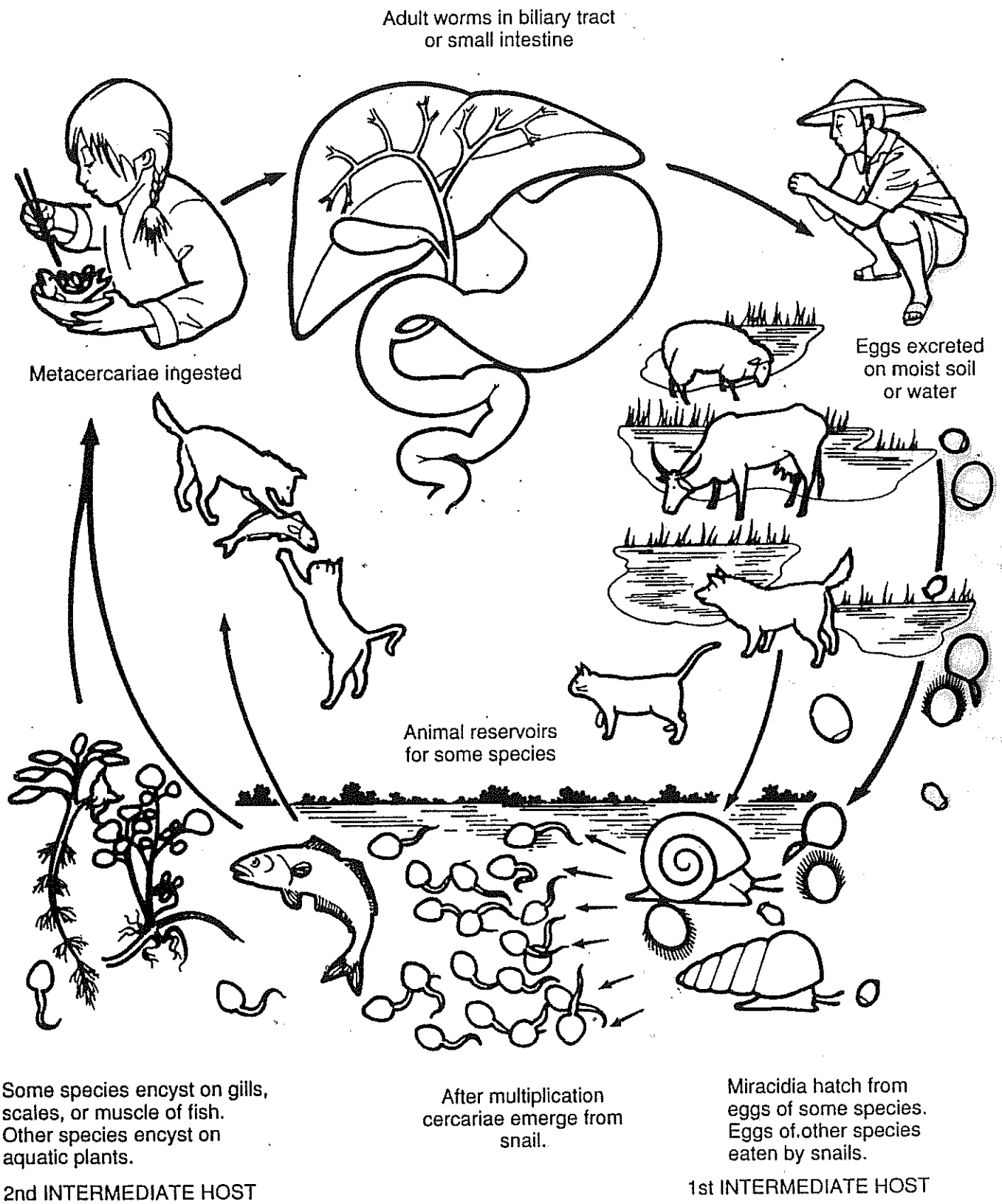


Figure 12-3. General life cycle for human intestinal and liver flukes (*Fasciolopsis buski*, *Heterophyes heterophyes*, *Metagonimus yokogawi*, *Nanophyes salmincola*, *Clonorchis sinensis*, *Opisthorchis felineus*, *O. viverrini*, and *Fasciola hepatica*).

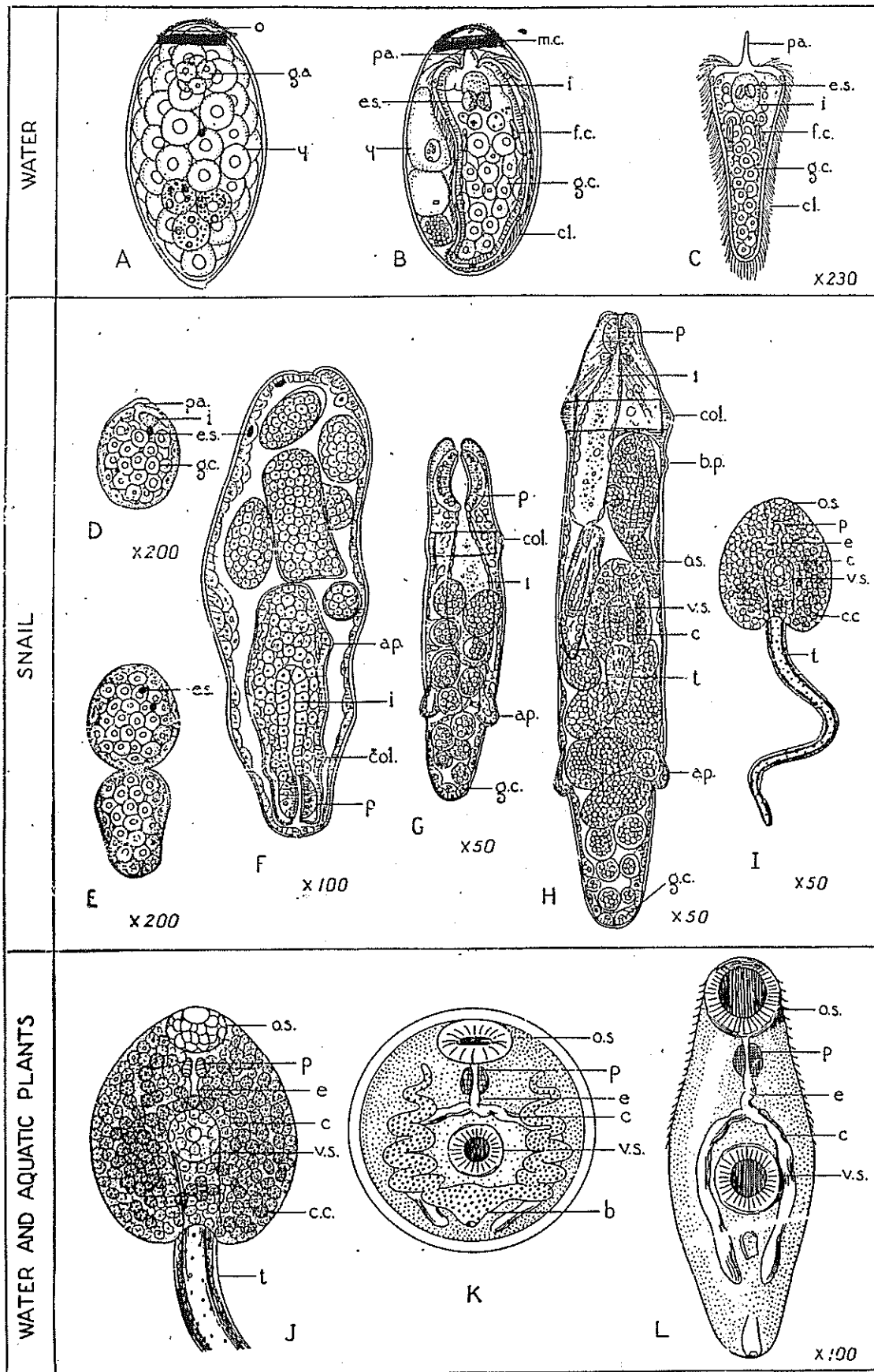


Figure 11-3. Larval forms of *Fasciola hepatica*. **A.** Immature egg. **B.** Miracidium in egg shell. **C.** Miracidium ready to enter snail. **D.** A very young sporocyst, immediately after completion of metamorphosis. **E.** Young sporocyst undergoing transverse fission. **F.** Adult sporocyst with rediae. **G.** Immature redia. **H.** Redia with developing cercariae and one daughter redia. **I.** Cercaria. **J.** Body of cercaria. **K.** Encysted metacercaria. **L.** Excysted metacercaria. ap.=appendages; b=excretory bladder; b.p.=birth pore; c=ceca; c.c.=cystogenous cells; cl.=cilia; col.=collar; e=esophagus; e.s.=eye spots; f.c.=flame cells; g.a.=germinal area; g.c.=germinal cells; i=digestive tract; m.c.=mucoid cap; o=operculum; o.s.=oral sucker; p=pharynx;

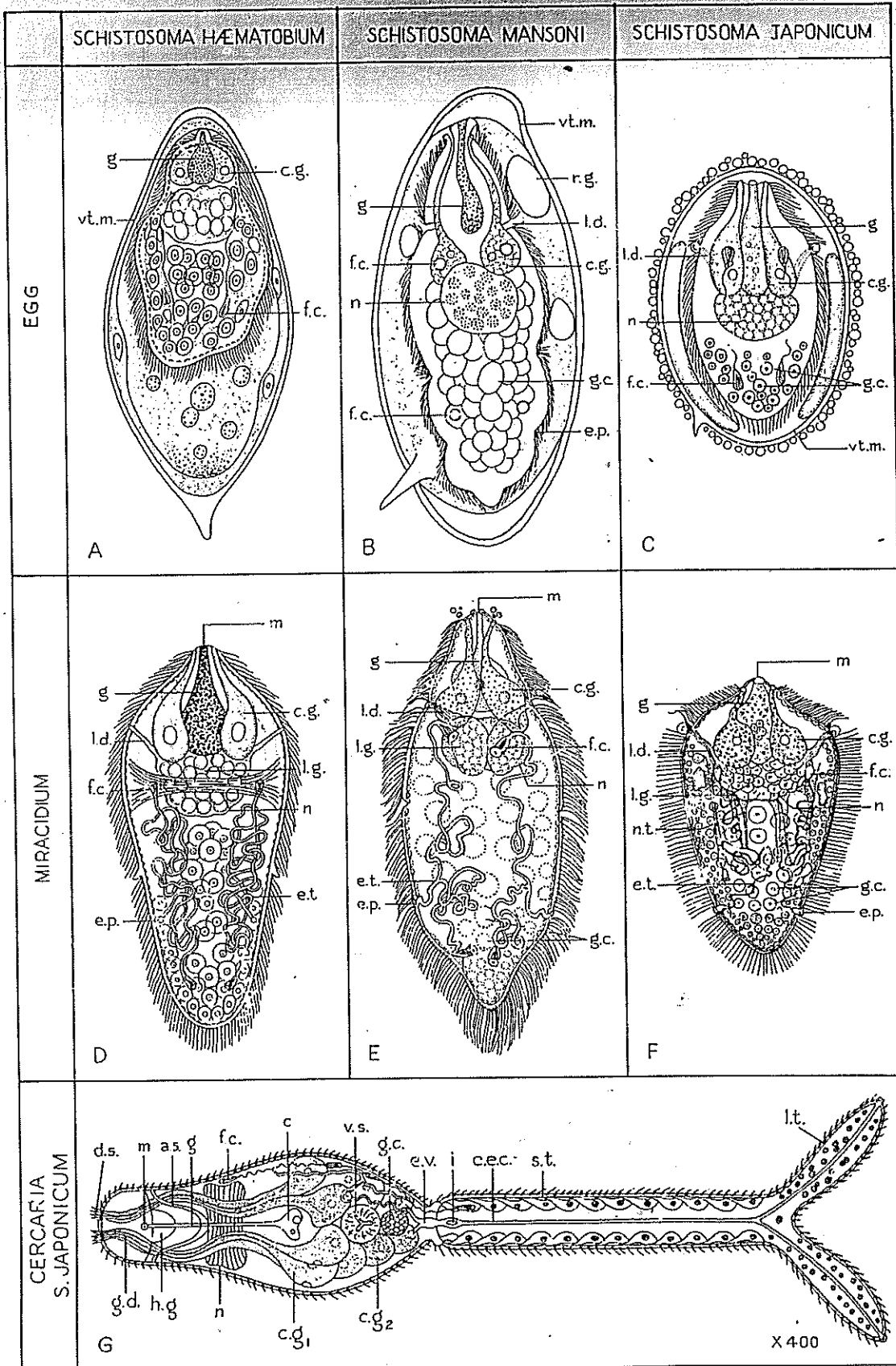


Figure 13-3. Egg, miracidium, and cercaria of the schistosomes of humans. a.s.=anterior sucker; c=cecum; c.e.c.=caudal excretory canal; c.g., g.g.₁, c.g.₂=cephalic glands; d.s.=duct spines; e.p.=excretory pore; e.t.=excretory tubule; e.v.=excretory vesicle; f.c.=flame cell; g=gut; g.c.=germinal cells; g.d.=gland ducts; h.g.=head gland; i=island of Cort; l.d.=lateral duct; l.g.=lateral gland; l.t.=lobe of tail; m=mouth; n=nervous system; n.t.=nerve trunk; r.g.=refractile globule; s.t.=stem of tail; v.s.=ventral sucker; vt.m.=vitelline membrane.

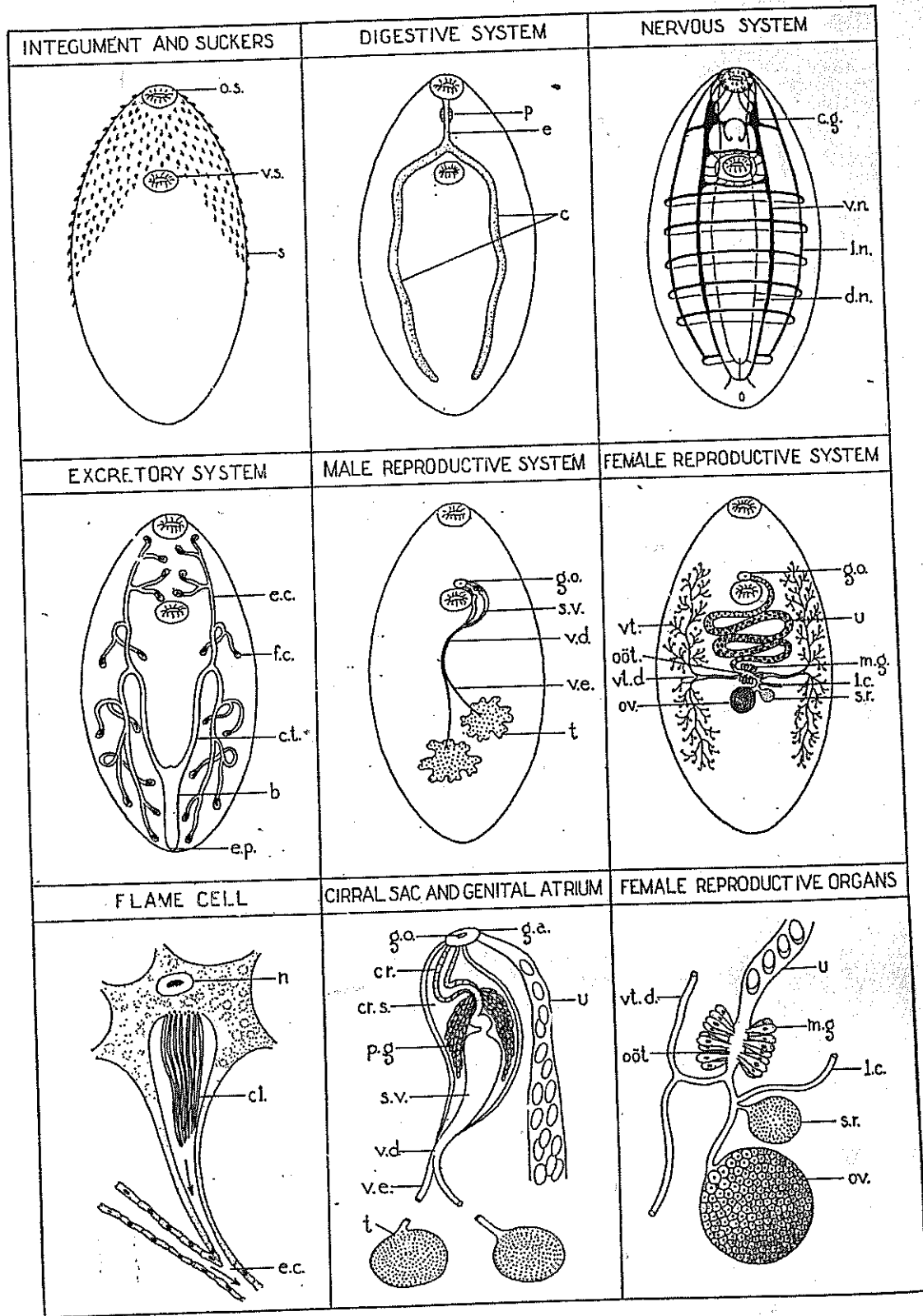


Figure 11-2. Schematic representation of morphology of a typical trematode. b=bladder; c=ceca; c.g.=cephalic ganglia; cl.=cilia; cr.=cirrus; cr.s.=cirral sac; c.t.=collecting tube; ceca; c.g.=cephalic ganglia; e=esophagus; e.c.=excretory capillary; e.p.=excretory pore; d.n.=dorsal nerve trunk; e=esophagus; g.o.=genital opening; l.c.=Laurer's canal; l.n.=lateral nerve trunk; m.g.=Mehliss' gland; n=nucleus; oöt=ootype; o.s.=oral sucker; ov.=ovary; p=pharynx; p.g.=prostate gland; s=spines; s.r.=seminal receptacle; s.v.=seminal vesicle; t=testis; u=uterus; v.d.=vas deferens; v.e.=vas efferens; v.n.=ventral nerve trunk; v.s.=ventral sucker; vt.=vitellaria; vt.d.=vitelline duct.

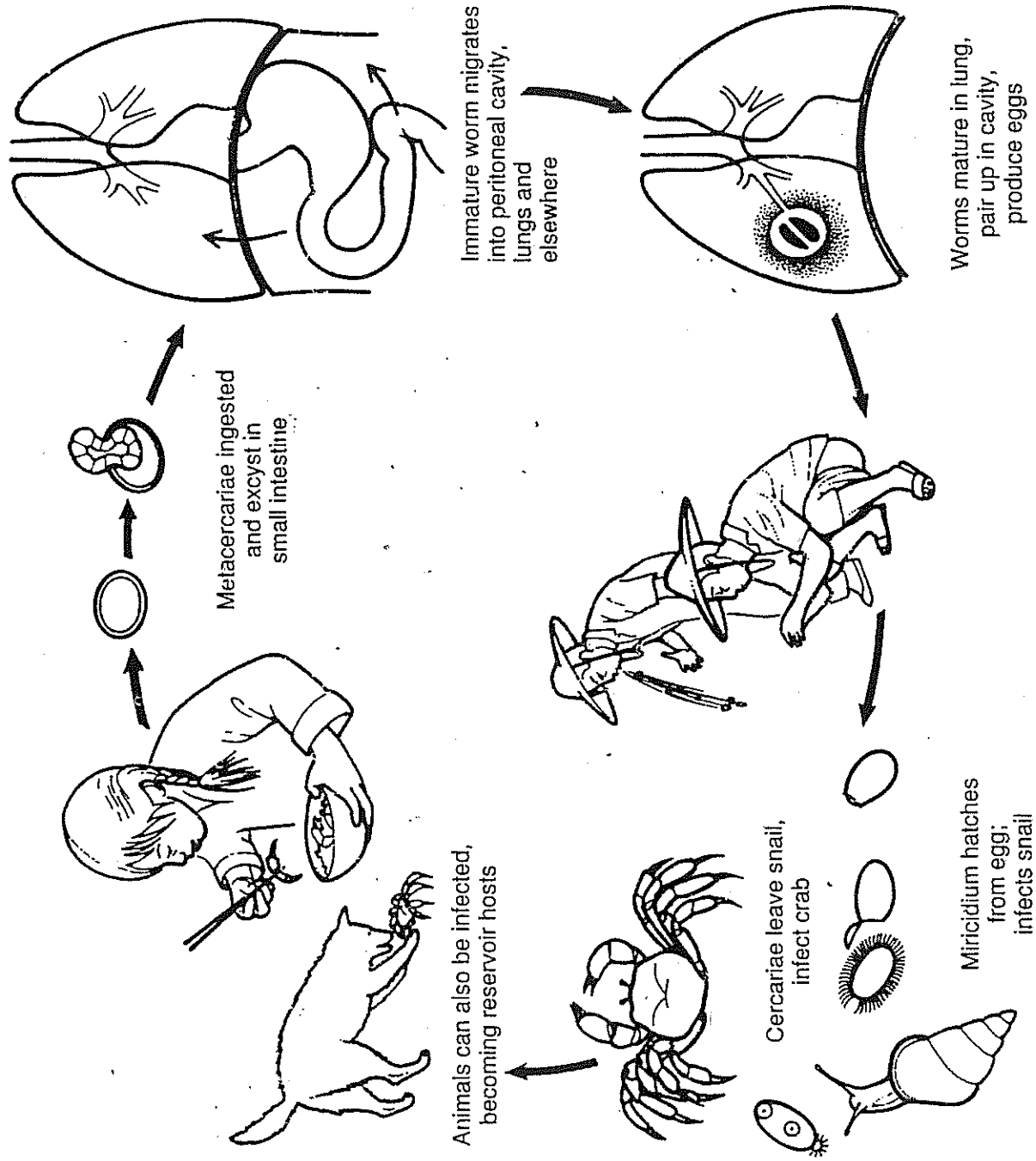


Figure 12-8. Life cycle of *Paragonimus westermani*.

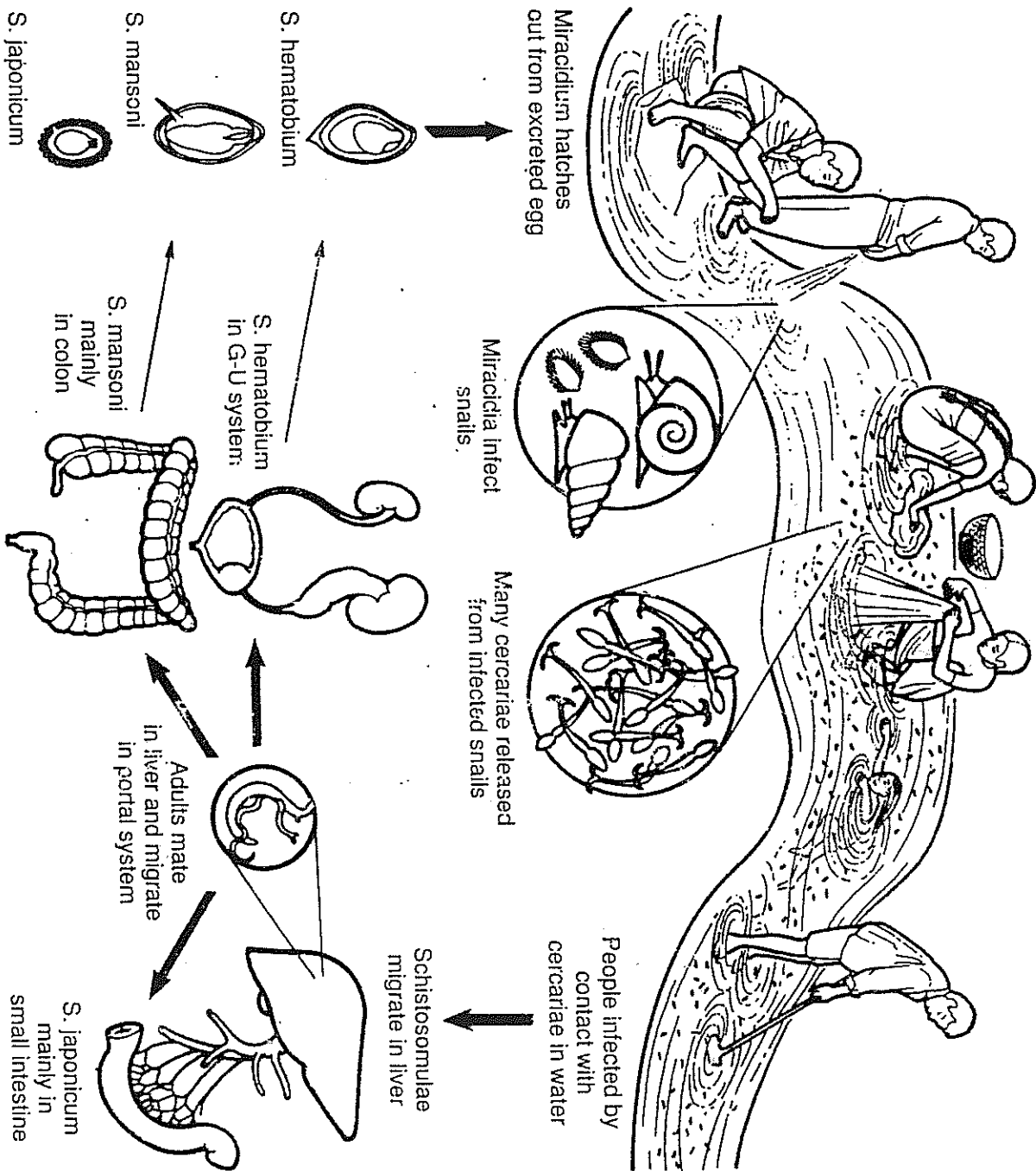


Figure 13-2. Life cycle of three main species of human schistosomes (*S. mansoni*, *S. haematobium*, and *S. japonicum*).

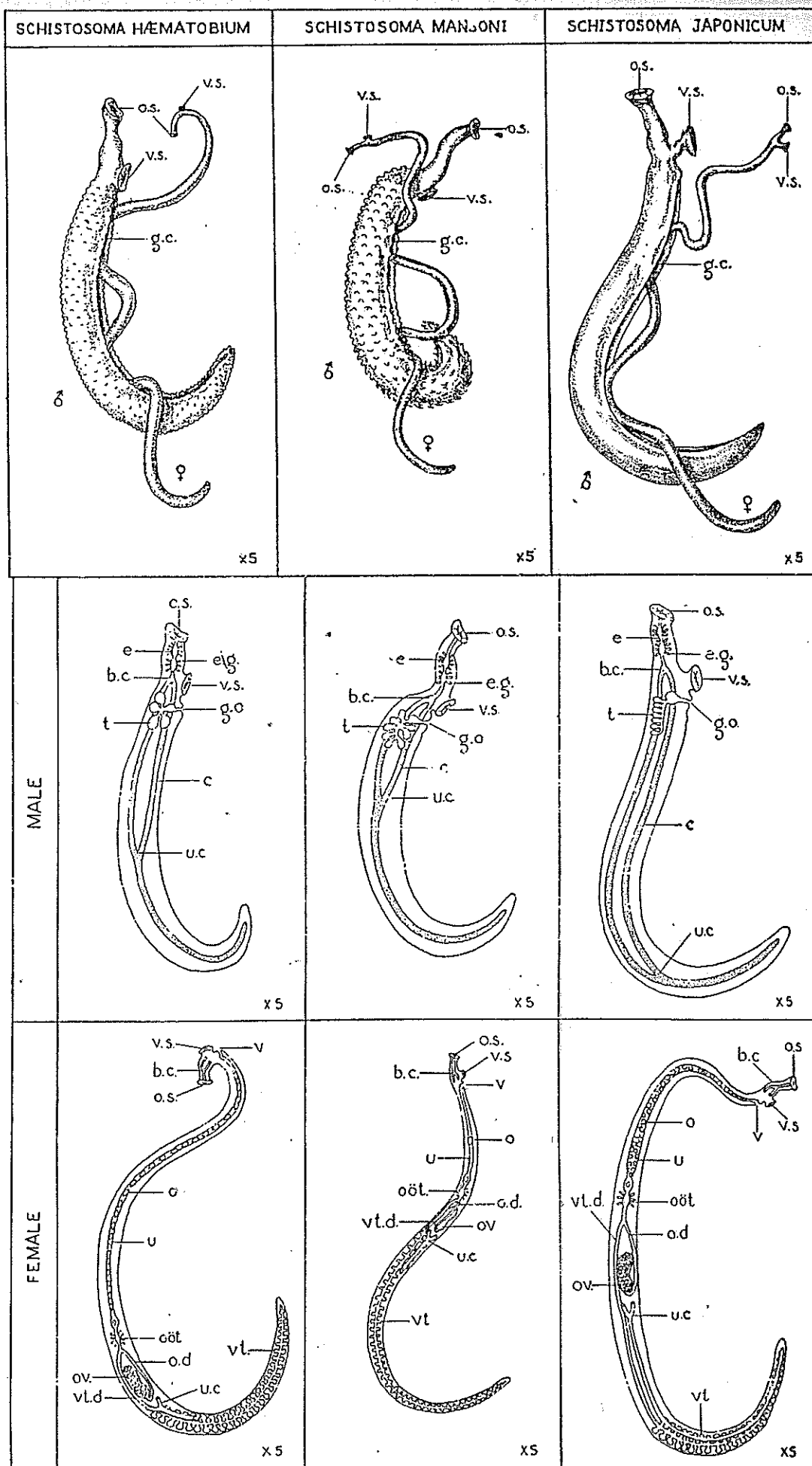


Figure 13-1. Schematic representation of important schistosomes of humans. b.c.=bifurcation of ceca; c=ceca; e=esophagus; e.g.=esophageal glands; g.c.=gynecophoric canal; g.o.=genital orifice; o=eggs; o.d.=oviduct; oöt=ootype; o.s.=oral sucker; ov.=ovary; t=testes; u=uterus; u.c.=union of ceca; v=vulva; v.s.=ventral sucker; vt.=vitellaria; vt.d.=vitelline duct.