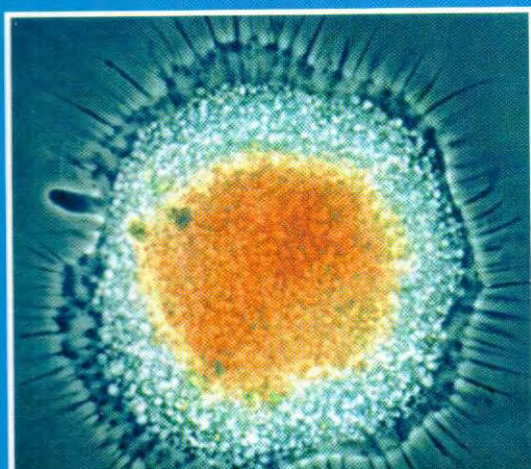




К. Кочеван,
Н. Кочеван,
П. Павлов

БОТИСТОЛОГИЯ



Tetramastigota

- Retortamonadea
- Diplomonadea
 - Enteromonadida
 - Diplomonadida
- Oxymonadea
- Parabasalea
 - Trichomonadida
 - Hypermastigida

Discicristata

- Euglenozoa
 - Euglenida
 - Kinetoplasta
 - Bodonea
 - Trypanosomatidea
 - Diplonemida
- Heterolobosa
 - Schizopyrenidea
 - Acrasea

Hemimastigophora

Pseudociliata

Chromista

- Prymnesiomonada
- Cryptomonada
- Heterokonta
 - Proteromonadea
 - Opalineae
 - Chrysomonadea
 - Chrysomonadida
 - Pedinellida
 - Silicoflagellida
 - Bacillariophyceae
 - Heteromonadea
 - Eustigmatophyceae
 - Labyrinthulea
 - Raphidomonadea
 - Bicosoecidea
 - Hyphochytriomycetes
 - Oomycetes

Alveolata

- Dinoflagellata
- Diniferea

Syndinea

- Perkinsozoa
 - Family Colpodellidae

Apicomplexa

- Gregarinea
- Coccidea
 - Agamococcida
 - Protococcida
 - Adeleida
 - Eimeriida

Haematozoa

- Haemosporida
- Piroplasmida

Ciliophora

Postciliodesmatophora

- Karyorelictea
 - Protostomatida
 - Loxodida
 - Protoheterotrichida

Heterotrichea

- Licnophorida
- Heterotrichida

Intramacronucleata

Spirotrichea

- Protocruziidia
- Phacodiniidia
- Hypotrichia
- Oligotrichia
- Choreotrichia
- Stichotrichia

Litostomatea

- Haptoria
- Trichostomatia

Phyllopharyngea

- Phyllopharyngia
- Rhynchodia
- Chonotrichia
- Suctorina

Nassophorea

- Synhymeniida
- Nassulida
- Microthoracida

Colpodea

- Prostomatea
- Plagiopylea
- Oligohymenophorea

- Peniculia
- Scuticociliatia
- Hymenostomatia
- Apostomatia
- Peritrichia
- Sessilida
- Mobilida
- Astomatia
- Clevelandellida
- Odontostomatida
- Haplospora

Cercozoa

- Phytomyxa
- Reticulofilosa
- Monadofilosa

Foraminifera

Biliphyta

- Rhodophyta
- Glaucocytophyta

Viridiplantae

- Chlorophyta
- Prasinomads
- Ulvophyceae
- Trebouxiophyceae
- Chlorophyceae
- Volvocida
- Chlorococcales
- Streptophyta
- Mesostigmatophyceae
- Chlorokybophyceae
- Klebsormidiophyceae
- Conjugatophyceae

Amoebozoa

- Lobosa
- Gymnamoebea
- Acarpomyxea
- Testacealobosea

Conosa

- Archamoeba
- Mycetozoa
- Eumyxa
- Protostelea
- Myxogastrea
- Dictyostela
- Aconchulin

Opisthokonta

Fungi

- Chytridiomycota
- Zygomycota
- Eumycota
- Microspora
- Microsporea
- Rudimicrosporia
- Microsporia
- Ascomycota
- Archaeascomycota
- Hemiascomycota
- Euascomycota
- Family Nephridiophagidae
- Basidiomycota
- Choanozoa
- Mesomycetozoa
- Choanoflagellata
- Metazoa
- Myxozoa

Eukaryota incertae sedis

Actinopoda

- Acantharea
- Polycystinea
- Phaeodarea
- Heliozoa
- Actinophryida
- Desmothoracida
- Ciliophryida
- Taxopodida
- Centrohelida

Paramyxea

593.1
28.691
X 26

Protistology, by Klaus Hausmann, Norbert Hiilsmann, Renate Radek

H., : , 2010. — 495 ,

(2003).

384 . 22

— *Trypanosoma brucei* () (Oliver Meckes

Nicole Ottawa, Reutlingen, Germany). : 1450x;

— *Vampyrella ulothrichis* (-
) (Norbert Hiilsmann, Berlin, Germany). : 450*;

— *Paramecium bursaria* ; -

DAPI). — ()
(Arthur Hauck, Pfalzgrafeweiler, Germany). : 500x.

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Stuttgart (Germany), 2003

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Protozoology -

10 -

1985 -

1995

Предисловие авторов к третьему изданию

1956 : « Protozoologie, » ;

1985 — ».

Protozoology Protistology,

« »

(Hans Machemer),

(Bochum),

Hallenberg,
(Maria Mu
Sauerland,
lisch)

(Gunter Steinbrück)

: « »

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(Frederic Bartlett),

(Karl Gottfried Grell)

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(Peter Adam) — ;
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, Nägele) Schweizerbart'sche Verlags
, buchhandlung ,
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(Stefanie () -
Kortfleisch) ,
-
(Marcus Schober). -
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2003

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1988
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1996
(2003)
«Protisto
logy»,
2003
Hausmarm,
(sakarpov4@gmail.com,
s_korsun@ocean.ru).

I.

()

(,).

—Ur Thiere.

« »

«zoon»

Protozoa

(Ernst Haeckel, 1866).

(« »)

1818

(Georg August Goldfuss,
Protozoa.

1782 1848)

1

Protozoa (Protista)

— **Animalcula** (

— Antoni van Leeuwenhoek, 1676):

Animalia, . . .

Volvocida,

Myxogastrea.

(
Gottfried Wilhelm Leibniz, 1714):

(Myxozoa),

Metazoa.

Protista

()
 , -
 , -
 :
Monas O.F. Müller, 1786; Cryptomonada
 Ehrenberg, 1838; Chrysomonadida Engler,
 1898; Diplomonadida Wenyon, 1926; Tri
 chomonadida Kirby, 1947; Proteromona
 dida Grasse, 1952; Prasinomonadea Chris
 tensen, 1962.

— **Infusoria**, **Animalcula**
Infusoria (— Mar
 tin Frobenius Ledermüller, 1760
 1763):
 (*Aufgufittierchen*).

()
 , -
 .
 (Jean Baptiste de
 Lamark, 1744—1829)
 Infusoria

XIX
 XX ()
 , -
)

Urthiere (.) (—
 Lorenz von Oken, 1805):
 Infusoria,

« -
 » (. = Urtiere),

— **Protozoa** (-
 — Georg August GoldfuB,
 1818):
 Infusoria
 « »
 1845 , (Carl
 Theodor von Siebold)

Animalia Microscopica (—
 Jean Baptiste
 Bory de Saint Vincent, 1826):
 Animalcula Infusoria.
 (Vorti
 cella)
 (règne psychodiale).

— **Eithiere**, **Oozoa** (—
 Carl Gustav Carus,
 1832):
 Animalcula Infusoria

Archaeozoa (—
 Maximilian Perty, 1852):

Protozoa. () -

(Archezoa) 1 -

Microzoaires (Robert Whittaker, 1959). -

— Emile de Fromentel, 1874): -

((Prokaryota = Monera). -

((Peter Simon Pallas — 1) -

1741 1811) (Felix , 2) -

Dujardin — 1801 1860) -

Zoophyta Zoophytes Infusories -

) XIX (Margulis et al., -

1990). , Protoctista -

Phaeo -

phyta, Chytridiomycota, Oomycetes, Rho -

dophyta -

(Rudolf Leukart — 1822 1898) -

— **Protista** (-

— Ernst Haeckel, 1866): -

(1848). -

Acrita (— Richard Protista -

Owen, 1861): -

(*Closteri* -

) — Metazoa -

(Animalia) -

(Vegetabilia). : + -

= -

— **Protoctista** (-

— John Hogg, 1861): -

: Protozoa, Archezoa, Protocista
Protista¹.

« »,

¹ « »

(Hans & Zacharias Janssen)
1590
80
(Hans & Zacharias Janssen)
1676
80
animalcula.
1678
(Christian Huygens, 1629
1695).
1
(Delft),
400
XIX

¹ «simple microscope»
« »; a «compound microscope»
« ».



ANTONIUS A LEEUWENHOEK.

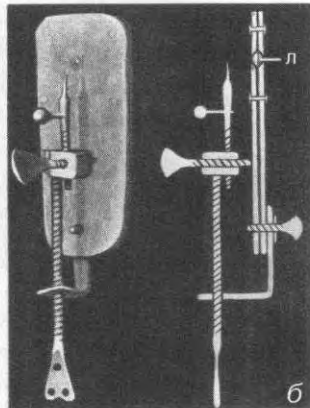
*Regia Societatis Londinensis
membrum.*

J. Verkolge pinx

A. de Blou fec

Рис. 1. Антон Левенгук, основатель научной микроскопии.

(Louis Joblot)



2.
1670 ().

(),
250 ()
().

1727

ratio spontanea), (gene 1749 -
 (George Buffon, -
 1707 1788) -
 (John Needham, -
 1713 1781). -
 , Animalcula -
 -
 Sperma- -
 tozoa, . . . -
 -
 (Lazzaro Spallanzani, 1729 1799) -
 -
 XIX , -
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 1805 , -
 -
 -
 Urthiere (-
), -
 ; -
 -
 -
 -
 -
 (Louis Pasteur, 1822

1895) (Robert Koch,
1843 1910).

1775

(Henry Baker)

1754

«

1768
1730 1784)

(Otho Fredericus Müller,

(. 3).

(Beiträge zu nützlichem und vergntigen
dem Gebrauch und Verbesserung des
Microscopii),

(1755)

(August

10

«

Johann Resel von Rosenhof).

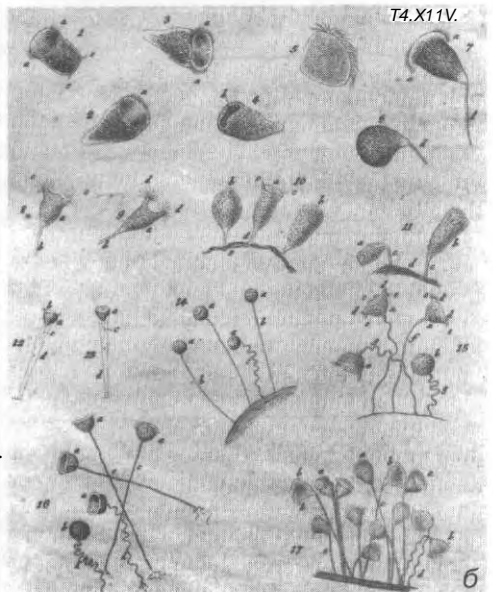
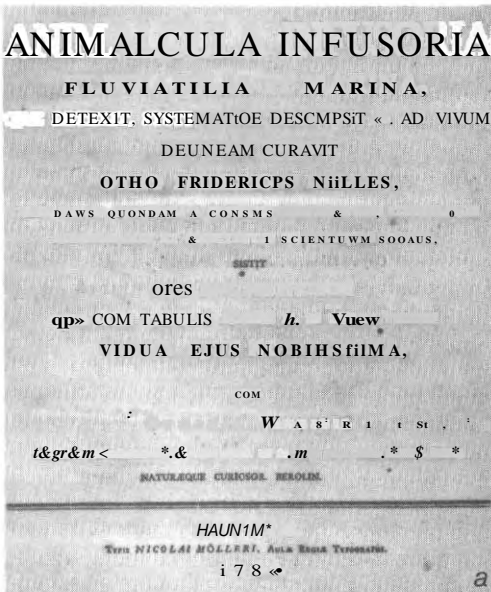
»

(Carl

(Nikolas Theodore de Saussure)

von Linne, «Systema », 1758), . .

1769



Monas, Ceratium hirudinella, Bursaria truncatella, Euplotes patella, Lacrymaria olor, Stylonychia mytilus.

XIX

XIX
(Jan Evangelista Purkinje, 1787 1869)
(Theodor Schwann, 1810 1882)
(Matthias Jacob Schleiden, 1804 1881)

?

(Alcide d'Orbigny, 1802 1857)

Foraminifera (

).

(Christian Gottfried Ehrenberg, 1795 1876),

Protista, 1873

() .

1835

« » (Die Infusionsthierchen als vollkommene Organismen, . 4)

(. .

«),

»,

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(

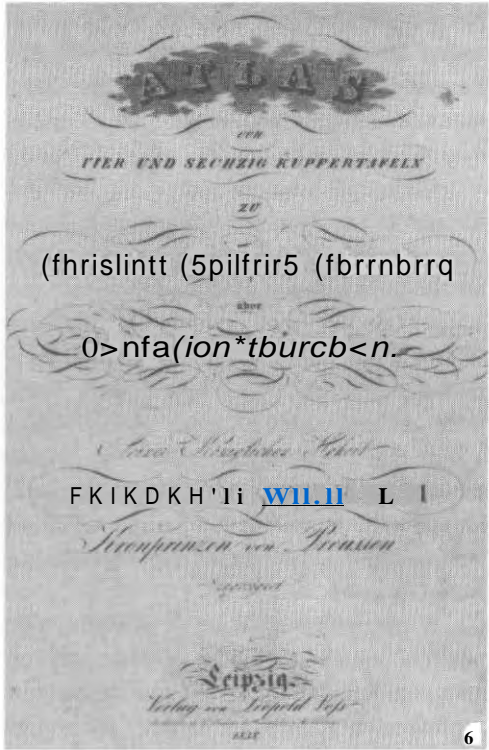
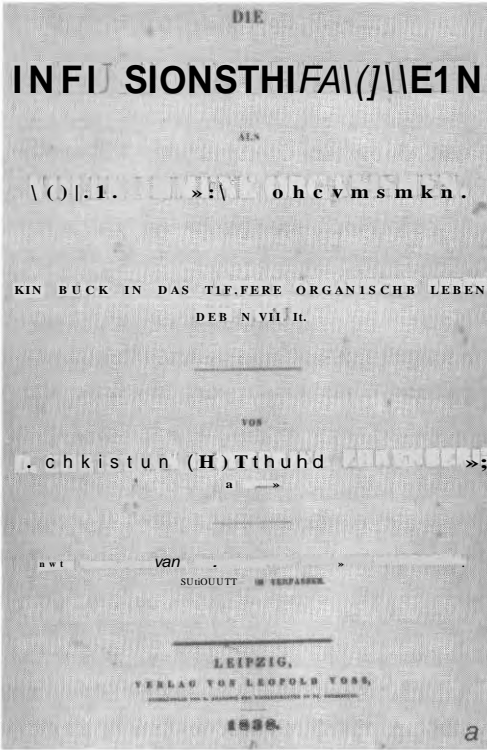
)

Sarcodina Sarco

()

mastigophora,

(,) .



4.

()

()

- Chlamydomonas, Cryptomonas, Dinobryon, Euglena, Euplotes, Loxodes, Nassula, Peridinium, Prorodon, Spirostomum, Synura

1840

Actinophrys,
Amoeba, Arcella, Bodo, Carchesium,

Coccolithophorida. —

; -
 -
 (1859 1930), -
 ; -
 (George Klebs, 1857 1918)
 -
 ; -
 (Rudolf Leukart,
 1861 1822 1898), -
 Sporozoa; -
 (Max Schultze, 1825 1874), -
 (Fritz Richard Schaudinn, 1871 1906); -
 (Franz
 Eilhard Schulze, 1840 1917) -
 ; -
 4000 -
 ; -
 (Edouard Gerard
 Balbiani, 1823 1899)
 ; -
 (Otto Bütschli, 1848 1920), -
 (Heinrich Anton de , 1831 1888), -
 ; - (Clifford Dobell, 1951) « -
 (Charles Louis »
 Alphonse Laveran, 1845 1922), -
 () -
 1907 -
 ; -
 XIX
 (Edouard Claparede, 1832 1871), - 1879
 (Joseph Leidy)
 (Johannes Lachmann) 1888 (Alfred
 Stokes) -
 ; -
 (Wil-
 liam Savill Kent, 1845 1908) -
 « » XX -
 (Manual of the Infusoria); -
 (Richard Hertwig,
 1850 1937), -

1.

1:

(1675)

2:

(G.A. Goldfuss) (1818): Protozoa

(A. D'Orbigny) (1826): Foraminifera

X. (Chr. G. Ehrenberg) (1838):

3:

(. von Siebold) (1845):

(F. Dugardin) (1835) X. (. von Mohl) (1846)

(. Schultze) (1861, 1863): —

4:

(. Gruby) (1843):

Trypanosoma ()

(C.W. von Naegeli) (1857):

Nosema bombycis

(F. Lösch) (1875):

*histolytica**(Entamoeba*

P. (R. Leuckart) (1879):

Sporozoa

A. (A. Laveran) (1880):

(Plasmodium)

O. (. Bütschli) (1881):

Myxosporidia (= Myxozoa)

(G. Balbiani) (1882):

Microsporidia (= Microspora),
Sarcosporidia

(J.E. Dutton) (1902):

Trypanosoma gambiense —

5:

(. Bütschli),

(1878)

1.

- (F.E. Schulze), (1884)
- (R. Hertwig), (1885)
- (F. Schaudinn) (1902):
«Archiv für Protistenkunde», 1988
«Protist».
- (1904): Reichsge
sundheitsamt Berlin Lichterfelde, 1906
- Bernhard Nocht Institute)
- (1908)¹:
- (Hartmann) (1914):
Berlin Dahlem.
- 1947: — ; 1954
«Journal of Protozoology» (1993 «Journal
of Eukaryotic Microbiology»).
- 1963: «Acta Protozoologica»
- 1968: «Protistologica» (1987
«Journal of Protistology»)
- 1972:
(International Society of Evolutionary Protistology — ISEP)
- 1999: «Protistology»².
- 1961, :
4 : 1965 , 1969 -
, 1973 , 1977 , 1981 , 1985 -
, 1989 , 1993 , 1997 , 2001 -
/ , 2005 , 2009

(, 2001; Fokin, 2001). —

¹ 1922 1929
» (Archives de la Societe Russe de Protistologie),

: Hartmann,
A. Pascher, J. Oltmanns, Laveran, Chatton, R. Ross P. Manson. —

1900 (. . 26). XIX
(Gary Natan Calkins, 1901 1933), (. 5). XIX
(Franz Doflein, 1901, 1909, 1911, 1916), XIX : 1830
(Eduard Reichenov, 1929 1953) - 1830
(. 1).) ,
1880 , 1885 , 1932

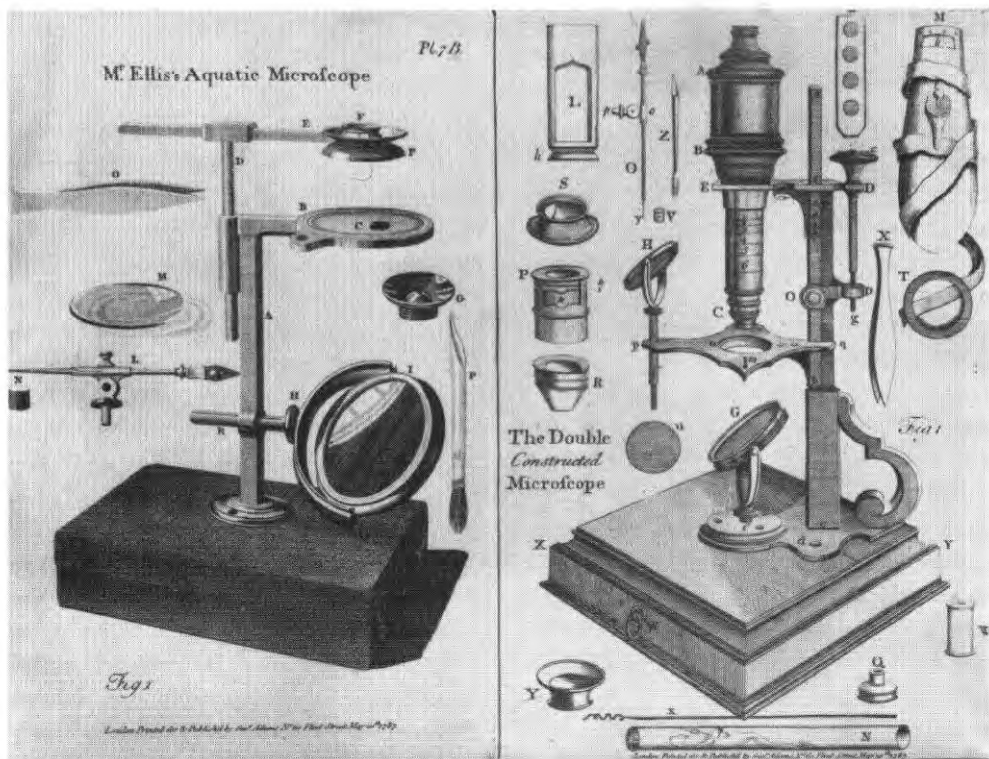


Рис. 5. Год 1787: две страницы из каталога британского изготовителя микроскопов.

(Frits Zernike).

(Ernst Ruska)

1986

(Manfred von Ardenne)

1960

1950

(. 6, 7).

(. 8).

8).

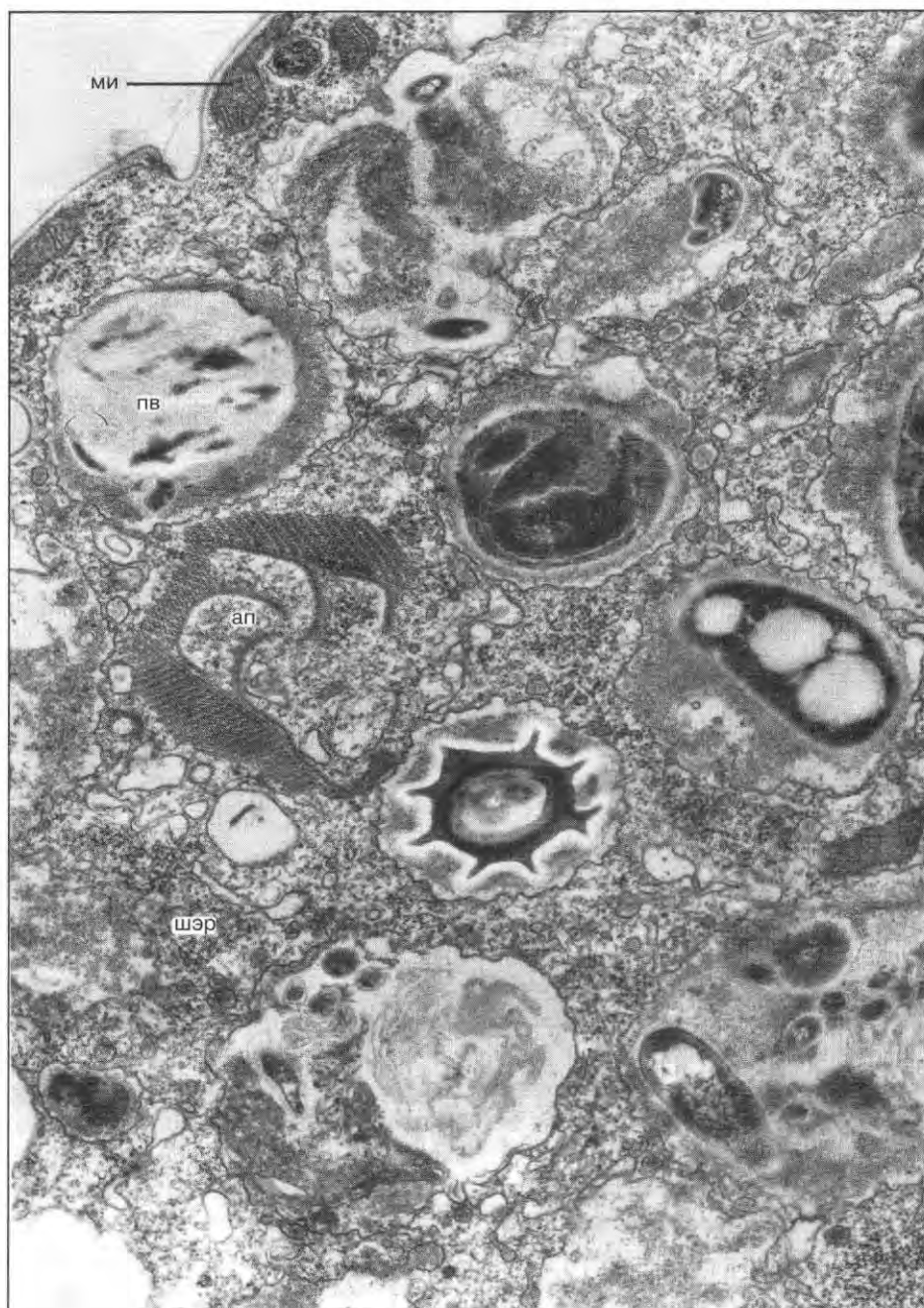
(. 8).

(. 8,).

Entamoeba

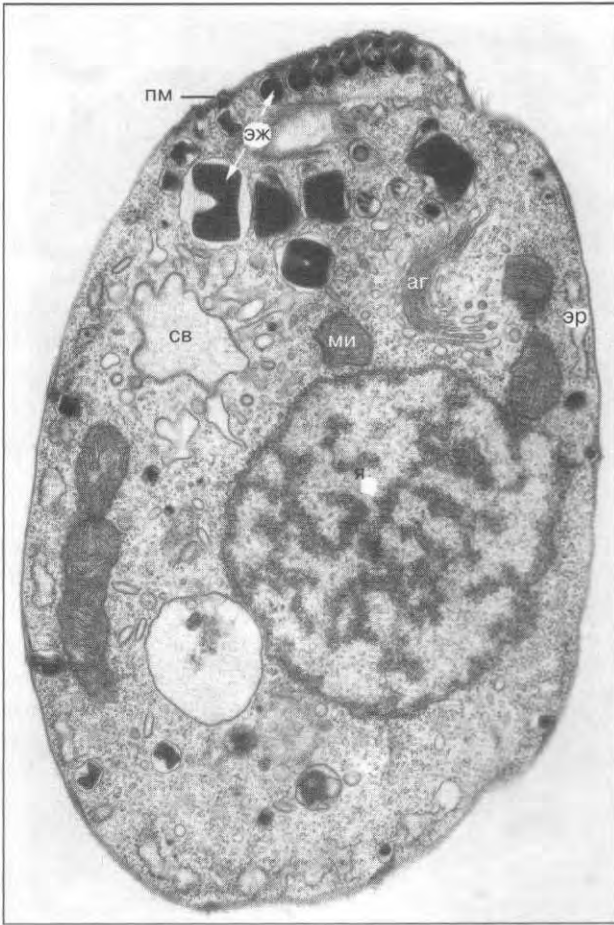
Giardia,

Apicomplexa



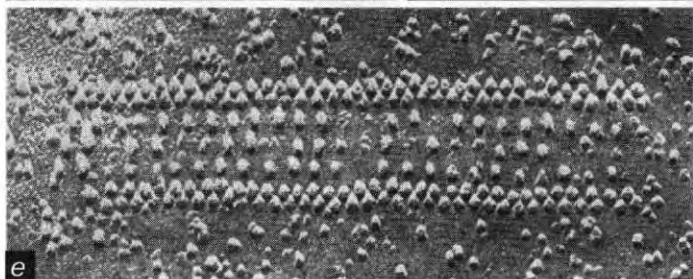
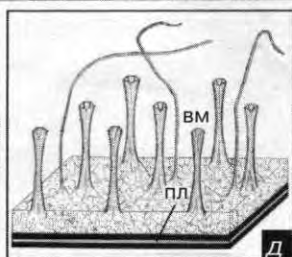
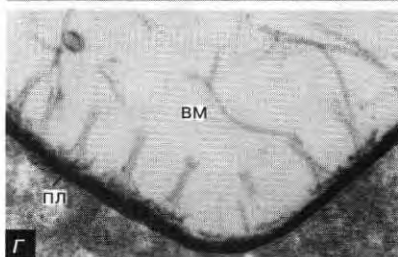
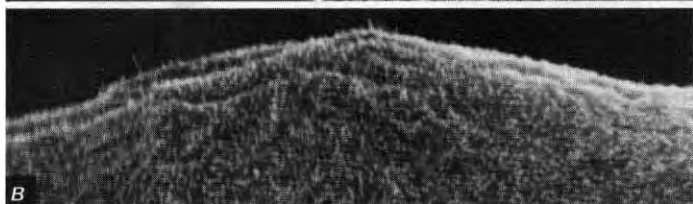
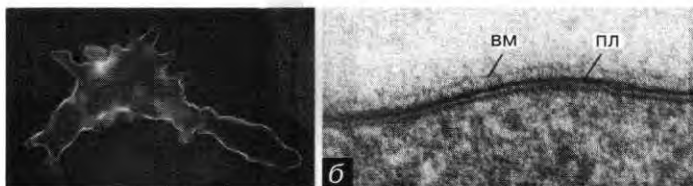
6.

Entosiphon sulcatum: an —



7. *Goniomonas*.
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 (. 12) (. 13, 14),
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Tetrahymena (Ciliophora)



8.
 ()
 Amoeba proteus,
 FITC Con ();
 Vampyrella lateritia
 ()
 (); Vannella
 simplex
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 Cyclidium () (—
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) . : — 150 ,
 6—185 , — 7 500 ,
 — 150 , —
 100 .

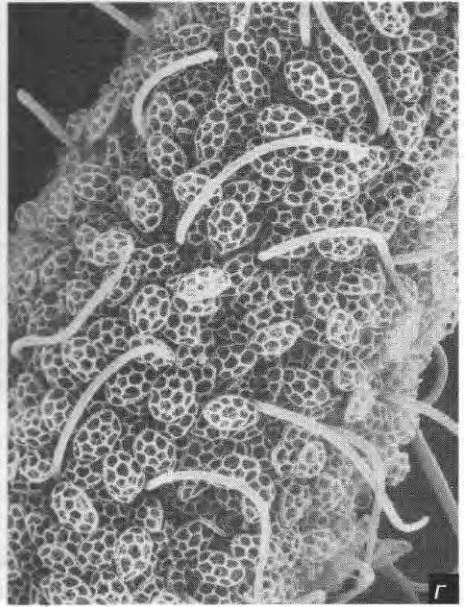
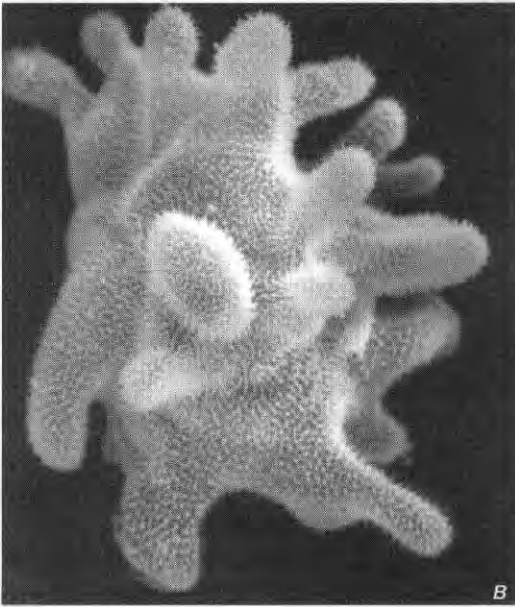
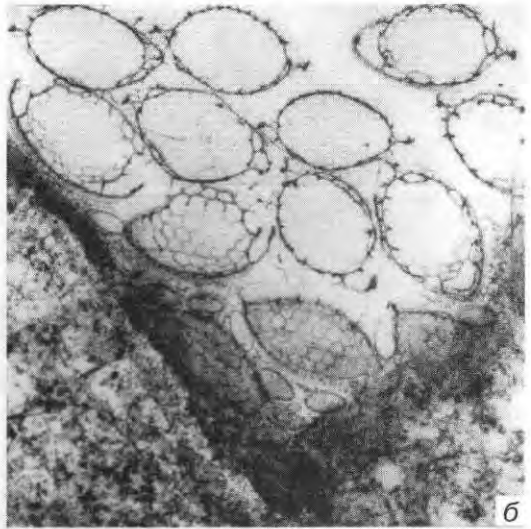
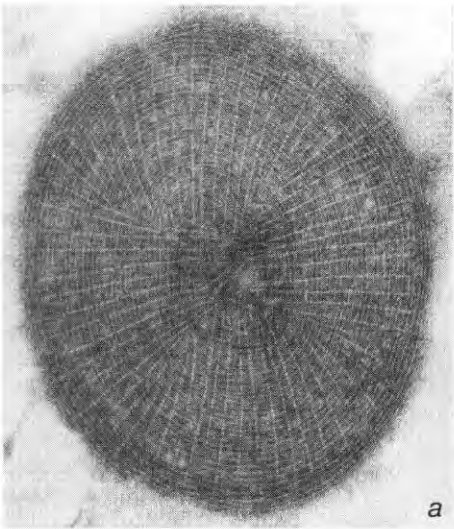
30

Trichonympha (Hypermastigida).

0,2 0,3

(. 15).

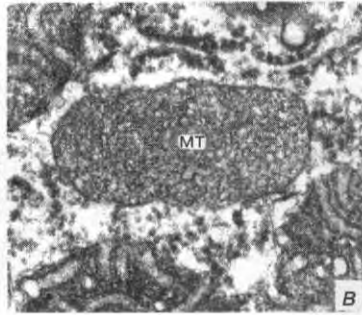
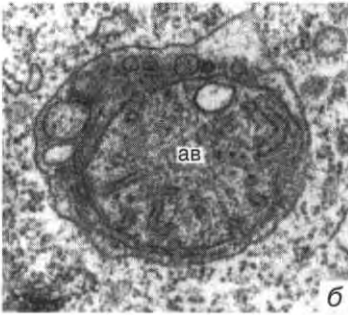
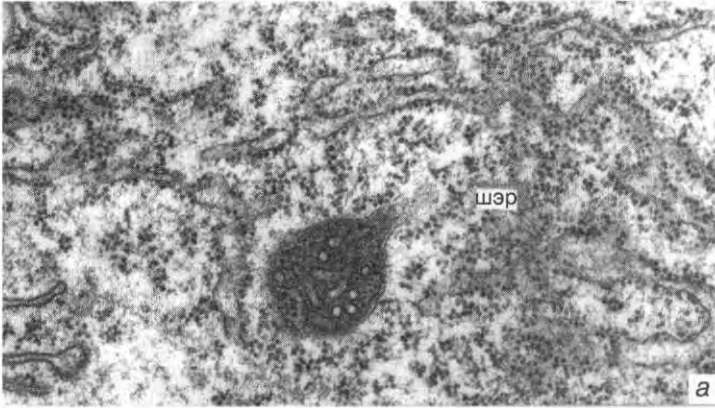
Trypanosoma brucei



9.
Pleurochrysis ();
 ();

Cochliopodium (); *Dactylamoeba*,
Lepidotrachelophyllum () (—

1 800 , — 4 200) . . . — 77 , 6—28 , —



. 10.

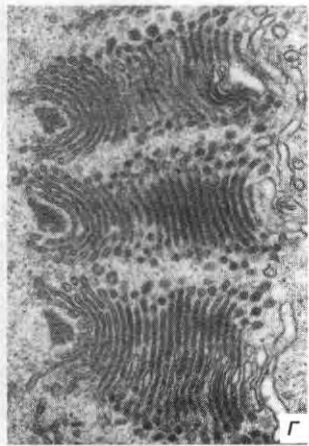
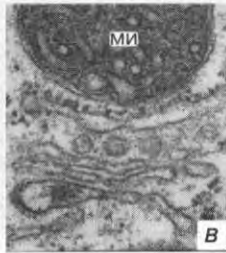
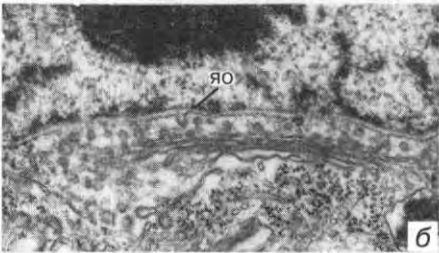
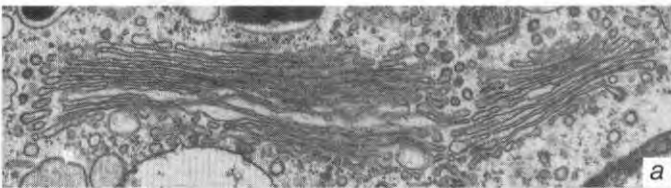
Paramecium.

() () ;

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() ;

() () .
— 25 , —
35 мкм, — 50 .



. 11.

Rhodomonas () ,

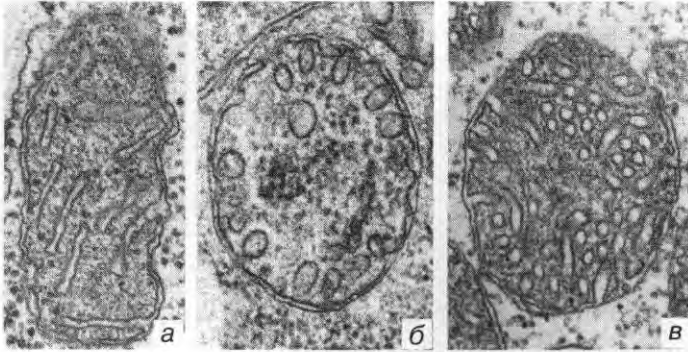
() ,

Pseudomicrothorax ()

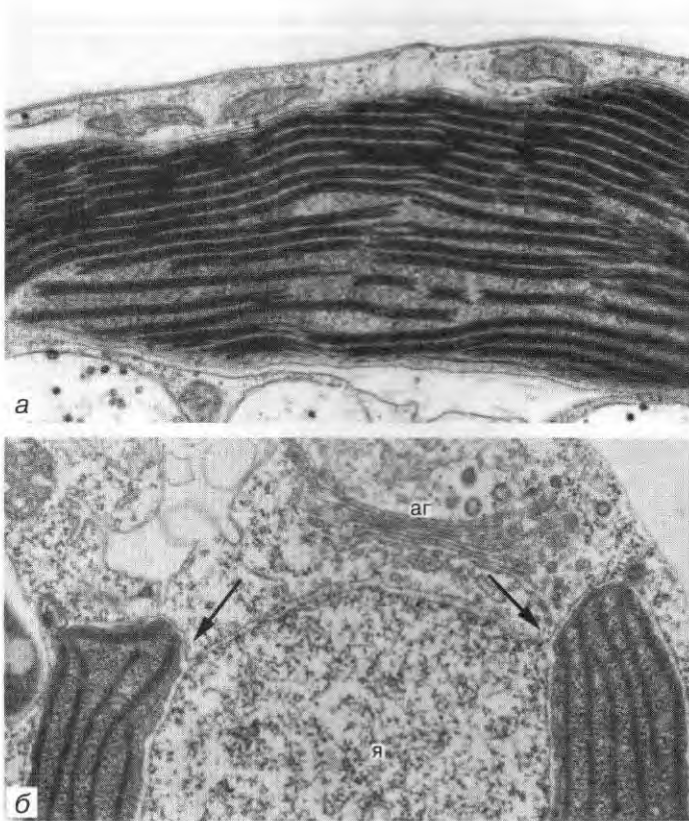
Joenia () ,

— 25 , 6 — 25

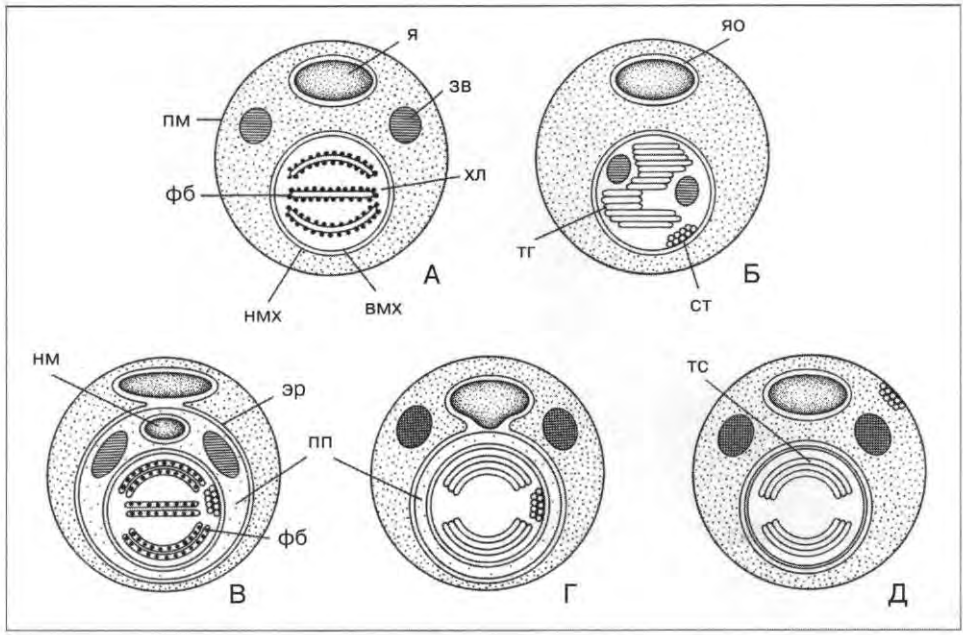
— 50 , —



12. *monas* (), *Vampyrella lateritia* () *Gonio*
 : — 55 , 6 — 40 , — 60 *Paramecium caudatum* ().



13. *Rhodomonas* (): —
) *Ochromonas* (), — (—
 : — 20 , — 18



14.

(), (), Biliphyta
 (A), Chlorophyta (), Cryptomonada (), Chryomonadea () Euglenida ().

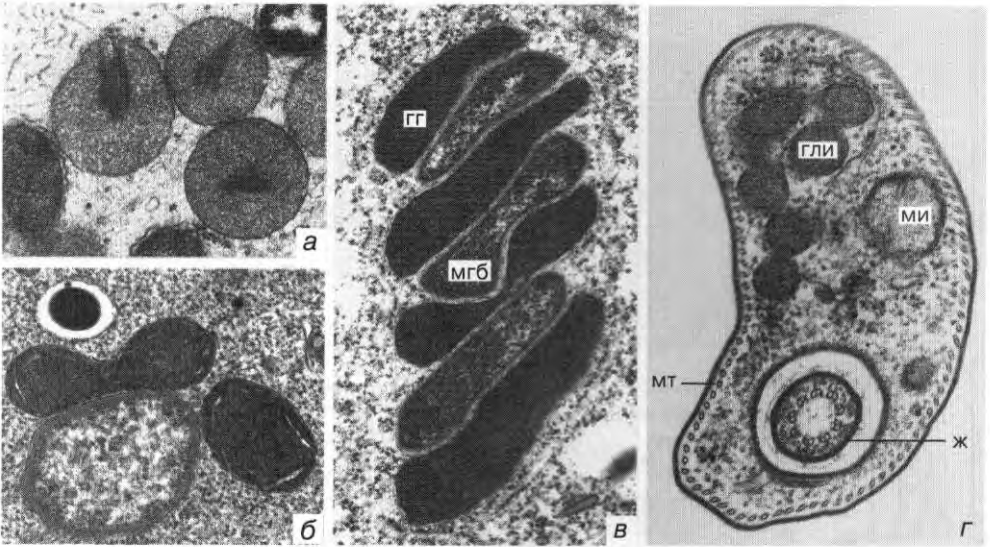
()
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(15)

3

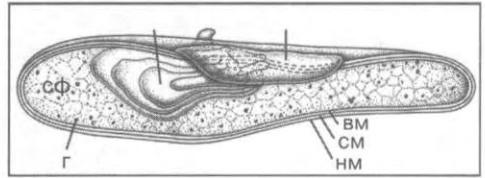
1
 1
 3

(13). —



15. () *Joenia annectens* () *Metopus contortus* () *Plagiopila frontata* () () *Trypanosoma brucei* () — (— : Fenchel and Finley: Europ. J. Protistol. 26 [1991] 201).
 ∴ a — 25 000x, б — 35 , — 20 , — 35

(=) —
Entamoeba histolytica.
Entamoeba



16.
Plasmodium falciparum.

Apicomplexa.

(apicoplast)
apicomplexan plastid ()
)

(16),

Apicomplexa.

35

« »

, « » «

»,

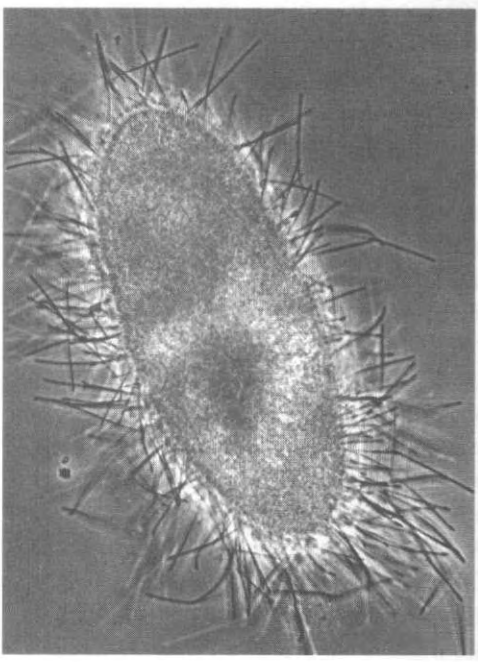
Toxoplasma *Plasmodium.*

mecium (. 17).
15

Para-

(. 14).

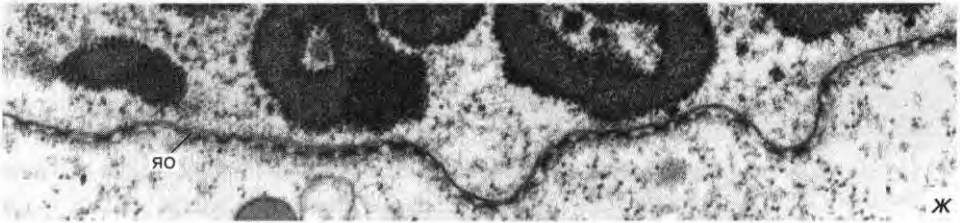
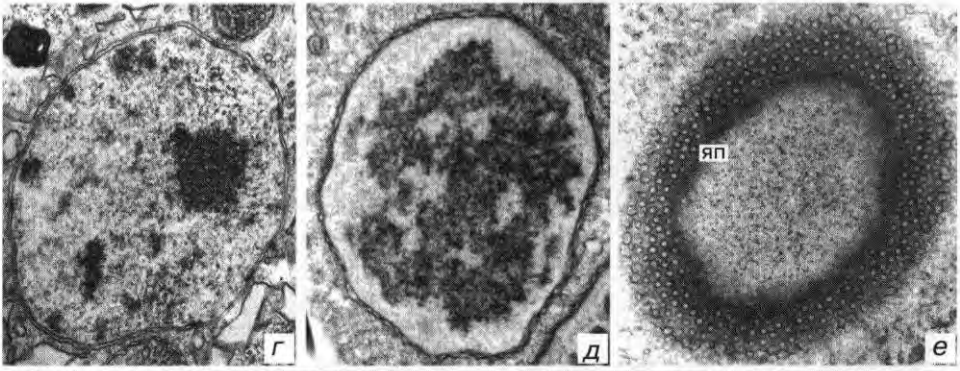
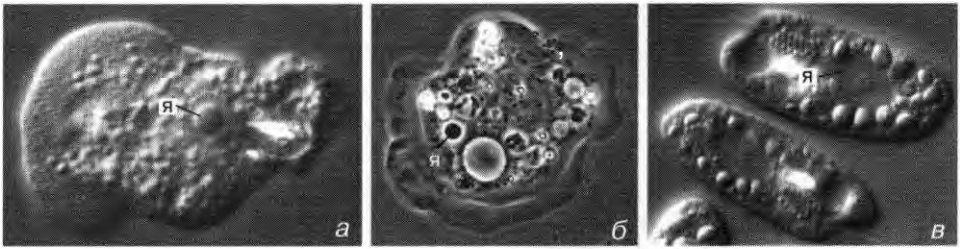
(. 18).



. 17.
mecium. : 500 .

Para-

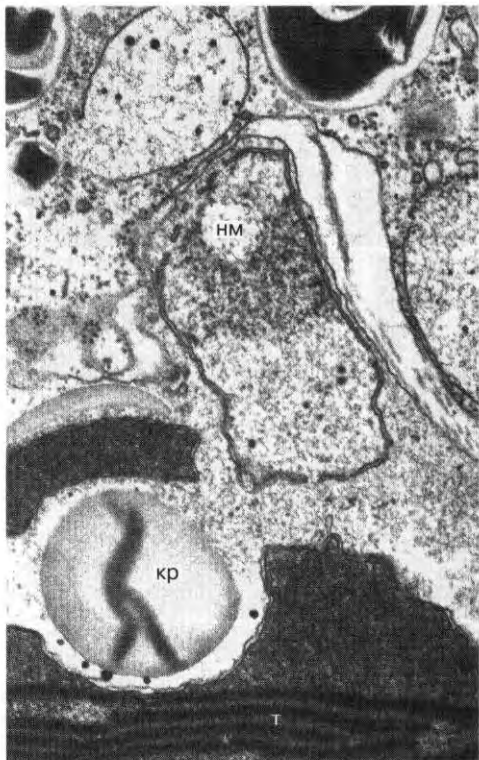
(. . 112 306).



18. () *Vahlkampfia* () *Thecamoeba* () *Chilomonas* ()
 : *Vampyrella* (), *Pseudomicrothorax* (),
Staurojoenina
 (), () *Pseudomicrothorax*
 () (—
 ,) . : — 1800 , — , — 1800 , — 18 , — 14 , — 10 800 ,
 — 22 500 .

(. . 300).

(. 19)



19. ()
Cryptomonas ovata.

: 35

4 10

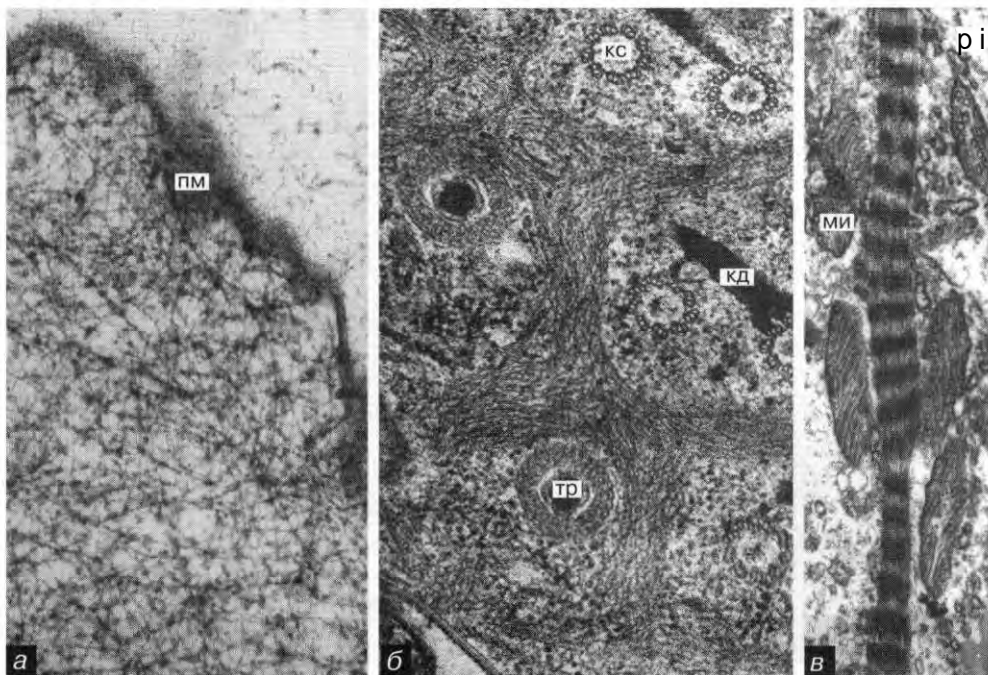
(. 20).

Stentor

(. 21).

(. 226,)

Paramecium.

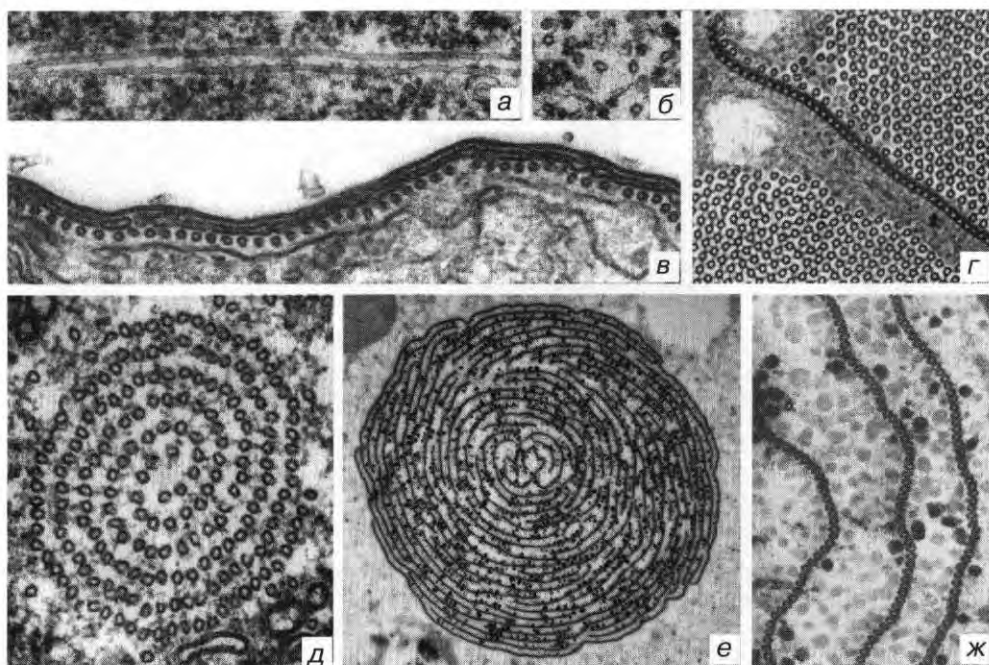


20. *Amoeba proteus* () *Paramecium caudatum*
 () *Loxophyllum meleagris* (), — , — , — , —
 — , — , — (— , —)
). : — 115 000 , 6 — 57 , — 19 .

(. 22, 23) -

(. 154)

(Lobosa: *Amoeba*, *Mayorella*,
Nebela, *Saccamoeba*, *Stereomyxa*; Hetero
 lobosa, Conosa, Mesomycetozoa);



. 21. () () -
Paramecium.
Euplotes (). *Nassula* (). -
Actinophrys (). *Joenia*
(,). : , - 38 , - 43 , - 33 , - 76 , - 7500 , - 30 .

(Aconchulina: *Nuclearia*, *Hyalodiscus*;
Protostelea; Cercozoa: *Cyphoderia*; Hete
rokonta: *Labyrinthulea*, *Chrysonomadea*;
Chytridiomycota);

(Acantharea,
Polycystinea, *Phaeodarea*,
Actinophrys);

(Foraminifera: *Allogromia*, *Reticulomyxa*);

(Aconchulina: *Hyalodiscus*;
Lobosa: *Vannella*);

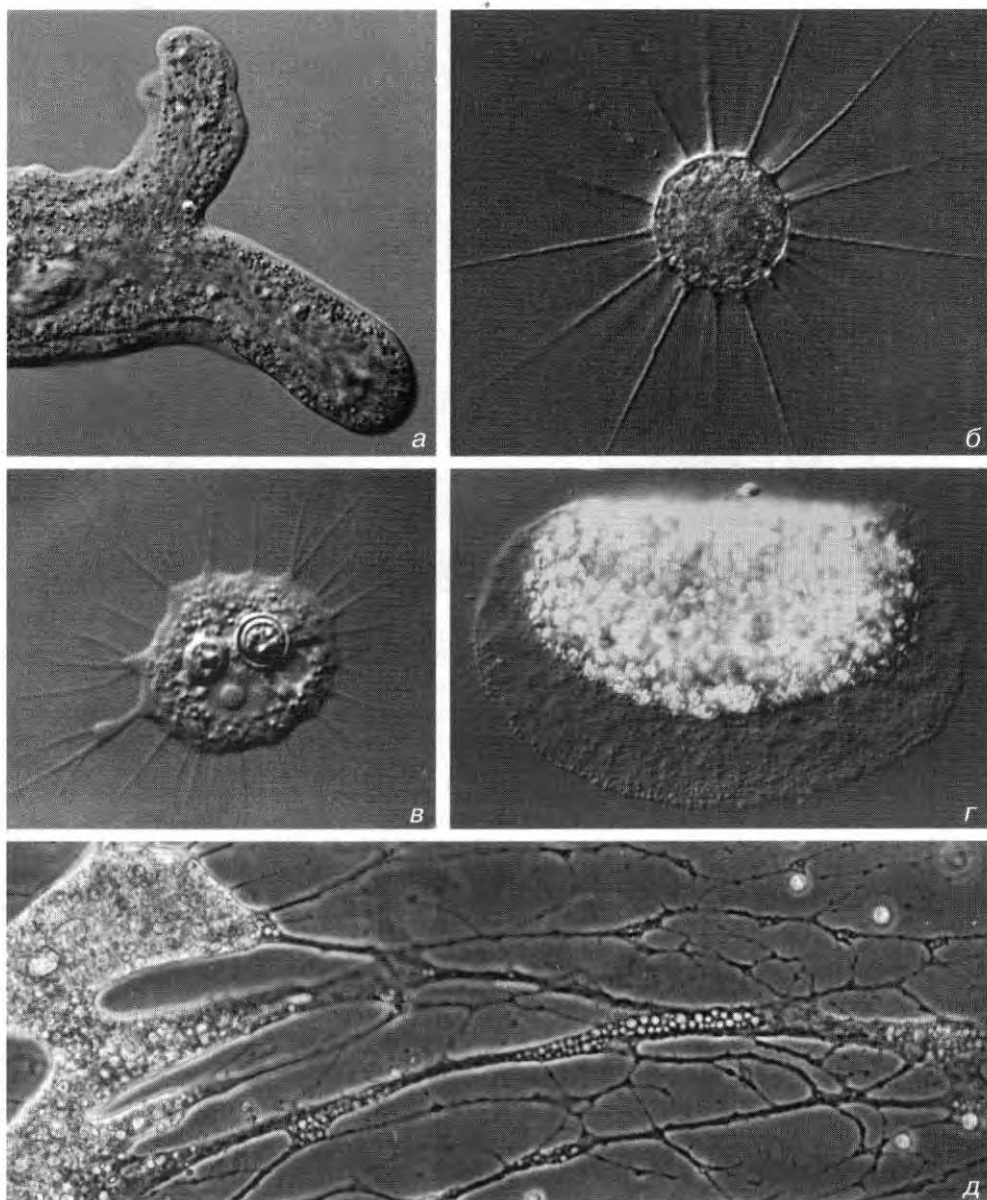
).

Hyalodiscus,

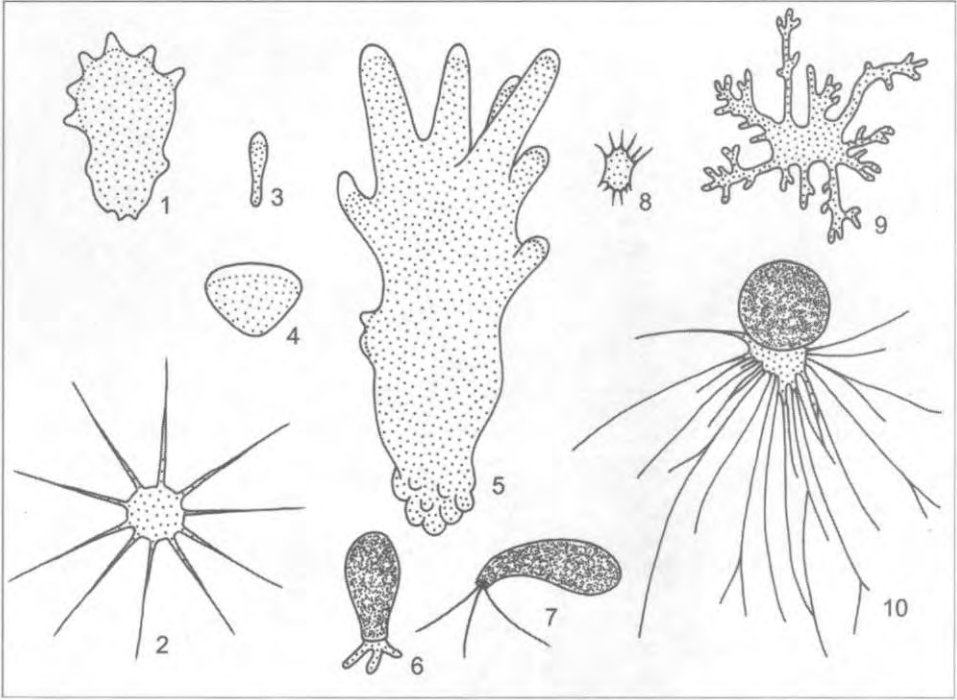
Foraminifera,

+
cystinea

Acantharea, Poly-



22. : *Amoeba proteus* (), *Actinophrys sol* (),
Nuclearia (), *Hyalodiscus predatus* (), *Reticu*
lomyxa filosa () (— , — 580 , — 875 , — 175 .) . . : — 580 ,



23. () 1 —
 {Mayorella}, 2 — (Actinophrys¹), 3 —
 (Saccamoeba), 4 — (Vannella), 5 —
 (Amoeba), 6 — (Nebela), 7 —
 (Cyphoderia), 8 — (Nuclearia), 9 — (Stereomyxa), 10 —
 (Allogromia²).

9x2+2

(. 36).

Tetra

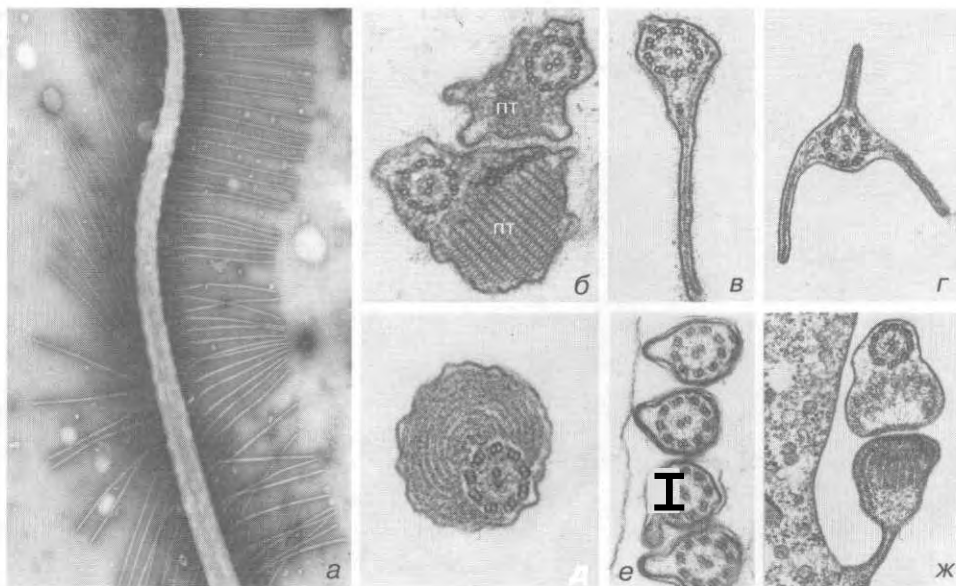
¹ Actinophrys

² Allogromia

Allogromia

Foraminifera

Gromia

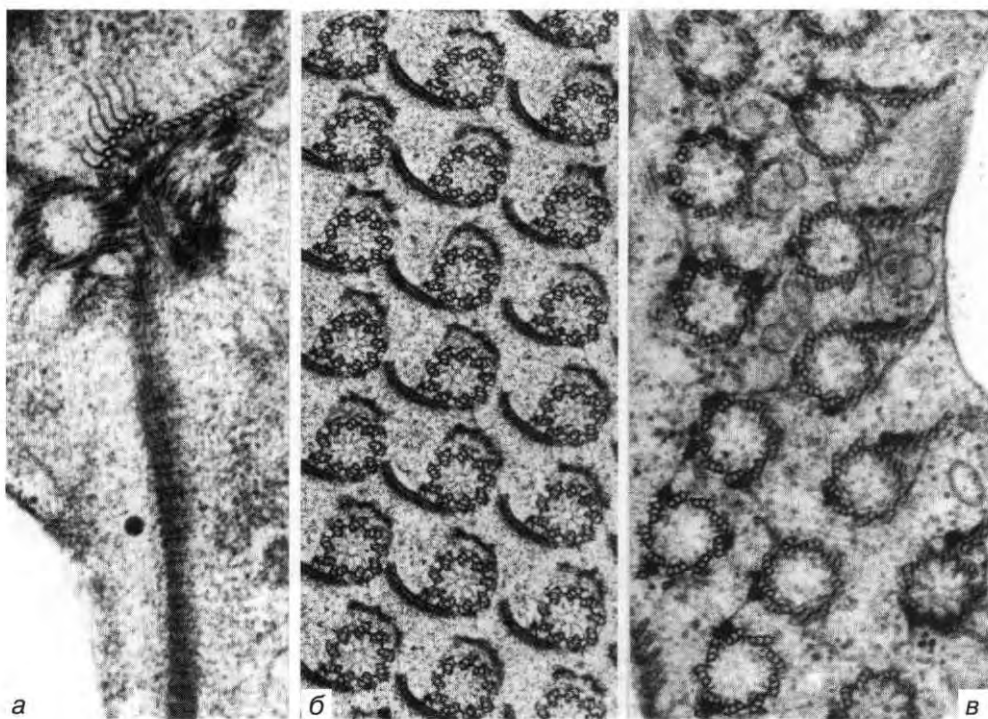


. 24. () Entosiphon (), ()
 Retortamonas () Colponema loxodes ()
 Stylonychia () Foaina ()
 Tritrichomonas angusta () (—
 ; —) . : — 16 , 6 — 36 , , , —
 32 , — 40 , —28 .

(. 25).

(. 24),
 (. 168).

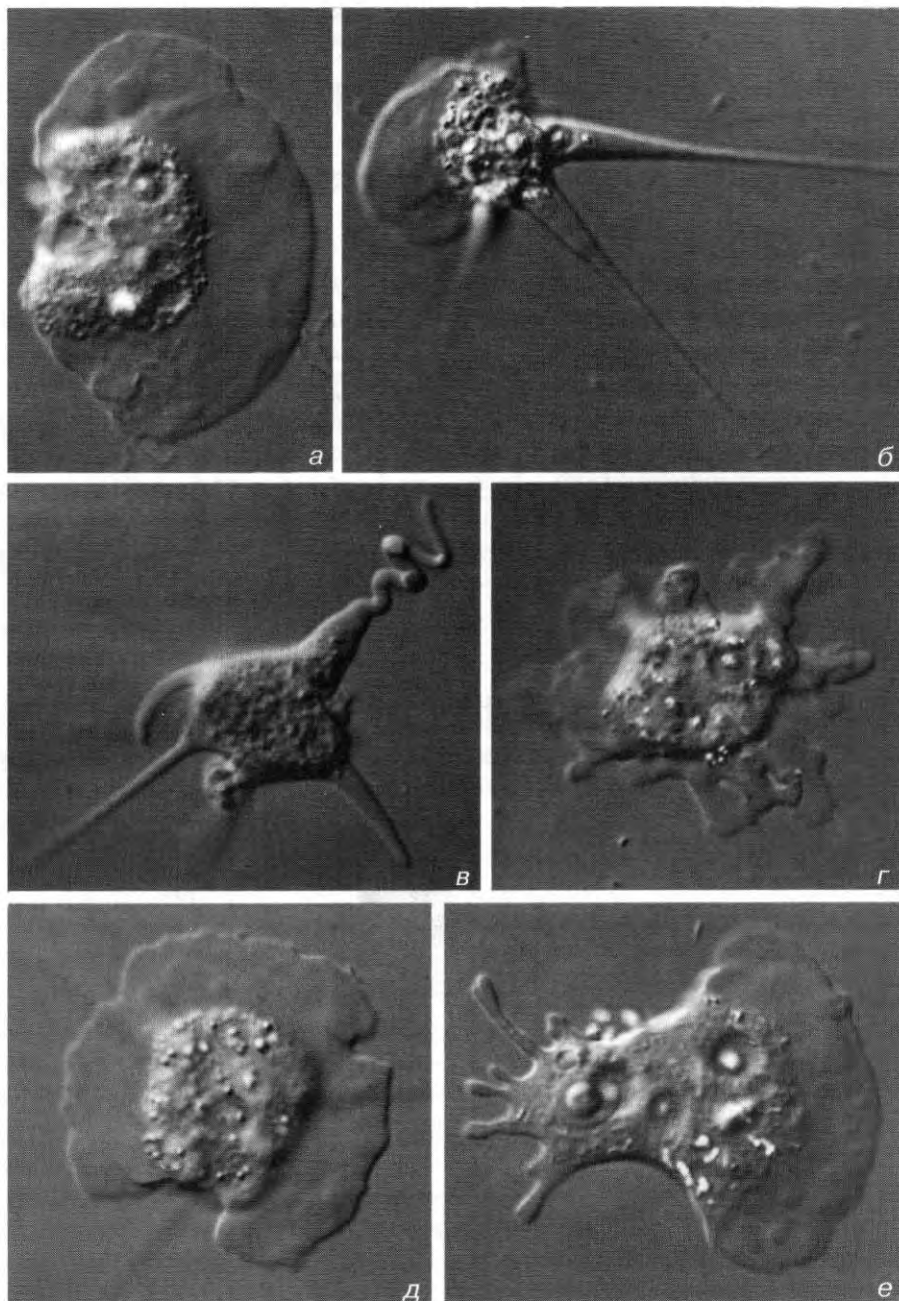
(. 26).



25. *Chilomonas* (), *Joenia* () *Eufolliculina* ().
 65, 6 — 48, — 65

(. 27):

28).



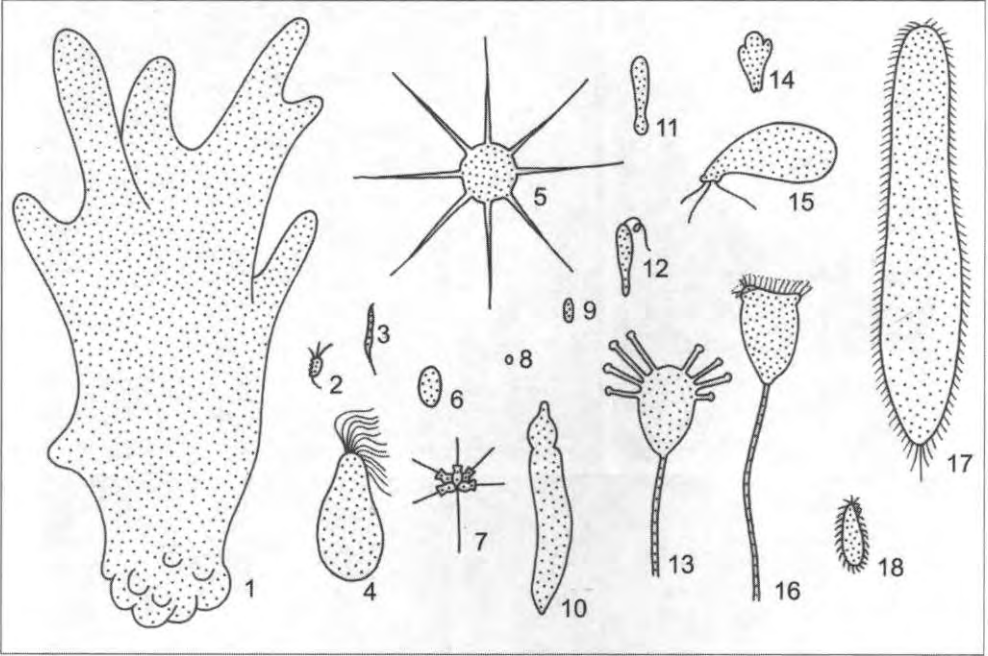
. 26.

«

Vannella simplex.
 (). .: 930 .

()

(,),



. 27.

(
). 1 — *Amoeba*, 2 — *Trichomonas*, 3 — *Trypanosoma*, 4 — *Joenia*, 5 — *Actinophrys*, 6 — *Eimeria*, 7 — *Codonosiga*, 8 — *Microspora*, 9 — *Myxozoa*, 10 — *Gregarina*, 11 — *Saccamoeba*, 12 — *Euglena*, 13 — *Discophrya*, 14 — *Entamoeba*, 15 — *Trinema*, 16 — *Vorticella*, 17 — *Paramecium*, 18 — *Tetrahymena*.



. 28.

Physarum polycephalum,
 5,54²,

1 ()
 ,)

II.

2500 1500

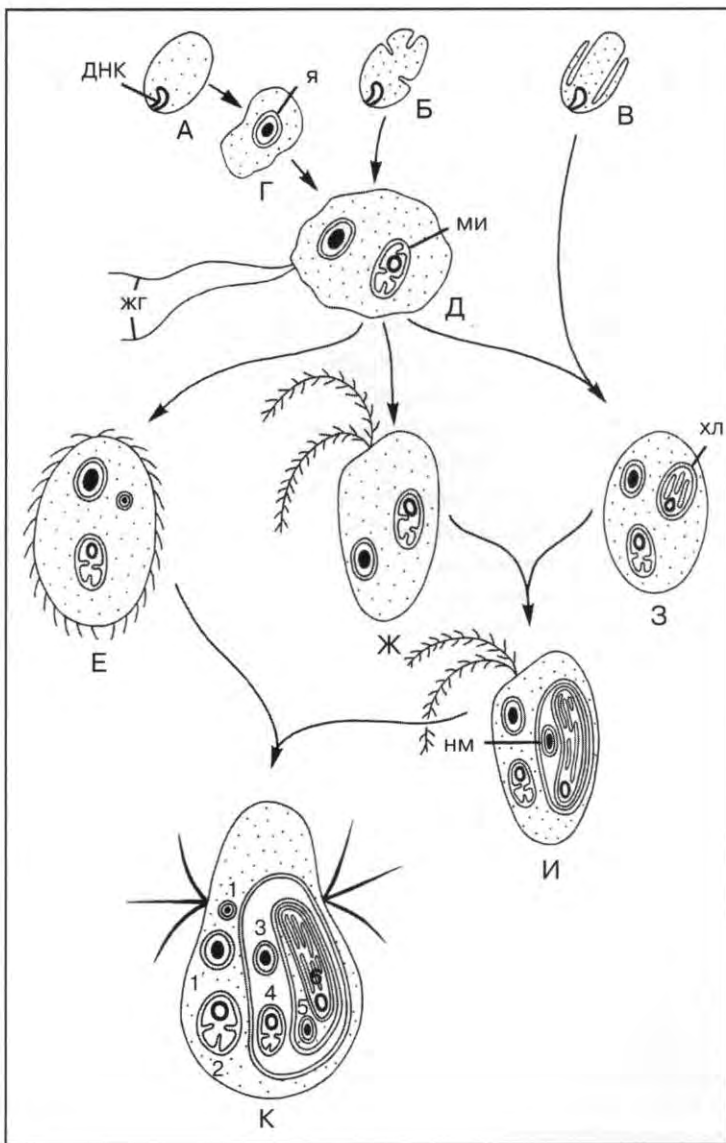
4550

4000

13 / 12

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 , -
 , -
 , -
 , -
 (, -
);
 • 02 -
 () -
 —
 « » («soda »);
 • 2*
 (10~7
 10-2), -
 ;
 • 10 (-
 7 8);
 •
 •
 •
 •
 • ();
 • , -

29.



Myrionecta (= Mesodinium) rubra,

()
 ()
 1 —
 ; ()
 2 —
 ; ()
 3 —
 ; ()
 —
 () ; ()
 ()
 (=) ; ()
 ; ()
 ()
 () ;
 (3)
 ()
 ()
 ; ()
 ; ()
 1 —
 , 4 —
), 6 —

()
 : 1 —
 , 3 —
 ()
 —
)

2 —
 , 5 —
 ;
 ()

()

. 30. ()

(HP) — () — (2),

(3). + —

() (Eus) (D), (Chr),

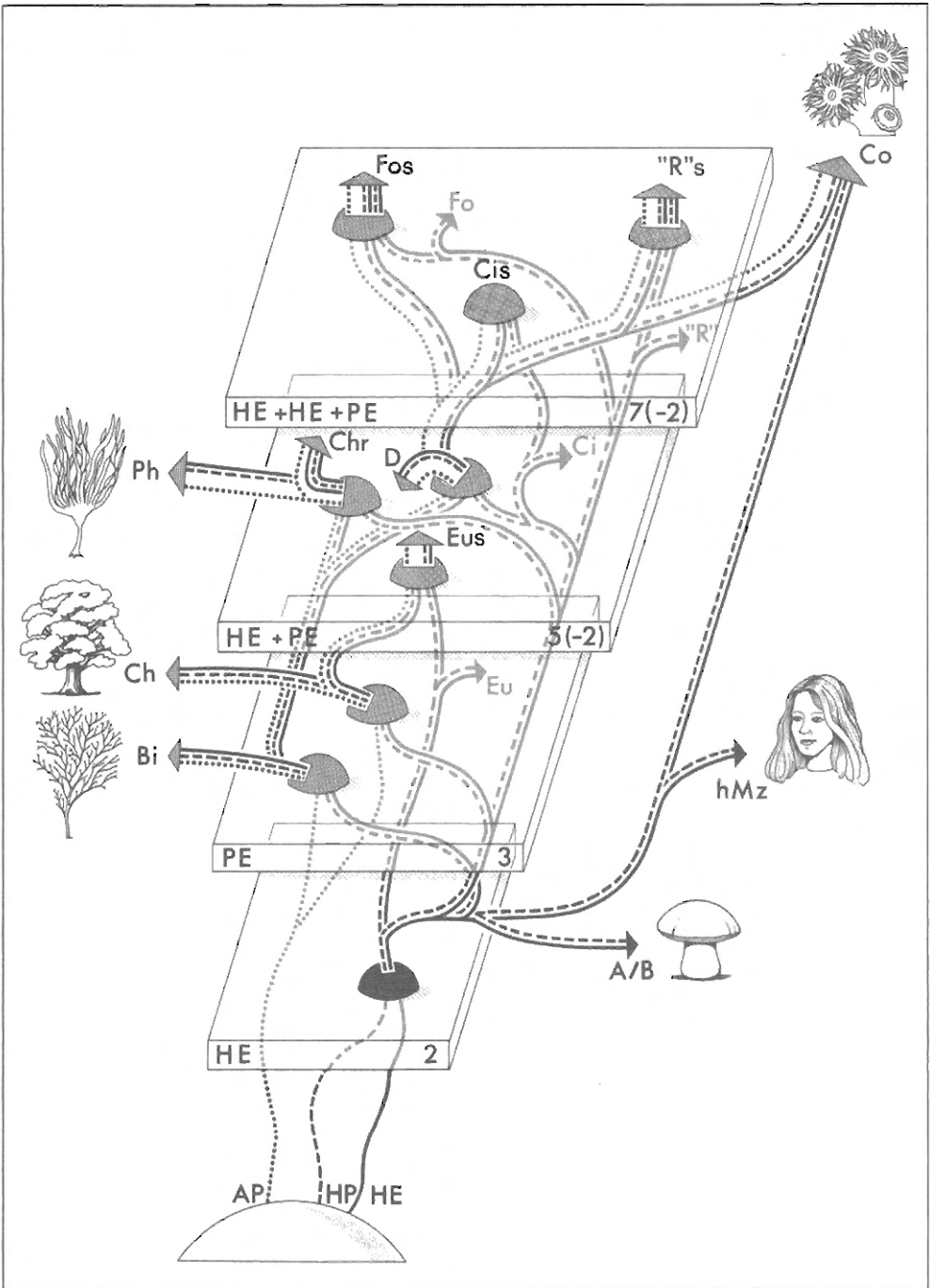
4 (+ 1) ; + + —

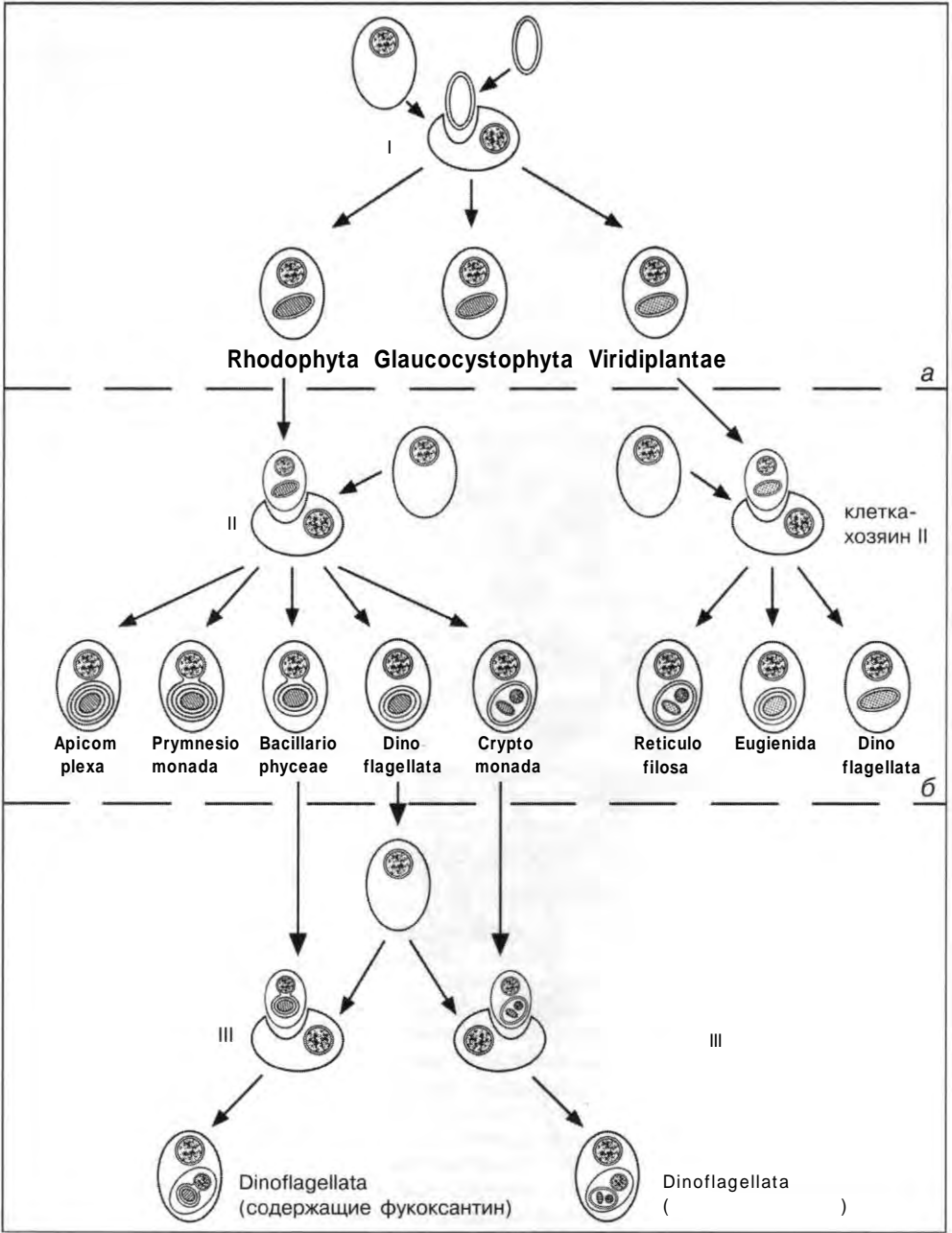
(«.» «R>s), (Ci Cis), (Fo

()). 5.

Biliphyta (Bi), Chlorobionta (Ch), Phaeophyta (Ph),
(/ — Ascomycota/Basidiomycota) Metazoa (hMz) (

).





Chlorophyta,
Rhodophyta Glaucocystophyta (. 30).

31.

(= Chlorobionta), Rhodophyta Glaucocystophyta.

Viridiplantae

(.) .

Parabasalia

1

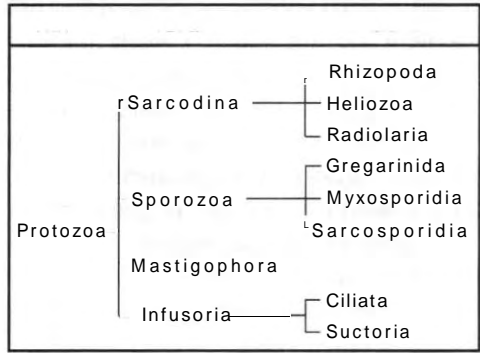
(. . . 33).

70S

- Sporozoa Leuckart, 1879; Acantharea
 - Haeckel, 1881; Myxosporidia Biitschli,
 1881.

Protozoa (. 2).

2. 1889



XXI

Animalcula, Infu-

soria.

1964

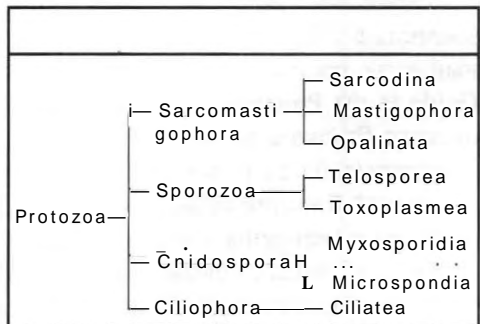
3.

(1842

3.

1964

: Polycystinea Ehrenberg,
 1838; Rhizopoda von Siebold, 1845;
 Ciliata Perty, 1852; Flagellata Cohn, 1853;
 Radiolaria J. Mtiler, 1858; Suctoria Clapa
 rède et Lachmann, 1858/59; Mycetozoa de
 , 1859; Heliozoa Haeckel, 1866;
 Mastigophora Diesing, 1866; Sarcodina
 Schmarda, 1871; Filosea Leidy, 1879;



- « » (Hand-
 - book of Protoctista),
 Sporozoa Cnido 1990 , ,
 spora () - , -
 Sporozoa (Protoctista, -
), Mastigo- , 35 -
 phora Sarcodina - (. 6). -
 Sarcomastigophora. , -
 - Protozoa,
 -
 - (Rhodophyta, Phaeophyta,
 Chlorophyta) (Hypho
 chytridiomycota, Plasmodiophoromycota,
 Chytridiomycota Oomycota). (-
) 1980) -
 (, -
 15) , -
 / -
 Protozoa (. 4). -
 4. -
 1980 -

: Protozoa	
1.	Sarcomastigophora Honigberg & Balamuth, 1963
2.	Labyrinthomorpha Page, 1980
3.	Apicomplexa Levine, 1970
4.	Microspora Sprague, 1977
5.	Ascetospora Sprague, 1978
6.	Myxozoa Grasse, 1970
7.	Ciliophora Doflein, 1901

(1996), , -
 -
 1985 « -
 » (The Illustrated
 Guide to the Protozoa) , -
 Protozoa 6 28
 (. 5). (. 7). (1998)
 (1980) , -
 « -
 » (The Illustrated Guide to the
 Protozoa, 2000),

5.

» 1985

Protozoa (Goldfufl, 1818) von Siebold, 1846

- Sarcomastigophora Honigberg & Balamuth, 1963
- Mastigophora Diesing, 1866
 - Phytomastigophorea Calkins, 1909
 - Zoomastigophorea Calkins, 1909
- Opalinata Corliss & Balamuth, 1963
 - Opalinatea Wenyon, 1926
- Sarcodina Schmarda, 1871
 - Rhizopodea von Siebold, 1845
 - Lobosea Carpenter, 1861
 - Acarpomyxea Page, 1976
 - (Acrasea Schröter, 1886)
 - Mycetozoea de Bary, 1859
 - (Plasmodiophorea Cook, 1928)
 - Filosea Leidy, 1879
 - Granuloreticulosea de Saedeler, 1934
 - (Xenophyophorea Schulze, 1904)
 - Actinopodea Calkins, 1902
 - Acantharea Haeckel, 1881
 - Polycystina (Ehrenberg, 1838) Riedel, 1967
 - Phaeodarea Haeckel, 1879
 - Heliozoa Haeckel, 1866
- Labyrinthomorpha Page, 1980
 - (Labyrinthulea Levine & Corliss, 1963)
- Apicomplexa Levine, 1970
 - Perkinsida Levine, 1978
 - Sporozoasida Leuckart, 1879
- Microspora Sprague, 1969
 - Metchnikovellidea Weiser, 1977
 - [Rudimicrosporea Sprague, 1977]
 - Microsporididea Corliss & Levine, 1963
 - [Microsporea Delphy, 1963]
- Myxozoa Grasse, 1970
 - Myxosporea Butschli, 1881
 - Actinosporea Noble, 1980
- Ciliophora Doflein, 1901
 - Postciliodesmatophora Gerassimova & Seravin, 1976
 - Karyorelictica Corliss, 1974
 - Spirotrichea Butschli, 1889
 - Rhabdophora Small, 1976
 - Prostomatea Schewiakoff, 1896
 - Litostomatea Small & Lynn, 1981
 - Cyrtophora Small, 1976
 - Phyllopharyngea de Puytorac et al., 1974
 - Nassophorea Small & Lynn, 1981
 - Oligohymenophorea de Puytorac et al., 1974
 - Colpodea de Puytorac et al., 1974

6.

1990

Protoctista (Hogg, 1861) Margulis & Schwartz, 1988	
I	
1. Rhizopoda	Lobosea Filosea
2. Haplosporidia	Haplosporea
3. Paramyxea	Paramyxidea Marteiliidea
4. Myxozoa	Myxosporea Actinosporea
5. Microspora	Rudimicrosporea Microsporea
II	
6. Acrasea	Acrasida
7. Dictyostelida	Dictyostelida
8. Rhodophyta	Rhodophyceae
9. Conjugatophyta	Conjugatophyceae
III	
10. Xenophyophora	Psamminida Stanomida
11. Cryptophyta	Cryptophyceae
12. Glaucocystophyta	Glaucocystophyceae
13. Karyoblastea	Karyoblastea
14. Zoomastigina	Amoebomastigota

Bicoecida	
Choanomastigota	
Diplomonadida	
Pseudociliata	
Kinetoplastida	
Opalinata	
Proteromonadida	
Parabasalia	
Retortamonadida	
Pyrsonymphida	
15. Euglenida	Euglenophyceae
16. Chlorarachnida	Chlorarachniophyceae
17. Pymnesiophyta	Pymnesiophyceae
18. Raphidophyta	Raphidophyceae
19. Eustigmatophyta	Eustigmatophyceae
20. Actinopoda	Polycystina Phaeodaria Heliozoa Acantharia
21. Hyphochytriomycota	Hyphochytrida
22. Labyrinthulomycota	Labyrinthulida Thraustochytrida
23. Plasmodiophoromycota	Plasmodiophorida
IV	
24. Dinoflagellata	Dinophyceae Syndiniophyceae
25. Chrysophyta	Chrysophyceae Pedinellophyceae Dictyochophyceae (= Silicoflagellata)
26. Chytridiomycota	Chytridiomycetes
27.	Protostelida Myxomycotina

6.

28. Ciliophora	Karyorelictea
	Spirotrichea
	Prostomatea
	Litostomatea
	Phyllopharyngea
	Nassophorea
	Oligohymenophorea
	Colpodea
29. Granuloreticulosa	Athalamea
	Foraminifera
30. Apicomplexa	Gregarinia
	Coccidia
	Haematozoa
31. Bacillariophyta	Coccinodiscophyceae

	Fragilariophyceae
	Bacillariophyceae
32. Chlorophyta	Prasinophyceae
	Chlorophyceae
	Ulvoephyceae
	Charophyceae
	4
33. Oomycota	Saprolegniomycetidae
	Peronosporomycetidae
34. Xanthophyta	Xanthophyceae
35. Phaeophyta	Phaeophyceae
36. incertae sedis:	Ellobiopsida
	Ebriida

7.

1996

Eukaryota	Microspore				
	Mastigota	Archamoebaea			
		Dimastigota	Tetramastigota	Retortamonada	
				Axostylata	
			Euglenozoa		
			Heterolobosa		
			Dictyostela		
			Protostela		
			Myxogastrea		
			Chromista		
			Metakaryota	Alveolata	
				Choanoflagellata	
				Chlorophyta	
				incertae sedis	Amoebozoa
Granuloreticulosa					
Actinopoda					
Ascetospora					
Myxozoa					

Protozoa

- Archezoa Cavalier Smith, 1983
 - Metamonada (Grasse, 1952) Cavalier Smith, 1981
 - Eopharyngia Cavalier Smith, 1993
 - Axostylaria (Grasse, 1952) Cavalier Smith, 1997
 - Trichochozoa Cavalier Smith, 1997
 - Anaeromonada Cavalier Smith, 1997
 - Parabasala (Honigberg, 1973) Cavalier Smith, 1997
- Neozoa Cavalier Smith, (1993), 1997
 - Sarcomastigota Cavalier Smith, 1983
 - Neomonada Cavalier Smith, 1997
 - Apusozoa Cavalier Smith, 1997
 - Isomita Cavalier Smith, 1997
 - Choanozoa Cavalier Smith, (1981), 1983
 - Cercozoa Cavalier Smith, (1995, 1997), 1998
 - Phytomyxa Cavalier Smith, 1997
 - Reticulofilosa Cavalier Smith, 1997
 - Monadofilosa Cavalier Smith, 1997
 - Foraminifera (d'Orbigny, 1826) (Eichwald, 1830), Margulis 1974
 - Amoebozoa Lühe, 1913
 - Lobosa (Carpenter, 1861) Cavalier Smith, 1997
 - Conosa Cavalier Smith, 1998
 - Archamoeba Cavalier Smith, 1983
 - Mycetozoa de Bary, 1859
 - Eumyxa Cavalier Smith, 1993
 - Dictyostelia Lister 1909
 - Discicristata Cavalier Smith, 1998
- Percolozoa Cavalier Smith, 1991
 - Tetramitia Cavalier Smith, 1993
 - Pseudociliata Cavalier Smith, 1993
- Euglenozoa Cavalier Smith, 1981
 - Plicostoma Cavalier Smith, 1998
 - Saccostoma Cavalier Smith, 1998
- Alveolata Cavalier Smith, 1991
- Miozoa Cavalier Smith, 1987
- Dinozoa Cavalier Smith, 1981
 - Protalveolata Cavalier Smith, 1991
 - Dinoflagellata (Butschli, 1885) Cavalier Smith, 1991
- Sporozoa (Leuckart, 1879) Cavalier Smith, 1981
 - Gregarinae (Haeckel, 1866) Cavalier Smith, 1998
 - Coccidiomorpha (Doflein, 1901) Cavalier Smith, 1993
 - Manubrispora Cavalier Smith, 1998
 - Heterokaryota (Hickson, 1903) Cavalier Smith, 1993
- Ciliophora (Doflein 1901, Copeland 1956) Cavalier Smith, 1998
 - Tubulicorticata de Puytorac et al., 1992
 - Epiplasmata de Puytorac et al., 1992
 - Filocorticata de Puytorac et al., 1992
- Actinopoda (Calkins 1902) Cavalier Smith, 1997
- Heliozoa (Haeckel, 1886) Margulis, 1974
- Radiozoa Cavalier Smith, 1987
 - Spasmaria Cavalier Smith, 1993
 - Radiolaria (Miiller, 1858) Cavalier Smith, 1993

9.

» 2000

«

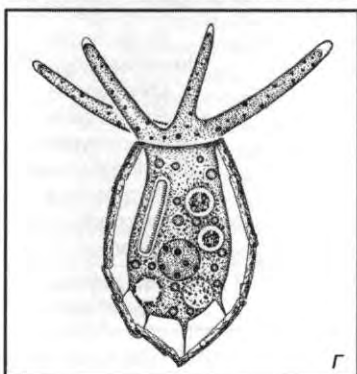
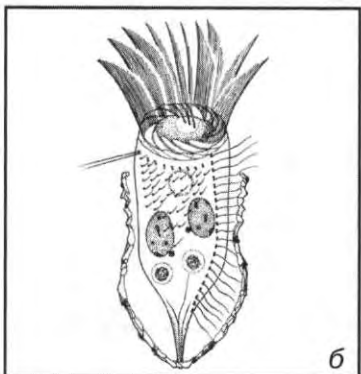
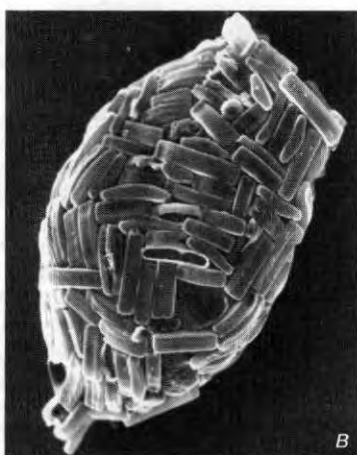
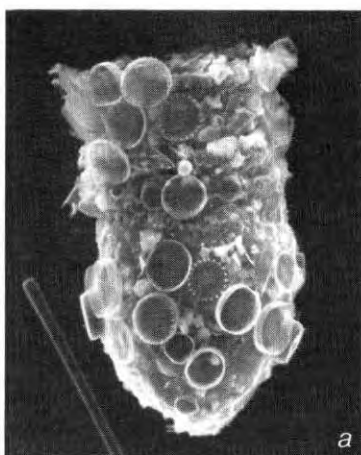
	Choanoflagellata Microsporida Myxozoa Volvocida	
	Apicomplexa Colpodellidae Ciliophora Dinozoa	
	Chryomonada Pelagophyceae Raphidomonadida « Slopalinida Synurophyceae Silicoflagellata »	« »
	Acantharia « Arcellinida Heliozoa Granuloreticulosea Mycetozoa Phaeodaria Polycystina » « Schizocladidae » « Trichosidae Xenophyophorea »	« » « » « »
	Pelobiontida Heterolobosea	
	Cryptomonadida Diplomonadida Euglenozoa Hemimastigophora Oxymonada Parabasalia Pedinophyceae Prasinophyceae Prymnesiida « Retortamonadida »	« »
	Haplospora Plasmodiophora	

8 9.

(. 33).

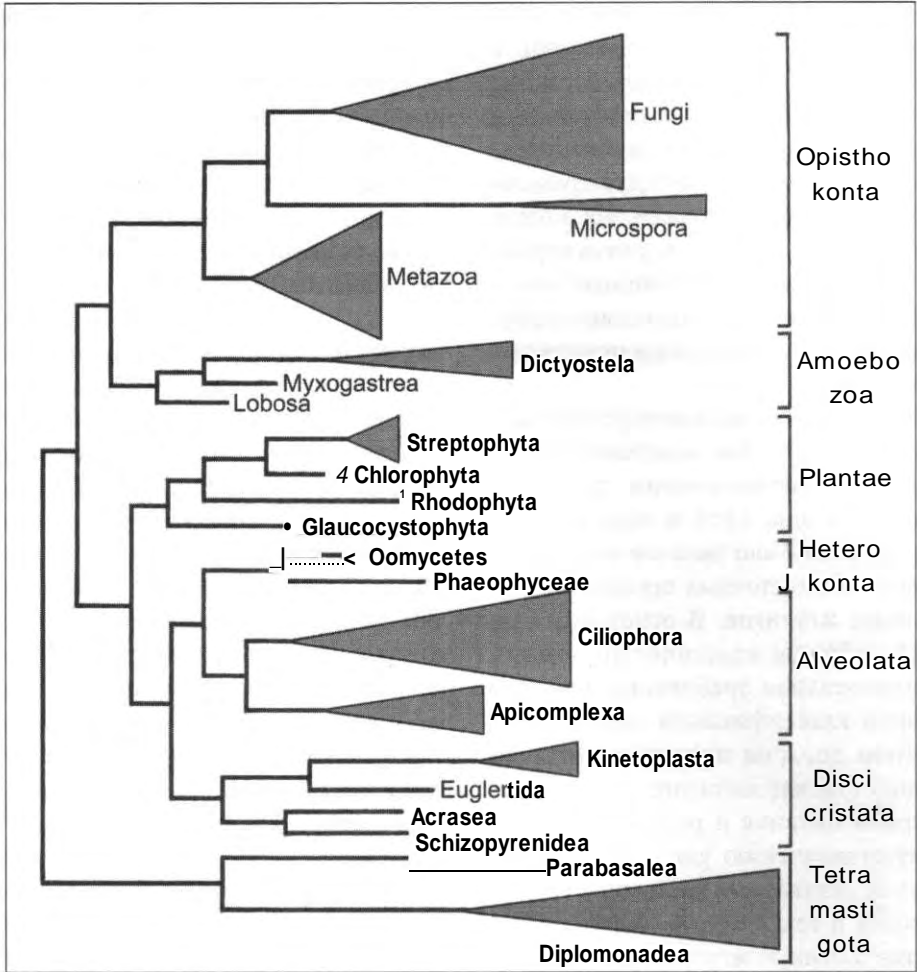
Protista

(. 32)



. 32.

— *Codo nella cratera* (); — *Diffugia* () (: Foissner and Hausmann: *Microcosmos* 76 [1987] 258). : a 1 400x, — 700x, — 400x, — 200x.



33.

1,

3

(.) .

(distance matrix),

(maximum parsimony)

(maximum

likelihood)

Protoctista

Protozoa,

1910

« »,

(
« » « »

)

1 (

(9x2+ 2)

Flagellata Coën, 1853 Mastigophora
Diesing, 1866

Mastigota.

Masti-

- gophora Flagellata,

()

Phytoma

stigophorea

. Zoomastigo

phorea —

Sarcodina Rhizopoda

1 « »

() .

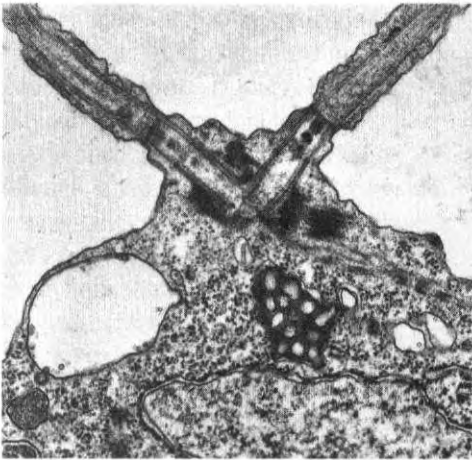
« » , « » , « » , « »

—

»

EUKARYOTA Chatton,
1925 (Eucarya) —

Eukaryota



34.

(. 34).

Diphyllia
rotans (= *Aulacomonas submarine*),

(: Brugerolle and Patterson: Europ.
J. Protistol. 25 [1990] 191). : 20 000x.

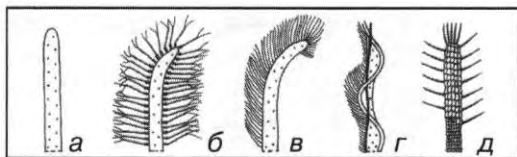
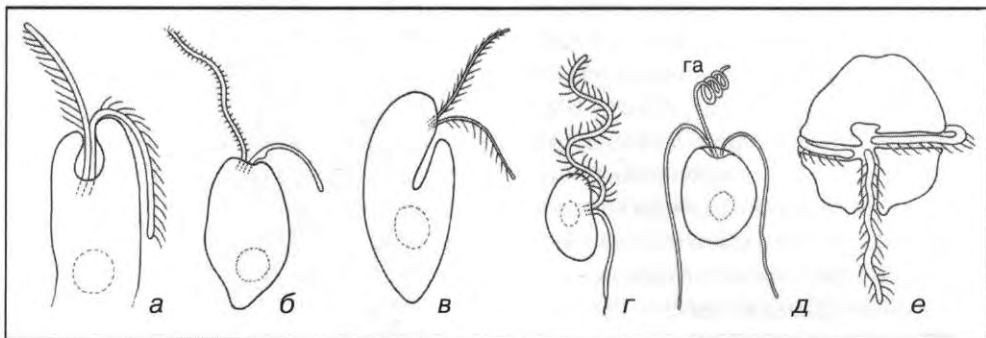
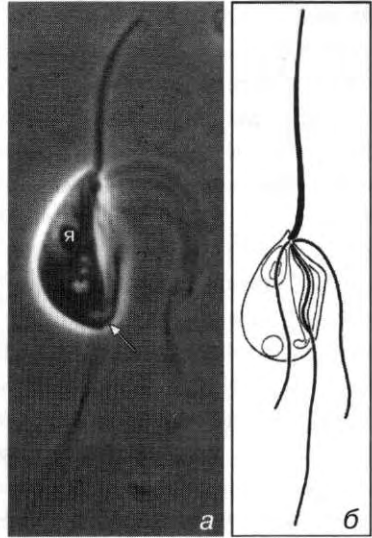


Рис. 35. Особенности организации свободной части жгутика у хлорофитов (а), хризомонад (б), эвгленовых (в), динофлагеллат (г) и прازیномонад (д).



36. ; — Euglenida, ; — Chrysoomonada, ; — Cryptomonada, ; — Prymnesiomonada (= Haptomonada), ; — Dinoflagellata ; Labyrinthulea, () ;

(. 35), (,) ; (. 34), (. 36), () ; *Chlorarachnion*, Cercozoa, (Conosa), « » ; (1990). —



37. Tetramastigota. — *Trimastix marina*,

Eubacteria,

(. . . 328).

TETRAMASTIGOTA Hülsmann & Hausmann, 1994

mastigota,

Tetra

mastigota

(. . . 37).

Tetra

Excavata —

1 —

() ;

)

(

(. excavate —).

Heterolobosa Excavata (. 38).

(Retortamo

{Jakoba, Histiona, nas); Chilomastix —

Reclinomonas),

Trimastix, Carpediemonas

Malawimonas.

Excavata

Excavata,

Euglenozoa

Tetra

mastigota

Heterolobosa.

()

RETORTAMONADEA Grassé,
1952 —

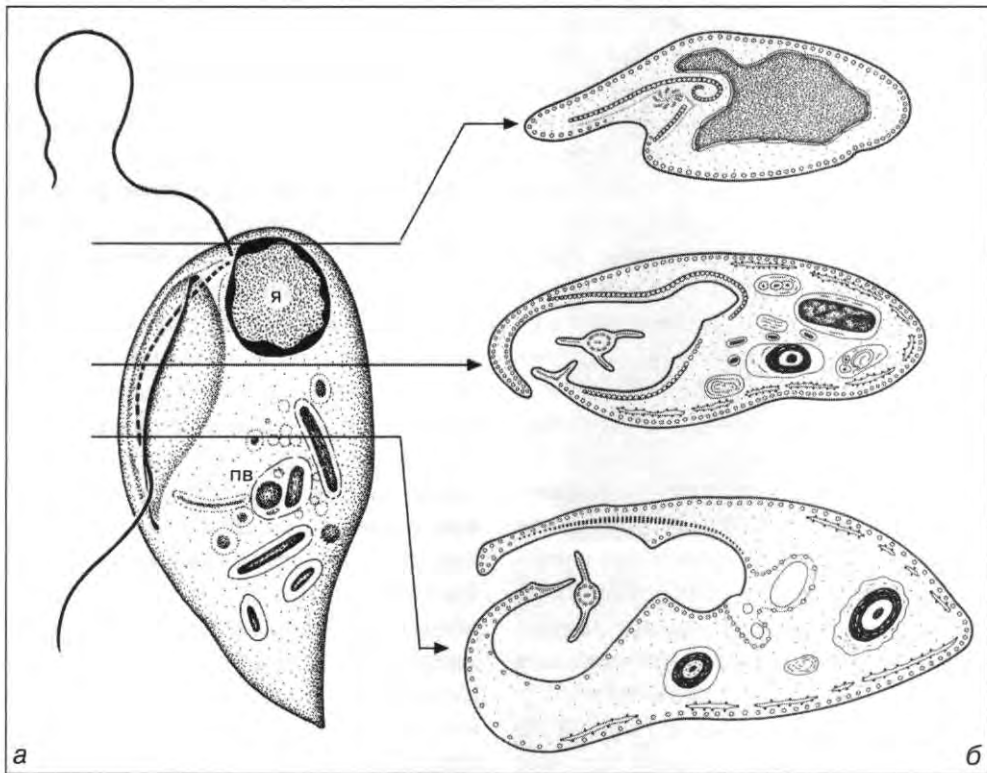
(5 20)

{Chilomastix mesnili

, Chilomastix gallinarum

).

: Chilomastix, Retortamonas.



38. Tetramastigota, Retortamonadea: *Retortamonas*, ()

() . : - 7 , - 15

DIPLOMONADEA Wenyon,
1926 —

: Enteromona
dida Diplomonadida.

Enteromonadida Brugerolle,
1975 —

Enteromonadida

15

, *Enteromonas hominis*)

: *Caviomonas*, *Enteromonas*, *Trimitus*.

Diplomonadida Wenyon,

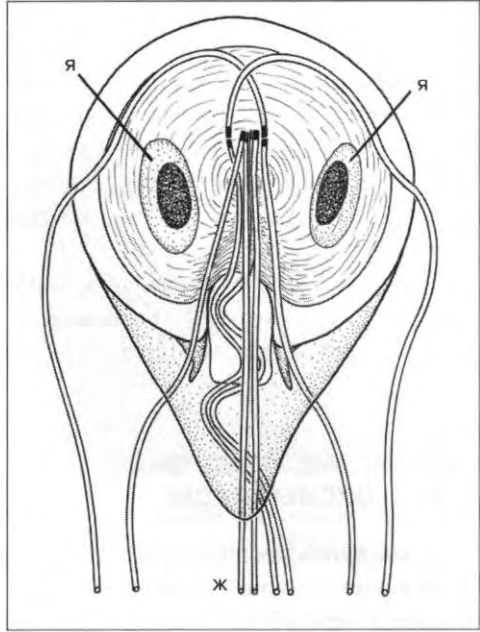
1926 —

Diplomonadea,

39).

Giardia (= *Lamb*

39)



. 39. Diplomonadea: *Giardia* (= *Lamblia*)

() () . : 6 ()

100

.),
Giardia

50

: *Hexamita*, *Trepomonas*,
Trigonomonas; : *Giardia*,
Octomitus, *Spironucleus*.

« ... ». Polymastigi-
 dae

4

OXYMONADEA Grasse,

1952

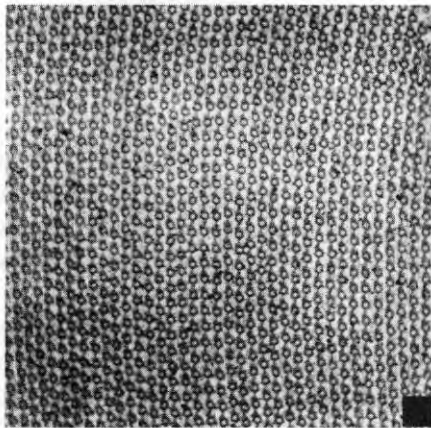
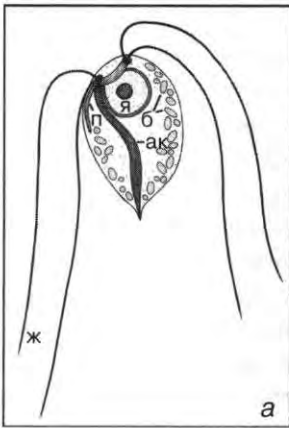
Oxymona-

didae

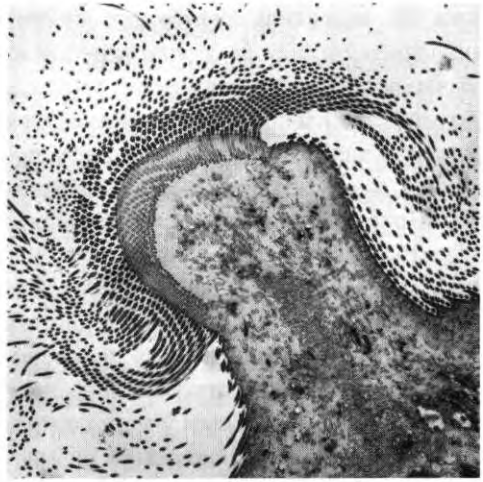
Oxymonadidae

Pyrrsonymphidae

40).



40. Oxymonadea: — *Monocercomonoides hausmanni* (), —
 (), (), (). —
 (— : Radek: Arch. Protis
 tenk. 144 [1994] 373; —
 2 , 6 — 32



41. Parabasalea: *bonita*. : 1 800 .

Parabasalea

(. . .),

(. 41, 44).

(. . .),

monas ivm).

: *Monocercomonoides*,
monas, *Pyrrsonympha*, *Saccinobaculus*.

PARABASALEA Honigberg,
1973 —

(20 30)

Parabasalea —

Parabasalea —

Parabasalea

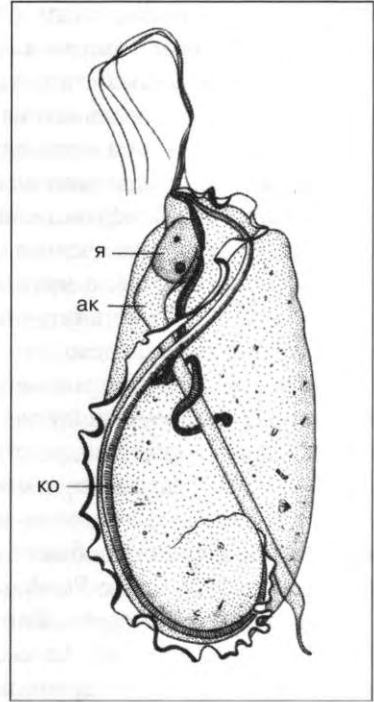
Trichomonadida Kirby,

1947 —

5 25

4 6

Trichomonadidae



42. Trichomonadida: *Trichomitopsis*
(= *Trichomonas*) *termopsidis*.

3 500

nas,

; *Dientamoeba,*

(*Histomo*

).

(. 24 , 42).

-

Cochlosomatidae

Trichomonadida.

(),

Cochlosoma

monadida

Tricho-

Trichomonas

: *Dientamoeba* (

nalis

: *Trichomonas vagi-*

), *Monocercomonas* (3+1),

hominis,

Mycoplasma

Pentatrachomonas (5+1), *Tritri-*

chomonas (3+1), *Calonympha*

Coronympha ().

Hypermastigida Grassi &

Foa, 1911 —

hominis

; *foetus*

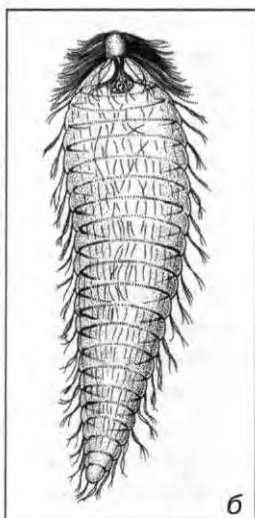
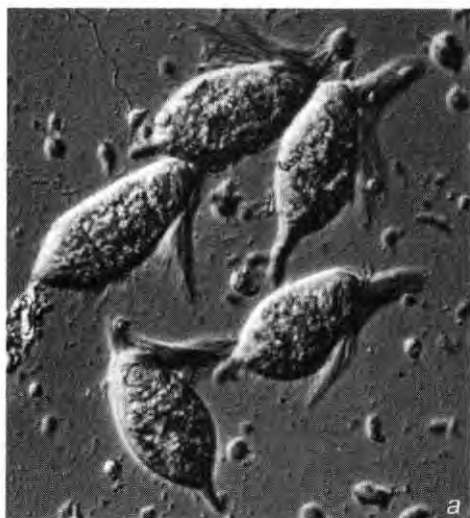
Mixotricha paradoxa,

(. 43, 44).

Calonymphidae

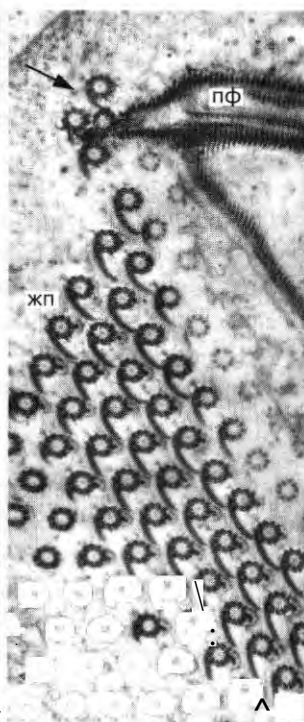
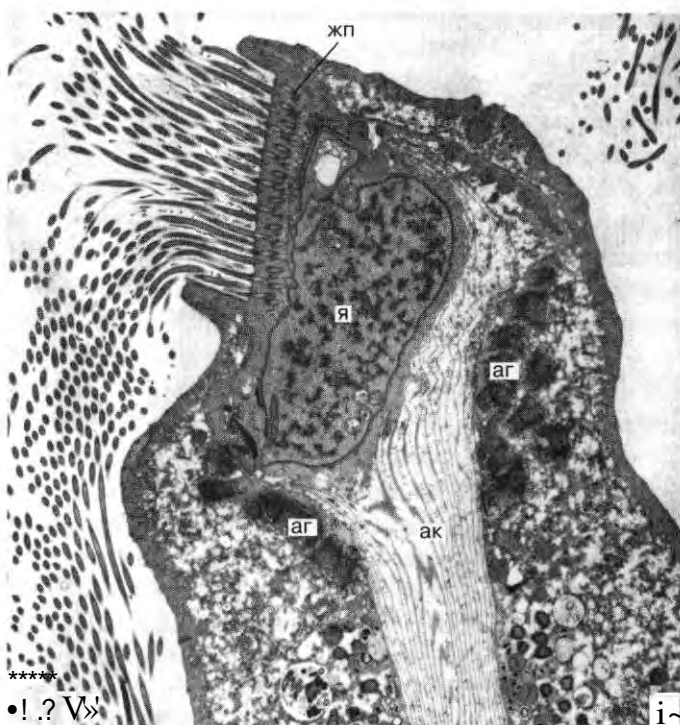
(),

().



43. *Hypermastigida*: — (*Joenia annectens*)

Kalotermes flavicollis,
 — *Teratonympha mirabilis* ().
 : — 200 , — 280 .



44. *Hypermastigida*: — *Joenia annectens* (), (), () *J. annectens* (). — () . — (— : Radek and Hausmann: BIUZ 21 [1991] 160). : a — 3 , 6—13 .

(
Cryptocercus),

Devescovichidae,

Hypermastigida

: Eucomonymphidae, Trichonymphidae Spirotrichonymphidae + Holomastigotidae.

, a Spirotrichonymphidae Holomastigotidae

: *Barbulanympha*, *Joenia*, *Lophomonas*.

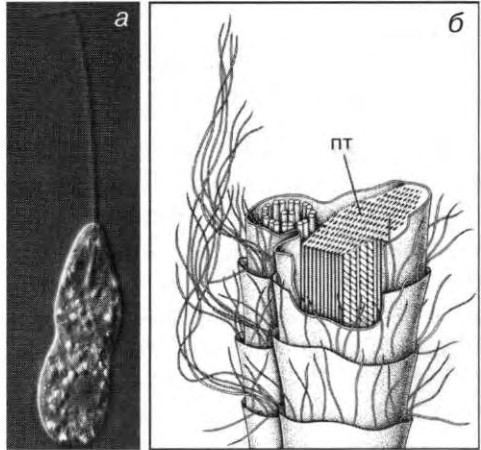
DISCICRISTATA Cavalier
Smith, 1998

: Euglenozoa Heterolobosa.

EUGLENOZOA Cavalier
Smith, 1981

Euglenozoa

. 246, 45);



. 45. Discicristata, Euglenida: —

Anisonema. —
(—). .: — 500 , —
40

nozoa, , Egle
 () .

1,2

0,2

Euglenida,

Kinetoplasta.

— Eugleni-

da Kinetoplasta — Euglenozoa

:

Postgaardi.

()

Hemimastigophora, *Stephanopogon*

Bordnamonas

Euglenozoa.

EUGLENIDA Butschli,

1884 —

1000

те симбиоза гетеротрофной эвг-

1

2

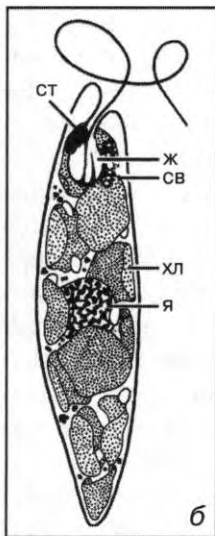
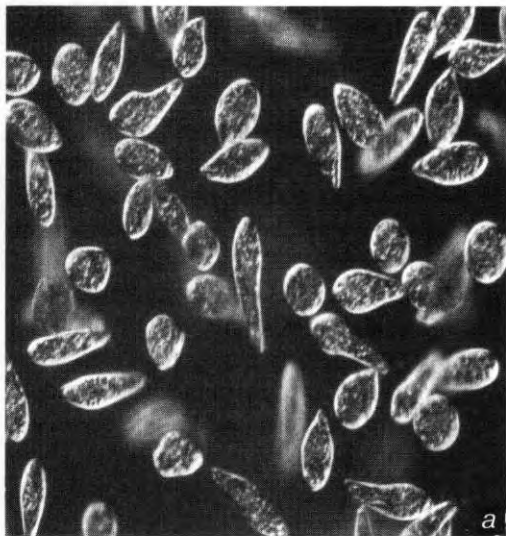
Euglenida

3

Euglenozoa. —

Euglenida

« » « » . — . . .



46. Euglenida:

Euglena gracilis,
Euglena gracilis,
 — 1 200 .

« »

(, *Phacus*)

(*Trachelomonas*)

(*Colacium*).

()

(,),

()

(2 20).

Chlorophyta. : *Anisonema*, *Astasia*, *Entosiphon*,

KINETOPLASTA Honigberg,

1963

(800)

(. 47),

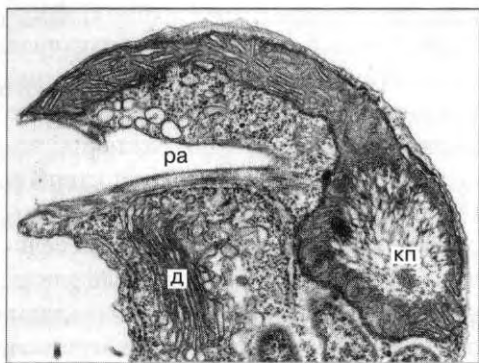
Euglenida

(. 48).

« »

Astasia.
Euglenida

(Neusiedl,
).



. 47. Kinetoplasta, Bodonea:
Bodo ()

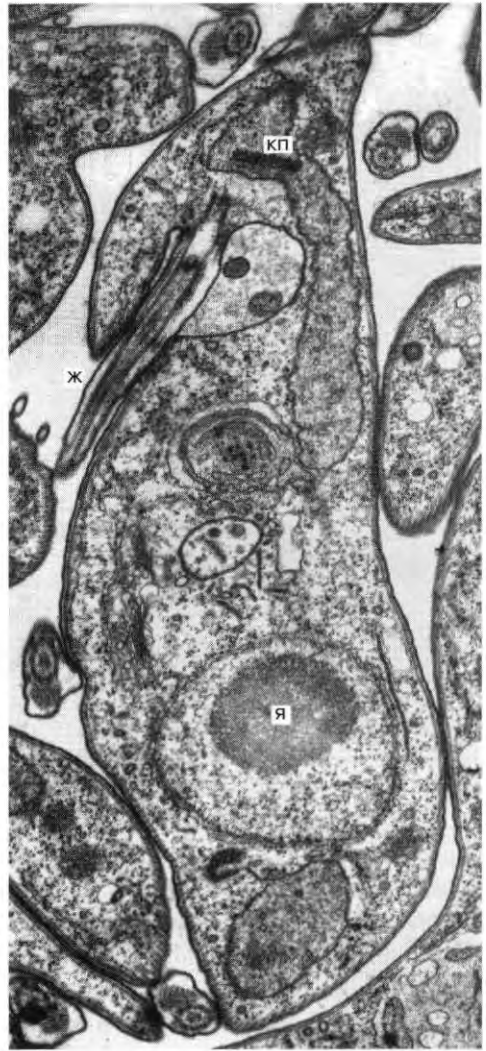
: *Euglena*,

Eutreptia, *Phacus*;

: 7 200 .

50).
 (. 49,
 :
 20 38 . . .) 25 50,
 (5000 27000, 0,46
 2,5 . . .).

(. guide RNA),

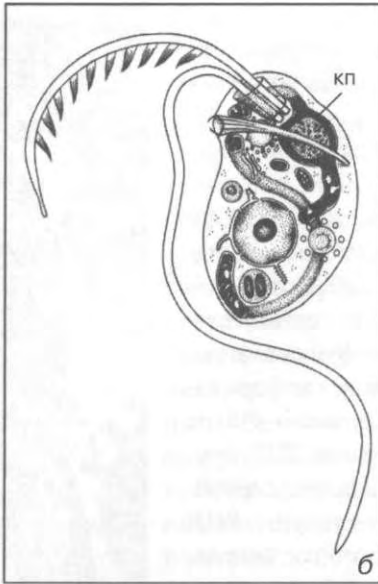
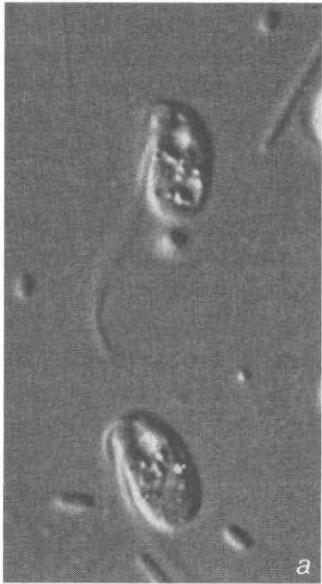


. 48. Kinetoplasta, Trypanosomatidea:
Trypanosoma brucei

(. . .) . . . : 20 . . .

(. . .) . . . (. . .) . . .

; . . . ;



49. Bodonea: -
 Bodo ()
 (), —
 (—) .
 : — 1 , —
 2 200 .

Bodonea

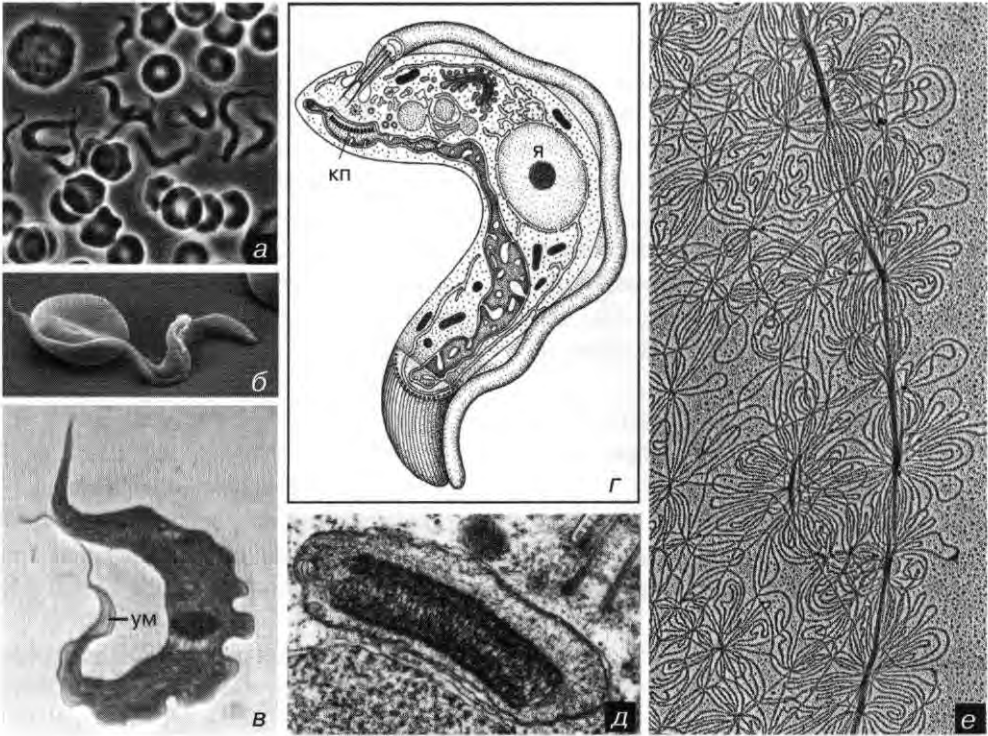
(. 49).

18S

1

2

2



50. Trypanosomatidea: *Trypanosoma brucei* (—);
fallisi; — *congolense*; —
Blastocrithidia triatomae; — *Crithidia fasciculata*. —
 ; — (—)
 ; — : Martin and Desser: J. Protozool. 37 [1990] 199); —
 ; — : Perez Morga
 and Englund: J. Cell Biol. 123 [1993] 1069). : a 800x, б 2 , — 3 200x, —
 7 200x, — 36 , e — 85 000x.

BODONEA Hollande, 1952 —

(. 49).
 ; — (—) —
 (. 49).
 ; — (—) .

• : (= ;
):
 , *Bodo saltans* ;
 () • (= ;
Rhynchomonas nasuta () :
). - ;
 — - • (= ;
):
 : *Bodo* (;
), *Cryptobia* (), *Ich* • : -
thyobodo (). - ;

TRYPANOSOMATIDEA Kent, 1880 —

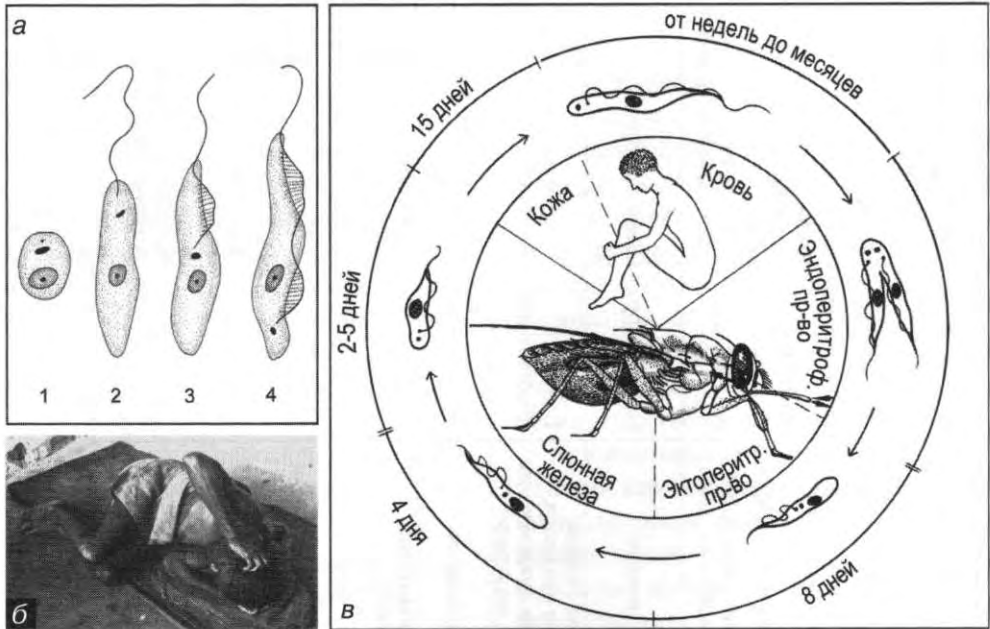
• : -
 ;
 — • : -
 (. . 15). - • : -
 , , -
 - -
 , -
 (. 50). , , -
 (,) ; -
 - (. 10). -
 () , -
 — — -
 (. 51). - ,
 (. 51, 52). -
 , -
 • ,
 (=) :

Trypanosoma

Leishmania,

()

			<i>Glossina</i> spp.	
	()		<i>Glossina</i> spp.	
()	()		<i>Glossina</i> spp.	
			<i>Glossina</i> spp.	
			<i>Triatoma</i> <i>Rhodnius</i> spp.	
			<i>Tabanus</i> spp.	
			<i>Tabanus</i> <i>Stomoxys</i> spp.	
			<i>Lutzomyia</i> spp.	
()			<i>Phlebotomus</i> spp.	
			<i>Phlebotomus</i> spp.	



51. Trypanosomatidea. — : 1 — (=), 2 — (=), 3 — (=), 4 — (=); — (—); — (—).
Trypanosoma brucei gambiense.
 WHO TDR Image Library,

Trypanosoma Leish
 mania
 : [Tabanus [Tabanidae —], *Glossina* = [Muscidae —], *Phlebotomus* [Psychodidae —], *Triatoma Rhodnius* [Reduviidae —]), (Desmodontidae).
Trypanosoma brucei (. 51),

. 52. Trypanosomatidea:

Trypanosoma cruzi: 1 —

(), 2 3 —

(2)

(3), 4 —

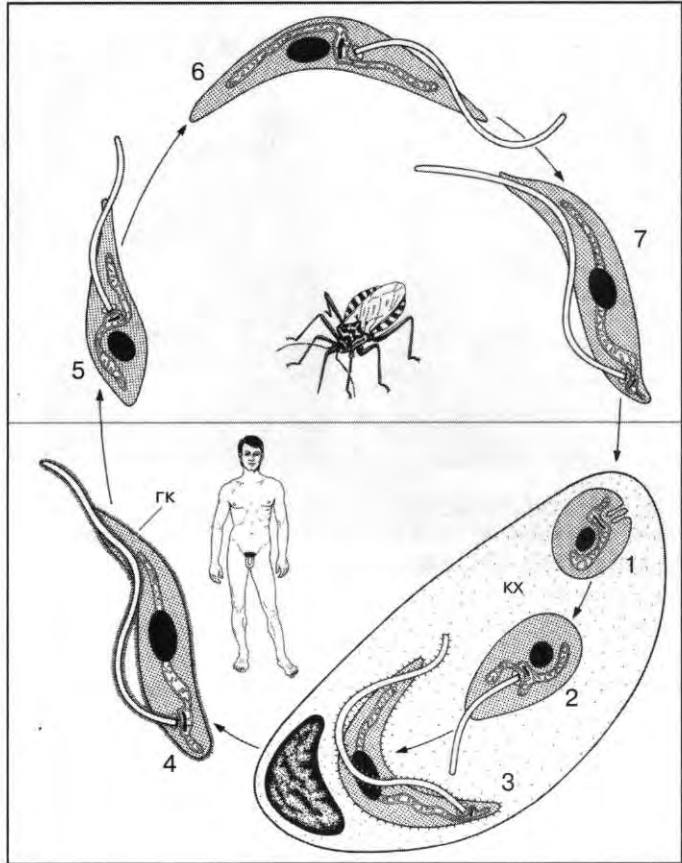
(), 5 —

Redu

viidae, 6 —

(7),

().





. 53. Trypanosomatidea:

WHO TDR Image Library, () ()

Toxoplasma *Pneumo-*
cystis.

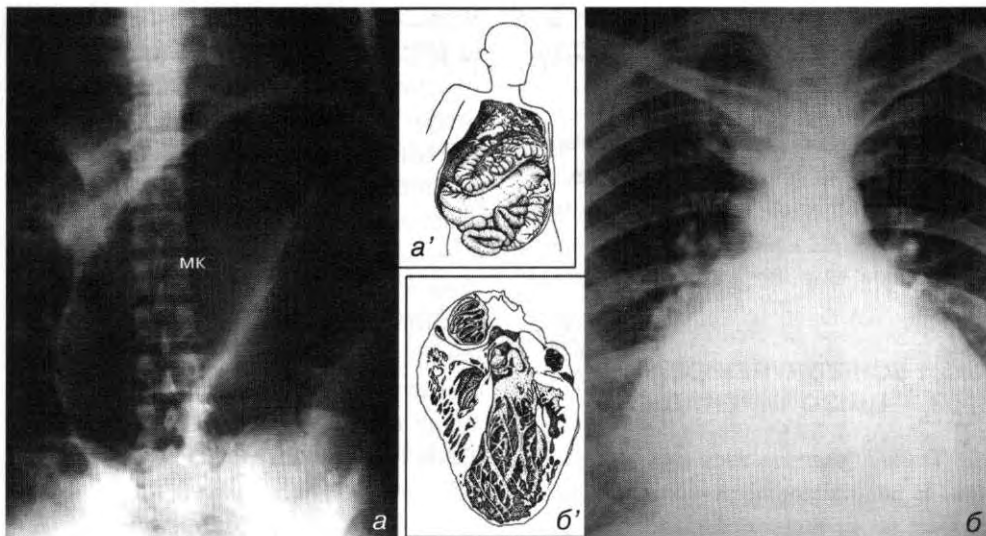
15)

(. 52).

1000)
40%

(. 53).

) *Leishmania donovani*



54. Trypanosomatidea:
Trypanosoma cruzi, ' —
 (—) (—
 1990, ' —)

(—); , ' —
 WHO TDR Image Library, Geneva

DIPLONEMIDA Cavalier
 Smith, 1993

Leishmania infantum

2 : *Diplonema* (*Isonema*)
Rhynchopus.

(. 54).
Phytomonas,

700
 500

Trypanosoma.
 : *Leishmania*, *Phytomonas*,
Trypanosoma.

: *Diplonema*, *Rhynchopus*.

HETEROLOBOSA Page & Blanton, 1985 —

Sarcodina, -

(*Tetramitus*)

(. 55).

SCHIZOPYRENIDEA Singh, 1952 —

100 -

Vahlkamfia

Tetramitus,

Naegleria.

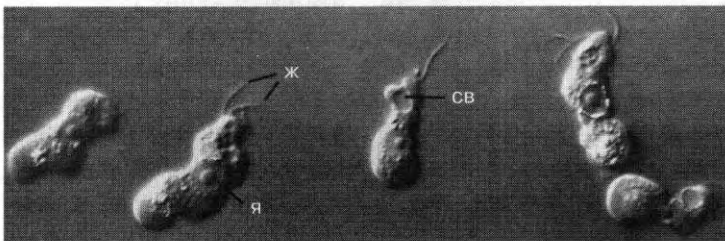
{*Naegleria*

fowleri , *Naegleria austriacensis*)

Acrasea.

40 ° (

. 19).

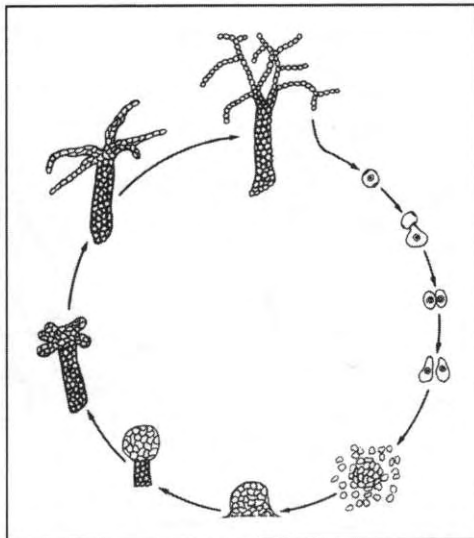


. 55. Heterolobosa, Schizopyrenidea:

Naegleria.

: 1

() .
Naegleria
 : *Naegleria* (
), *Tetramitus* (
), *Vahlkamfia* (
), *Willaertia*.



ACRASEA Blanton, 1990 —

. 56. Acrasea: *Acrasis rosea* (: Olive et al.: J. Protozool. 8 [1961] 467).

(. 56). Acrasea
 :
 () .
 : *Acrasis*, *Pocheina*.

*
 (. 576).

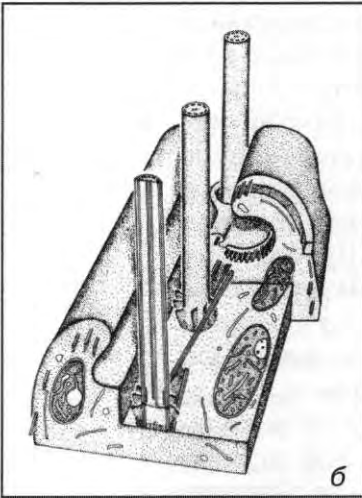
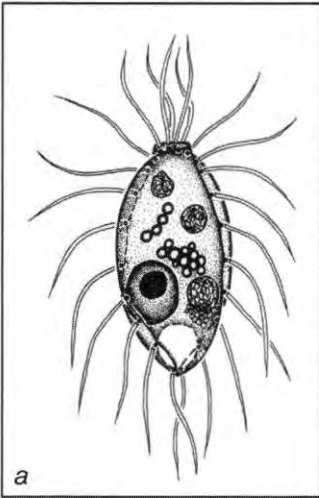
HEMIMASTIGOPHORA

Foissner et al., 1988

(. 57).

20
 10 60
 Discicristata
 (. 57).

: *Hemimastix*, *Paramastix*,
Spiroonema, *Stereonema*.



57. Hemimastigophora: — *Hemimastix amphikineta*. —

— . *amphikineta*.
 — . *amphikineta*



(: Foissner et al.: Europ. J. Protistol. 23 [1988] 361).
 a — 2 200x.

PSEUDOCILIATA Corliss & Lipscomb, 1985

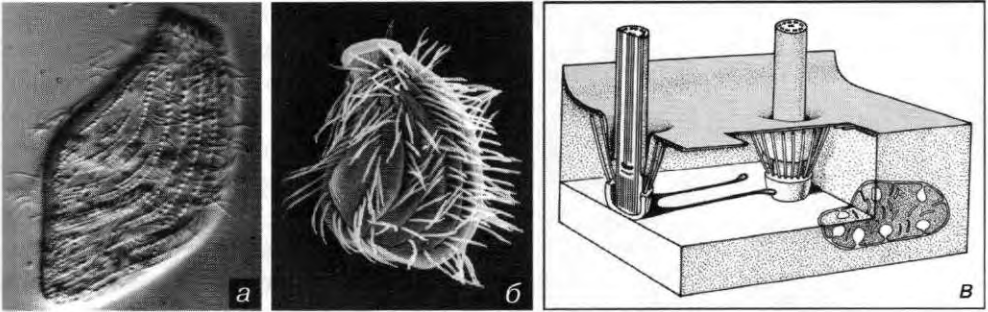
Stephanopogon

Ciliophora.
apogon

Stephanopogon

Stephanopogon (. 58).

(Primociliata).



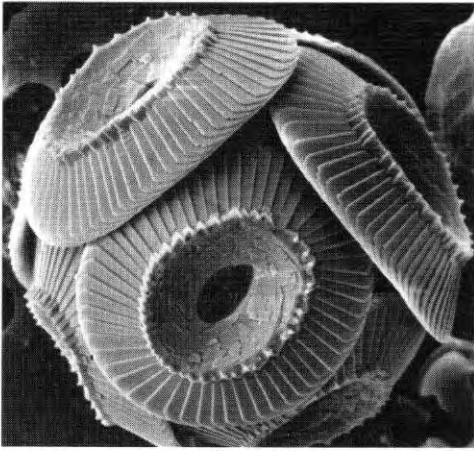
58. Pseudociliata. *Stephanopogon*: (),
 () () (— ; — ; —) ; — 800 , — 8

.]
 ;
 ,
 (. 58).
 2 16) —
 — (20
 50) ,
 100 (. 31).
 : *Stephanopogon*.

CHROMISTA Cavalier Smith,
 1987

PRYMNESIOMONADA
 Hibberd, 1976 (Haptomonada,
 Haptophyta) — 0 0

Hapto-
 phyta Haptomonada,
 [. —



59. Chromista, Prymnesiomonada:

Coccolithus pelagicus (). : 4 300 .

500

(. 59).

()

(. 60).

6 8

(. . 277).

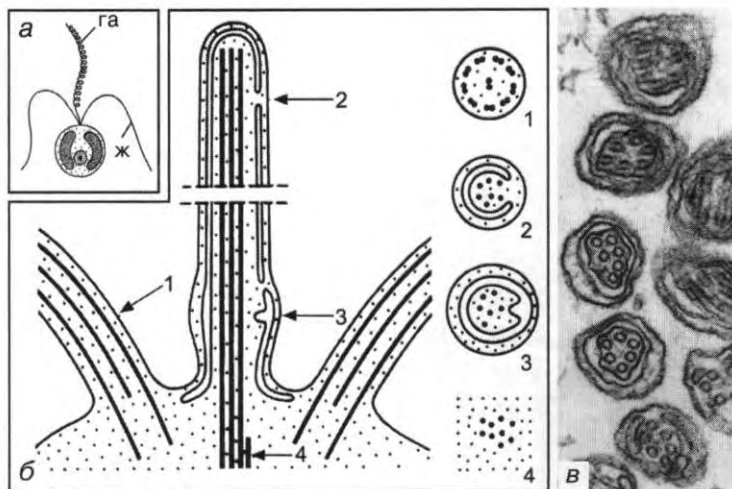
100

(

Phaeocystis

(. . 353).

Chrysochromulina



60. Prymnesiomonada: — ()
 (); — : 1 —
 9x2+2; 2 4 —
 (—
). : —65

1988 - ra (, -
 -); *Chrysochromulina*,
 (*Prymnesium* (
 -); *Diacronema*, *Pavlova* (-
 .)

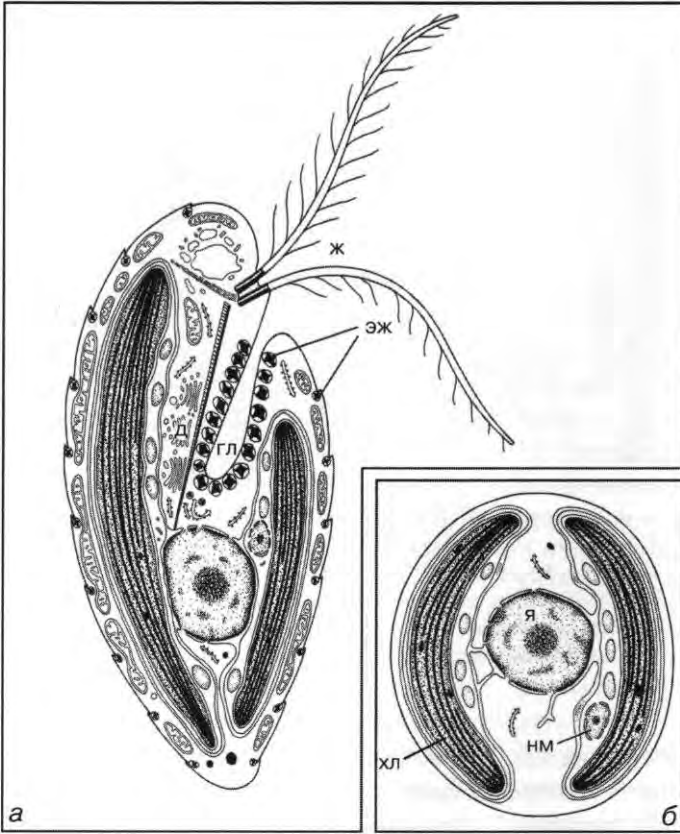
CRYPTOMONADA Senn,

1900 —

1,5

: *Emiliana*, *Pleurochrysis* 61).

(); *Coccolithus*, *Umbellosphae*),



61. Chromista,
 Cryptomonada: -
 () ()
 Cryptomonas
 ovata, -
 *
 () () . —
 — , —
 — , —
 (—
). : 5 500 .

(. . 242).

Chlorophyta Rhodophyta,
1

(. 61).

. 19)

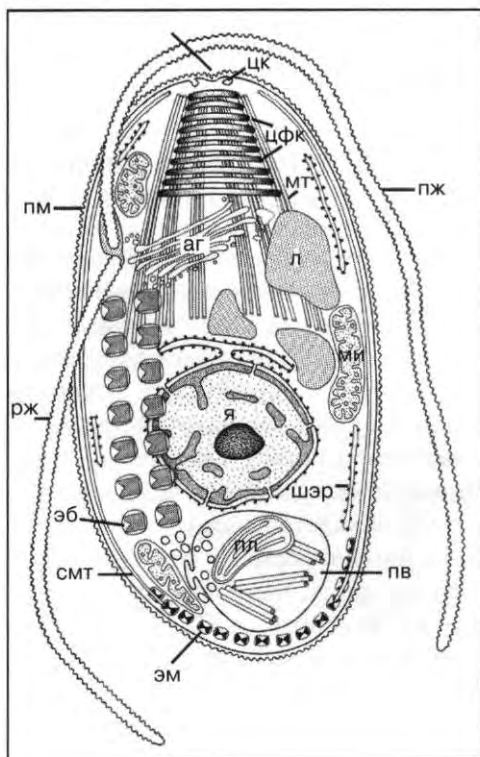
Guillardia theta

551 264

350×10^9

— 121

— 48



. 62. Cryptomonada:

Katablepharis remigera.

(),

()

().

()

()

(),

().

(),

62, —

(

).

8 500

: *Chilomonas*, *Cryptomonas*,
Guillardia, *Katablepharis*, *Pyrenomonas*,
Rhodomonas.

HETEROKONTA Luther,

(Phaeophyta)

1899

», «
; ,

(— strame
nopiles),

(>
. 254).

(

)

(. 29),

(. 254) (. 249).

();

1;

PROTEROMONADEA Grasse,
1952

10 30

: *Karotomorpha*, *Proteromonas*.

OPALINEA Wenyon, 1926 —

400 4

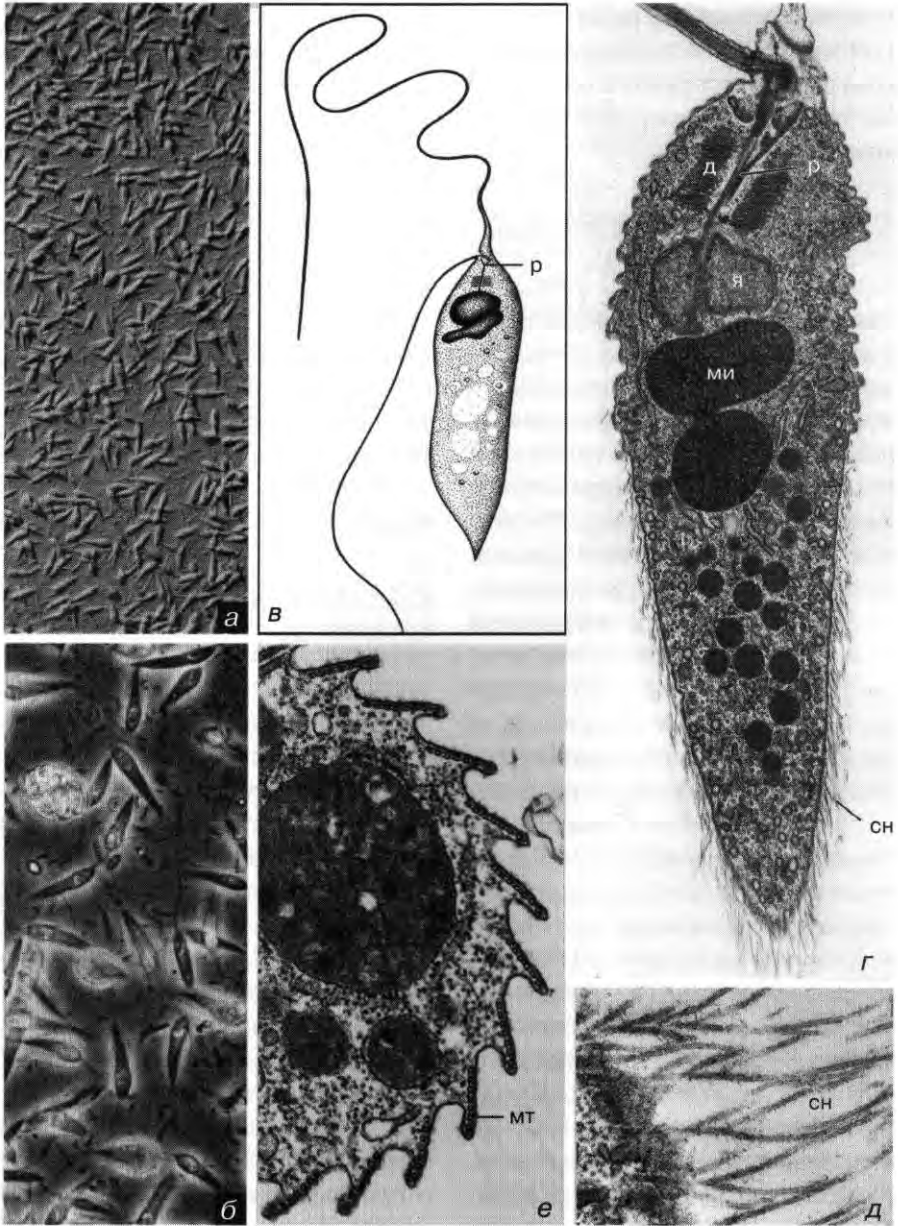
Opalineia

Proteromonas (. 63)

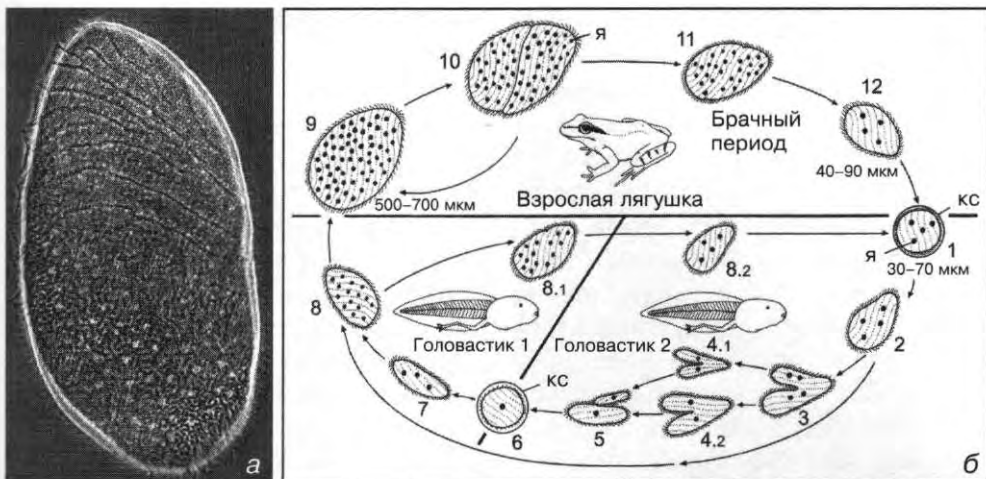
(3)

(. 64).

()



63. Chromista, Heterokonta, Proteromonadea: *Proteromonas lacertae viridis* (): - (,), () (,); - *Karotomorpha bufonis* (). - () - () - 3 500 , - 10 , - 50 , - 40 .) . : - 350 , - 850 ,



64. Heterokonta, Opalineae: — *Opalina ranarum* ; — -
ranarum: (1); -
(2); (3, 4);
(5); *Opalina* -
(6); (7, 8);
(8.1, 8.2);
(10), () (9);
2 12 (11, 12); (1),
().

Ciliophora,
Opalineae —

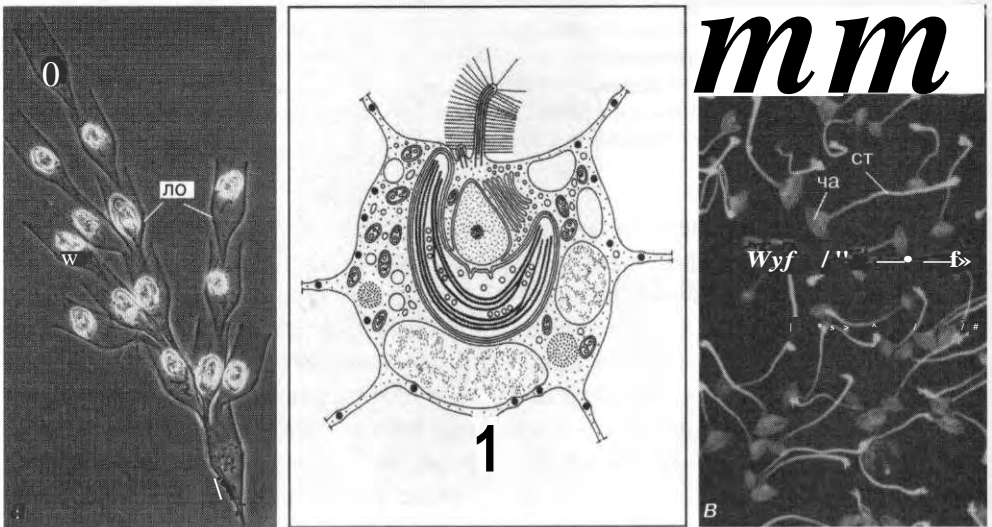
(. 646).

() .

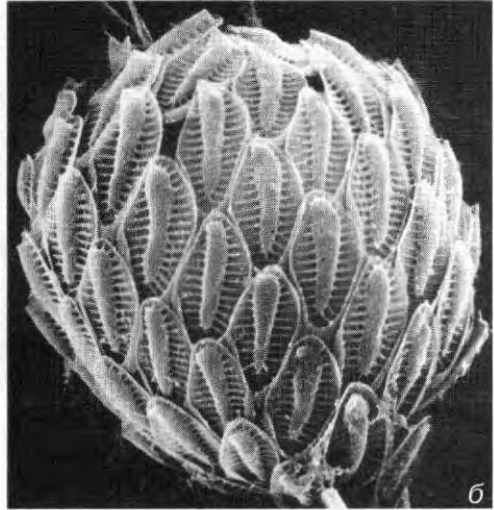
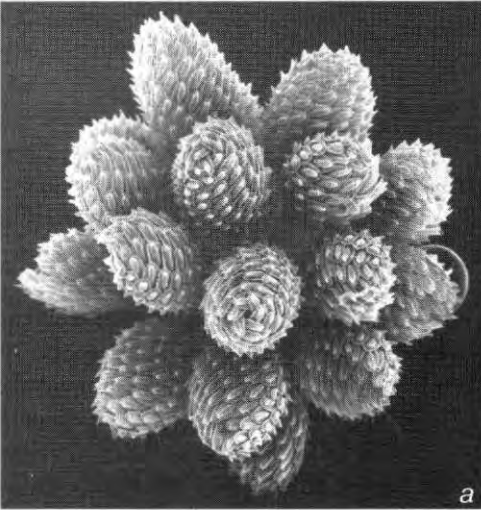
()

()

: *Cepedia*, *Opalina*, *Proto*
 (- *opalina*, *Zelleriella*.



65. Heterokonta, Chrysomonadea: a — *Dinobryon*,
 () ; — *Chrysamoeba radians*
 ; — *Poterioochromonas malhamensis*
 () () — ; —
). : — 450 , 6 — 6 , — 750 .



66. Chrysomonadea: (—) Synura petersenii. — ; — — 500 , — 3

CHRYSOMONADEA¹ Engler,

1898 —

1000

5 20 (. 65).

(Synura, Mallomonas, Paraphysomonas)

(. 66).

¹ phyton — Chrysophyta.

phycos — Chrysophyceae

Dinobryon

Dinobryon)

1

Chrysomonadea —

Chrysamoeba,
— *Chry*

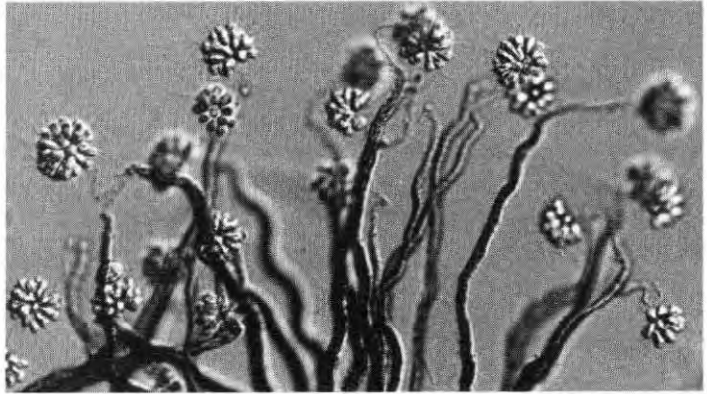
sarachnion.

: Chryso

monadida, Pedinellida

Silicoflagellida.

.67. Chrysomonadea:
Anthophysa (:
 Zollfel and Hausmann:
 Microcosmos 76 [1987]
 353). : 230x.



Chrysomonadida Pascher,

1912

3
 : *Oikomonas*, *Pedinella*,
Pteridomonas.

: *Anthophysa*,
Dinobryon, *Ochromonas*, *Synura*;
 : *Chrysamoeba*, *Chrysarachnion*,
Chrysostephanosphaera.

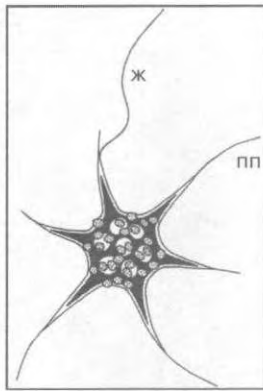
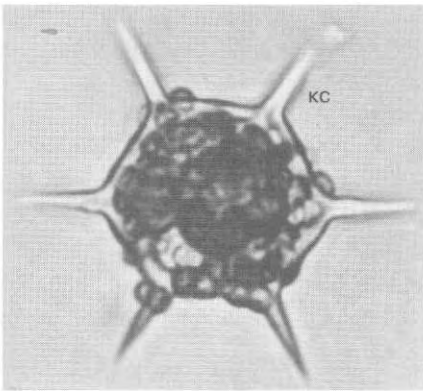
Silicoflagellida Borgert, 1891
 (Dictyochales) —

Pedinellida Pascher, 1910 —

1

2

(, *Pteridomonas*)
 ()



. 68. Chryomonadea, Silicoflagellida: *Distephanus speculum* -
 (), () -
 () () (-
 . : - 400 .

(. 68). -

(. 70).

: *Dictyocha*, *Distephanus*.

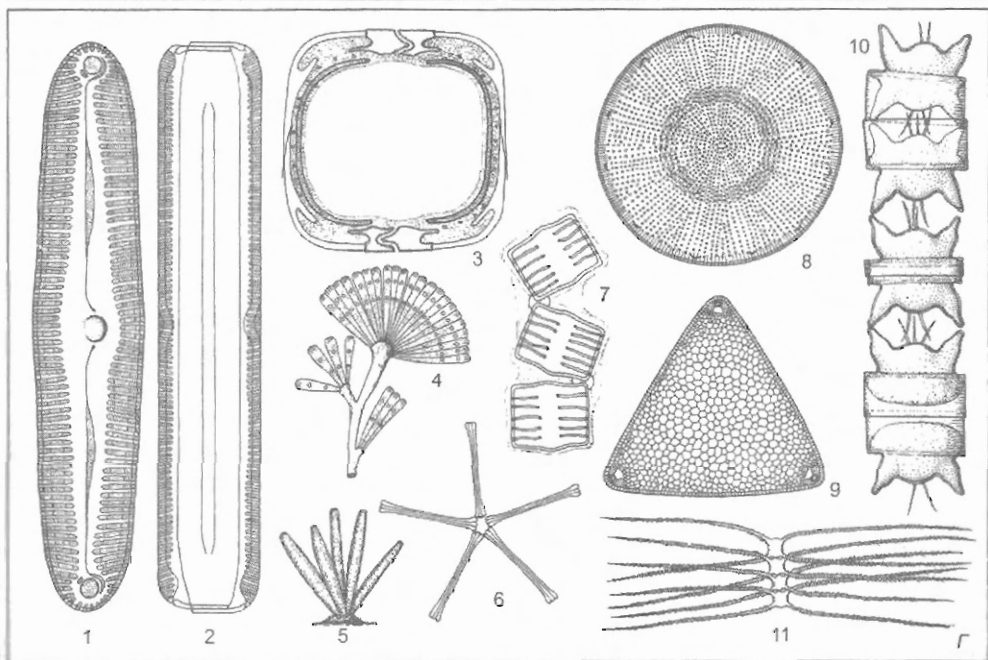
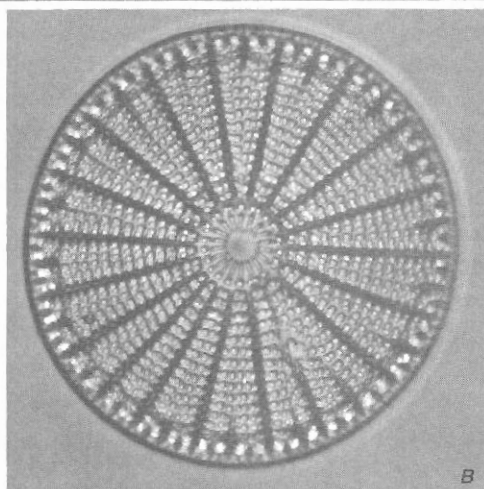
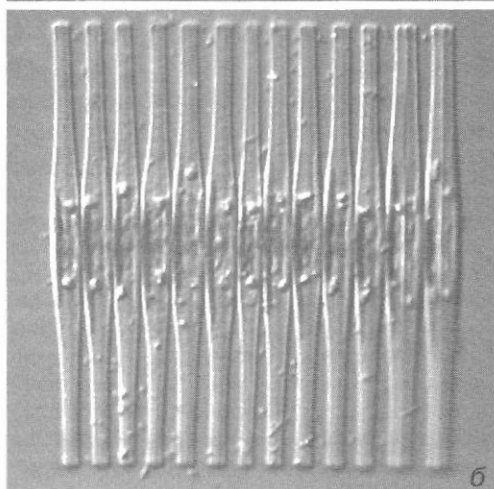
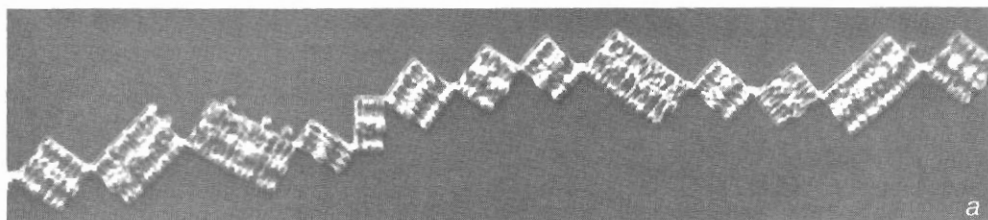
BACILLARIOPHYCEAE

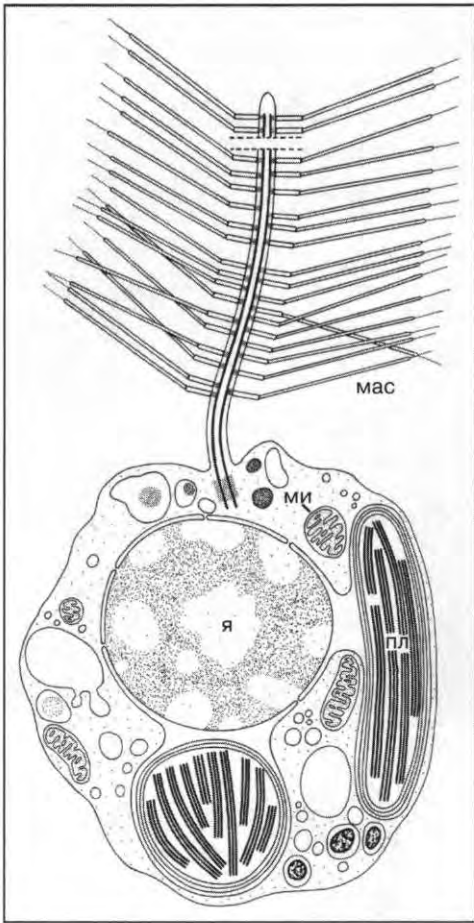
Haechel, 1878 (Diatomeae) —

100

(. 69).

. 69. Heterokonta, Bacillariophyceae: — *Tabellaria*, — *Fragilaria*,
 — *Arachnoidiscus*, — : 1 7 — ; 8 10 —
 ; 1 3 — *Pinnularia viridis*, 4 — *Licmophora flabellata*, 5 — *Synedra gracilis*,
 6 — *Asterionella formosa*, 7 — *Tabellaria flocculosa*, 8 — *Coscinodiscus pantocseki*, 9 —
Triceratium distinctum, 10 — *Odontella* (= *Biddulphia*) *aurita*, 11 — *Chaetoceros castracanei*
 (—). : — 200 , — , — 800 , : 1 2 — 500 , 3— 1 ,
 4 6 165 , 7 335 , 8 9 165 , 10 335 , 11 21 .

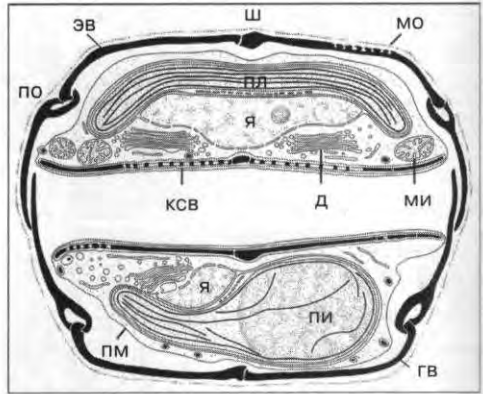




. 70. Bacillariophyceae:

Lithodesmium undullatum

— , —
 — (—)
) . : 7 000 .
 (—)
) .)
 () ,



. 71 . Bacillariophyceae:

Amphipleura

pellucida,

— , — , —
 , — , —
 , — (—) .
 : 10 .

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) .)
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 : (—)
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) , (—)
) .

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(

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1

Pseudo nitzschia (*P. multiseriata*,
P. australis, *P. pseudodelicatissima*, *P. pun-
gens* *P. seriata*)

SiO₂),

Thalassio

sira Chaetoceros convolutes,

()
)

(,)

Symbiodinium

nales. : Centrales , Centrales,

: *Bacillaria*, *Navicula*, *Nitzschia*, *Pleurosigma*, *Pseudo nitzschia*.

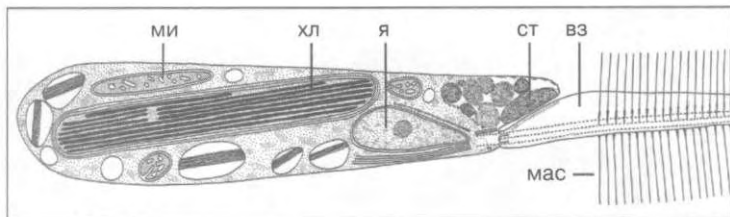
HETEROMONADEA Leedale, 1983 (Xanthophyceae) —

(.70).

: *Biddulphia*, *Coscinodiscus*, *Odontella*, *Rhizosolenia*.

(3

(*Tribonema*, *Vaucheria*)



72. Heterokonta, Eustigmatophyceae:

() . : 4 400 .

(. 72),

()¹.

: *Chloromonas*;
: *Chlamydomonas*,
Rhizochloris, *Reticulosphaera*.

: *Eustigmatos*, *Chlorobotrys*,

Monodopsis.

EUSTIGMATOPHYCEAE

Hibberd & Leedale, 1971 —

E

LABYRINTHULEA Cienkowski,
1867 (Labyrinthulomycota) —

6 15

Labyrinthulida

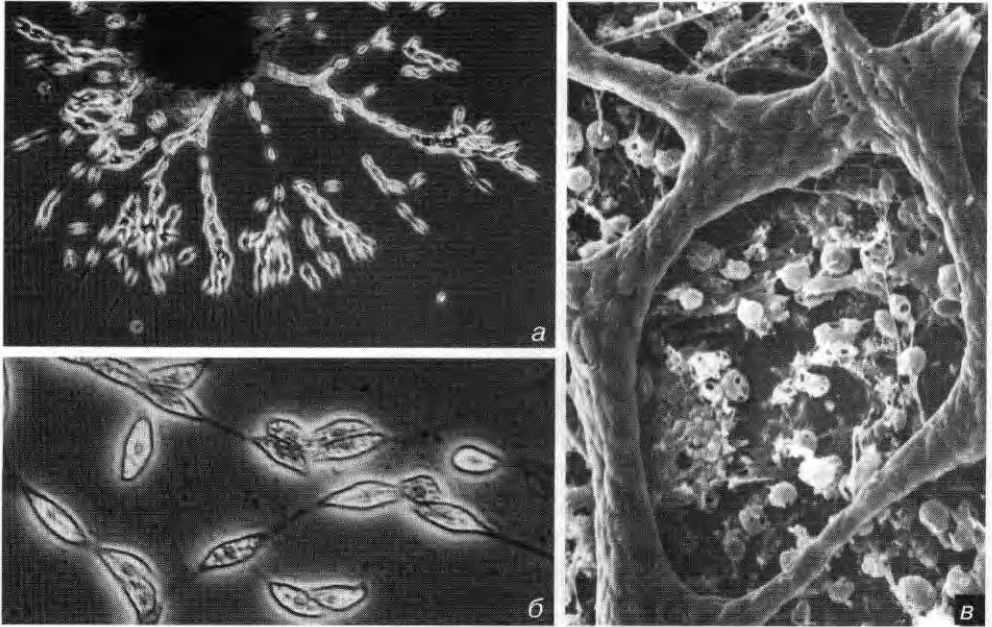
Labyrinthulidae Thraustochytriidae,

40

(10 15)

(. — .)

(. 72).



73. Heterokonta, Labyrinthulea: — *Labyrinthula coenocystis*; —
 Mikrosk. Anat. 102 [1969] 387). : a — 190x, — 800x, s — 330x. (— : Stey: Zellforsch.

: *Labyrinthula zosterae*
L. macrocystis —

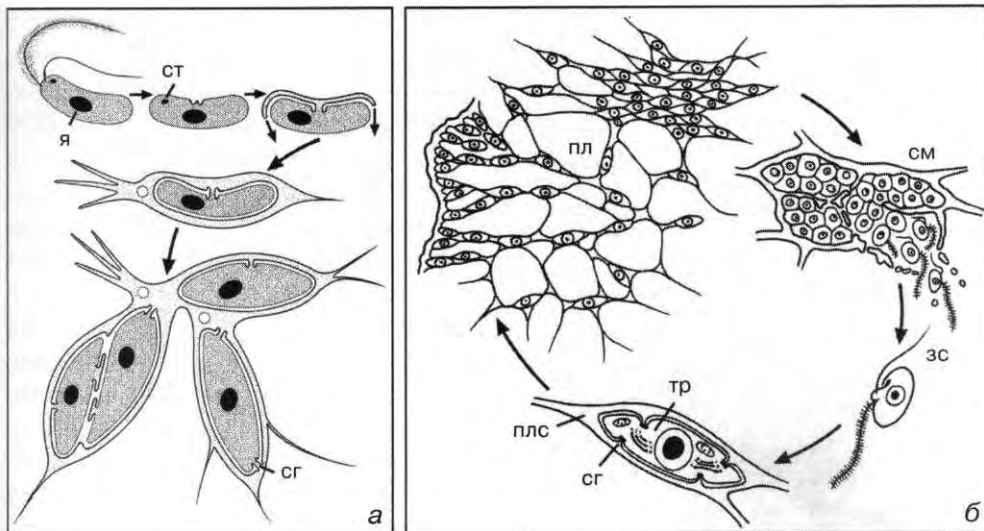
Laby-
rinthula

(. 73).

(« »)

« »

(. 74).



. 74. Labyrinthulea: —

(= « »).

Labyrinthula:

(),

« »

(),

(),

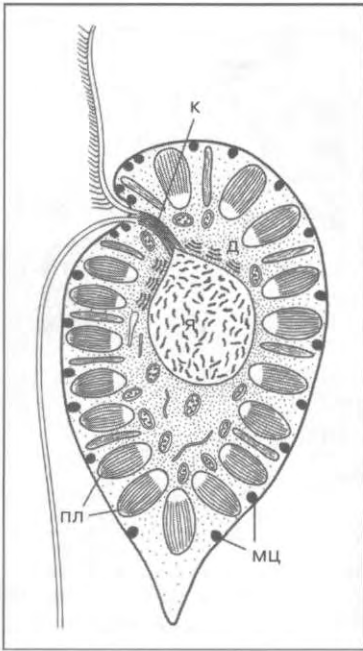
(),

(),

().

Heterokonta.

: *Labyrinthula*, *Labyrithuloides*, *Thraustochytrium*.



. 75. Heterokonta, Raphidomonadea: *Chattonella* sp.

Vacuolaria.

()
 (), — ()
 ∴ 3 700 .

(Cercozoa).

RAPHIDOMONADEA

(Chloromonadea) Heywood & Leedale, 1983 —

(20) —

(. 75).

Heterosigma
shiwo, *Chattonella antiqua*, *Ch. marina*,
Fibrocapsa japonica

90

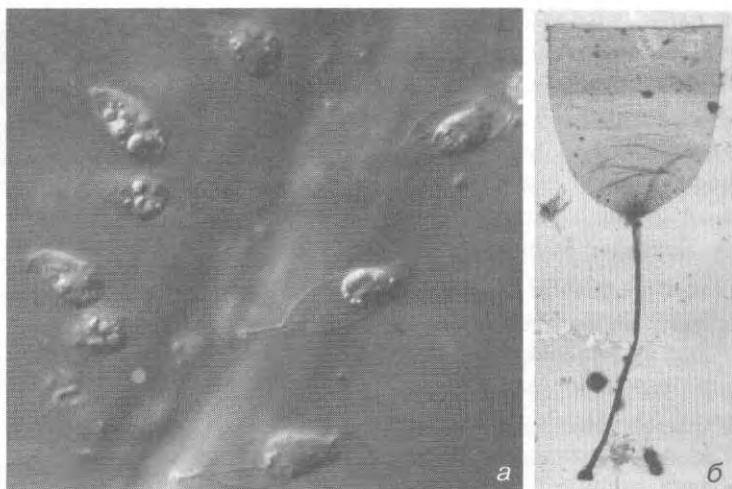


Рис. 76. Heterokonta, Bicosoecidea: живые особи (а) и препарат отдельного домика (б) *Bicosoeca* (= *Bicoeca*). (а — любезно предоставлен Х. Шнайдер, Ландау). Увел.: а — 800х, б — 2 400х.

: *Chattonella*, *Heterosigma*,
Gonyostomum, *Fibrocapsa*, *Vacuolaria*.

**BICOSOECIDEA Grasse &
 Deflandre, 1952 —**

40

(. 76, 273).

5

, 1 (

2

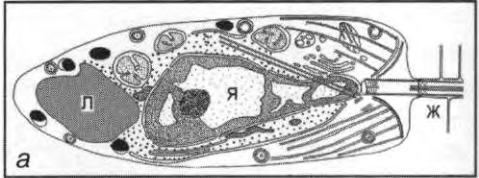
: *Bicosoeca* (= *Bicoeca*),
Cafeteria, *Pseudobodo*.

60

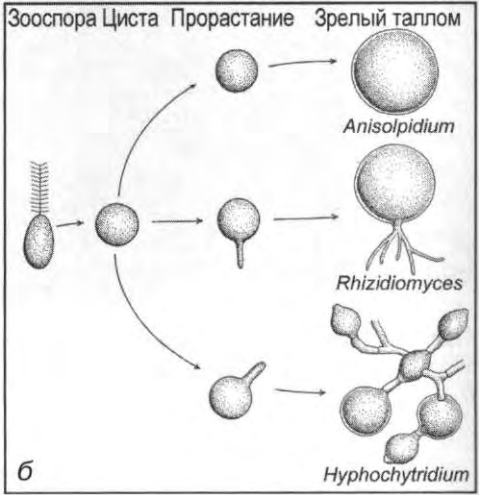
12

HYPHOCHYTRIOMYCETES

Patterson, 1982 —



25



. 77. Heterokonta, Hyphochytriomycetes:

Hyphochytrium ()

(), —

4 6 (. 77)

(—)

∴ — 5

Heterokonta,

Rhizidiomyces.

776,

Hyphochytrium.

18 48

: *Anisopidium*, *Hyphochyt*
rium, *Rhizidiomyces*.

: *Phyto*

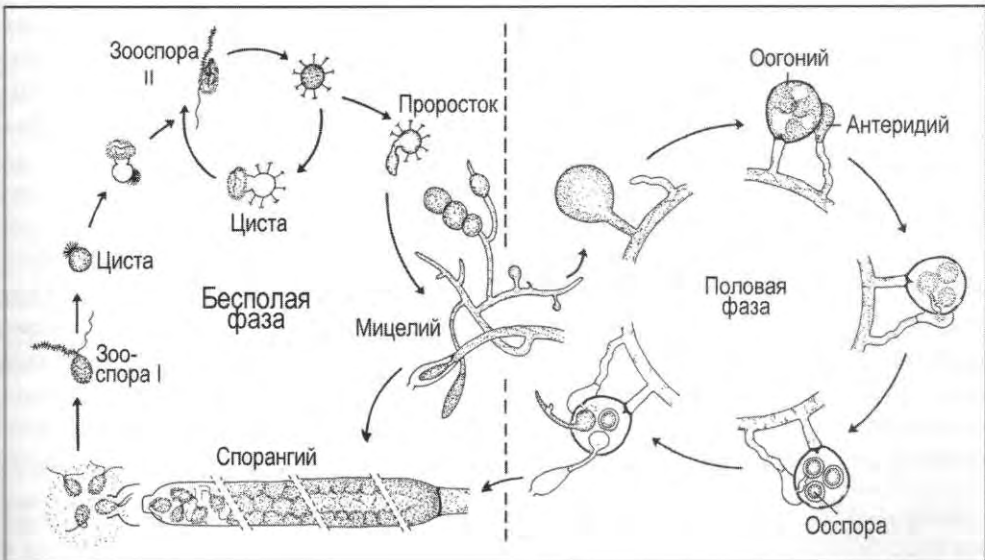
OOMYCETES Dick, 1976 —

phthora infestans —

800

65

(The Great Irish Potato Famine),



78. Heterokonta, Oomycetes:

Saprolegnia;

Oomycetes

(I)

(II)

()

()

()

()

1840 ¹; *Pythium* spp.,

; *Plasmopara viticola* —

; *Saprolegnia* spp.

Achlya spp., ²

(. . 238).

Saprolegnia)

(. . 78).

¹ 1840

¹ 1845 1852 . — ()

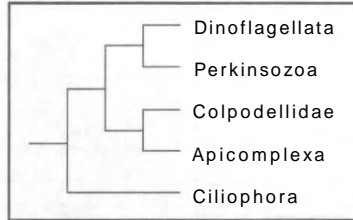
« » . « »

(. .) —

11.

Alveolata

()



(3 1,3

(3 1,6

(Perkinsozoa

Colpodellidae)

(. 11).

Apicom-

plexa —

: *Achlya*, *Albugo*, *Haptoglossa*, *Plasmopara*, *Phytophthora*, *Pythium*, *Saprolegnia*.

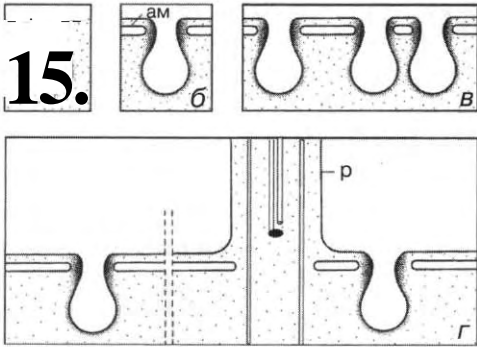
1200

ALVEOLATA Cavalier Smith, 1992 —

Perkinsus;

— Ciliophora, Apicomplexa Dinoflagellata, Ascetospora (Haplospora)

Apicomplexa (. 79).



15.
 .79.
 — Perkinsus; Alveolata:
 Apicomplexa; —
 ()
 () —
 — () .

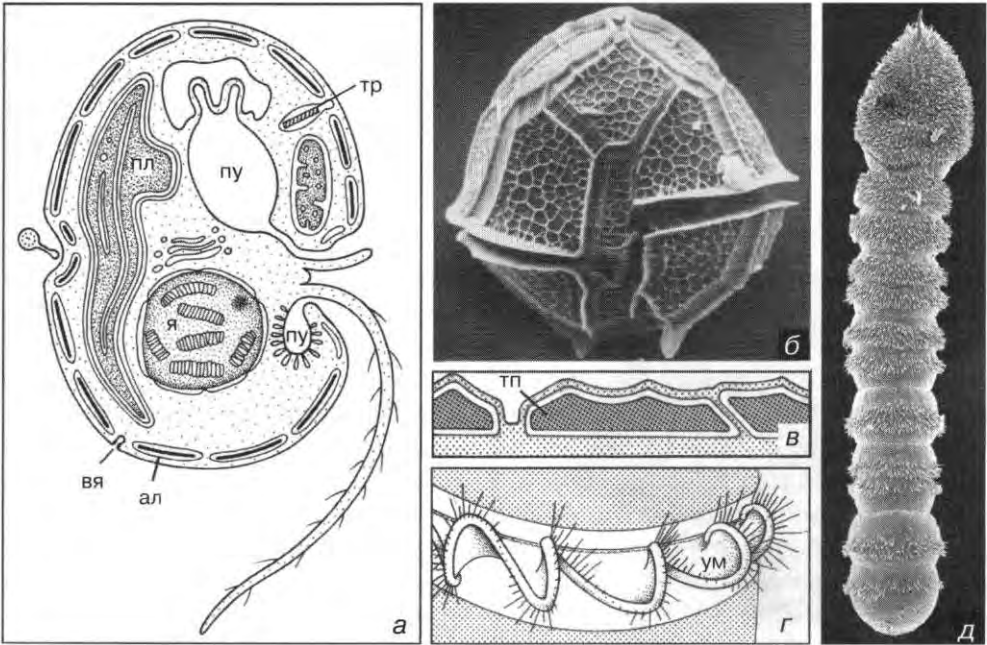
80).
 ()

, Perkinsozoa *Colpodella*.
 ;
 , Perkin-
 sozoa
 , a Colpodellidae —
 Apicomplexa.

DINOFLAGELLATA Biitschli,
 1885 (Dinozoa, Dinophyta) —

2500

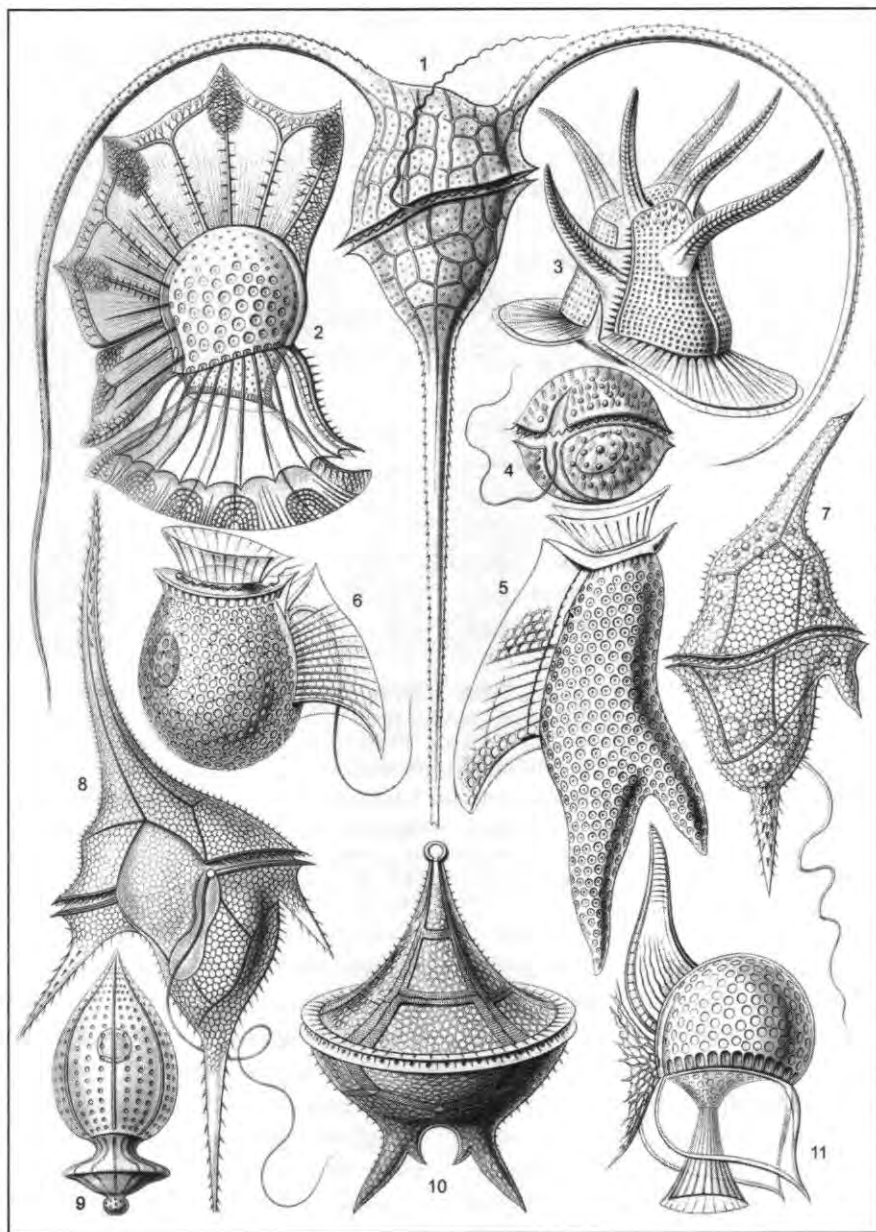
4000



80. Alveolata, Dinoflagellata: — ; —
Pehdinium bipes; — () ; —
 () ; —
 () ; —
Haplozoon axiothellae. — ; — ; —
 — ; — (— ; —
 P.M. ; — : Leander et al.:
 Europ. J. Protistol. 38 [2002] 287). : 6 — 1 000x, —800x.

(. 80)

(. 81).



81. Dinoflagellata:
 (Peridinea). 1 — *Ceratium tripos*, 2 — *Ornithocercus magnificus*, 3 — *Ceratocorys horrida*, 4 — *Goniodoma acuminatum*, 5 — *Dinophysis homunculus*, 6 — *D. sphaerica*, 7 — *Ceratium cornutum*, 8 — *C. macroceros*, 9 — *Pyrgidium pyriforme*, 10 — *Peridinium divergens*, 11 — *Histioneis remora* (: Haeckel: *Kunstformen der Natur*. Verlag des Bibliographischen Instituts. Leipzig 1899 1904).

Ceratium;

Gymnodinium mikimotoi, *G. breve* *G. gala theanum*;

Gymnodinium eucyaneum *G. acidotum*;

Lepidodinium viride, *Gymnodinium chlo rophorum*;

Peri dinium balticum, *P. foliaceum*;

Podolampas bipes.

Noctiluca *Oodinium*.

To,

Nocti-

luca scintillans

(
);
2

(. . . 31):

Ornithocercus magnificus, *Citharistes regius*;

(. . . 31).

1

2

2 :
 (3
 Nocti
 luca *Protopteridinium* (. . 285).
 (*Blastodinium*, *Oodinium*).
 (. . . 244)
Zooxanthella, *Symbiodinium* —
 (*Polykrikos*),
 (. . . 237).
 1998
 Warnowiidae
 « » (coral
 bleaching) —
 1
 1997 1998
 Scleractinia. —

30

Alexandrium tamarense, *A. catenella*,
Gambierdiscus toxicus, *Gonyaulax tama-*
rense *Gymnodinium catenatum*.

(ciguatera).

Pfiesteria piscicida

Noctiluca scintillans *Gonyaulax*.

(),

, 440

Dinoflagellata

: Diniferea Syndinea.

Diniferea.
dinea —

Syn-

1

: *Alexandrium*, *Amoeboph-*
rya, *Blastodinium*, *Ceratium*, *Dinophysis*,

Gambierdiscus, Gymnodinium, Lepidodinium, Noctiluca, Oodinium, Ornithocercus, Pfiesteria, Podolampas, Prorocentrum, Protoperidinium, Symbiodinium, Syndinium, Zooxanthella.

Apicomplexa

PERKINSOZOA Noreen

(. 82)

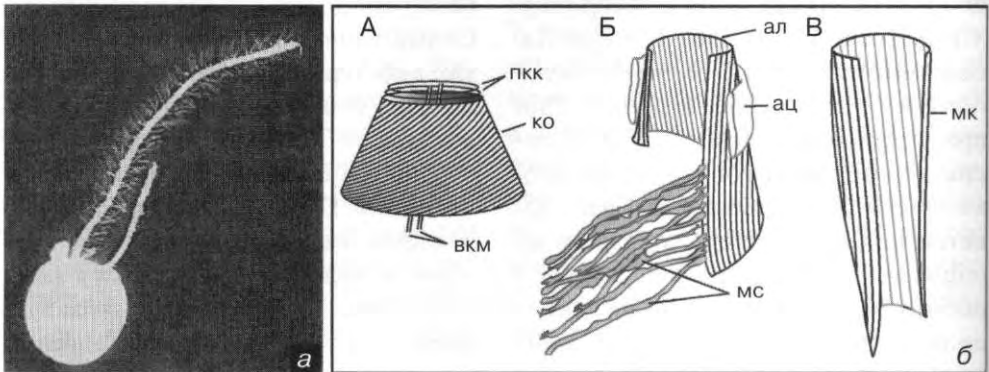
et al. 1999 —

Perkinsozoa

18S

, *Perkinsus*

Colpodella



. 82. Alveolata, Perkinsozoa: —

Perkinsus marinus; —

Dinoflagellata (). Apicomplexa (,)

Apicomplexa (A), Perkinsozoa ()

(). *Perkinsus* ():

Amphidinium poecilochroum () (—

). .: — 4 500 .

Perkinsus

Perkinsus

Perkinsus

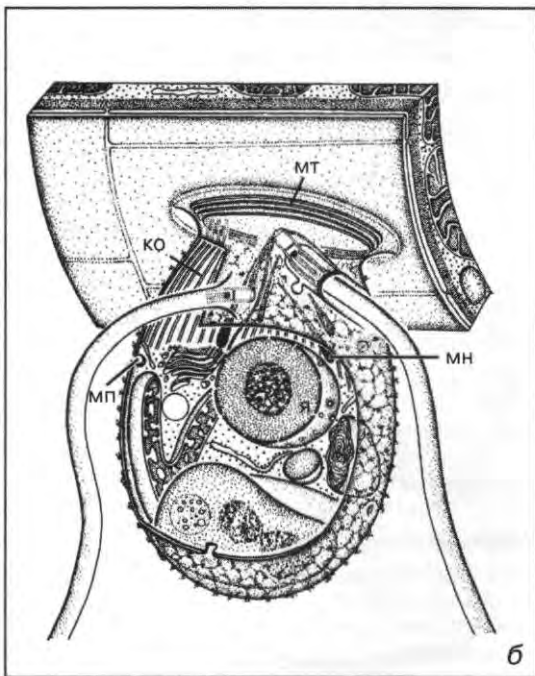
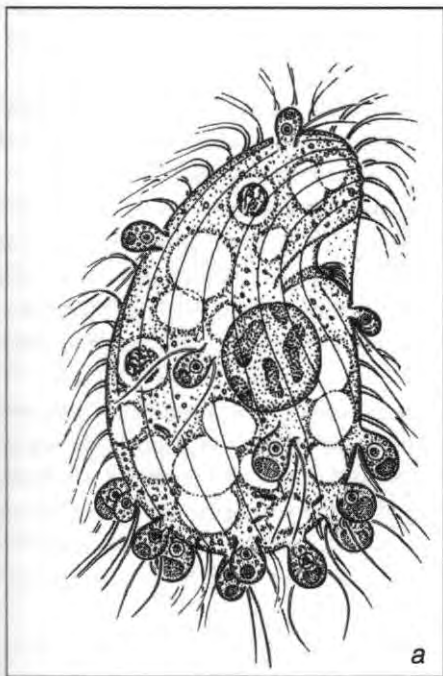
Parviluci

fera (*P. infectans*)

Alexandrium,

: *Parvilucifera*, *Perkinsus*,

Rastrimonas.



83. Alveolata, Colpodellidae: a — *Colpodella gonderi* (= *Spiromonas*) (Colpoda); — (), (), () (: Foissner and Foissner: Protistologica 20 [1984] 635). : a — 750x, 6 — 7 000x.

Colpodellidae Simpson & Patterson, 1996

Colpodella (*Spiromonas*) —

4800

(. 83).

Colpodella

(. 84).

Perkinsozoa

: *Perkinsus*

(. 85)

Dinoflagellata, a Colpo-

dellidae,

Apicomplexa (. 11).

: *Colpodella*.

APICOMPLEXA Levine,

1970 —

Sporozoa, Apicomplexa

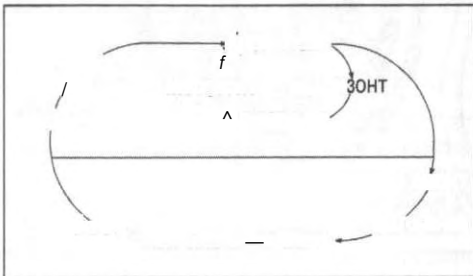
20

2

Apicomplexa

(. 86,

87):

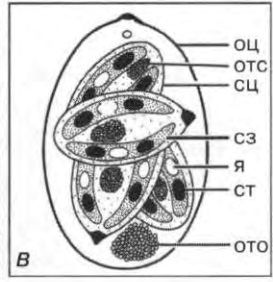
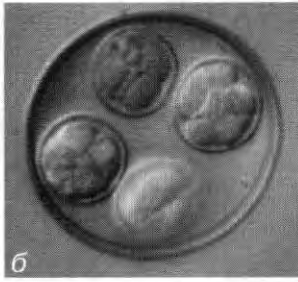
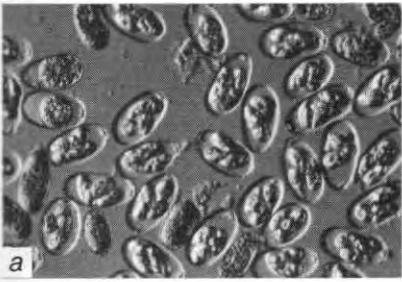


()

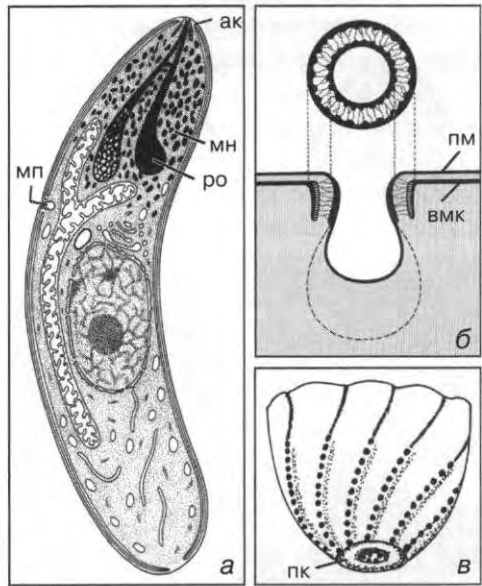
. 84. Alveolata, Apicomplexa:

(=),

2 8



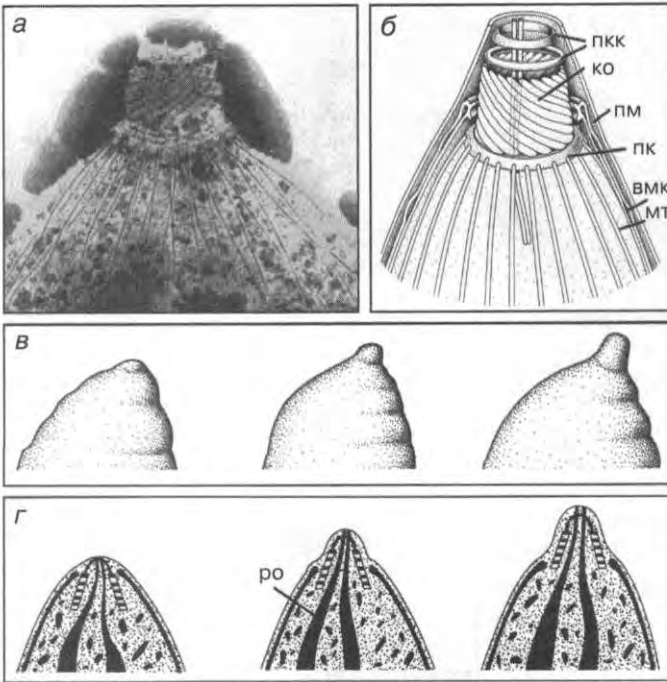
85. Apicomplexa: — *Eimeria stiedae*; — *Eimeria sp.*,
 ; —
 ; —
 (—)
 ; — 1



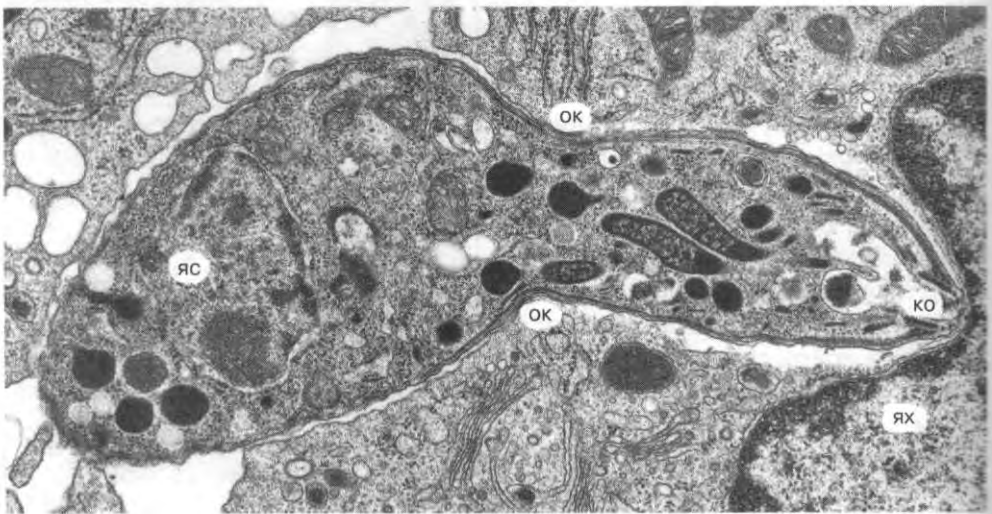
(. 87, 88, 98).

86. Apicomplexa: —
 ; —
 ()
 (), —
 ; (), —
 ; —
 () (—
 rich proteins). —
)

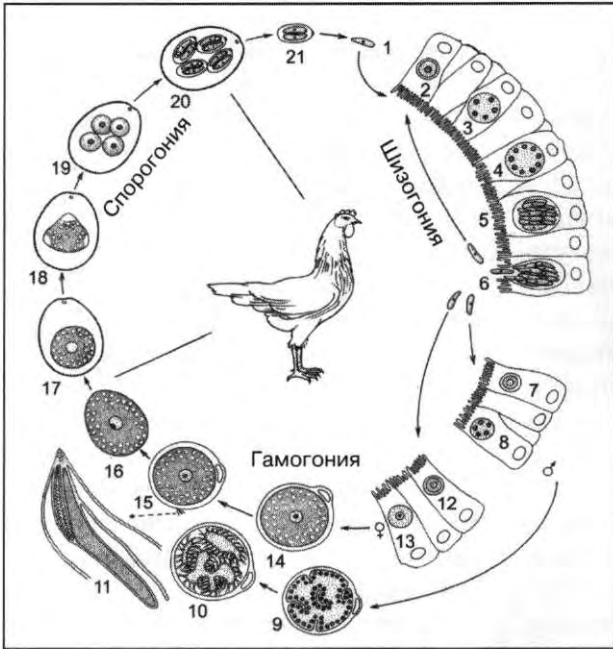
(hystidine



87. Apicomplexa: *Toxoplasma gondii* (Nichols et al.: J. Protozool. 34 [1987] 217; 6 r.). — 35



88. Apicomplexa: *Toxoplasma gondii* (Nichols and O'Connor: Lab. Invest. 44 [1981] 324). — 20



. 89. Apicomplexa: -
Eimeria maxima. 1 -
 , 2 6 - -
 , 7 15 - , 12 14 -
 , 8 11 -
 , 16 -
 (), 17 20 -
 , 21 - ().

Apicomplexa

Eimeria,
Eimeria

1

1

3

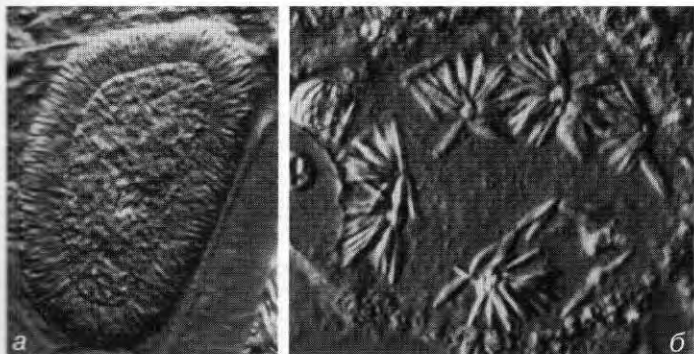
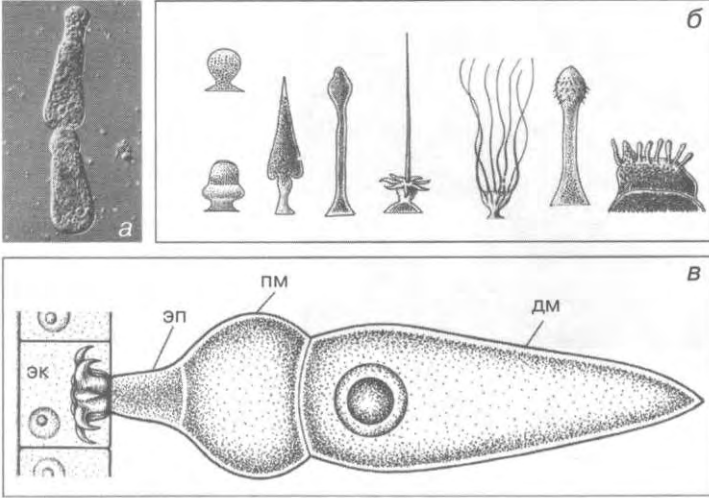


Fig. 90. Apicomplexa:
 () ()
Eimeria canadensis (: Müller et al.: J. Protozool. 20 [1973] 293). .. a — 800x, b — 1 000x.

1977	-		
1978	-		
1979	-		
1980	-		
1981	-		
1982	-		
1983	-		
1984	-		
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2099	-		
2100	-		



. 91. Apicomplexa.
 Gregarina: — грегарины
 ; б —
 ; —
 ;
 (),
 (), и
 ()
 (— по:
). : — 85 .

GREGARINEA Dufour, 1828

1465

Apicomplexa

Gregarina, Coccidea Haematozoa.

Conoidasida; Haematozoa

Aconoi

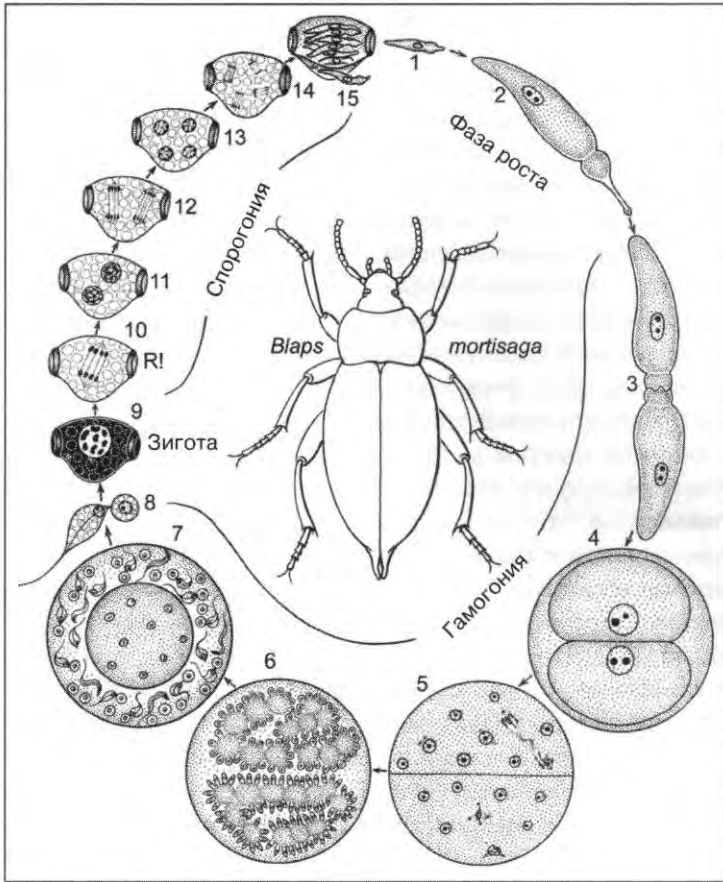
dasida.

(. 91)

1

Neogregarinida

Apicomplexa I



92. Gregarina:

Blaps mortisaga (1 4)

Stylocephalus longicollis.

(5 14).

(1); (2).
 (3).
 (4). (5),
 (6, 7). (7). (7, 8).
 (9). (10).
 8 (11 15).
 () ().
), 4
 (). 16
 ((10)

(. . 269).

2 ;

: Gregarina, Mattesia, Monocystis, Selinidioides, Stylocephalus, Siedleckia.

COCCIDEA Leukart, 1879 —

(. . 916)

()

().

(. 89).

4 32 ()

() ,

(. 92).

2 8 ()

().

Protococcida.

(Archi , Neogrega

rinida).

(),

1

— Eugregarinida —

2 « » — , Sipunculida
Enteropneusta. —

Стр. 134 -
Стр. 135 -
Стр. 136 -
Стр. 137 -

Стр. **Agamococcida** Levine, 1979 —

Агамоккида -

Агамоккида -

Агамоккида -

Агамоккида -

Агамоккида -

Агамоккида -

Агамоккида () -

Агамоккида : *Rhytidocystis*, *Gemmo*
cystis.

Стр. **Protococcida** Kheisin, 1956
(Coelotrophida) —

Протоккида -

Протоккида -

Протоккида -

Протоккида -

Протоккида -

Протоккида -

Протоккида : *Eleutheroschizon*, *Grellia*.

Стр. **Adeleida** Leger, 1911 —

Аделеда -

Аделеда -

Аделеда -

Аделеда -

Аделеда -

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Аделеда - 2 4

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Аделеда : *Haemogre*
garina

Аделеда -

Аделеда -

Аделеда : *Klossia*

Аделеда -

Аделеда -

Аделеда : *Adelea*, *Haemogregarina*,

Karyolysus, *Klossia*.

Аделеда -

Eimeriida Leger, 1911 —

Аделеда -

Аделеда -

Аделеда -

Аделеда -

Аделеда -

Аделеда -

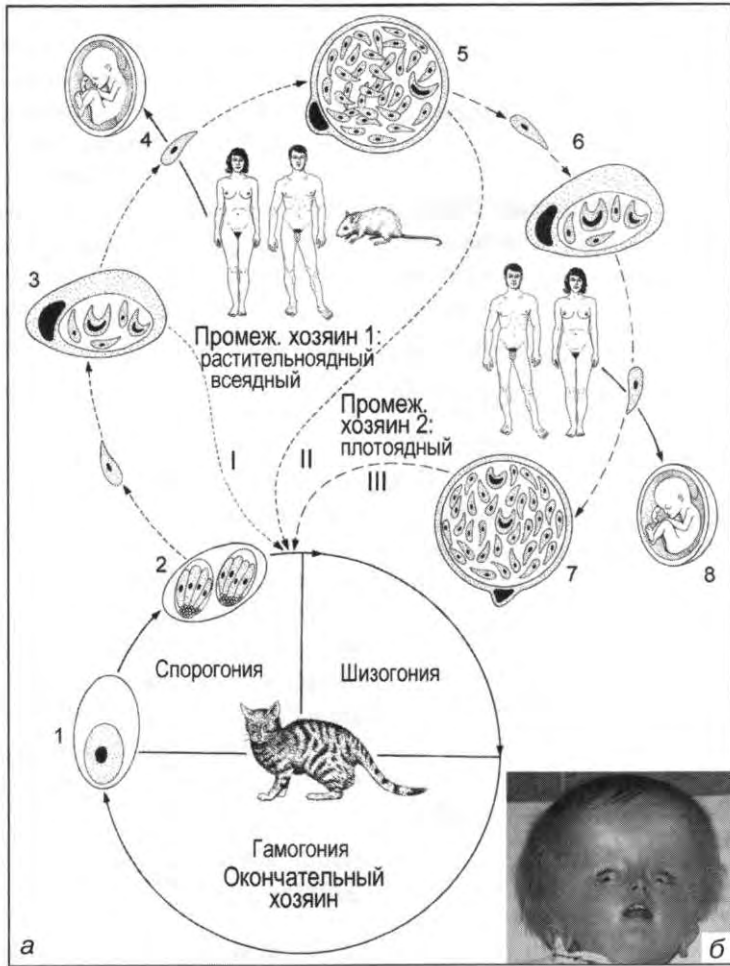
Аделеда -

Аделеда -

Аделеда -

Аделеда -

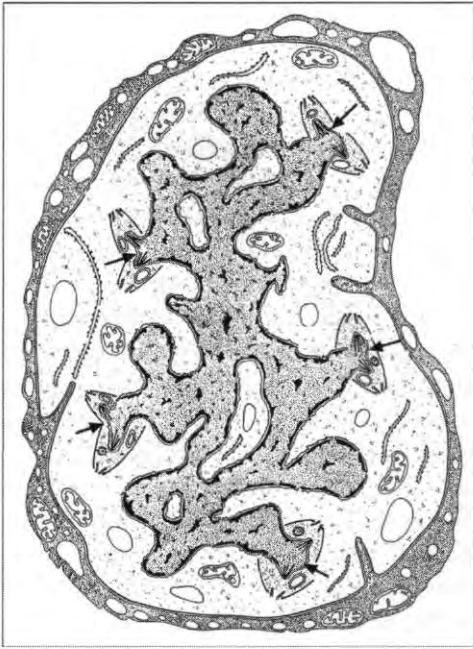
Аделеда -



93. Apicomplexa, Coccidia: — *Toxoplasma gondii*. 1 — ; 2 — ; 3 — ; 4 — () (5) () ; 6 — 3 5 (7) (8); (I) — 9 11 ; 2 (III) — 3 ; — 14 (— , —).

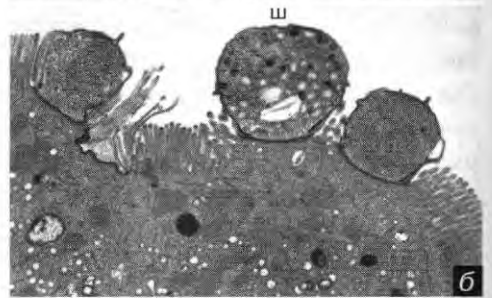
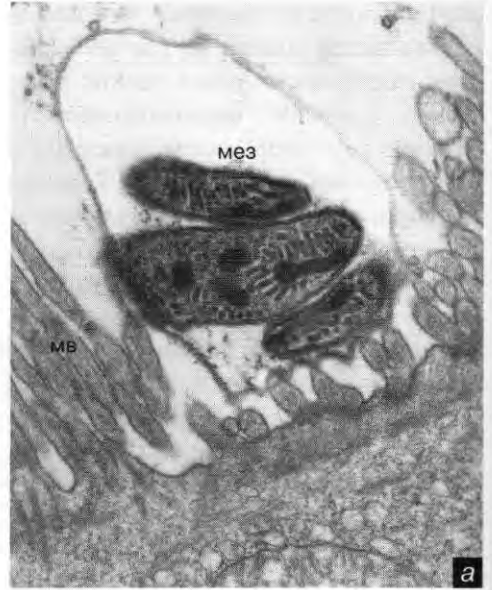
450 *Eimeria*
 (4 , 2
 89) *Isospora*
 (2 , 4
)
 {*Toxo-*
plasma, Sarcocystis, Frenkelia}.
Toxoplasma gondii (2
 4)
 (. 93).
Toxo-
plasma gondii

(.
).
 (« »)
 «
 »,
 (...).
 ()
 .



94. Coccidea: *Sarcocystis suis hominis*.

(: Heydorn and Mehlhorn: Zentralbl. bakt. Microbiol. Hyg. 1. AMI., Orig. A, 240 [1978] 123).



95. Coccidea: *Cryptosporidium parvum*.

Sarcocystis, Aggregata Frenkelia.

()

()

()

, *Sarcocystis suis hominis* (), *S. equicanis*

()

() ()

6 4 500 .

() *S. ovifelis* ()

, ,

(. 94).

Cryptosporidium parvum

(. 95).

dium

Cryptospori-

: *Cryptosporidium*, *Eimeria*, *Frenkelia*, *Isospora*, *Sarcocystis*, *Toxoplasma*.

HAEMATOZOEAE Vivier, 1982

Haematozoa

Aconoidina

Aconoidasida.

(=)

Haematozoa —

mosporida Piroplasmida

Haemosporidia Danilewsky

1885 —

Haemosporidia

Plasmodium ()

()

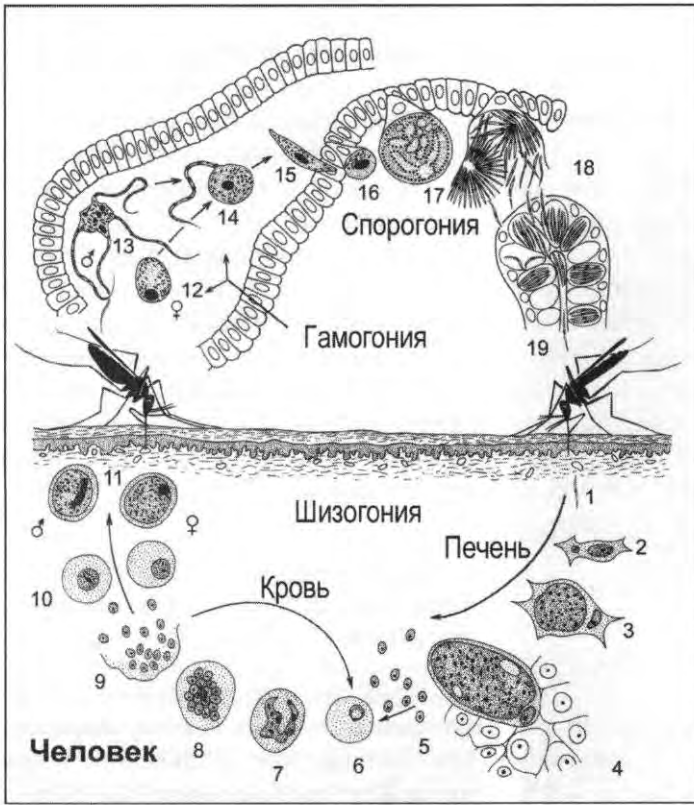
Anopheles, *Aedes*

Culex;

Plasmodium

(DEC. 96),

(NO 1)



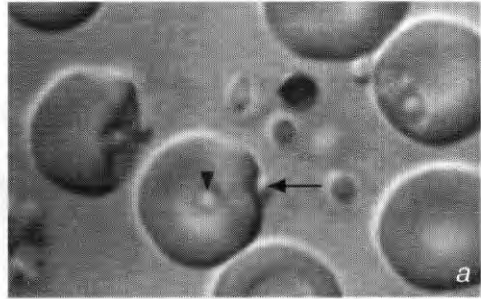
. 96. Apicomplexa,
 Haematozoa: -
Plasmodium
vivax. -
 : 1 5 —
 , 6 9 —
 , 10 11 —
 ;
Anopheles:
 12 —
 , 13 —
 ,
 14 —
 15 — , 16—18 —
 , 19 —
 ()
).

(. 97, 98),

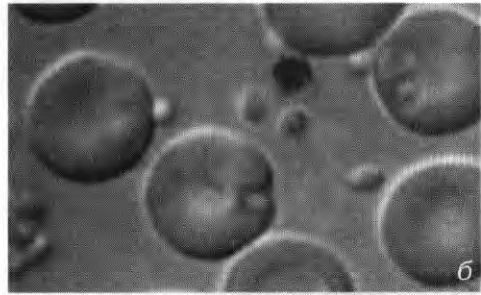
()

()
).

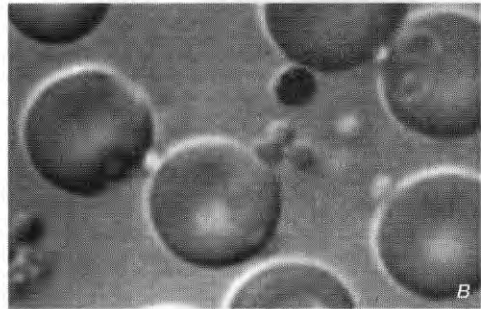
10



()



16 °



11

Plasmodium,

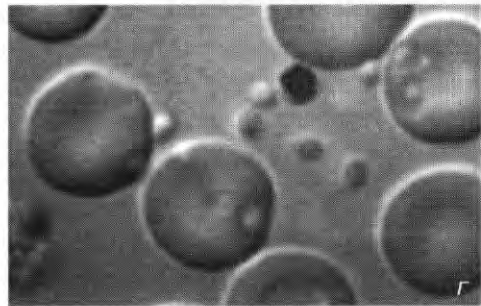
160

12.

malala

aria —

()



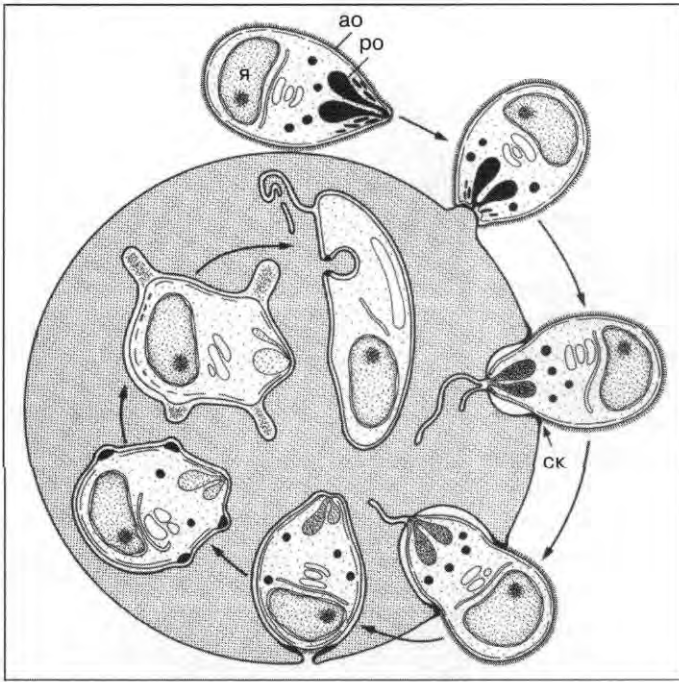
97. Haematozoa: ()

Plasmodium

() ()

100

4



. 98. Haematozoa:

Plasmodium knowlesi

12.

Plasmodium

<i>P. vivax</i>		8 16	48	
<i>P. ovale</i>		15	48	
<i>P. malariae</i>		20 35	72	+/
<i>P. falciparum</i>		7 12		+

; 300

1858 1869

— 18 . XX —
 : « », « —
 », « —
 ».

P. vivax

1997 2000 1996—

dium falciparum.
500 *Plasmo-*
300

Haemosporidia.

(Ixodidae).

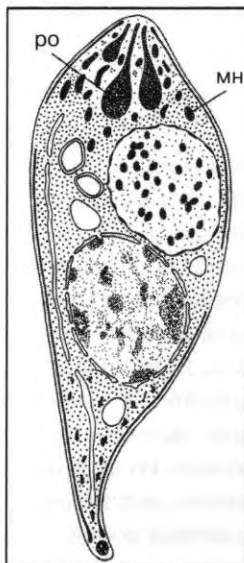
5

2

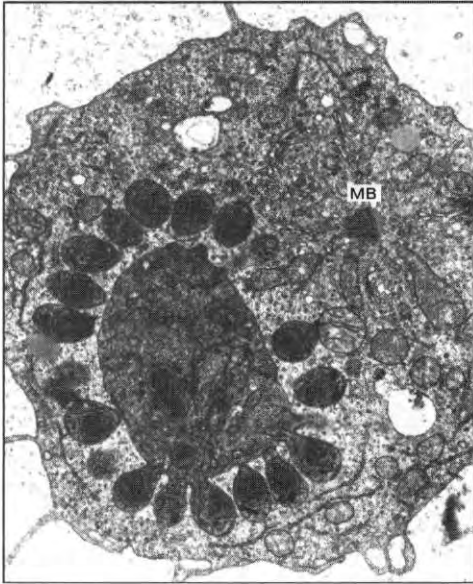
: *Haemoproteus*, *Leucocyto-*
zoon, *Plasmodium.*

Piroplasmida Wenyon,

1926 —



99. Haematozoa: *Babesia bigemina*,



100. Haematozoa:
Theileria annulata

() X.
) : 5 700 .

Babesia

Babesia bigemina

(. 99), 50%. *Babe-*
sia (. *bovis*, . *divergens* . *microti*)

Plasmodium, —

Theileria (.

100).

: *Babesia*, *Dactylosoma*,
Piroplasma, *Theileria*.

CILIOPHORA Doflein,

1901 —

Ciliata

(Perty, 1952) Infusoria (Bütschli, 1887).

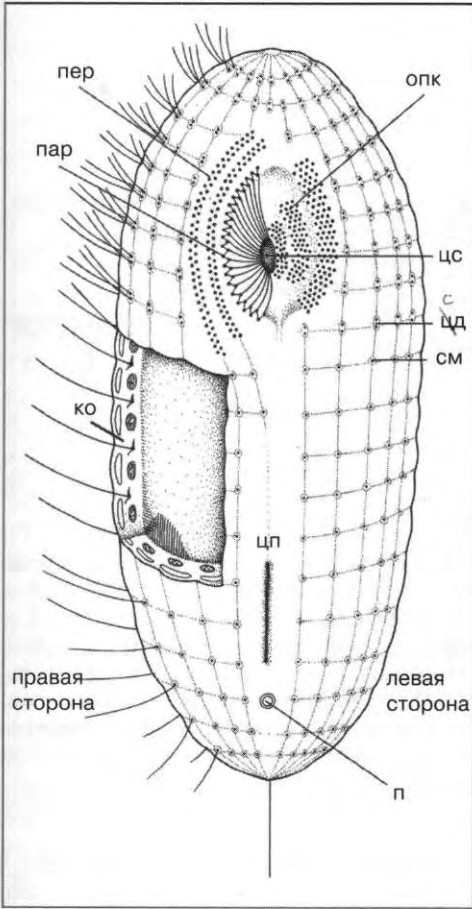
8000

(. 101),

: (1)

(2)

(3)



14

: (1) (2)

(*Euplotes*, . 104)

(*Coleps*, . 134),

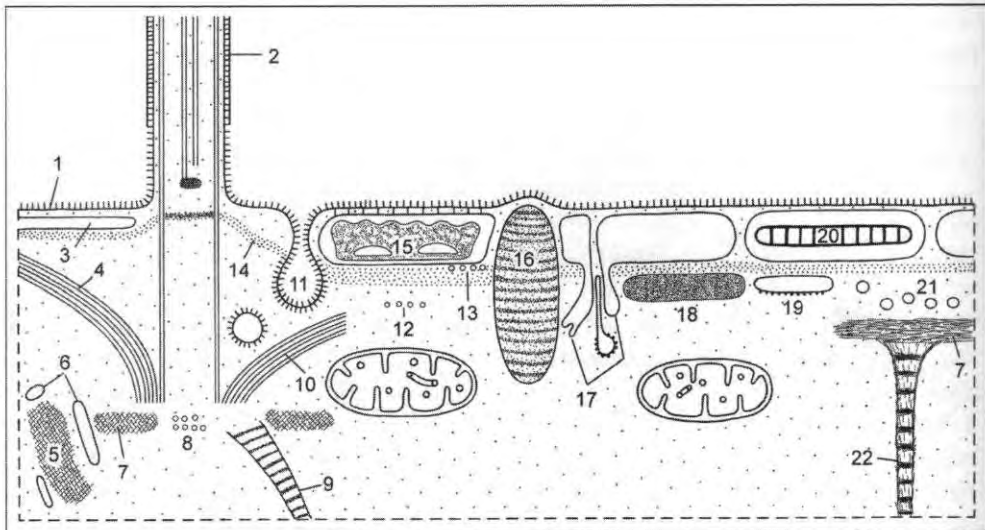
. 101. Alvelolata, Ciliophora:

105),

(. 102, 103),

), (. 102, 103),

)



102. Ciliophora:

1 —
 2 —
 3 —
 4 —
 5 —
 6 —
 7 —
 8 —
 9 —
 10 —
 11 —
 12 —
 13 —
 14 —
 15 —
 16 —
 17 —
 18 —
 19 —
 20 —
 21 —
 22 —

() .

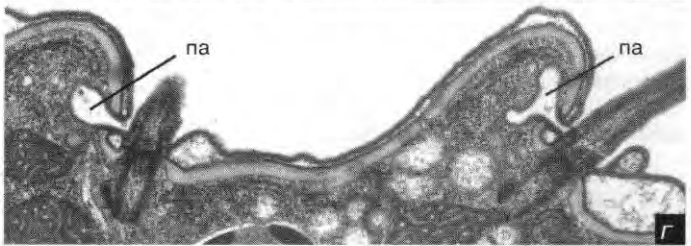
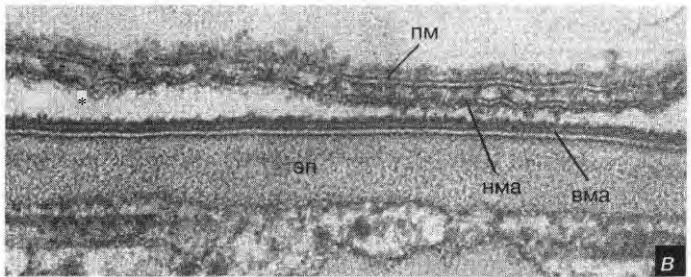
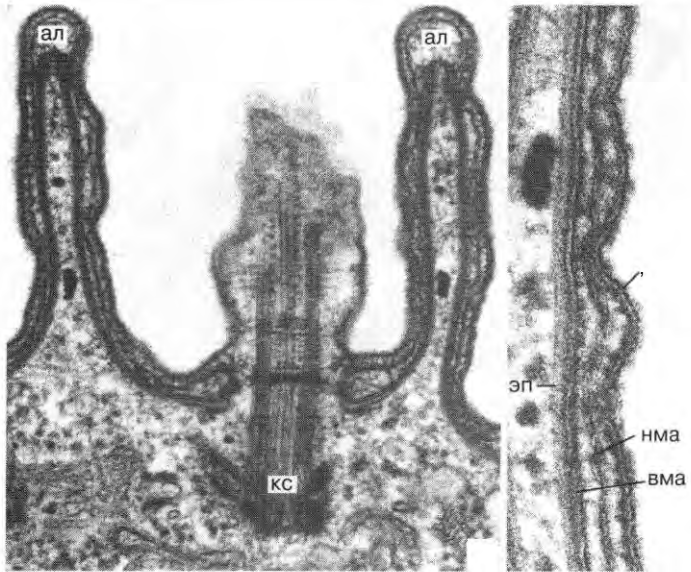
() .

(. 106) .

(. 107) .

(. 115) .

(. 108) :

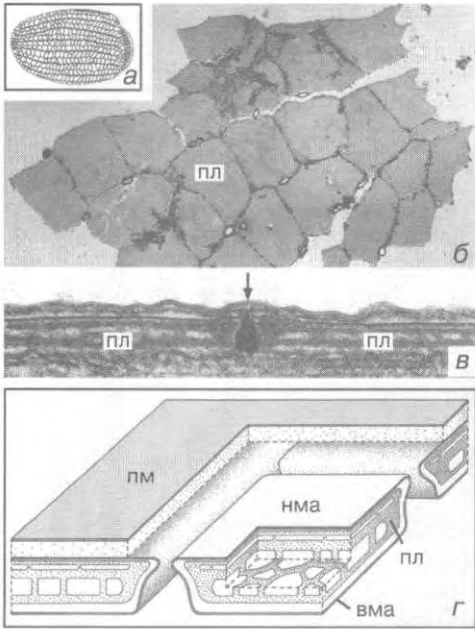


103. Ciliophora:

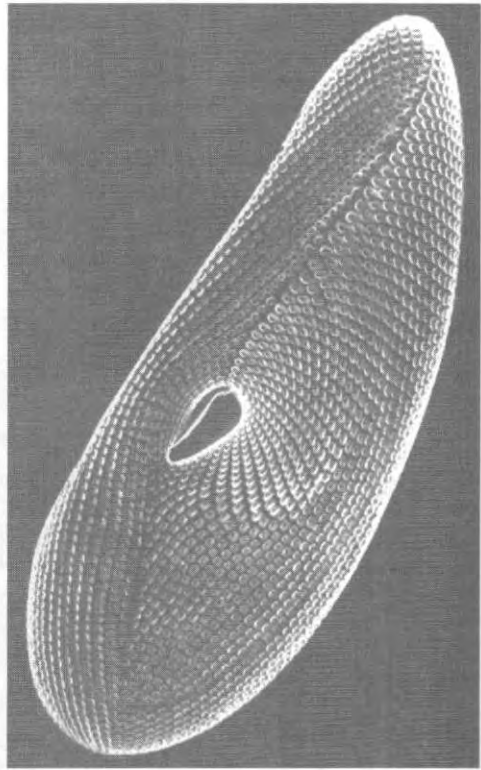
Paramecium (,) *Pseu*
domicrothorax (,), —

— , —
— , —
— , —
— , —
50 , 6 — 150 ,
160 , — 25 .

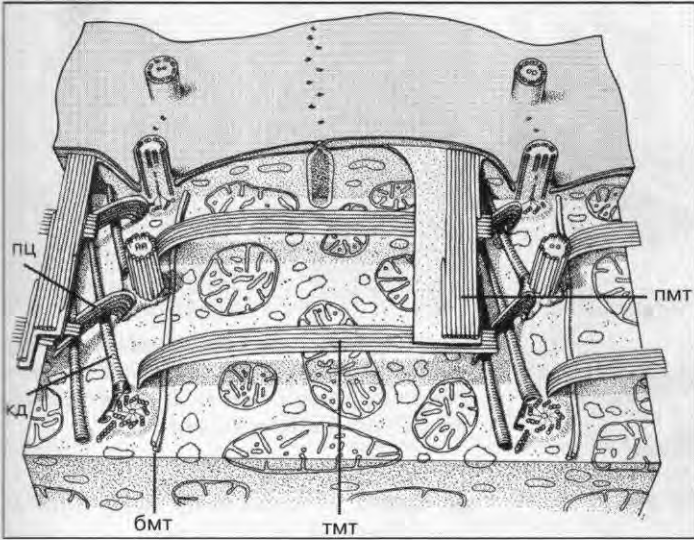
— « » ,
— — —
— — —
— — —
Glaucoma ferox;
— — —
() — — — () ,
() . — — — — —



104. Ciliophora:
 ; — ;
 ; — (),
 ;
 — ;
 (: Hausmann and
 Kaiser: J. Ultrastruct. Res. 67 [1979] 15).
 .: a — 250x, б — 2 200x, с — 85 000x.



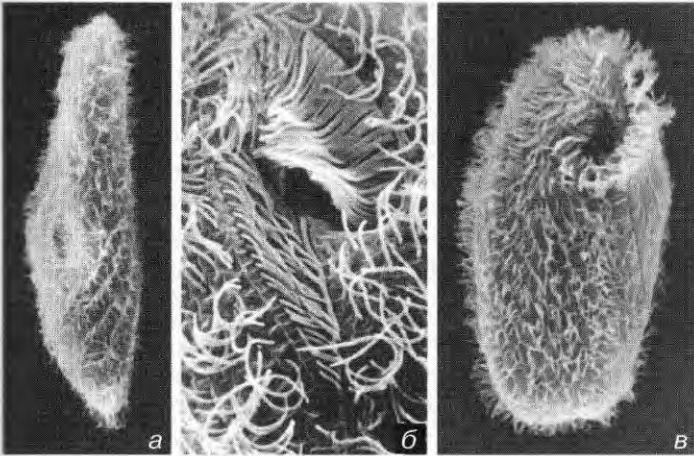
105. Ciliophora:
Paramecium,
 (: Jeanmaire
 et al.: Europ. J. Protistol. 29 [1993] 311).
 .: 600x.



. 106. Ciliophora: -

Tetrahymena.

- -
 - -
 - -
 - -
 - -
 - -
 - -
 () .



. 107. Ciliophora: -

Para-
mecium (a), Frontonia ()

Climacostomum ()

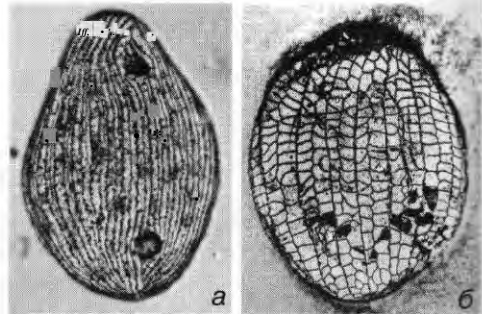
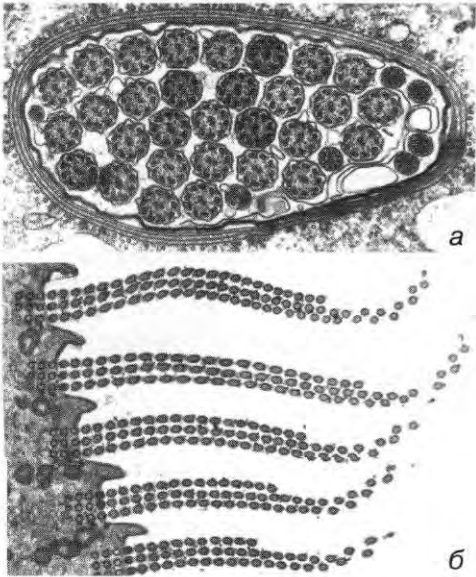
(-) .

∴ - 270 , -

1 400 , -200 .

Иллюстрация
 к учебнику
 биологии
 животных

: () - () -
 () - () —
 .
 ,
 (. 109).
 ,



108. Ciliophora: —
Euplotes vannus; —
Euplotes vannus (— :
 Hausmann and Kaiser: J. Ultrastruct. Res. 67
 [1979] 15). : a — 24000x, 6 — 1 700x.

109. Ciliophora:
Colpidium () *Euplotes* () (—
). : — 450 .

() (. 112).

(2 5),

(. 113).

111, 215).

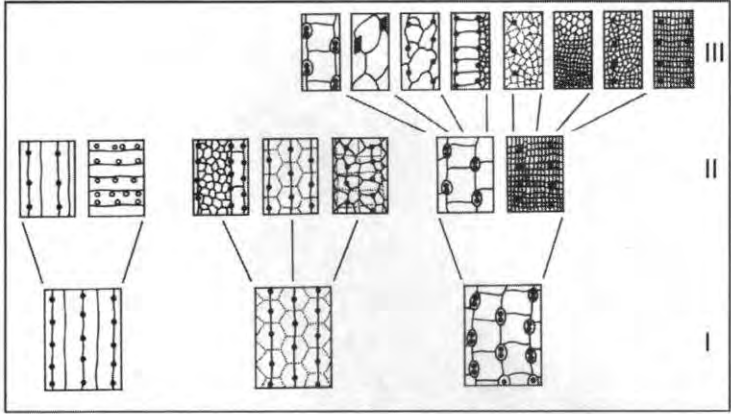
(. 106,

(. 114).

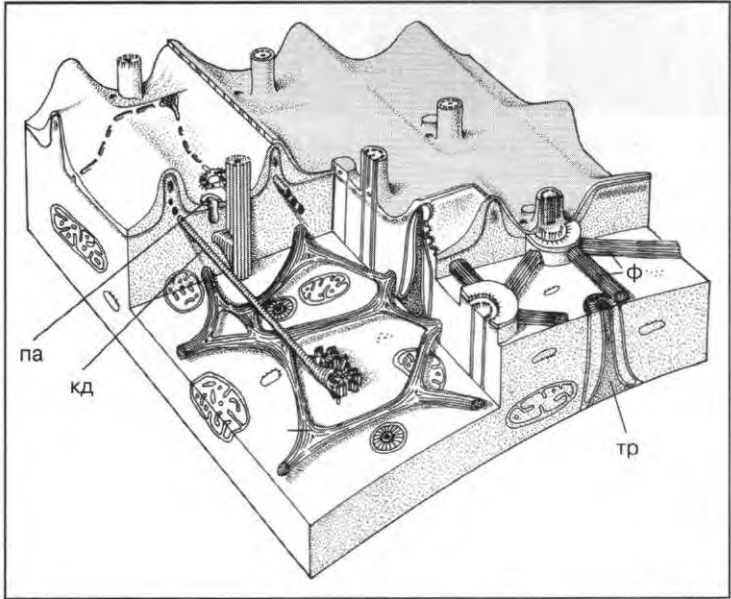
(Karyorelictida !

. 110. Ciliophora:

(I III)



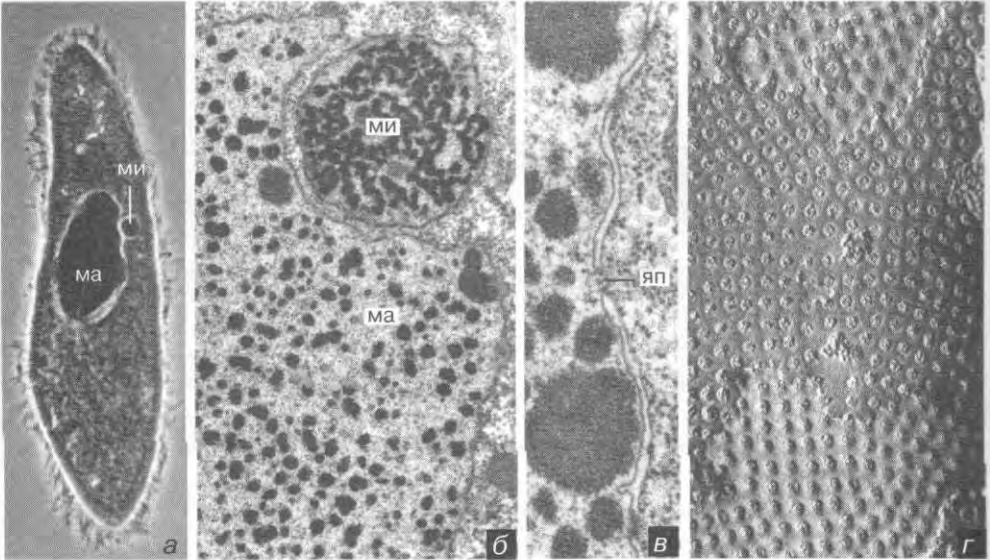
. 111. Ciliophora:
Paramecium caudatum.



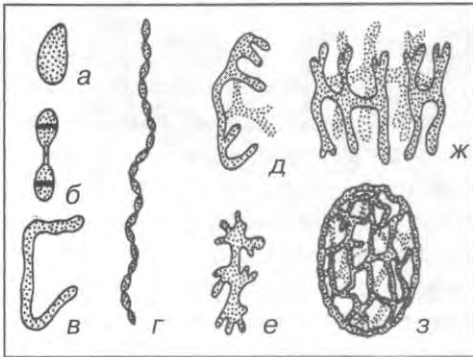
Ciliophora (. 1146).

Ciliophora

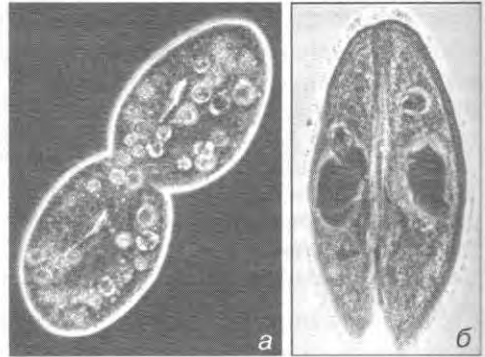
(Bütschli) (),



112. Ciliophora: *Paramecium* (), *Colpidium* (,); — *Paramecium*, — (—). : — 400 , — 15 , — 60 , — 40 .

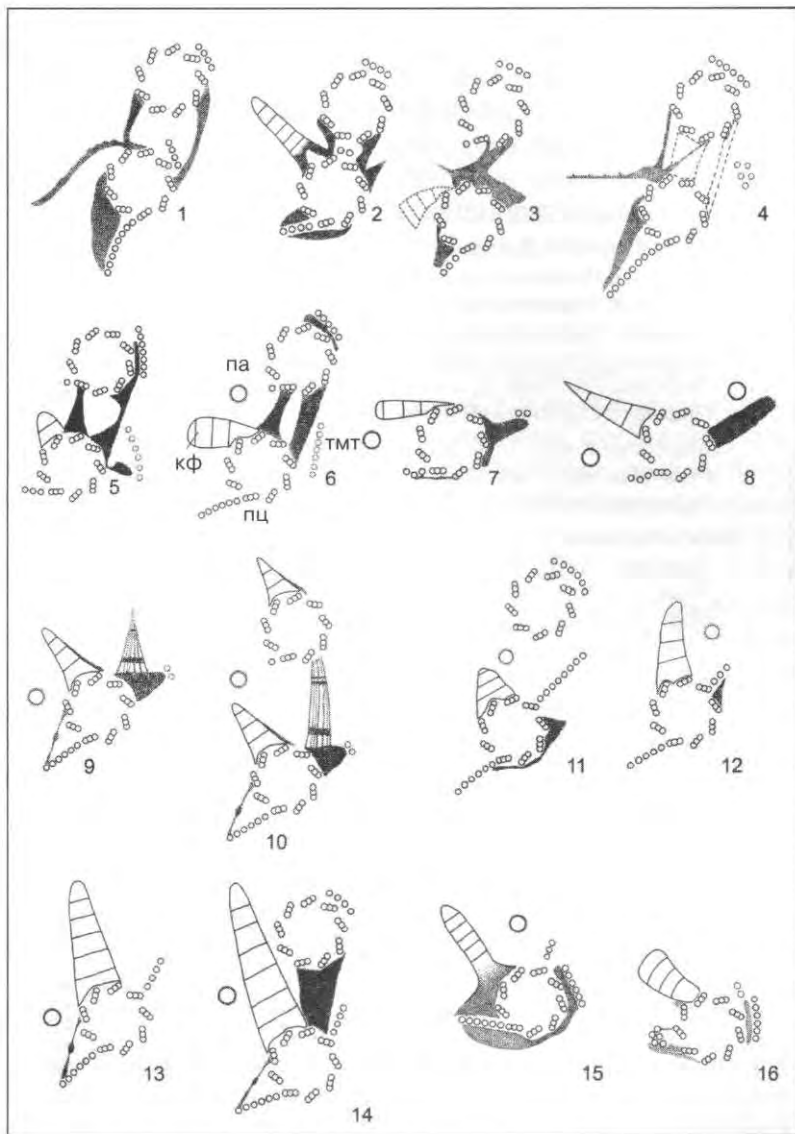


113. Ciliophora: — *Paramecium*, — *Stylonychia*, — *Vorticella*, — *Spirostomum*, — *Ophryodendron*, — *Conchophthirius*, — *Ephelota*, — *Metaphrya* ().



114. Ciliophora: *Paramecium* () (). : — 250 , — 290 .

Holotricha, Chonotricha, Peritricha, Spirotricha Suctorina. 1970



115. Ciliophora:

- (), (), Karyorelictea: *Geleia* (1) *Proto*
cruzia (2); Spirotrichea: *Stylonychia* (3) *Climacostomum* (4); Colpodea: *Sorogena* (5)
Pseudoplatyophrya (6); Phyllopharyngea: *Hypocoma* (7) *Trichophrya* (8); Nassophorea:
 (9) (10) *Nassula*; Oligohymenophorea: *Colpidium* (11) *Ichthyo*
phthirus (12); Prostomatea: (13) (14) *Coleps*; Litostomatea:
Epidotrachelophyllum (15) *Isotricha* (16) ().

CILIOPHORA Doflein, 1901**POSTCILIODESMATOPHORA** Gerassimova & Seravin, 1976

Karyorelictea Corliss, 1974

Heterotrichea Stein, 1859

INTRAMACRONUCLEATA Lynn, 1996

Spirotrichea Biitschli, 1889

Protocruziidia de Puytorac et al., 1984

Phacodiniidia Small & Lynn, 1985

Hypotrichia Stein, 1859

Choreotrichia Small & Lynn, 1985

Stichotrichia Small & Lynn, 1985

Oligotrichia Biitschli, 1887

Litostomatea Small & Lynn, 1981

Haptoria Corliss, 1974

Trichostomatia Biitschli, 1889

Phyllopharyngea de Puytorac et al., 1974

Phyllopharyngia de Puytorac et al., 1974

Rhynchodia Chatton & Lwoff, 1939

Chonotrichia Wallengren, 1895

Suctoria Claparède & Lachmann, 1858

Nassophorea Small & Lynn, 1981

Colpodea Small & Lynn, 1981

Prostomatea Schewiakoff, 1896

Plagiopylea Small & Lynn, 1985

Oligohymenophorea de Puytorac et al., 1974

Peniculia Faure Fremiet in Corliss, 1956

Scuticociliatia Small, 1967

Hymenostomatia Delage & Herouard, 1896

Apostomatia Chatton & Lwoff, 1928

Peritrichia, Stein, 1859

Astomatia Schewiakoff, 1896

ca: Kinetophragminophorea (

),

Oligohymenophorea (

)

Polyhymenophorea (

).

(. 115).

(... 13).

POSTCILIODESMATOPHORA
Gerassimova & Seravin, 1976

(
Oligotrichia Stichotrichia).

(Karyorelictea),

(Heterotrichia).

KARYORELICTEA Corliss,
1974 —

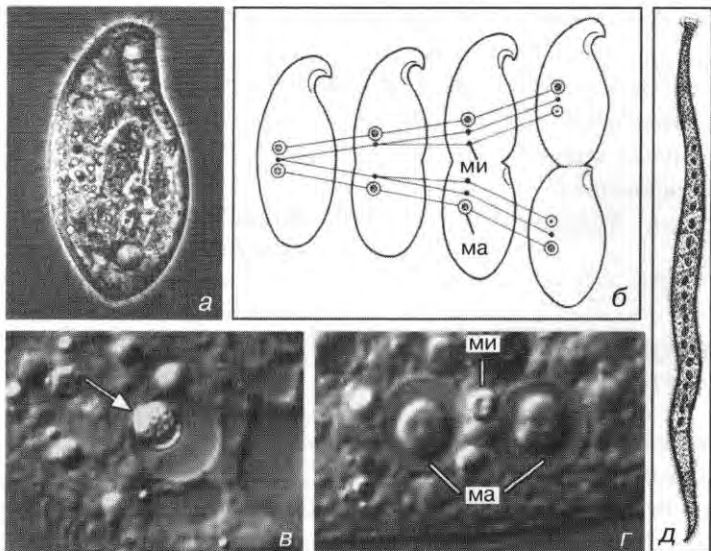
(... 116)

(*Protocruzia* Spirotrichea).

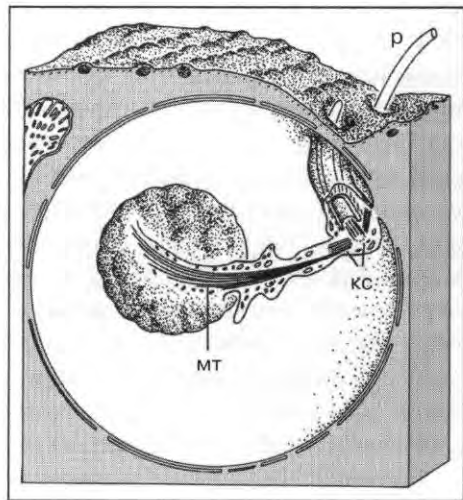
: Proto
stomatida, Loxodida Protoheterotrichida.

Karyorelictida (
Holotricha)

Loxodida;



116. Ciliophora, Postciliodesmatophora, Karyorelictea: — *Loxodes*; — () ; — () ; — *Loxodes* () ; — *Loxodes*; — *Trachelocerca* (— ; — ; — : Dragesco: Trav. Biol. Roscoff 12 [1960] 1). : a — 220x, — 2 , — 170 .



117. Postciliodesmatophora, Karyorelictea: *Loxodes*.

(. 117), , -

: *Trachelocerca*, *Trachelonema*, *Tracheloraphis* (Protostomatida); *Loxodes*, *Remanella* (Loxodida); *Avelia*, *Geleia* (Protoheterotrichida).

HETEROTRICHEA Stein,

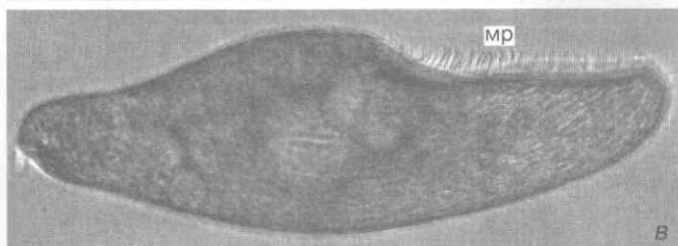
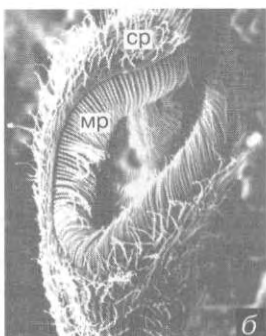
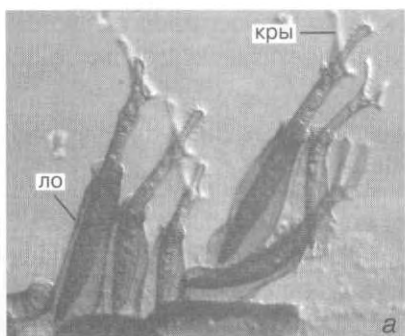
1859 —

Heterotrichea (Spirotrichea)

(. 118).

() .

() ,
() . — () .



118. Postciliodesmatophora, Heterotrichea: — *Eufolliculina* ()

() ;
 () *Eufolliculina*
 () ; — *Blepharisma*.
 : — 75 , 6 — 2 500 ,
 —

(Licnophorida
 Heterotrichida),

Folliculinidae,

Heterotrichida Stein, 1859

2 ;
Spirostomum,
Stentor
Blepharisma ; *Stentor coeruleus*
 , a *Stentor igneus* —
 Heterotrichida

; (. 118).
 : *Blepharisma*, *Condylostoma*,
Folliculina, *Peritromus*, *Spirostomum*,
Stentor.

INTRAMACRONUCLEATA

Lynn, 1996

Peritricha (. 264).

(
 Postciliodesmatophora).

; (. 13).

(Protocruziidia Phacodi
niidia), sedis mutabilis.

SPIROTRICHEA Biitschli,

1889 —

Protocruziidia de Puytorac

etal. 1987

(.) .

: *Protocruzia*.

Phacodiniidia Small &

Lynn, 1985

119).

: *Phacodinium*.

sedis mutabilis¹ (Armophorida,

Odontostomatida Clevelandellida).

Protocruziidia

²,

Hypotrichia Stein, 1859 —

(. . 299) —

Spi-
rotrichea,

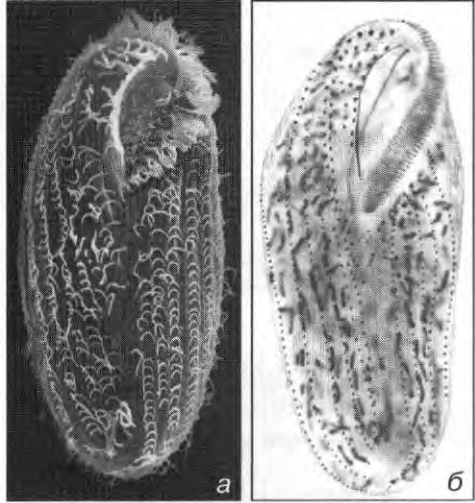
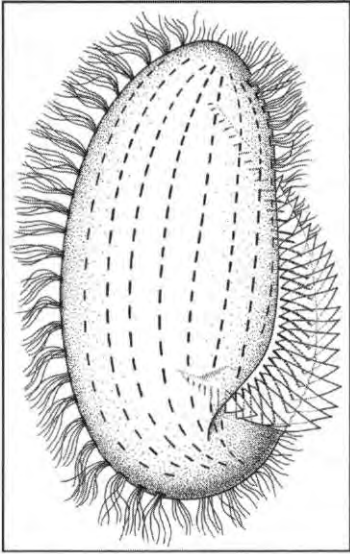
Hypotrichia, Choreotrichia, Stichotrichia

Oligotrichia

Nassophorea (.), что

¹ Sedis mutabilis —

¹



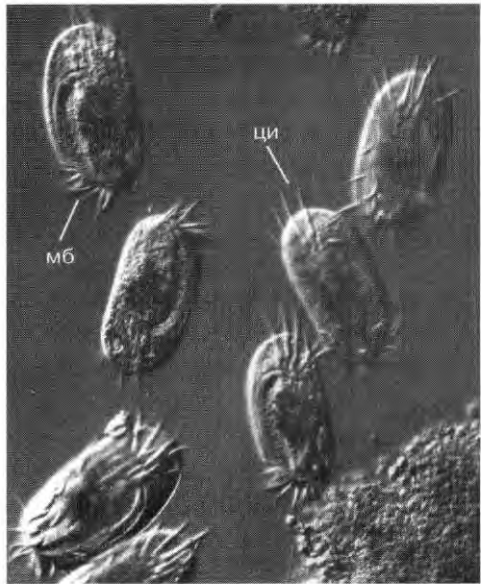
119. Ciliophora, Intramacronucleata, Spirotrichea:
Phacodinium metchnikoffi ().
 : 540 .

120. Spirotrichea:
Urostyla grandis:
 ()
 () ()
) . : — 190 .

Stichotrichia:

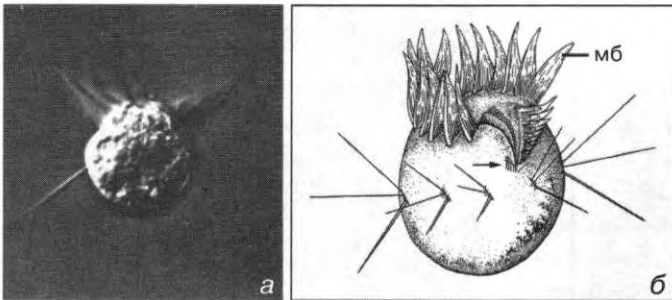
(. 120,
 121).

, Hypotrichia,
 , Stichotrichia Oligotrichia,
 —
 Stichotrichia Hypo-
 trichia
 (Oligotrichia).



: *Aspidisca*, *Euplotes*, *Uro-
 nychia*, *Urostyla*.

121. Spirotrichea: *Euplotes*
 () () . : 260 .



122. Spirotrichea:
Halteria ()
 ()
 () (—
)
 — 500 , — 700 .

Oligotrichia Biitschli,

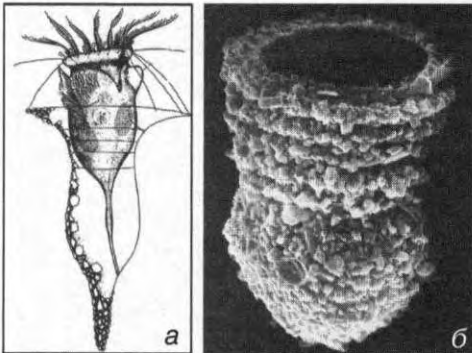
1889 — ,

(40)

(. 122).

: *Halteria*, *Strombidium*,
Tontonia.

Choreotrichia Small &
 Lynn, 1985



Choreotrichia

Tintinnina,

123. Spirotrichea: — *Tintinnopsis*

123).

; — *Codonella* (—

; — : Barnatzky et al.: Zool.
 Scripta 10 [1981] 81) : a — 650x, —
 720x.

Choreotrichia

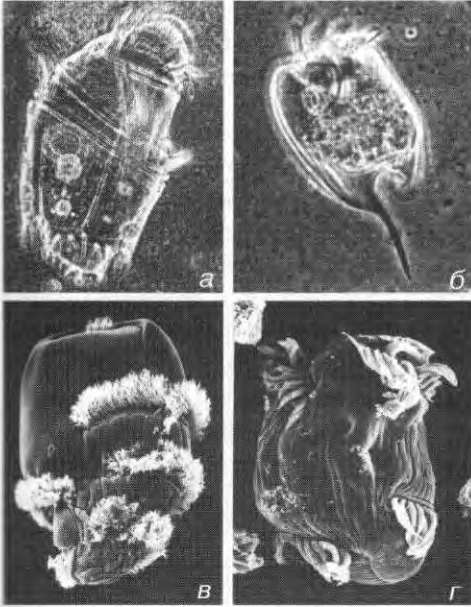


Fig. 126. Litostomatea: — *Ophryoscolex*; — *Entodinium*; — *Trogloditella gorillae*; — *Tetratoxum parvum* (— 190, — 220, — 440).



Fig. 127. Intramacronucleata, Phyllopharyngea: *Chilodonella* (— 680).

Phyllopharyngia (phyllae),
 Nassophorea.

Phyllopharingia
 Puytorac et al., 1974

Chilodonella
 (— 127)
 : *Chlamydodon*, *Chilodonna*, *Chitonella*, *Dysteria*.

Rhynchodia Chatton & Lwoff, 1937

Suctoriozoa Claparède & Lachmann, 1858 —

(),
: , *Crebricoma*.

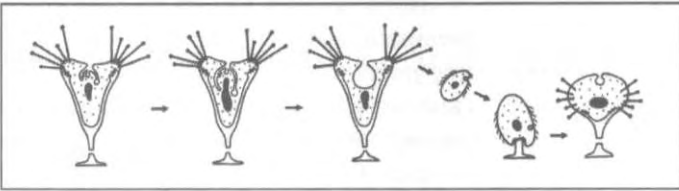
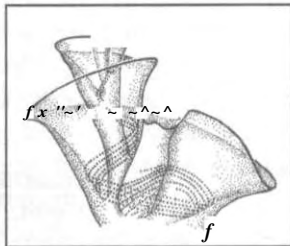
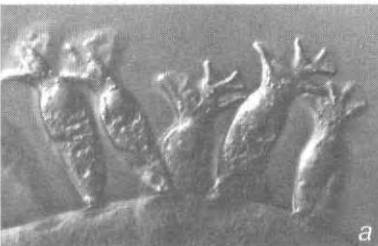
Chonotrichia Wallengren, 1895 —

(. 129). **Chonotrichia**, су-

(),

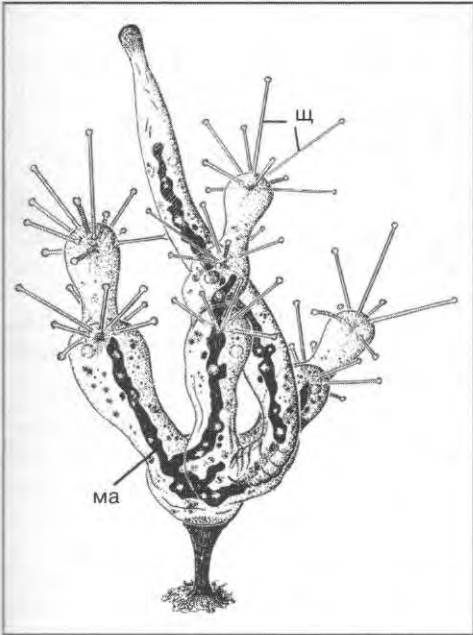
(. 128).

: *Heliochona*, *Spirochona*,
Stilochona.



. 128. Phyllopharyngea
— *Spirochona gemmipa*
ra
(—
; — 200

. 129. Phyllopharyngea
Acineta ()
).

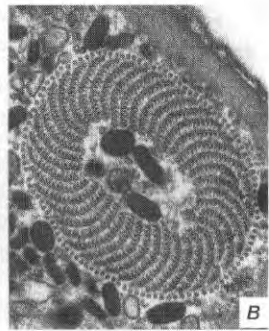
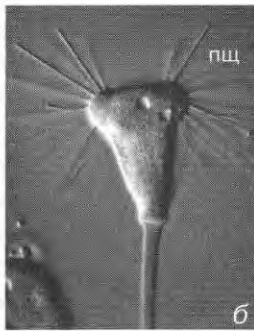
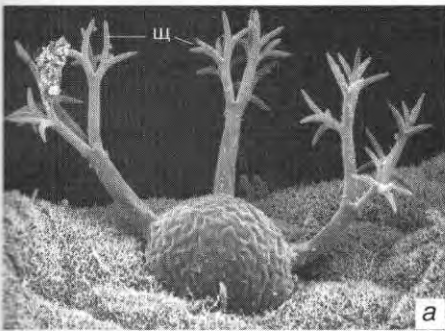


130).

(. 131).

130. Phyllopharyngea:
Dendrosomides grassei,
 (: Batisse: Protistologica 22
 [1986] 11) : 550 .

: *Dendrocometes*, *Discoph*
Ephelota, *Tokophrya*.



131. Phyllopharyngea: — *Dendrocometes* (); —
Tokophrya (); — *Acinetopsis*
 (—); —
 : Grell and Meister: Protistologica 18 [1982] 67).
 : a — 450x, — 320x, — 22 .

NASSOPHOREA Small & Lynn,
1981

(. 132).

: *Furgasonia*, *Nassula*.

Microthoracida Jankowski,
1967

Nassulida,
Microthoracida

279, 281).

: *Microthorax*, *Pseudomic
rothorax*.

Hypotrichia,

Spirotrichia, Nassophorea

Nassophoria.

COLPODEA Small & Lynn,

1981 —

Colpodea

Colpoda O.F. M tiller, 1773. 150

Synhymeniida de Puytorac et
al., 1974

(. 115).

(),

: *Synhymenia*.

Nassulida Jankowski, 1967

Colpodea

(>100)

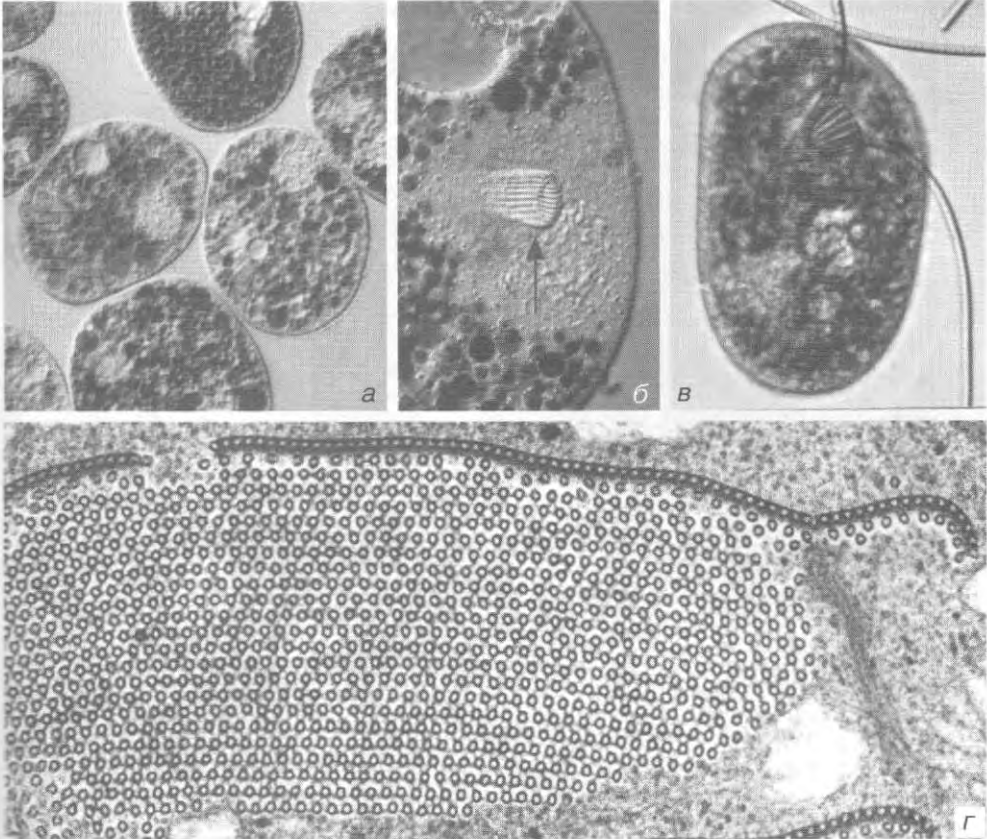


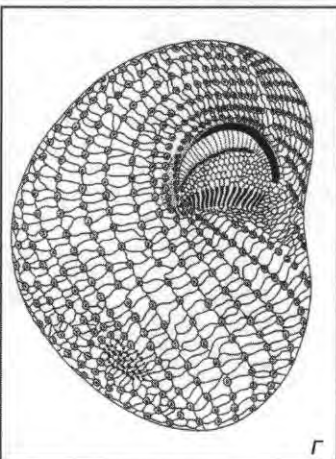
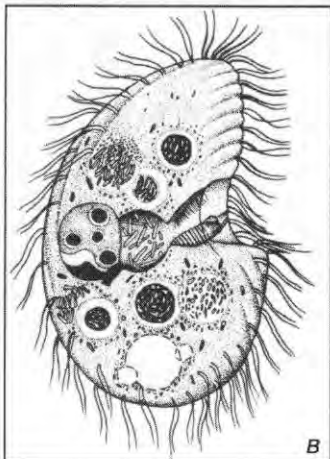
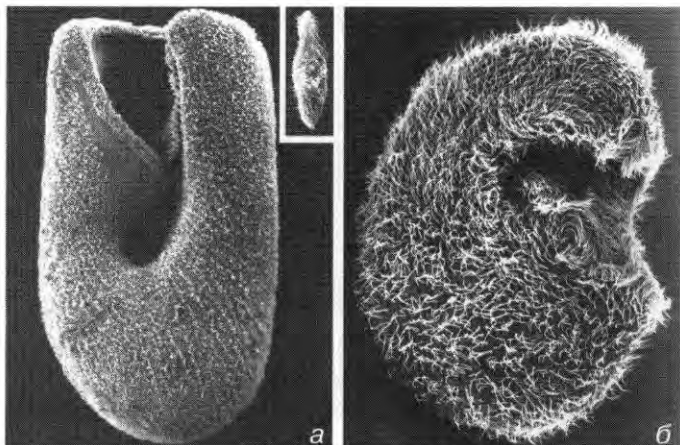
Рис. 132. Intramacronucleata, Nassophorea: *Nassula ornata* (),
 (,).
 (), —
 : — 120 , — 350 , — 240 , — 47

(.
 1J3),
 : Bresslaua, Bursaria, Col
 poda, Hausmanniella, Sorogena.

(2) Bursaria
 truncatella

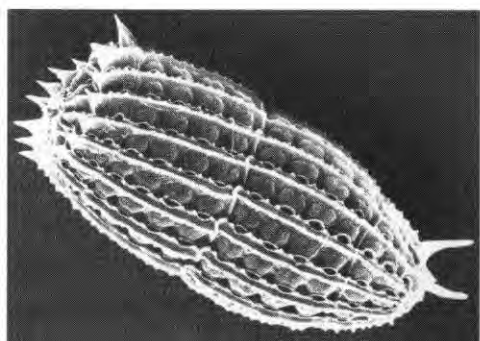
PROSTOMATEA Schewiakoff,
 1896

Prostomatea



133. Intramacro-
nucleata, Colpodea: —
Bursaria truncatella (

Paramecium);
— *Bresslauides australis*;
— *Colpoda* (—
); — *Hausmanniella*
(—
) (—
; — : Piatt
and Hausmann: Arch.
Protistenk. 143 [1993] 297:
—)
: — 90 , — 480 .
— 550 , — 500 .



134. Intramacronucleata, Prostomatea:
Coleps hirtus (

(. 134).

: *Coleps*, *Holophrya*, *Pro-*
rodon.

PLAGIOPYLEA Small & Lynn,
1985

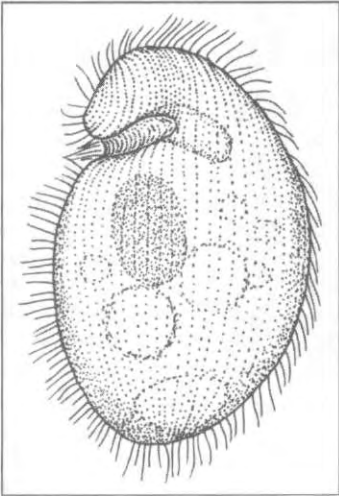


Рис. 135. Intramacronucleata, Plagiopylea:

Plagiopyla frontata (

). : 900 .

Величина, мкм, - ()

Сфера, мкм, ()

Безжелезистый, мкм, ()

Зона, мкм, -

Личинка, мкм, -

Микро, мкм, ;

• : (. 135).

: *Plagiopyla*, *Sonderia*.

Класс OLIGOHYMENOPHOREA

de Puytorac et al., 1974

Сфера, мкм, -

Безжелезистый, мкм, -

Личинка, мкм, -

Микро, мкм, () -

Сфера, мкм, -

Зона, мкм, -

Класс **Ciliophora**.

Сфера, мкм, -

Безжелезистый, мкм, -

» («) (. .

1376).

Nassophorea,

() ,

() ,

() ,

() .

Peniculia Faure Fremiet,

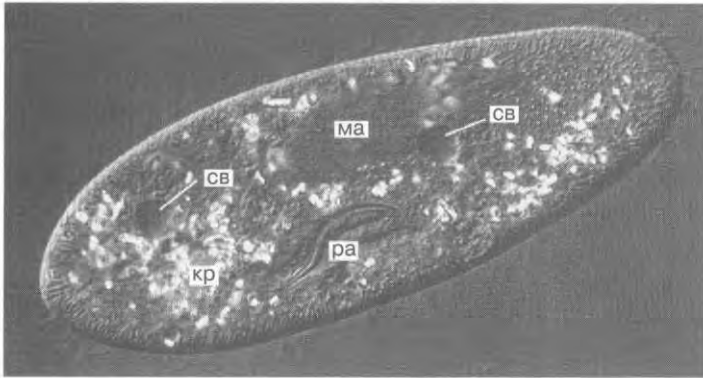
1956

Peniculia -

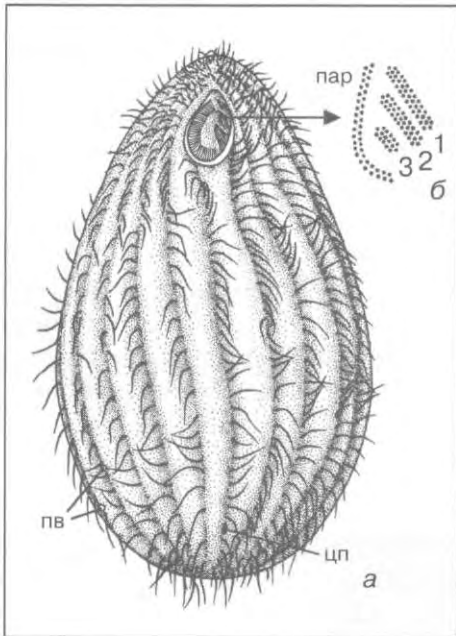
Oligohymenophorea:

« » (.

() -



. 136. Intramacronu-
cleata, Oligohymeno-
phorea: *Paramecium*
caudatum. — —
, — —
, pa — —
, — —
450 .



. 137. Oligohymenophorea:
Tetrahymena. — — ;
(1 3) (), — ()
, — ()
) . : — 1 200 .

, *Tetrahymena* (. 137).
;
,
—
— *Paramecium caudatum*.
: *Frontonia*, *Paramecium*.

Scuticociliata Small, 1967

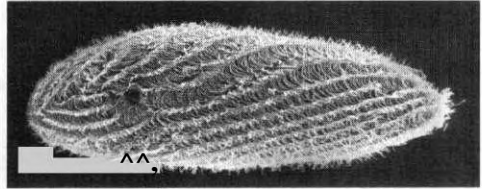
Hymenostomatia,
Scuticociliata
;

Paramecium (. 136) , — *Cyclidium*, *Orchitophna*,
Philasteria, *Pleuronema*, *Uronema*.

Hymenostomatia Dellage
& Hérouard, 1896

Hyme-

nostomatia



138. Oligohymenophorea: *Ophryoglena atra* (

Одн : -
Жив ,
Класс ,
Ряд (= -
Сем. = , = -
Род).
Линн .
Именн .
Обл. (. 137).
Ступ .
Му .
Класс ,
Мир, *Ophryoglena*
Три .
Ты .

). : 320 .
; ;
(. 139).
:
: *Colpidium, Ichthyophthi-
rius, Ophryoglena, Tetrahymena.*

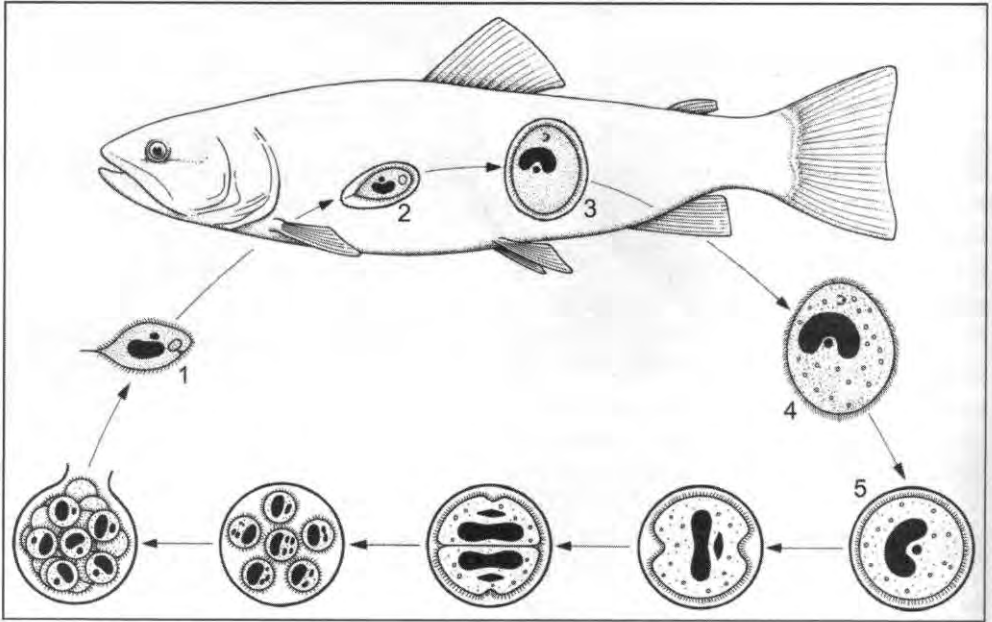
Hymenostomatia

Apostomatia Chatton &
Lwoff, 1928 —

Нена .
Вид .
Кл .
Три .
Животн .
Ichthyophthirus (*Ophryoglena*)¹ (. 138).
Мир .
> *Tetrahymena pyriformis* (рис. 137) . *thermophila:*
Рост .
Вид .
Класс .
Линн .
Именн .
Обл .
Ступ .
Му .
Класс .
Мир, *Ichthyophthirus*
Три .
Ты .
Инду .
Мир .

Вид .
Кл .
Три .
Животн .
Мир .
(. 140).
(.)
(.) .
:
Foettingeria, Hyalophysa, Spirophrya.

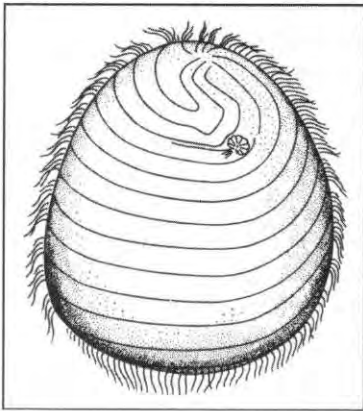
¹ Инду...



139. Oligohymenophorea:
 (), 2 —
 , 5 —
).

Ichthyophthirius multifiliis: 1 —
 , 3 — , 4 — (

Peritrichia Stein, 1859 —



140. Oligohymenophorea:
Foettingeria (: Corliss: Trans. Amer.
 Microsc. Soc. 97 [1978] 419). : 480x.

1000
 —
 (=)
 (. 141).
 (),

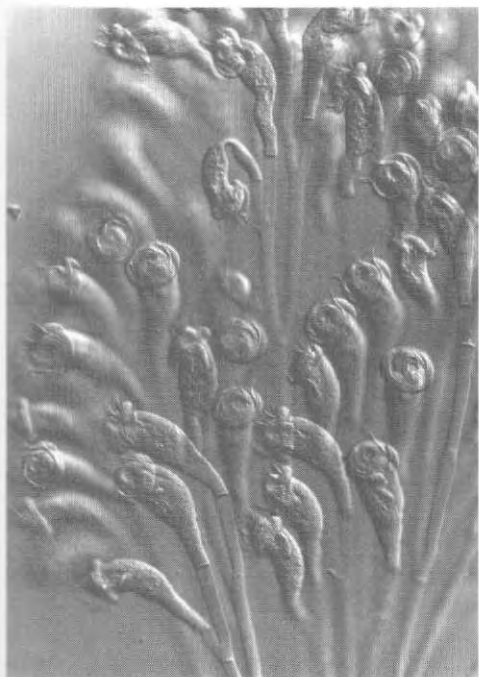


Рис. 141. Oligohymenophorea:

Epistylis,

де () X. ;
Литература () . : 180 .

Sessilida Kahl, 1933

()

всту ;

кесто ;

вма ;

водо ;

зед ; *Vorticella* *Carchesium*

> (. 142),

белко ;

стро ;

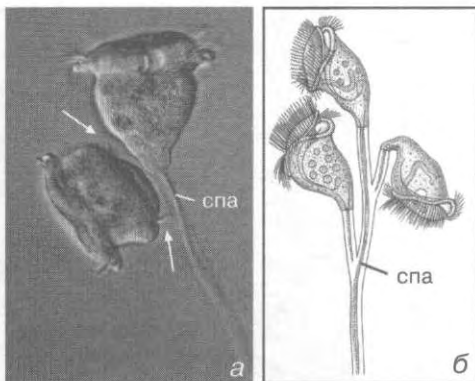
при ;

рост ; (

ма ; *Epistylis*);

но ;

но ;



. 142. Oligohymenophorea: — *Vorticella*
; ()
, (),
, — *Carchesium*.
— (—).
— 140 .

(*Vaginicola*, *Cothurnia*)

(*Ophrydium*, . 143).

144).

()

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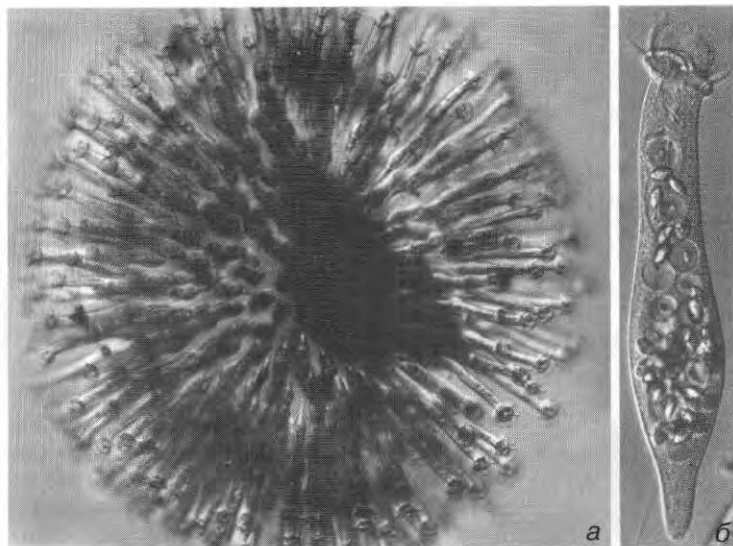
Peritricha

;

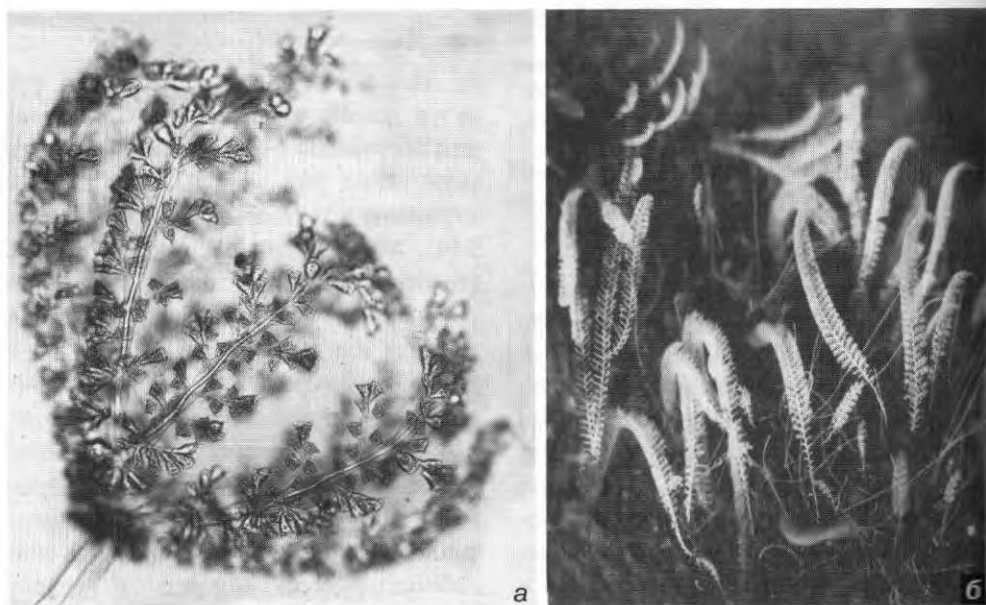
: *Carchesium*, *Cothurnia*,

Epistylis, *Ophrydium*, *Vaginicola*,

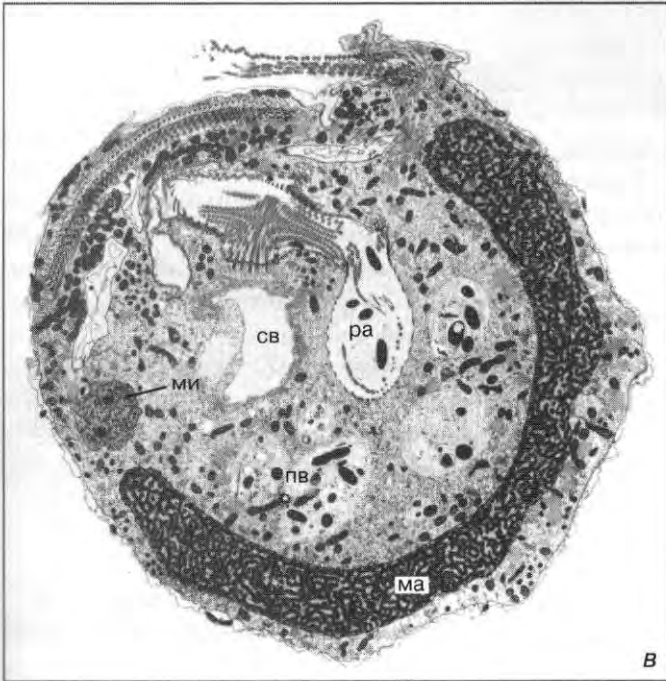
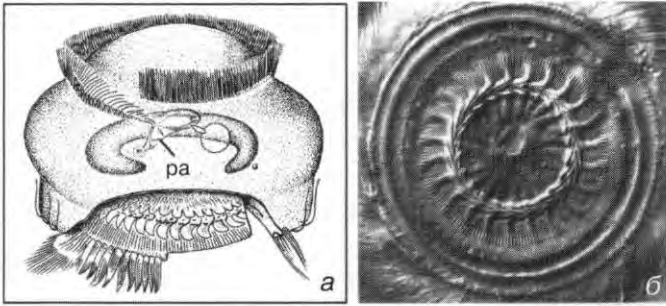
Vorticella.



143. Oligohymenophorea: () — () *Ophrydium* (: Hausmann and Ostwald: *Mikrocosmos* 76 [1987] 129). : a — 35x, — 160x.



144. Oligohymenophorea: a — *Zoothamnium arbuscula*; б — *Z. niveum*, (—). : — 80 , — 4 .



145. Oligohymenophorea: *Trichodina*. — ;
 — ;
 (—);
 — ;
 , (),
 (), (),
 () (—
) (—
 ; — :
 Hausmann and Hausmann:
 J. Ultrastruct. Res. 74 [1981]
 131). : a — 800x, —
 1 , — 2 600x.

Mobilida Kahl, 1933

Peritricha
 Mobilida.

(. 145).

Trichodina pediculus

. *pediculus*
 . *cyprinis*,

Clevelandellida de Puytorac & Grain, 1976

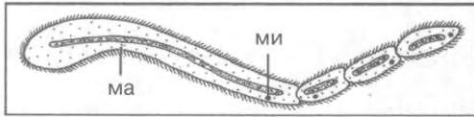
: *Trichodina*, *Urceolaria*.

Astomatia Schewiakoff,

1896 —

(. 146) —

Oligohymenophorea



. 146. Oligohymenophorea:

Radio

phrya.

(. 75) .

: *Anoplophrya*, *Haplophrya*,
Radiophrya.

Intramacronucleata

(*sedis mutabilis*').

¹ . 158.

: *Clevelandella*, *Nyctotherus*.

Odontostomatida Sawaya,

1940

Odontostomatida

147).

8 10

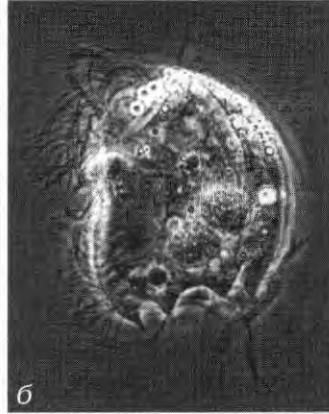
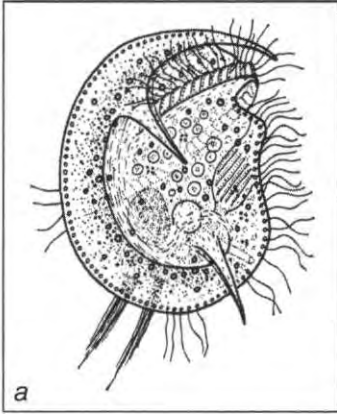
. Odontostomatida

: *Discomorphella*, *Epalxella*,
Mylestoma, *Saprodinium*.

HAPLOSPORA Caulery &

Mesnil, 1889 —

Haplosporidium (. 148),



147. Oligohymenophora:
Discomorpha pectinata ()
Saprodinium putrinium ()
 (—
 ;
 —
) . ∴ —500 , —
 450 .

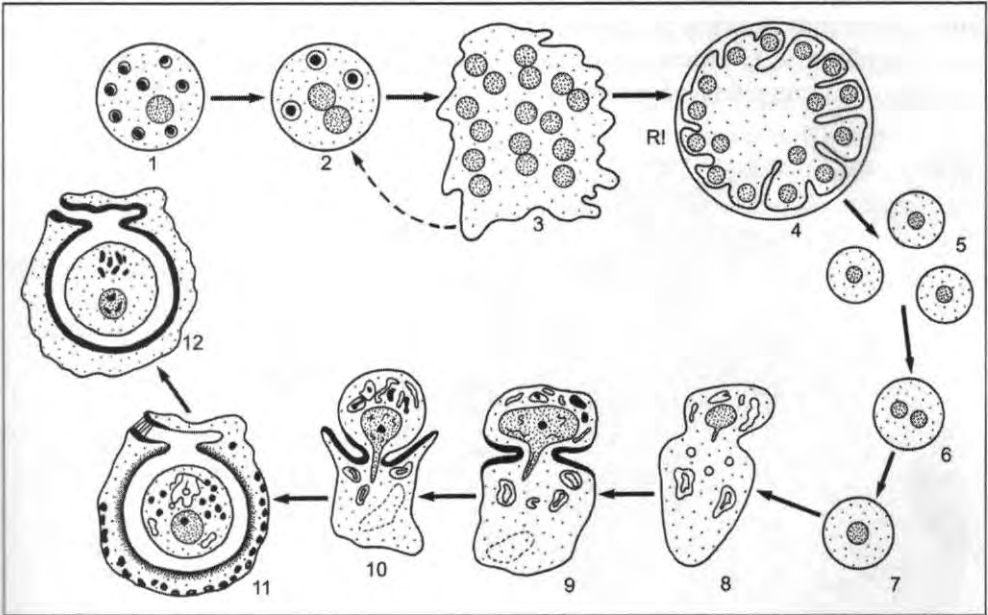
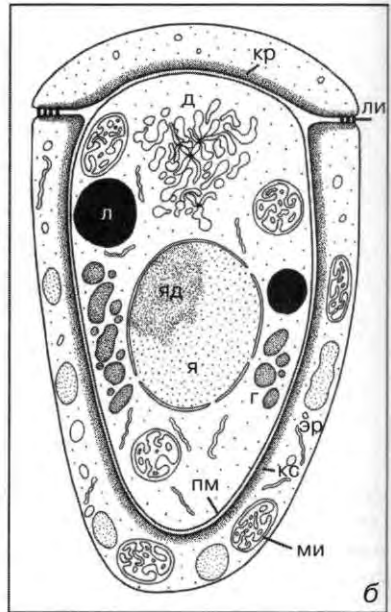
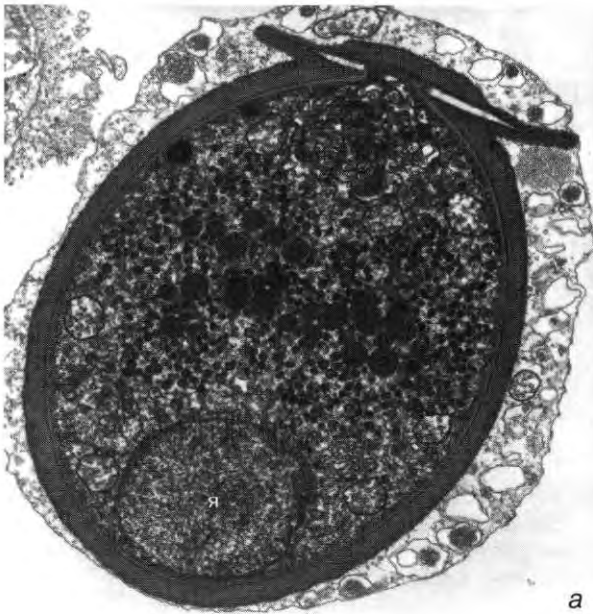


Fig. 148. Alveolata, Haplospora:

1 —
 2 —
 3 —
 4 —
 5 —
 6 —
 7 12 —

Haplosporidium. 1 —
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 3 —
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 2021 ;
 2022 ;
 2023 ;
 2024 ;
 2025 ;



149. Haplospora: —
); —

Minchinia louisiana (—
Minchinia nelsoni. —

). : — 11,000 .

Haplo-

spora

Alveolata.

(. 149).

: *Haplosporidium*, *Minchinia*, *Urosporidium*.

CERCOZOA Cavalier Smith,

1998

70

250

Rhizopoda *sensu*

von Siebold, 1845

(Heterokonta)

(,),

(. . 181).

: *Phytomyxa*, *Reticulofilosa*
Monadofilosa.

PHYTOMYXA Cavalier

Smith, 1998 (Plasmodiophorea) —

Haplosporidium

Haplospora

Paramyxea

Cercozoa,

Ascetospora.

Reticulofilosa *Monadofilosa*.

: *Plasmodiophora*, *Sorosphaera*, *Spongospora*, *Tetramyxa*.

RETICULOFILOSA

Cavalier Smith, 1998
(Chlorarachnida) —

Monodofilosa.

(*Reticulosphae*

(. 150).

).

(. 151).

(,)

1

Plasmodiophora brassica

4 8

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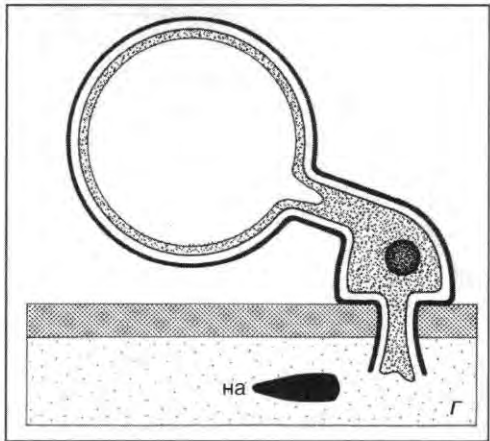
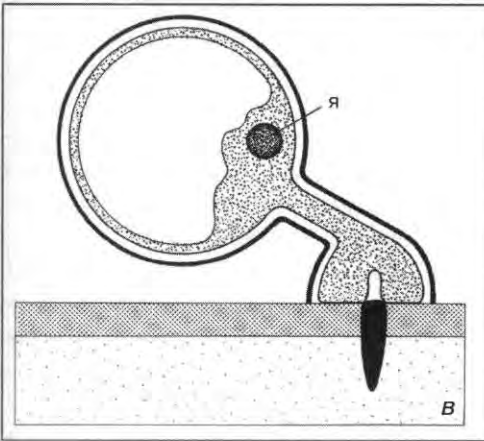
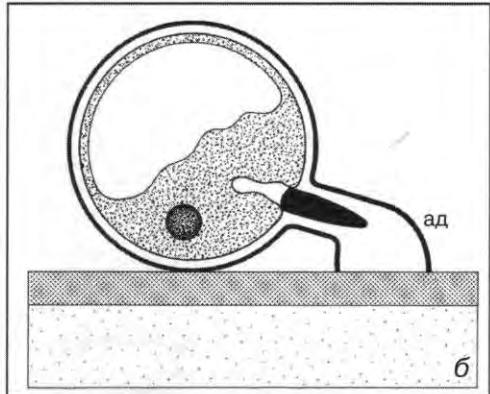
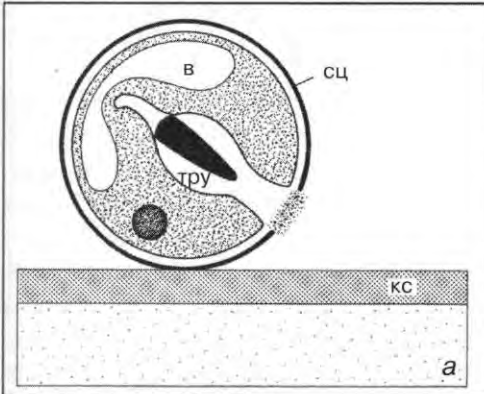
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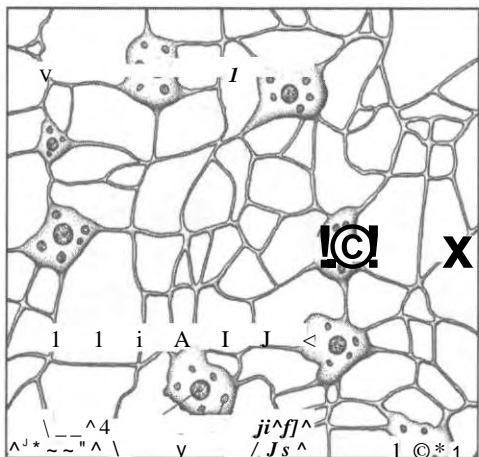
150. Cercozoa, Phytomyxa:

Plasmodiophora

(). — , — , — ()

Chlorarachnion reptans *Lotharella amoebiformis*.

() — .
 () —
 () —
 () —



. 151. Cercozoa, Reticulofilosa:
Chlorarachnion:

() () . : 1 500 .

: Chlorarachnion, Lotharella, Gymnochlora.

MONADOFILOSA

Cavalier Smith, 1998

Gromiida)
1879 (

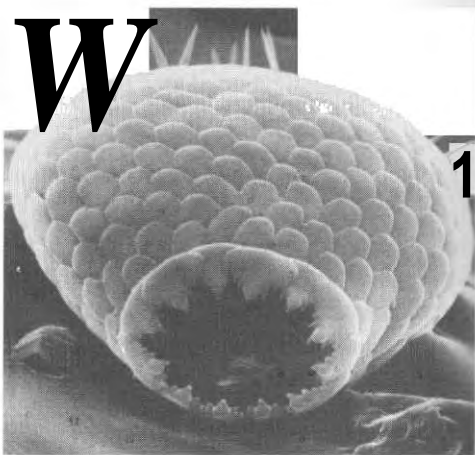
Filosea Leidy,

zoa),

Fungi/Meta

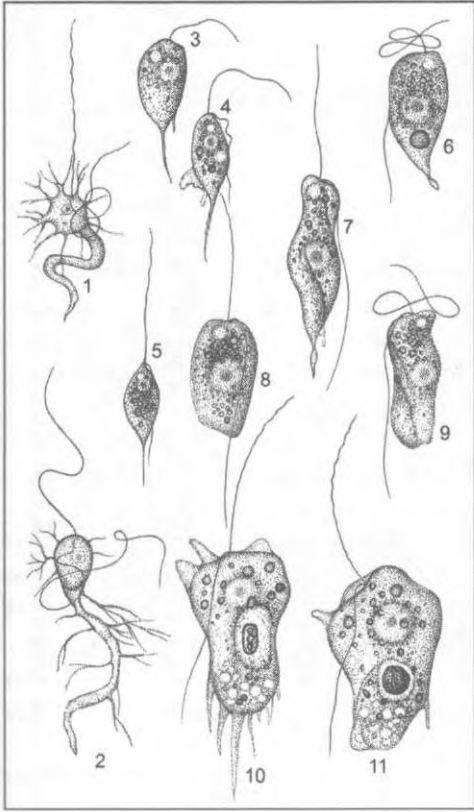
(Lecythium),
(Pseudodiffugia)
(Euglypha, . 152).

Paulinella chromatophora



. 152. Cercozoa, Monadofilosa:
Euglypha (

). : 980 .



153. Monadofilosa:
 1 2 — *Cercobodo**
draco ;
 3 5 — *varians*; 6 9 — *norrvicensis*; 10
 11 — *pyriformis* (). : 1 11 —
 1

(Sarcomonadea)

Cryothecomonas,

Thaumatomonas ()
Cercomonas ()

Cercobodo

Cercomonas. —

0,035 0,040

).
 (. 153).
 : *Cyphoderia*, *Euglypha*,
Lecythium, *Paulinella*, *Pseudodiffugia*,
Trinema (); *Cerco-*
monas, *Cryothecomonas*, *Thaumatomonas*
 ().

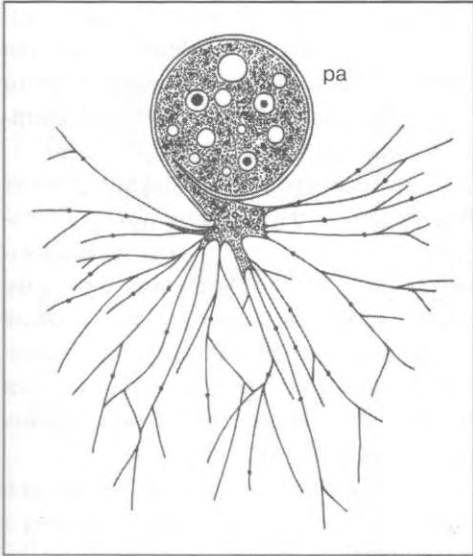
FORAMINIFERA d'Orbigny,
 1828 (Granuloreticulosa) —

Cercozoa

<1 (. 154).²

(. 22 , 23

10) —



Reticulomyxa (. 154)

Allogromiida,

(*Lieberkuhnia*,

Microgromia)

nifera:

Forami-

. 155. Foraminifera: *Lieberkuhnia*.
pa — (). .: 220 .

1

36

Granuloreticulosa *sensu* de Saedeleer -

4000

50

: *Athalamea* (),

thalamea (

, . 155) *Foraminifera* (

20

).

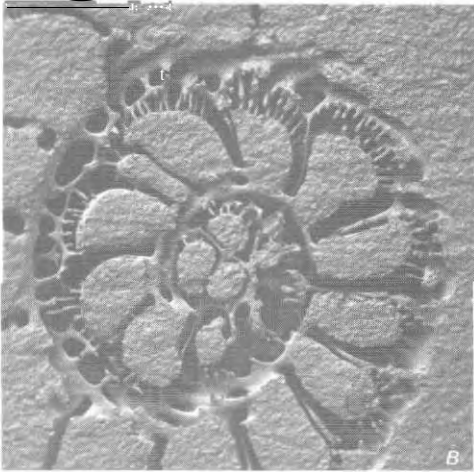
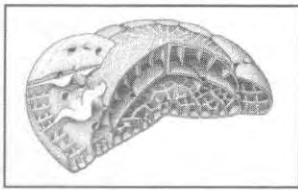
(*Biomy*

, *Pontomyxa*, *Reticulomyxa*)

(),

lomyxa filosa,

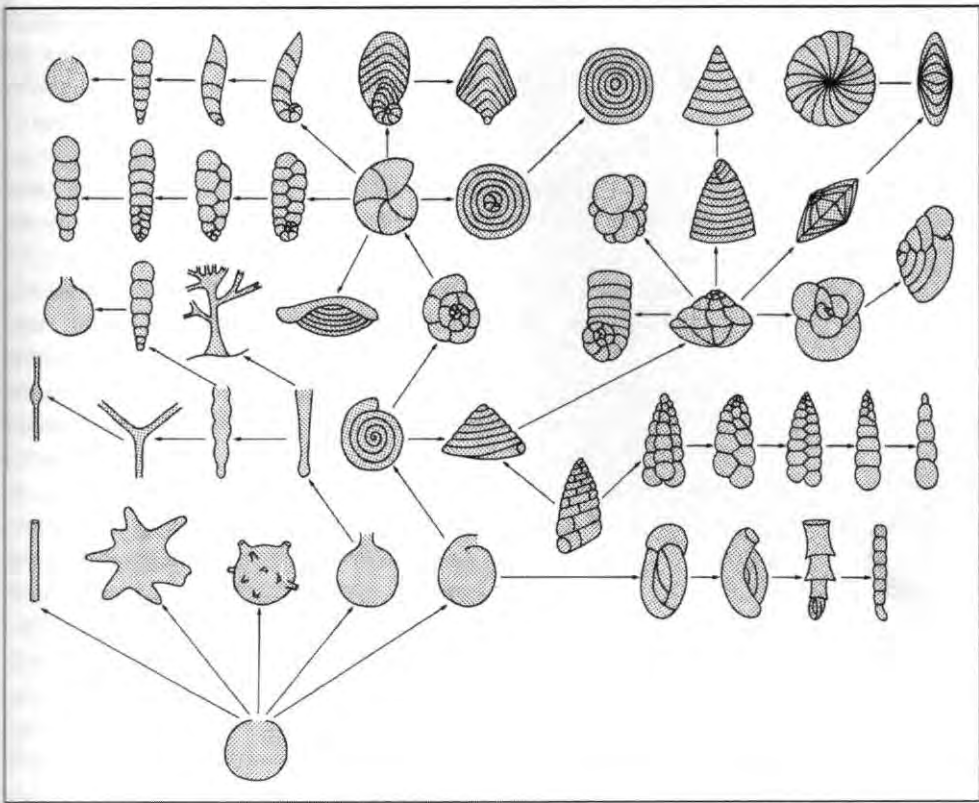
Reticu-



156. **Foraminifera:** —
 Sorites; —
 Orbitolina; —
Parrellina hispidula (—
 ; — : **Hottinger:**
Schweizerische Palaont. Abh. 101 [1980] 115).
 .: — 20 , — , — 140 .

Foraminifera

- Allogromiida (



157. Foraminifera:

().

- Textulariida ().

Xenophyophorea (

).

- Fusulinida (

).

- Rotaliida (

- Miliolida (

tularia Allogromiida)

Miliolida),

(Rotaliida

158):

(. 157,

2 3),

(

;

),

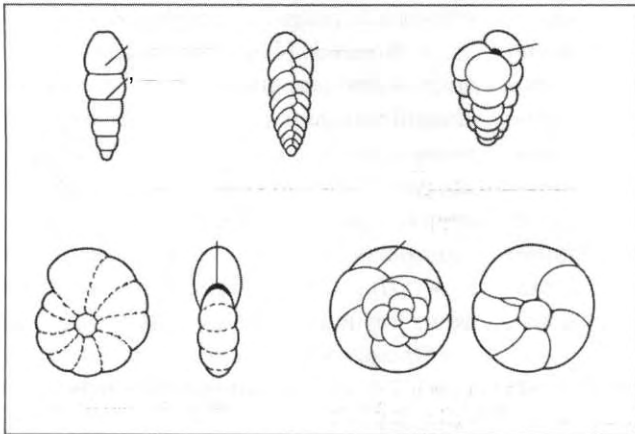
(

),

(

(. 157).

144°



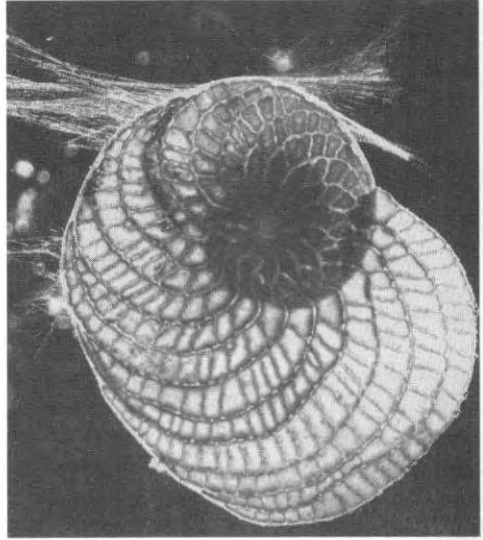
. 158. Foraminifera:

(. 157).

(), ()

(. 159)

(. 160).



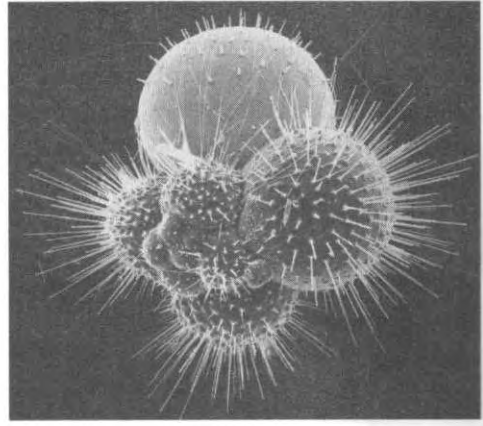
159. Foraminifera: *Heterostegina depressa*

: 5 .

3000

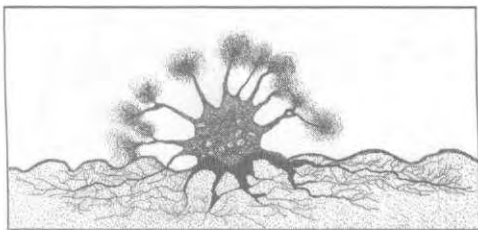
(. 160)

— *Gymnodinium beii*
Symbiodinium

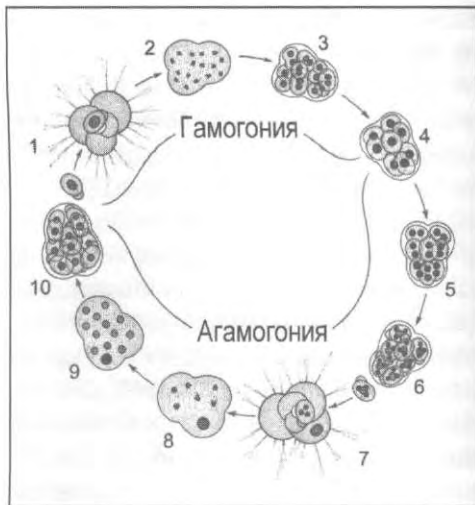


160. Foraminifera: *Globigerina bulloides*

() . : 170 .



161. Foraminifera: *Astrorhiza limicola*



162. Foraminifera:

Rotaliella

heterokaryotica.

- 1 —
- 2 —
- 3 —
- 4 —
- 5 —
- 6 —
- 7 —
- 8 —
- 9 —
- 10 —

(. 161).

: *Allogromia*, *Globigerina*, *Hastigerina*, *Heterostegina*, *Lieberkuhnia*, *Orbitolina*, *Reticulomyxa*, *Rotaliella*, *Schwagerina*, *Textularia*, *Triloculina*.

162) —

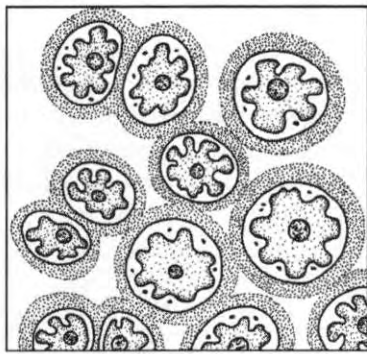
BILIPHYTE Cavalier Smith,
1981

Rhodophyta Glaucocestophyta.

RHODOPHYTA Wettstein,

1901 —

6000



163. Biliphyta, Rhodophyta:
Porphyridium omentum,
 (

.) : 550 .

: (1)

; (2)

; (3)

; (5)

(. 163),

1'

(.)

(, ,

),

Rhodophyta

Apicomplexa ,
Alveolata,

: *Porphyridium* (
).

GLAUCOCYSTOPHYTA

Kies & Kremer, 1986 —

Alveolata,

Viridiplantae (= Chloro
bionta,)

13 (4)

Cyanophora

doxa

()

Glaucocystis

G. nosto

chinearum (. 164)

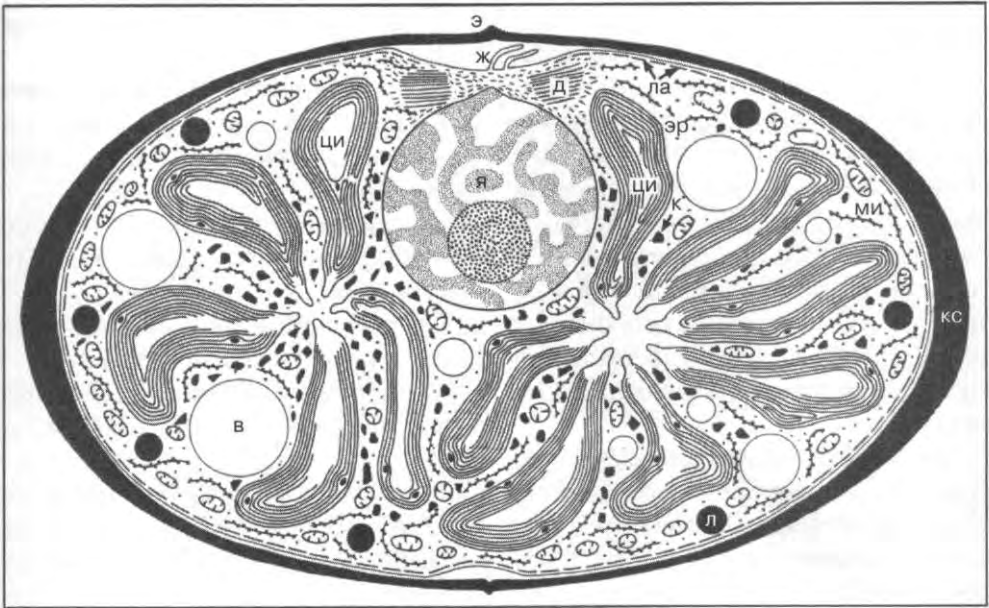
Trachelomonas (Euglenida).

(

).

(

)



164. Biliphyta, Glaucocystophyta: *Glaucocystis nostochinearum*.

(),
 (=)
 : 5

(Embryophyta),

PaulineUa chromatophora,

Gymnodinium Massar

8000

tia,

250

: *Cyanophora*, *Cyanoptycha*,

Gloeochaete, *Glaucocystis*.

VIRIDIPLANTAE Cavalier Smith,

1981 (Chlorobionta) —

(),

()

;

;

stigma ()

;



()

Meso ()

()

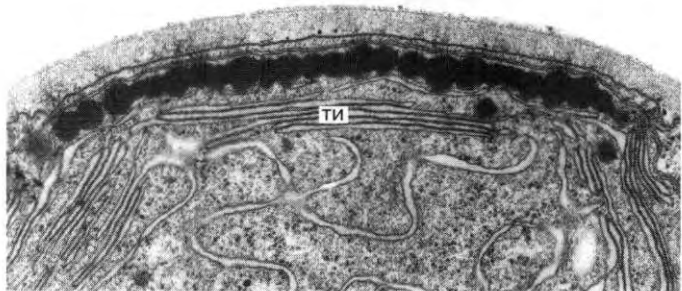
;

(1)

(2)

(249)

()



165. Viridiplantae: Chlorogonium

14.

Viridiplantae.

()

() ; Chlorophyta

(. 166)

14

CHLOROPHYTA
Pascher, 1914

Chlorophyta

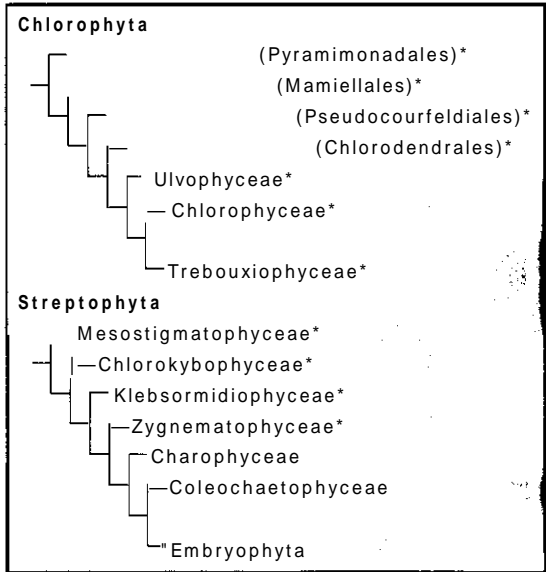
() ,

(Ulvophyceae, Trebouxiophyceae, Chlorophyceae).

— 50) ,

(40

(. 166).

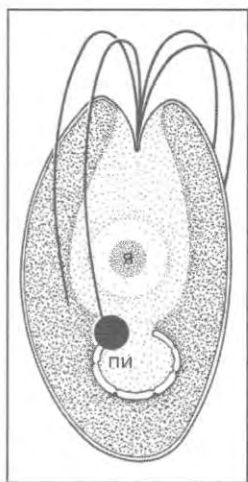


14,
t&pusyATI

В отличие от Volvocida, многоклеточные

Prasinomo

nadea



167. Viridiplantae, Chlorophyta, *Tetraselmis bichlora*.
 1600
 1 16,
 4 (. 167).

Tetraselmis,

().

Pyramimonadales

Katablepharis (. .

62).

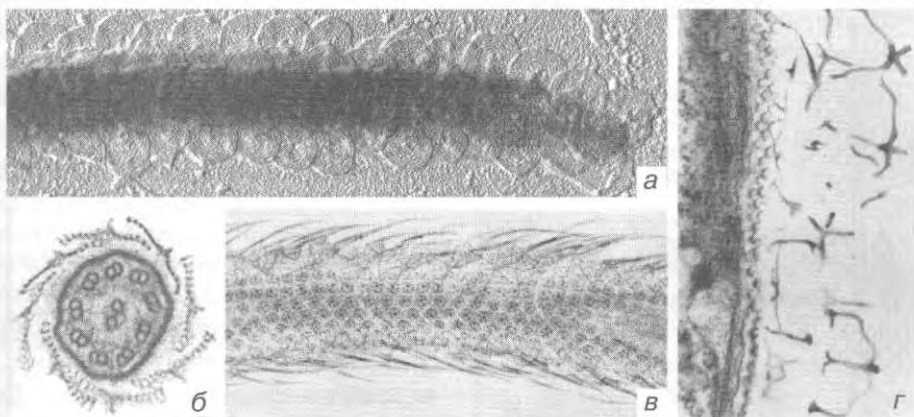
{*Tetraselmis convolutae*

= *Platymonas convolutae*)

Convoluta roscoffensis,

: *Pyramimonas*,

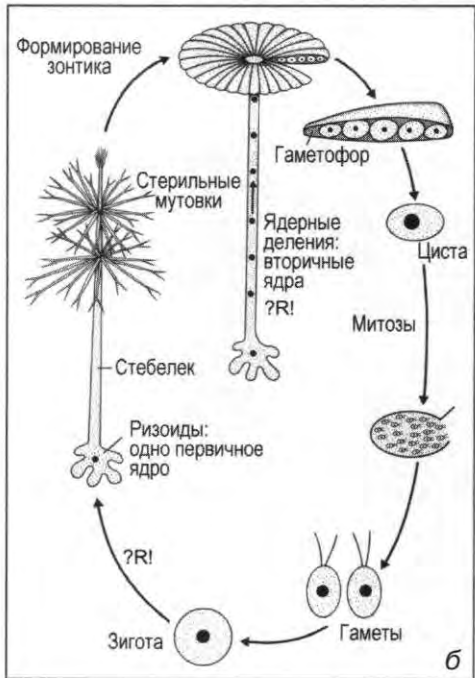
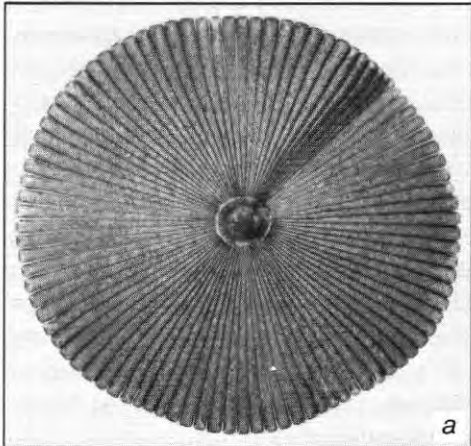
monas (Pyramimonadales), *Mamiella*,
 (Mamiellales), *Nephroselmis*, *Pseudo*



168. Chlorophyta, (), — *Mantiella squamata*; — *Mamiella gilva*; , — *Pyramimonas tetrahynechus* (. . 47 , — 68 , —

scourfeldia (Pseudoscourfeldiales), *Tetra-selmis* (Chlorodendrales), *Prasinomonas*.

ULVOPHYCEAE Mattox & Stewart, 1984 —



(*Ascosiphonia*, *Cladophora*, *Derbesia*, *Ulothrix*)

(*Ulva*, *Caulerpa*, *Halimeda*).

(*Dasycladales*).

(. . . 166).

Dasycladales

(. . .)

(. . . 169).

— *Acetabularia acetabulum* —

: *Acetabularia*, *Dasycladus*.

TREBOUXIOPHYCEAE Friedl,

1995 —

. 169. Chlorophyta, Ulvophyceae: *Acetabularia*: — —

(. . .). . . . — 8 .

Trebouxiophyceae —

(. 170).

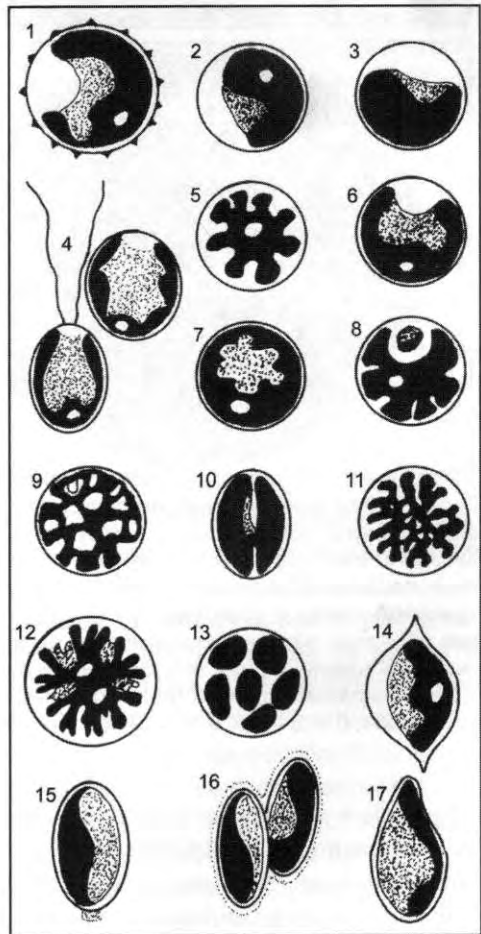
Chlorella (*cium bursaria*)

Chlorella)

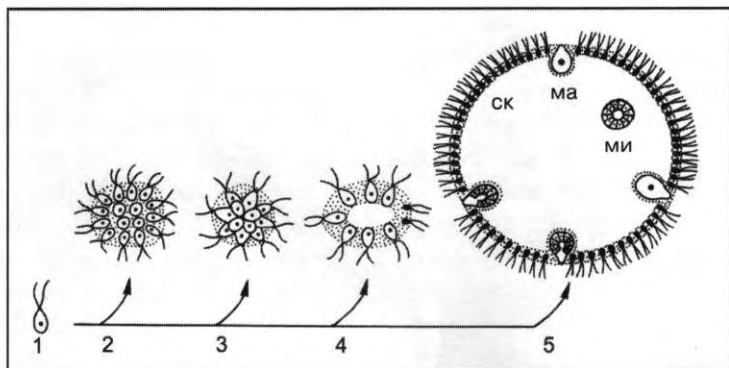
Trebouxia —

. 170. Chlorophyta:

: 1 — *Trochiscia*, 2 — *Chlorella*,
 3 — *Palmellococcus*, 4 — *Chlamydomonas*
 (), 5 —
Radiosphaera, 6 — *Chlorococcum*, 7 — *Neo*
chloris, 8 — *Trebouxia*, 9 — *Spongiochloris*,
 10 — *Myrmecea*, 11 — *Dictyochloropsis*, 12 —
Macrochloris, 13 — *Bracteacoccus*, 14 —
Scotiellopsis, 15 — *Pseudococcomyxa*, 16 —
Coccomyxa, 17 — *Choriocystis* (: Kremer:
Mikrokosmos 87 [1998] 25). : 1 11
 15 17—1 , 12 —350x, 13 14—550x.



1912 *Heli*



172. Chlorophyta, Chlorophyceae:
 monas (1), Gonium (2), Pandorina (3), Eudorina (4),
 Volvox (5), Eudorina, Volvox

Chlamydo-

()

Volvocida France, 1894

(Volvocales) —

Volvocida —

Polytoma, Hyalogramonium,

()

: Chlamydomonas, Chlorogonium, Dunaliella, Pandorina, Volvox.

Chlorococcales Marchand,

1895 —

(Chlamydomonas, Chlorogonium),

1000

: Goni-

um, Eudorina, Pleodorina, Volvox (172).

(

).

Chlamydomonas

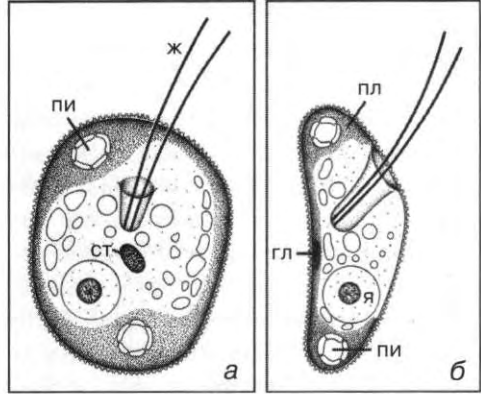
: *Chlorococcum*, *Pediastrum*, *Scenedesmus*.

STREPTOPHYTA Jeffrey,

1982

(Charales, Coleochaetales Embryophyta),

(Mesostigmatales, Chlo- rokybophyceae, Klebsormidiophyceae Conjugatophyceae)



173. Viridiplantae, Streptophyta, Meso- stigmatophyceae: *Mesostig- viride*: () (), — () .

2 200 .

MESOSTIGMATOPHYCEAE
Marin & Melkonian, 1999

(. 173),

KLEBSORMIDIOPHYCEAE

van den Hoek et al., 1995

Klebsormidiophyceae

15

Klebsormidium

: *Mesostigma* (
) , *Chaetosphaeridium* (
).

CHLOROKYBOPHYCEAE

Bremer, 1985

Chlorokybophyceae

: *Klebsormidium* (
) , *Raphidonema*, *Stichococcus*.

CONJUGATOPHYCEAE

Engler, 1892 (Zygnematophyceae) —

: *Chlorokybus atmos*
phyticus.

Amoebozoa,

Lobosa Conosa.

LOBOSA Carpenter,

1861 —

Conjugatophyceae

. 174.

: *Closterium*, *Micrasterias*.

AMOEBOZOA Luhe, 1913

Acarpomyxea

(

).

Amebozoa

Cercozoa Schizopyrenidea.

Multicilia

Conosa.

Conjugatophyceae

(Gymnamoebia, Acarn)
(Testacealobosea).

GYMNAMOEBEA Haeckel,

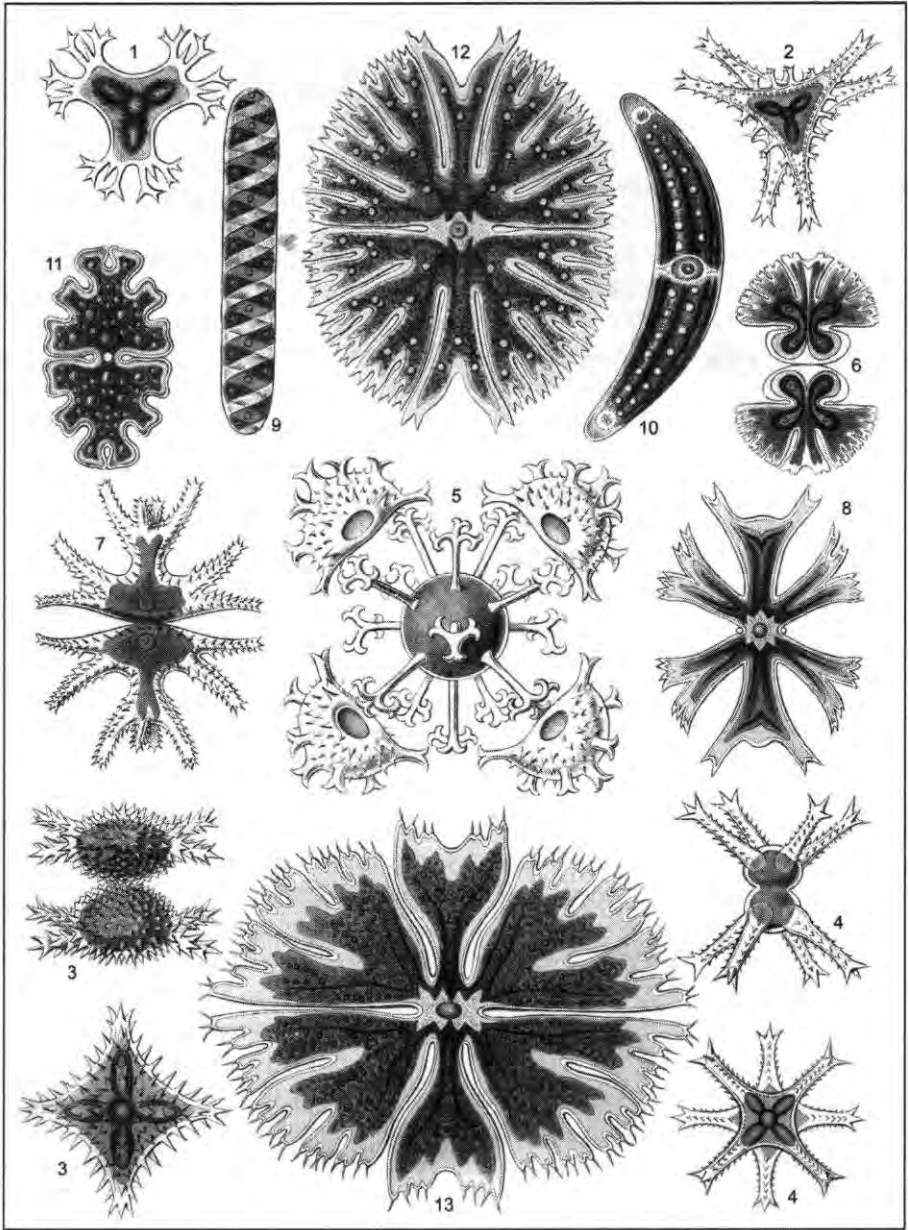
1862

(. 175).

(. 176)

(*Vannella*, . . 8).

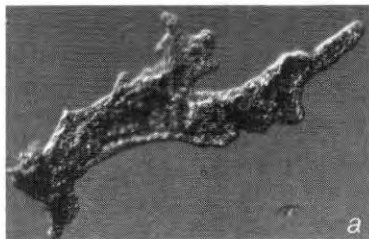
(, (Gymnamoebia)).



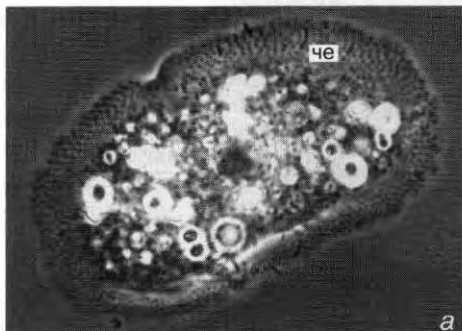
174. Streptophyta, Conjugatophyceae:

: 1 — *Staurastrum furcatum*, 2 — *S. vestitum*, 3 — *S. aculeatum*, 4 — *S. paradoxum*, 5 — *S. spinosum*, 6 — *Micrasterias denticulata*, 7 — *M. trigemina*, 8 — *M. melitensis*, 9 — *Spirotaenia condensata*, 10 — *Closterium costatum*, 11 — *Euastrum pecten*, 12 — *E. agalma*, 13 — *E. apiculatum* (: Haeckel: *Kunstformen der Natur*. Verlag des Bibliographischen Instituts, Leipzig 1899 1904).

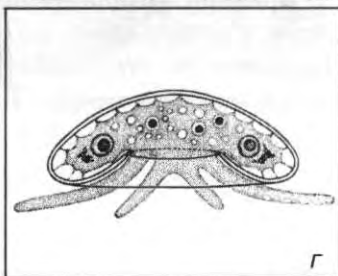
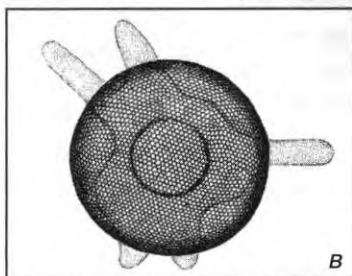
. 175. Amoebozoa,
Lobosa, Gymnamoebia:
Amoeba proteus:



()
()
: — 180 .



. 176. Gymnamoebia
() Testacealobosea
() : — *Cochliopodidum*,



() ; —
Diffugia; , —
Arcella vulgaris,
() ()
(—
, ; —
) . : — 800 ,
— 450 , — 220 .

nense.

(. . 259),

(. . 26).

(*Acanthamoeba*).

Multicilia

Amoeba proteus.

Vannella , *Hartmannella*,
Chaos caroli

Acanthamoeba.

TESTACEALOBOSEA de Seadeleer, 1934 —

Acanthamoeba,
Acanthamoeba castellanii, *A. culbertsoni* *A. polyphaga*

Cochliopodium (. 176)

Acanthamoeba,
Acanthamoeba

(. . 221).

: *Acanthamoeba*, *Amoeba*, *Chaos*, *Cochliopodium*, *Dactylamoeba*, *Hartmannella*, *Mayorella*, *Multicilia*, *Saccamoeba*, *Thecamoeba*, *Vannella*.

(. 1765, . . 32 ,)

ACARPOMYXEA Page, 1976

(. 176 ,

).

: *Arcella*, *Diffugia*, *Hyalosphenia*, *Nebela*.

(. . 23, 9).

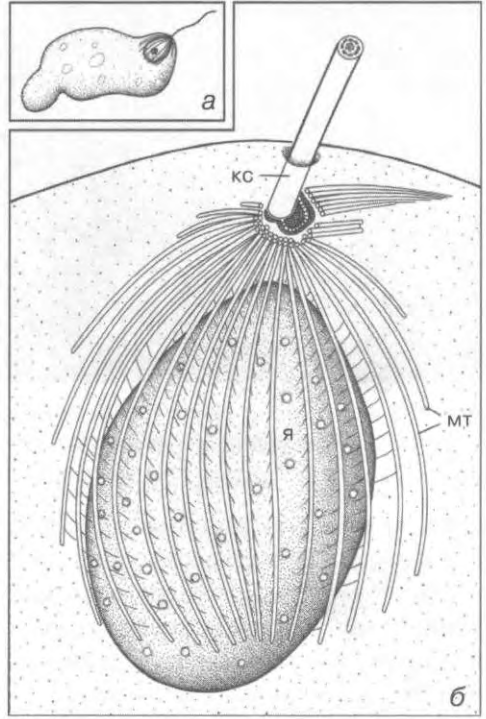
CONOSA Cavalier Smith,

1998

: *Corallomyxa*, *Leptomyxa*,
Stereomyxa.

Conosa

Информация
ARCHAMOEBA
 Cavalier Smith, 1983



177. Amoebozoa, Conosa, Archamoeba:
Mastigina (),

(. 177).

() () (), —
 () . ∴ — 250 , —
 12 .

Pelomyxa

palustris (. 178),

2 ,

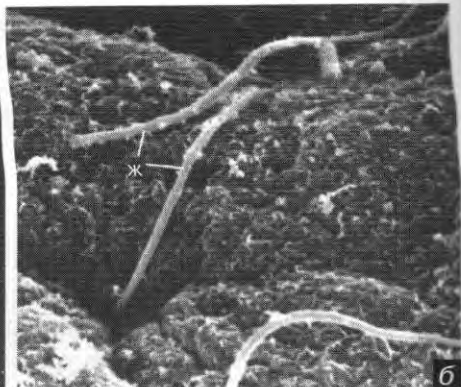
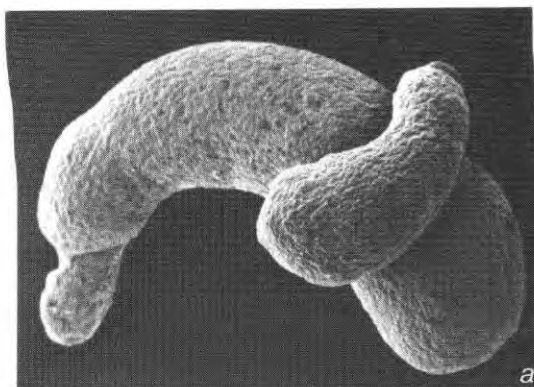
Rhizopoda Pelobiontida
 Page, 1976.

XIX ,

1 5 .

(. 259).

Mastigella Pelomyxa. —
 9x2+2



178. Archamoeba:

Pelomyxa palustris () () ()

: — 100 , 6 — 8 .

Mastigina.

Mastigella Mastigamoeba

Entamoeba histolyti-

ca. —

Enta-

moeba.

: *Entamoeba, Mastigella, Mastigina, Pelomyxa, Mastigamoeba (= Phreatamoeba).*

MYCETOZOA de

1859

Acrasea,

4

(Protostelea,

Myxogastrea Dictyostela)

(Aconchulina).

Acarpomyxea

: *Cavostelium*, *Ceratiomyxa*,
Protostelium.

MYXOGASTREA Olive, 1970 —

EUMYXA Cavalier Smith,

1998

Eumyxa

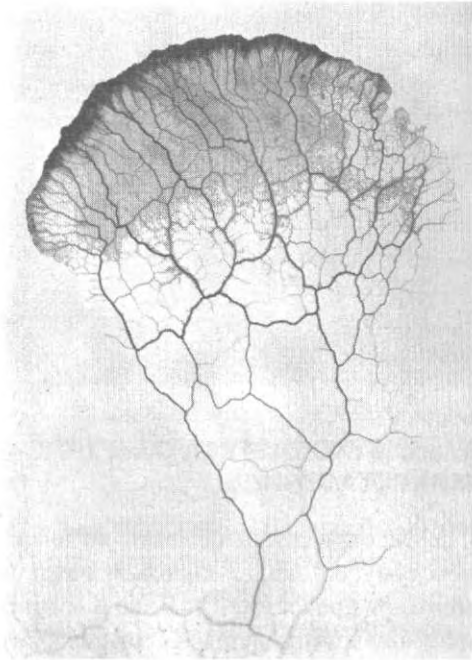
: Protostelea Myxogastrea,

1

(. . . 28),

PROTOSTELEA Olive, 1970 —

(12) (. . 179).



. 179. Conosa, Mycetozoa, Myxogastrea:
Physarum confertum (:
Stiemerling: Cytobiologie 1 [1970] 399). — :
2x.

: *Echinostelium*, *Physarum*.

Trichia.

DICTIOSTELA Olive,

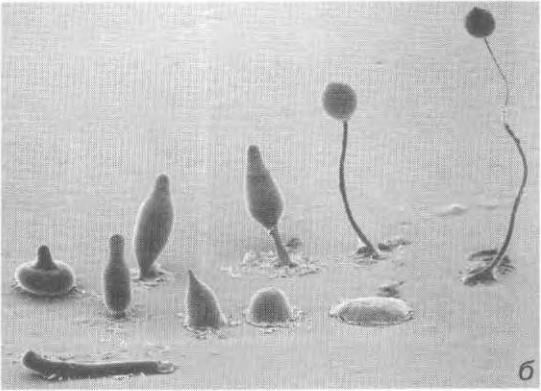
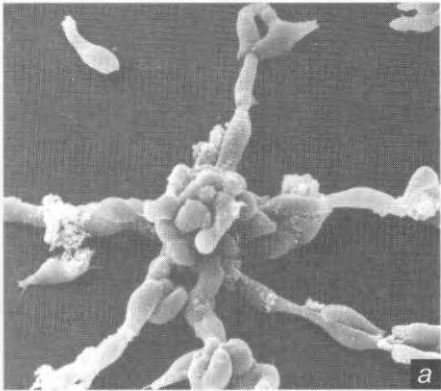
1970 —

(. 180, 316).

(. 180).

(,).

1



180. Mycetozoa, Dictyostela: — *Dictyostelium* (— 620, — 40)

Gromiida

Lobosa (Gymnamoebae, Acarpomyxea, Testacealobosea)

6

Aconchulina

: *Acytostelium*, *Dictyostelium*, *Polysphondylium*.

ACONCHULINA

de Saedeleer, 1934

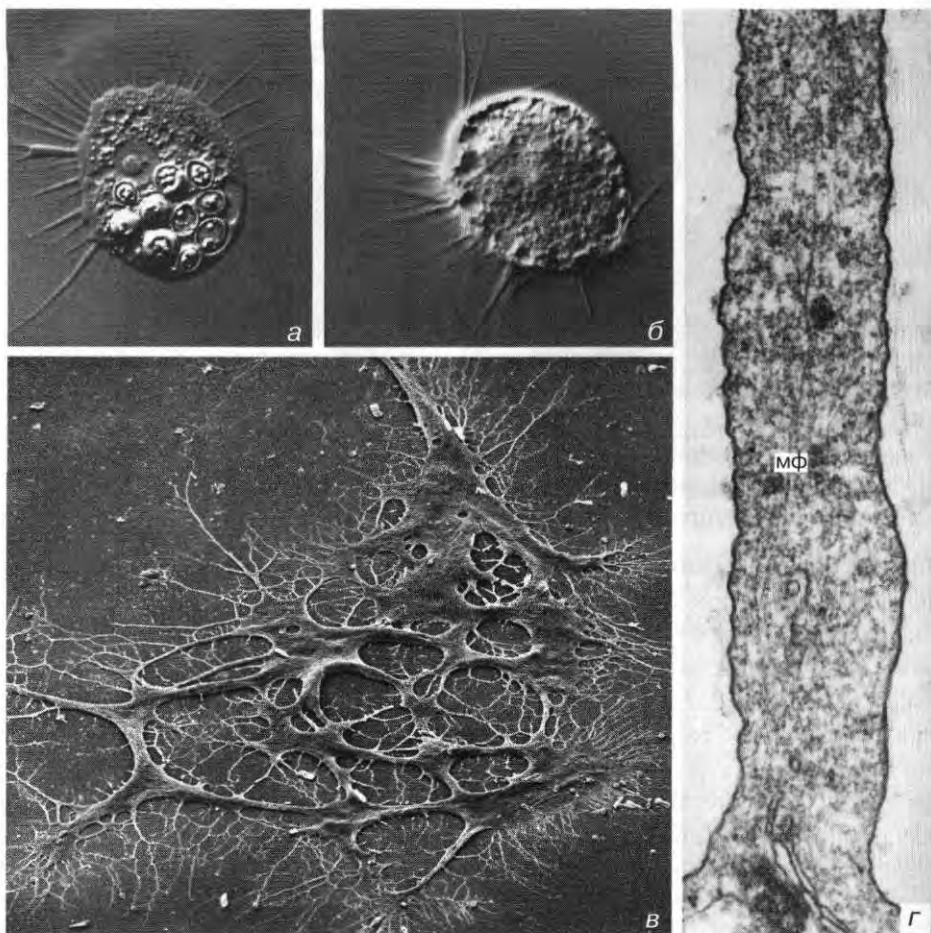
chulinida)

Gromiida.

Cercozoa.

Aconchulina

Vampyrellidae,



181. Mycetozoa, Aconchulina: — *Nuclearia*; — *Lateromyxa*
 — *Thalassomyxa australis*; — *Vampyrella lateritia*
 ; — : N. Hülsmann: J. Eukaryot. Microbiol. 40 [1993] 141; — : Grell: Protisto-
 logica 21 [1985] 215). : a — 500x, — 800x, — 160x, — 37

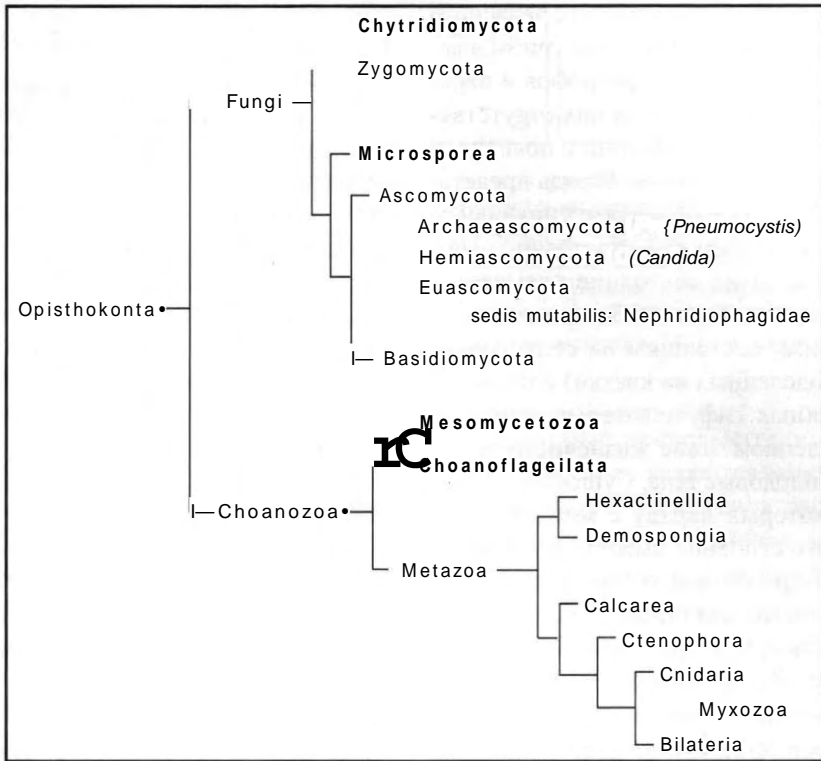
Aconchulina

ОПИСТОКОНТА Cavalier
 Smith & Chao, 1995 —

- : *Arachnula*, *Gobiella*,
- Hyalodiscus*, *Lateromyxa*, *Nuclearia*,
- Thalassomyxa*, *Vampyrella*.

15.

(), ().



FUNGI Nees, 1817 —

Animalia, Fungi, 100, 100
 (Mesomycetozoa,
 Nephridiophagidae), 10
 Chytridiomycota (), Zygomycota () Eumycota (Micro
 (. 15).

spora, Ascomycota Basidiomycota)¹.

Fungi

:

;

()

;

Opisthokonta.

Chytridiomycetes 5

Chytridiales

),

1

(. 182).

(. .

CHYTRIDIOMYCOTA

de , 1863 —

(*Polyphagus*);

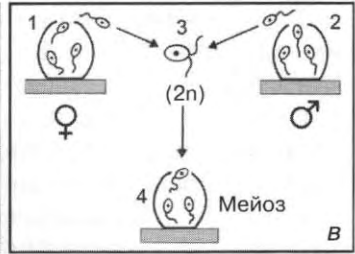
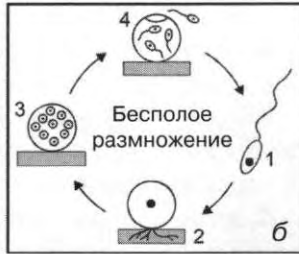
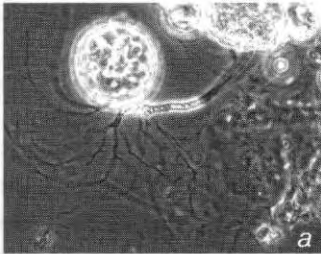
900

Aconchulina. Chytridiales

¹ 2007

(Hibbett

et al., 2007. A higher level phylogenetic classification of the Fungi. *Mycol. Res.* 111 (5): 509-547). —



182. Opisthokonta, Fungi, Chytridiomycota: —
 ; — ; 1 — , 2 — , 3 — , 4 —
 ; — (1) (2)
 (3); (4) (—
) . ∴ — 2 .

Chytridiomycota.

Spizellomycetales

1.

Olpidium,

Rhizophydium

sphaerotheca,

: *Neocallimastix*, *Olpidium*,
Piromyces, *Polyphagus*, *Sphaeromonas*.

Chytridiomycota

Chytri-

ZYGOMYCOTA Barr,

1982 —

Xeocallimastix frontalis,

1000

0₂ 2.

Chytridiales.

Spizellomycetales

Neocallimastigales. —

), (« — 1200
 » — 144
). (Apicomplexa, Ciliophora),
 (

Zygomycota : Zygomycetes Trichomycetes.

EUMYCOTA Cavalier Smith, 1998 (Dikaryomycota) —

Microsporea

Eumycota — (), () 70S
 Microsporea. (16S 23 S),

Sporozoa

MICROSPORA Sprague, 1982

Microsporea.

MICROSPOREA Sprague, 1982 —

1
 20

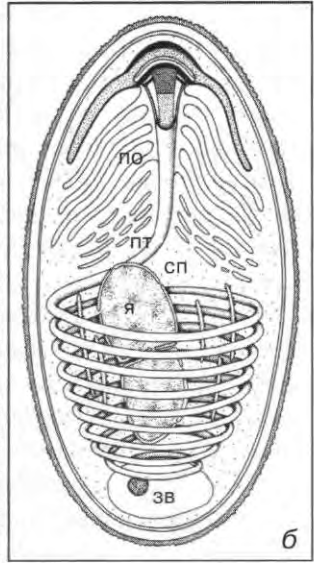
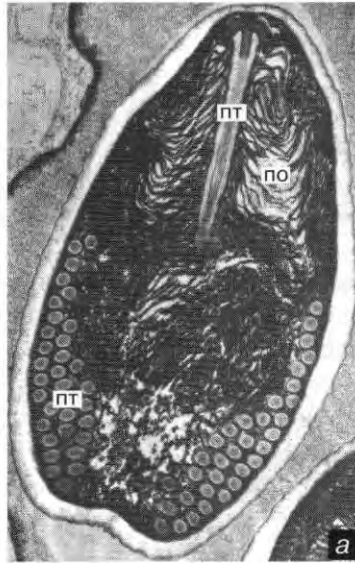
. 183. Fungi, Eumycota,
Microspora: —

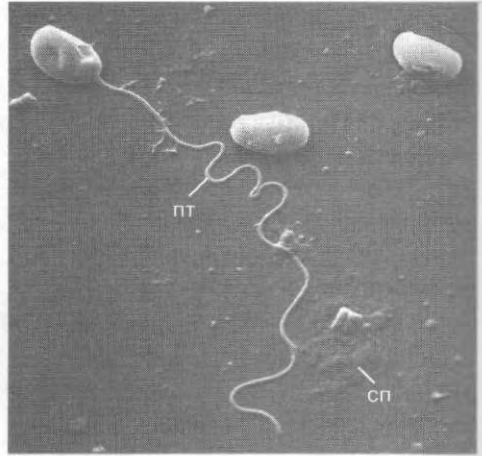
Pleistophora hypheobryconis

()

(), —

— (— : Lorn and
Corliss: J. Protozool. 14
[1967] 141). : 16





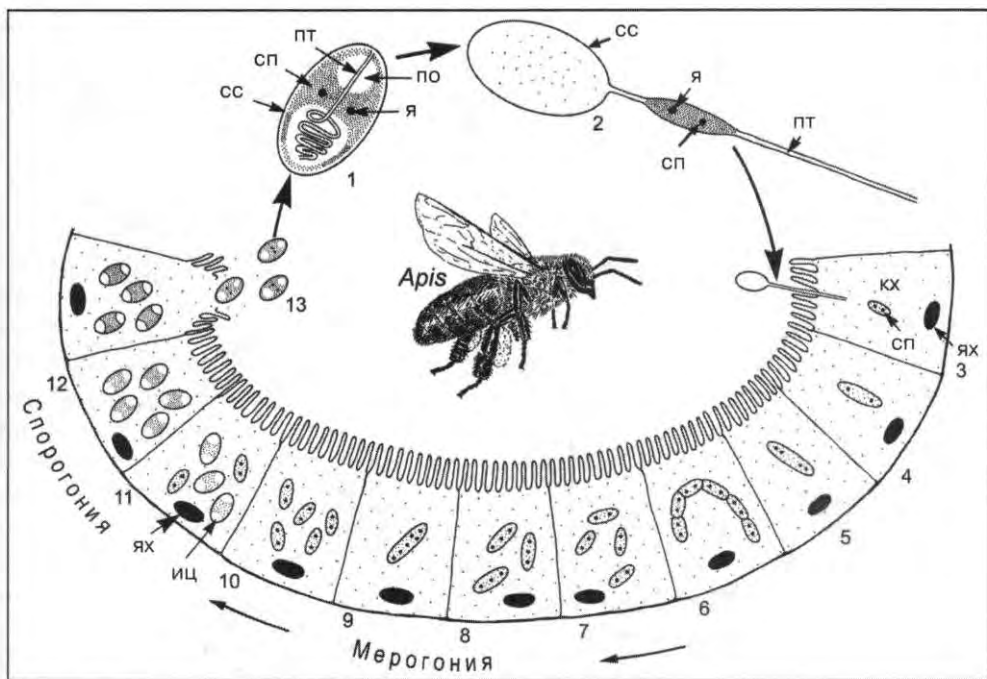
184. Microspore: () *Nosema tractabile* (: Larsson: Protistologica 17 [1981] 511). : 2900 .

vivo

in

() () 5 30

(. 184).



185. Microspore:

Nosema apis,

(). 1 —

. 2, 3 —

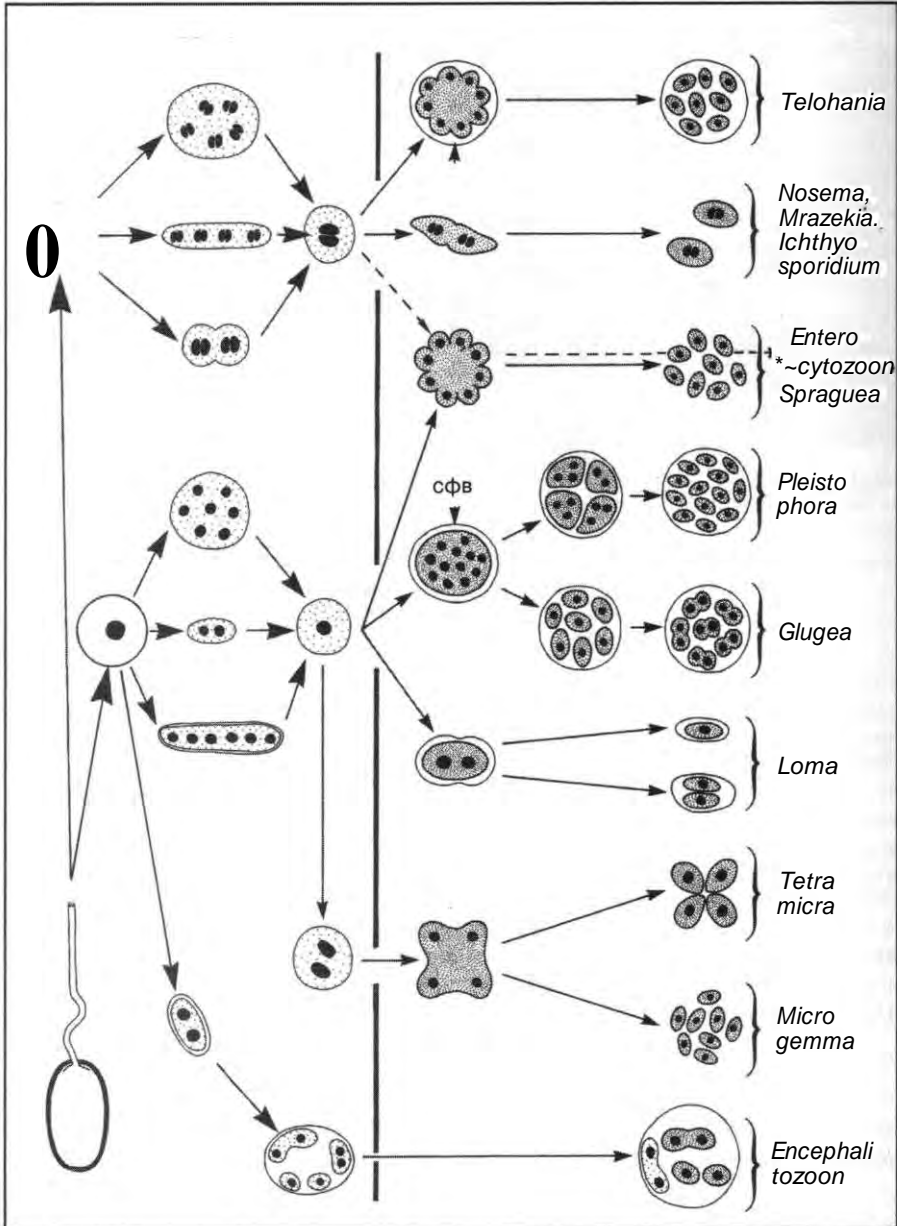
. 4 10 —

. 11 12 —

(10),

. 13 —

(. 185).



186. Microspora:

Encephalitozoon

() ()

)
 : *Amphiacantha*, *Desportesia*, *Metchnikovella*.

Microsporia Delphy, 1963

Microsporea sensu stricto,
 ()

: *Amblyostoma*, *Encephalitozoon*, *Enterocytozoon*, *Glugea*, *Nosema*, *Pleistophora*, *Vairimorpha*.

ASCOMYCOTA Berkeley,

1857 —

75%
 Fungi.

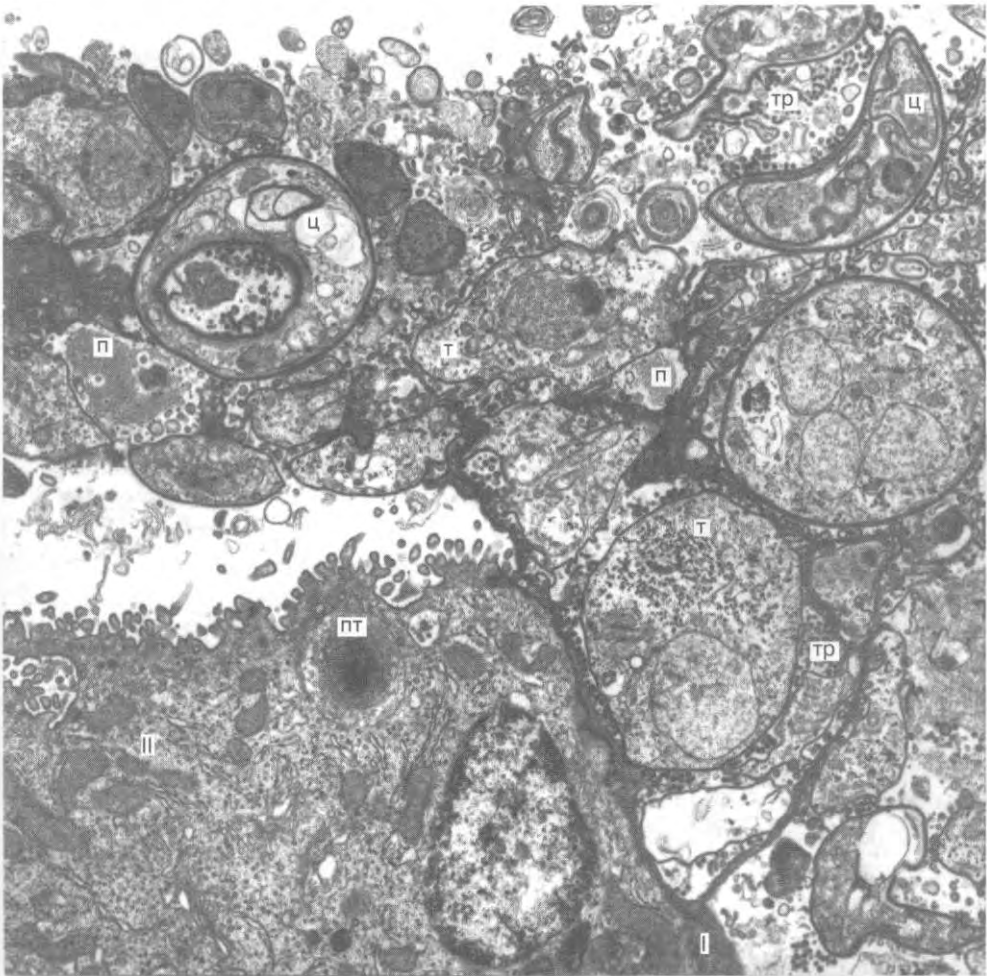
Pneumocystis carinii (Pneumocystidales) (. 187).

P. carinii Ascomycota.

1912

(),

рас-



187. Eumycota, Ascomycota: *Pneumocystis carinii*. I (I), II, (), II, () *Pneumocystis* (: Kaneshiro et al.: J. Eukaryot. Microbiol. 40 [1993] 805). : 8 000x.

Pneumo-
cystis carinii,

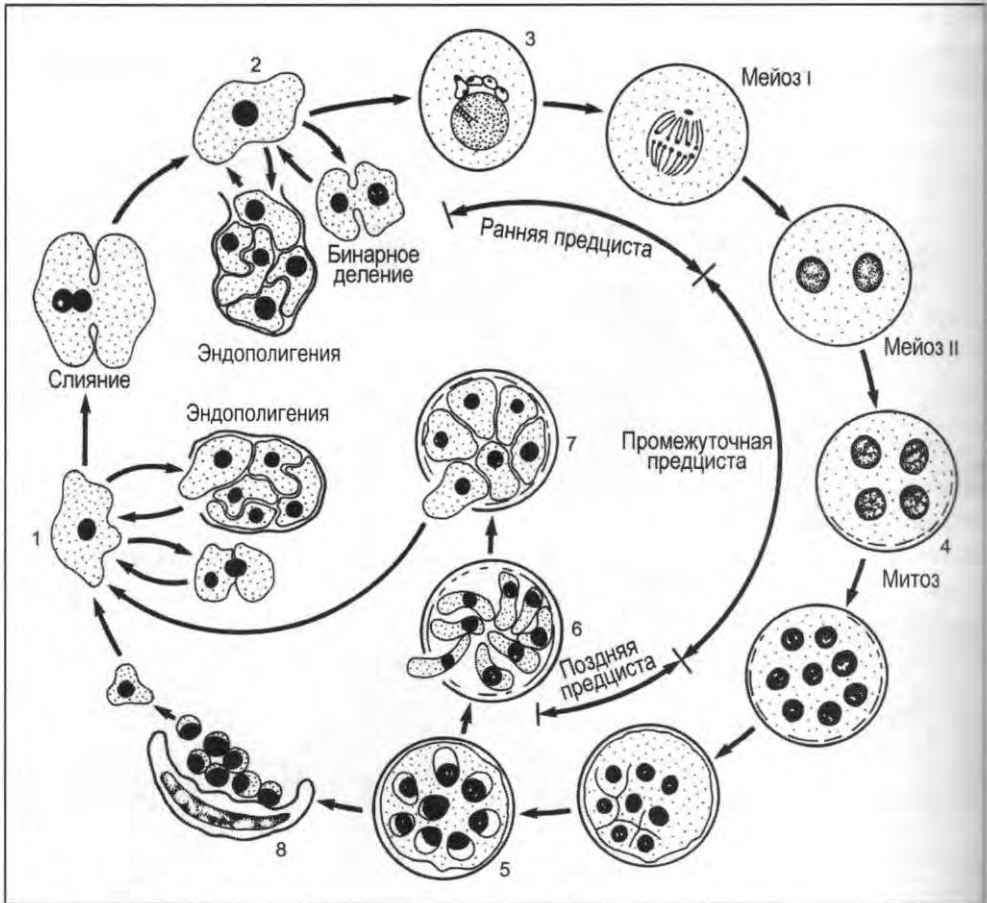


Рис. 188. Ascomycota: схема внутрилегочного клеточного цикла *Pneumocystis carinii*. 1 —

1 — зигота; 2 — эндополигония; 3 — ранняя предциста; 4 — промежуточная предциста; 5 — промежуточная предциста; 6 — поздняя предциста; 7 — промежуточная предциста; 8 — поздняя предциста.

()

50%

C. albicans

Hemiascomycota

P. carinii

Saccharomyces

cerevisiae,

(. 189,190).

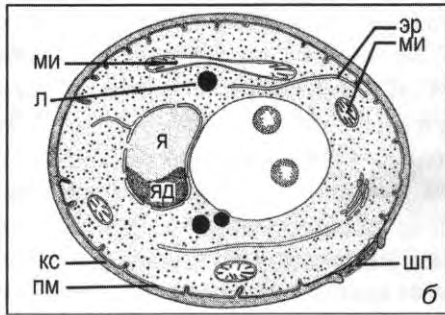
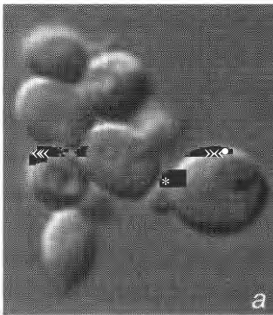
Archaeascomyco-

ta — Schizosaccharomycetales —

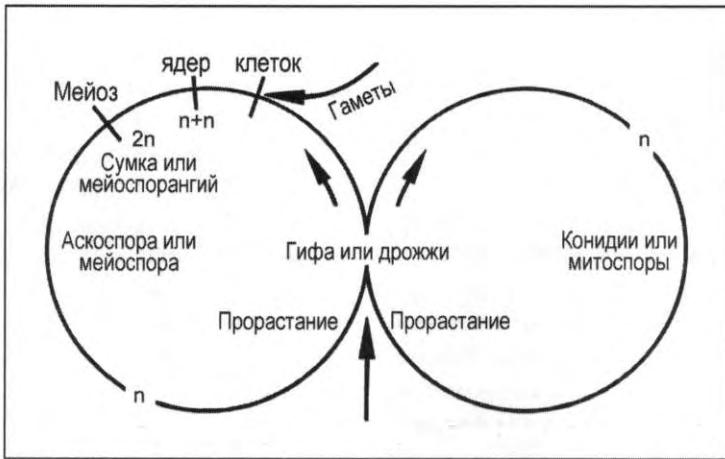
(, *Schizosaccharomycespombe*).

Candida albicans

37 ° .



. 189. Ascomycota: *Saccharomyces*.



190. Ascomycota ()
)
 ()
 () ()
 ()

Nephridiophagidae

Sprague, 1970

Nephridiophagidae () 191 — это

— *Cryptococcus*.

Nephridiophaga apis

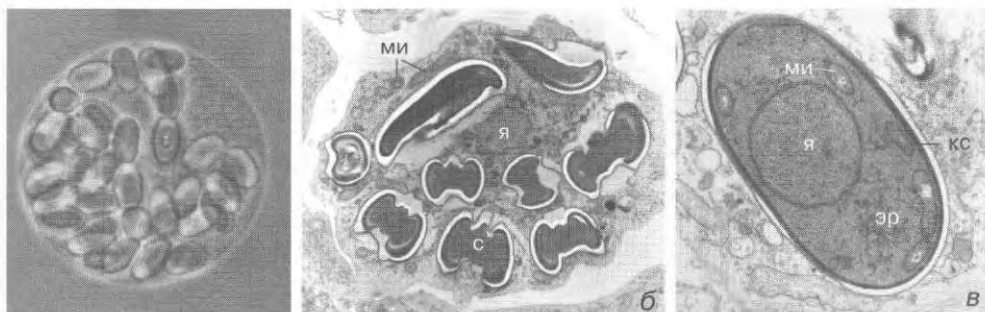
— *neoformans*.

Nephridiophagidae () « » —
 « » —)

Coelosporidiidae,

7 8% *Coelospo-
ridium*

(3 6%)



191. Ascomycota, Nephridiophagidae: *Nephridiophaga blattellae*:
 (); ()
 (); ()
 (), ()
 (). : - 1 800 , 6-4 , - 5

Nephridiophagidae

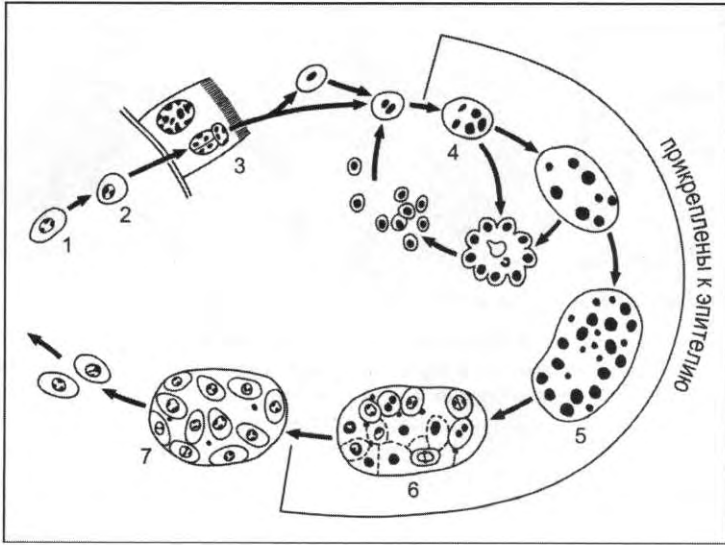
192). (5 10 2 4 ;
 : *Nephridiophaga*, *Orycto*
spora, *Coleospora*.

BASIDIOMYCOTA de

1866 —

Nephridiophaga blattellae,

« »



192. Nephridiophagidae:

Nephridiophaga blattellae.

- (1)
- (2)
- (3)
- (4)
- (5) —
- (6)
- (7) ()

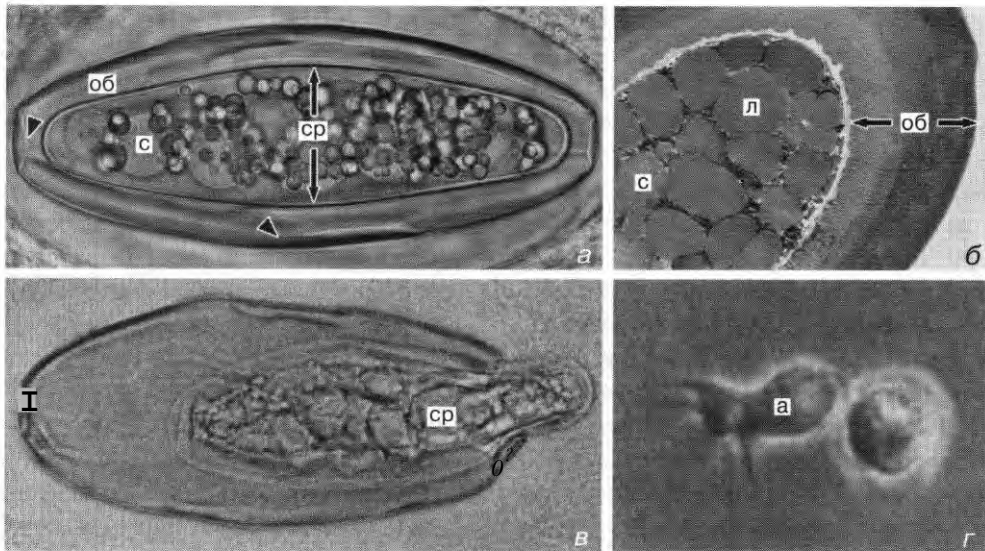
CHOANOZOA Cavalier

Smith, 1981

DEUTEROMYCETES

(Metazoa),
Mesomycetozoa

()



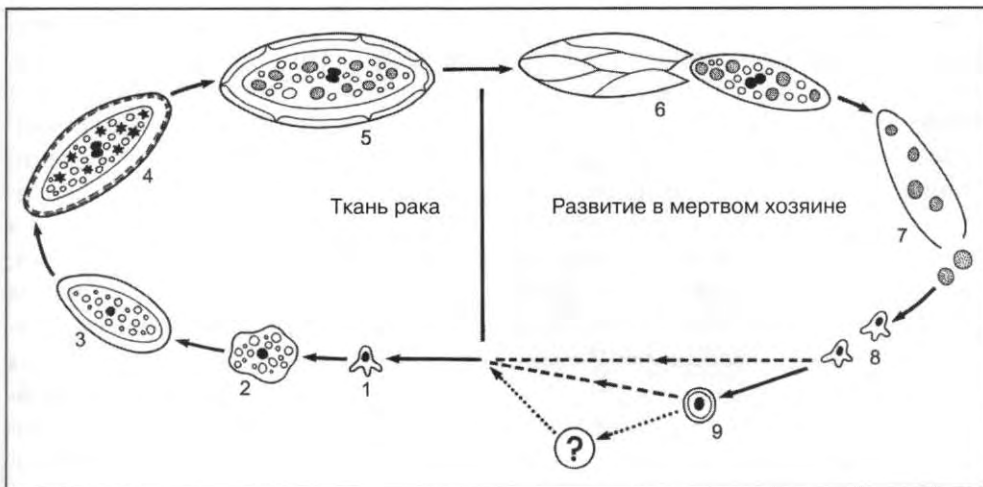
193. Opisthokonta, Choanozoa, Mesomycetozoa: *Psorospermum haeckeli* (, ,)
 (), —
 () (), () —
 ();
 (), — (), — ()
 (: Vogt and Rug: J. Exp. Zool. 283 [1999] 31). : a — 600x, — 1 600x, — 530 , — 1

DRIP —
 : *Der*
 : Choanozoa Mesomyce- *mocystidium*, rosette agent, *Ichthyophonus*
 tozoa Choanoflagellata, - *Psorospermium* (. 193).
 Metazoa. Ichthyosporea.

MESOMYCETOZOA Herr
 et al., 1999 *Rhinosporidium seeberi* DRIP
 . 1999
 Mesomycetozoa
 (« _____ »).
 . Mesomycetozoa
 Choanofla

gellata,	-	20	<i>Dermo-</i>
	Animalia ¹	<i>cystidium;</i>	
	Mesomycetozoa		
	;		
	-		
	-		
;	-		
	-		
	-		
	Psoro		
<i>spermium haeckeli</i>	<i>Ichthyophonus</i>		
<i>hoferi;</i>	<i>Dermocystidium</i>		
	-		
	in	agent, —	rosette
vitro,	-	;	
	-		
	6		
	-		
<i>Psorospermium, Ichthyophonus</i>	<i>Dermo-</i>		
<i>cystidium</i>	-		
:	-		
	-		
	-		
(-		
),	-		
	-		
	-	<i>Ichthyophonus hoferi</i>	
	(. 194).	()	80
	-		
	-		
	Mesomycetozoa		
	-		
	-		
	-		
	-	<i>I. hoferi</i>	

¹ Animalia Metazoa, Fungi



194. Choanozoa, Mesomycetozoa: *Psorospermium haeckeli*. 1 — , 2 — , 3 — , 4 — , 5 — , 6 — , 7 — , 8 — , 9 — , ? — (: Vogt and Rug: J. Exp. Zool. 283 [1999] 31).

(Eumycota)
Psorospermium haeckeli
 100 200
 Mesomycetozoa,
P. haeckeli
 Mesomycetozoa,

Amoebidium parasiticum, *Anurofeca richardsi*, *Sphaeroforma arctica*, *Rhinosporidium seeberi*.

273).

(. 195, . рнс. Choanoflagellata

().
Rhinosporidium seeberi

nosiga)

(*Codonocladium*);

: *Amoebidium*, *Anurofeca*, *Dermocystidium*, *Ichthyophonous*, *Rhinosporidium*, *Psorospermium*, *Sphaeroforma*.

(*Salpingoeca*).

CHOANOFLAGELLATA

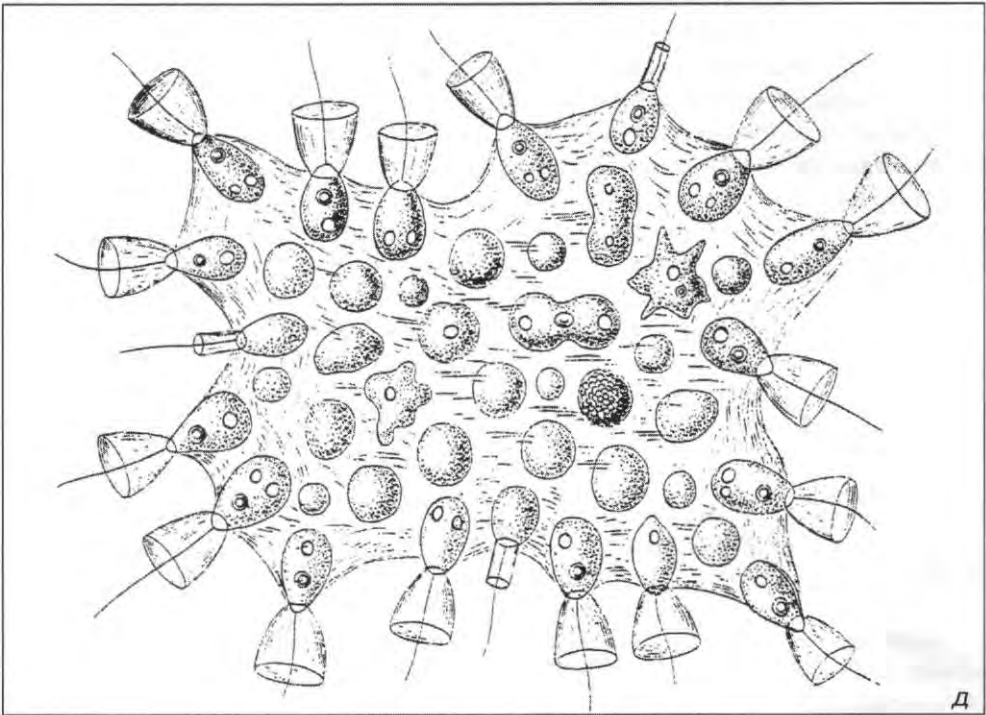
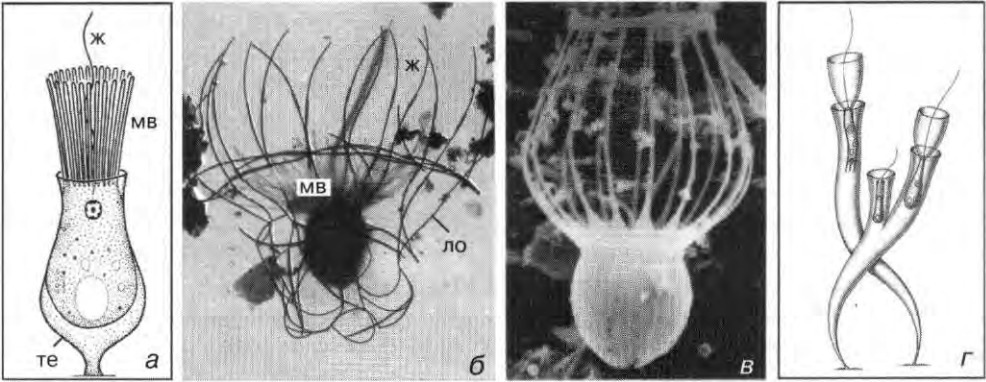
Kent, 1880 —

1956).

10

Sphaeroeca volvox (300 500)

Proterospongia



195. Choanozoa, Choanoflagellata: — *Salpingoeca amphoridium*
 (); — *Acanthoecopsis apoda* (), — *Diplothea costata*; — *Salpingoeca*
cornuta, — *Proterospongia haeckeli* 40 (—
 ; —).
 — 1 700 , 6 — 21 , — 2 900 , — 380 , — 1 200 .

(. 195).

— , — Meta-
zoa — , —
: Myxozoa.

Myxozoa —

()

MYXOZOA Grassé, 1970 —

1

1350

52

: *Codonosiga*, *Parvicorbicula*, *Salpingoeca*.

METAZOA Haeckel,

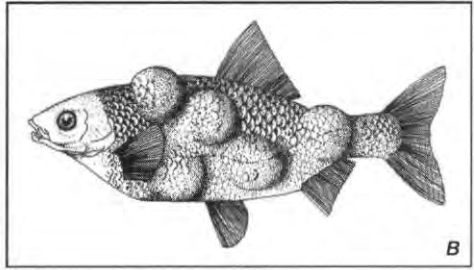
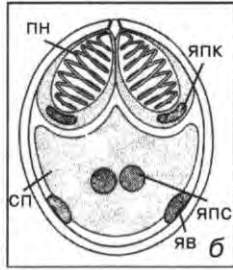
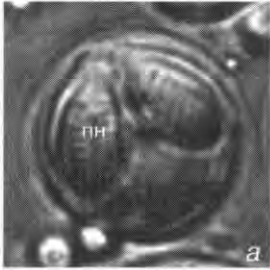
1874

Metazoa —

Cnidospora

Myxozoa (

196)

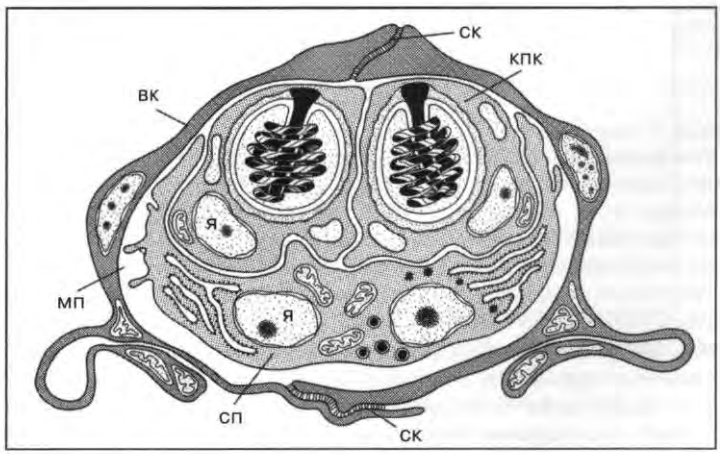


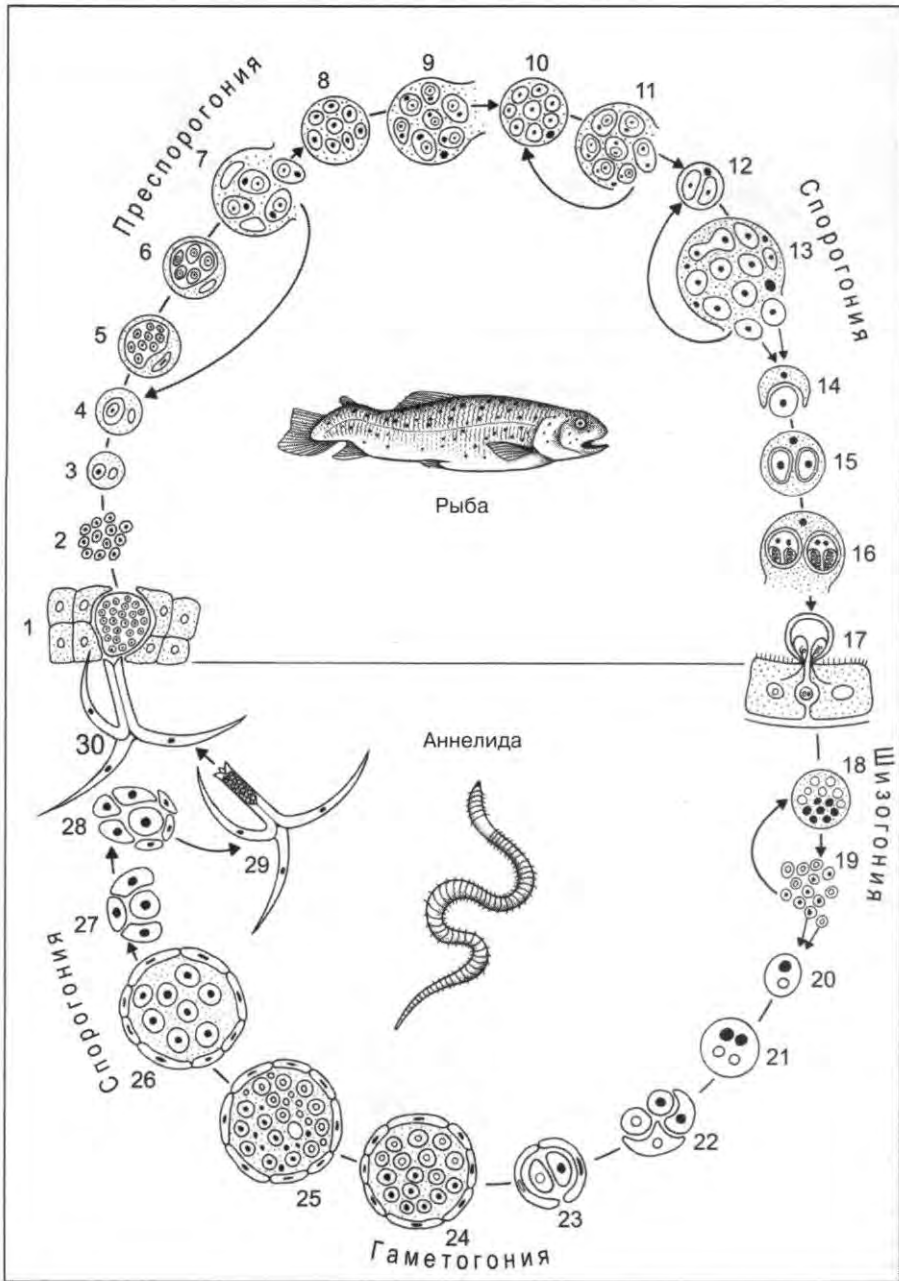
196. Choanozoa, Metazoa, Myxozoa: () ()
Myxobolus; — , — , — *Myxobolus*. — , —
 (— : Schmahl et al.: *Europ. J. Protistol.* 25 [1989] 26; —).
 ∴ — 2 200 .

— — — — —
 — — — — — (— . 197).
 — — — — —

18S
 Myxozoa —
 Narcome —
 Myxozoa —
 dusa Cnidaria. — Meta-
 zoa , Cnidaria — 1980 ,
 — — — — —
 — — — — — *Myxobolus*
 — — — — — *Tubifex tubifex*

197. Myxozoa: —
Leptotheca elon-
gata. —
 ()
 (), —
 —
 —
 ()
 ∴
 3 200 .





198. Мухозоа:

Myxobolus cerebralis. 1 16 —

Мухозоа,

; 17

30 —

. 1 —

; 2 —

(. 198).

— Myxosporea (

sporea (

6 — 12

Myxozoa.

Actinosporea

Myxozoa,

Myxobolus cerebralis (. 198).

; 3 13 —

21 26 —

; 24 25 —

8 . 27 29 —

(29)

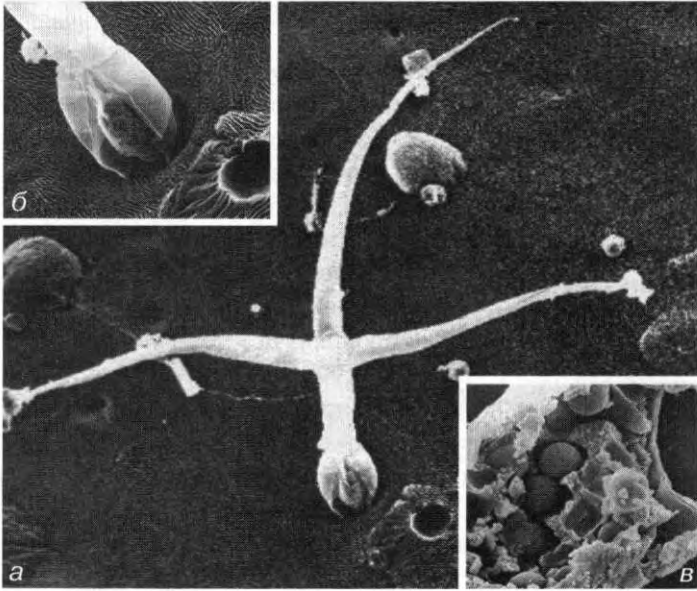
(30);

Eukaryot. Microbiol. 48 [2001] 339).

198, 1 2; 199).

(. 198, 3 13).

(: Kent et al.: J.



. 199. Myxozoa:

Myxobolus

cerebralis

1 - 700 , -
 , - 3 200 .

« »
 « ».

(. 198, 13 16).

. *cerebralis*,

),
 ()

16 16

8 (-)

198, 27 29) 8 (.

Myxo-

200). 8 (4,

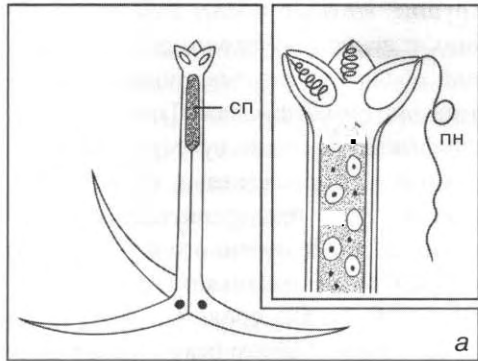
Tetraspora)

bolus

(. 198, 17 20).

20 25)

(. 198,



200. Myxozoa: —

Myxobolus cerebralis,

()

16 ; — ()

() ()

Myxozoa
pfeifferi,
 196);
 7
Myxobolus cerebralis

: *Henneguya*, *Myxobolus*,
Sphaerosoma.

EUKARYOTA incertae sedis

(
)

Sarcodina (

1. — .).

Sarcodina (DEC.

22)

(*)

ACTINOPODA* Calkins, 1902 —

(. 201).

(. 202).

(,)

(,)

),

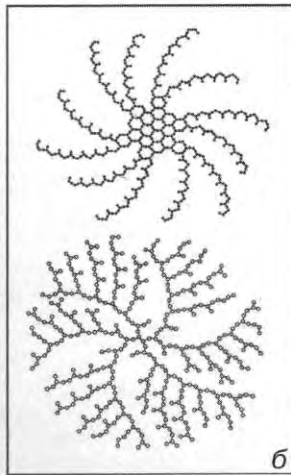
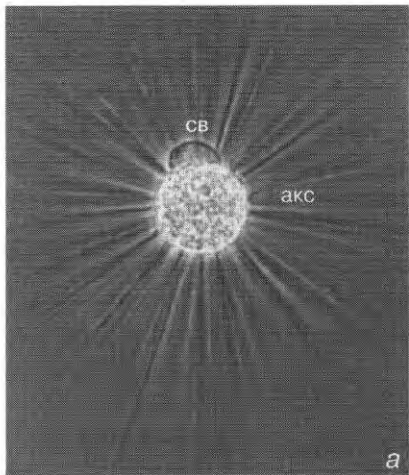
. 201. Actinopoda,

Heliozoa:

: — Actinoph
rys sol

(), — ;

(—
).



(. 203).
Actinopoda
Heliozoa Radiolaria.

Acantharea Haeckel, 1881 —

Radiolaria

(50 — 1)
10 20

(. 205, 206);

(),
() (. 204).

1

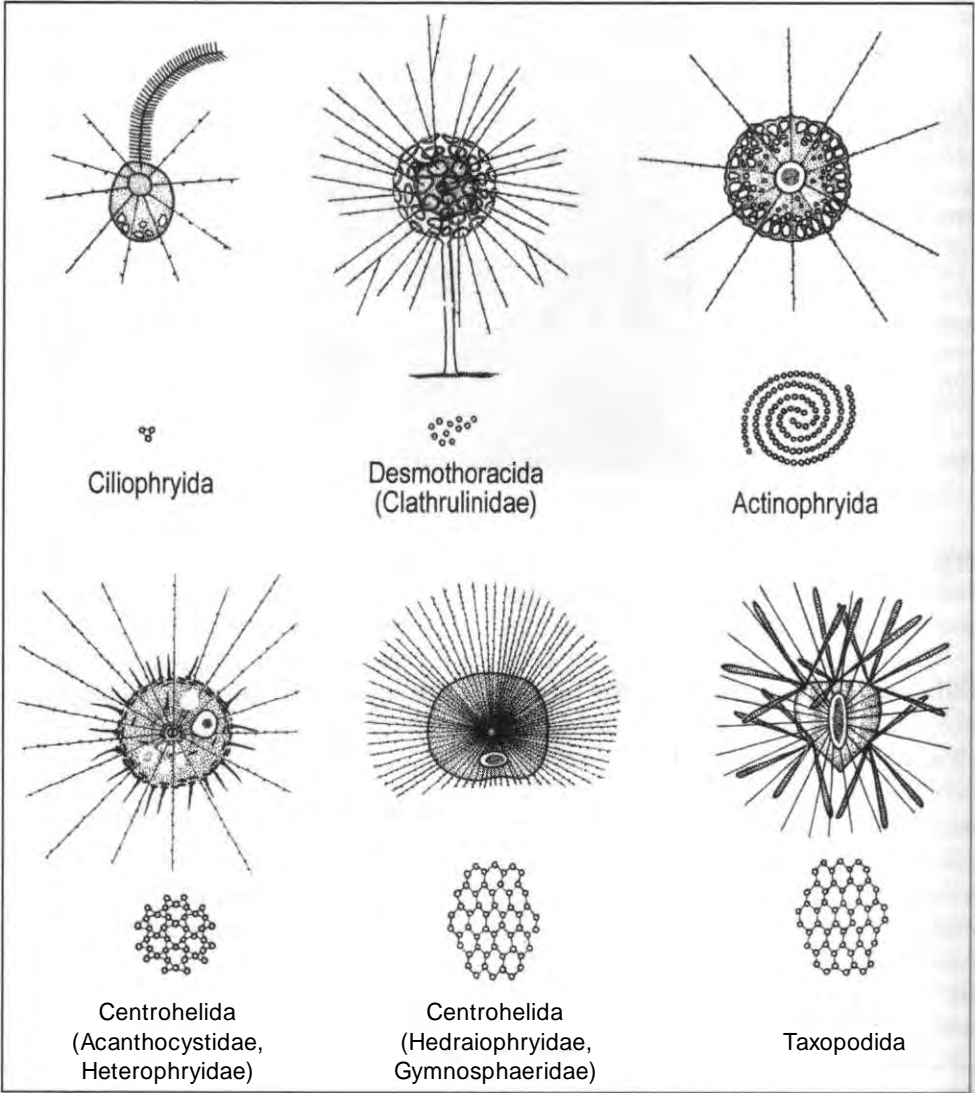
2

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(— — — — —).

Cercozoa

Cercozoa.



. 202.

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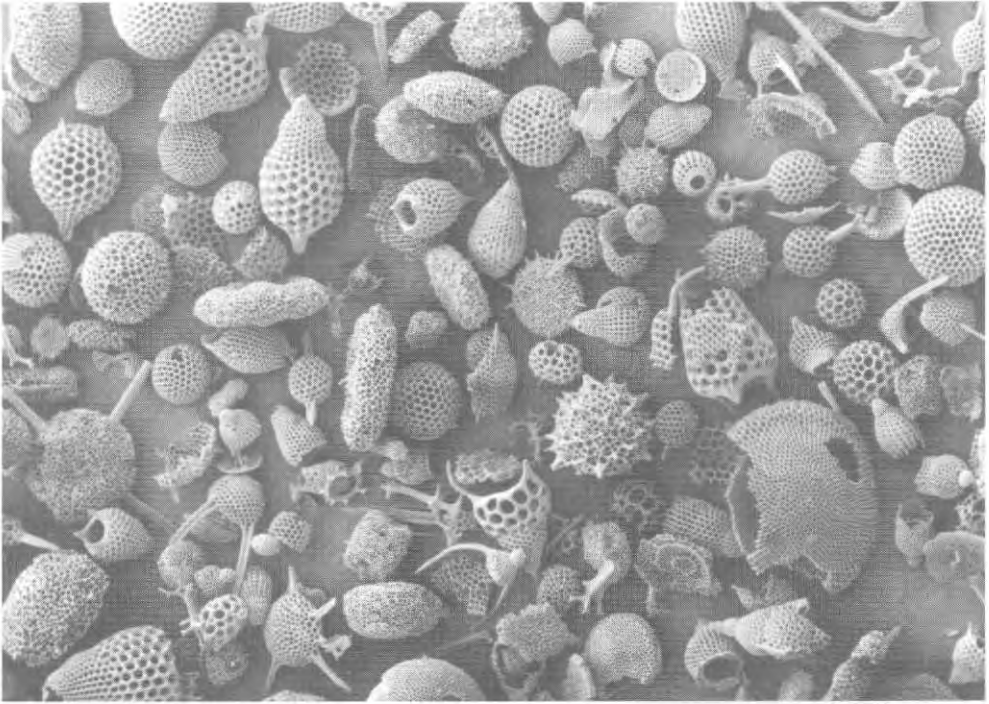
;

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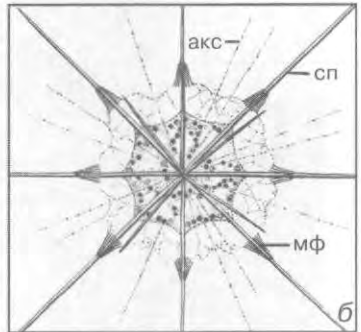
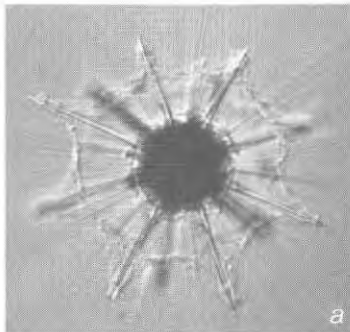


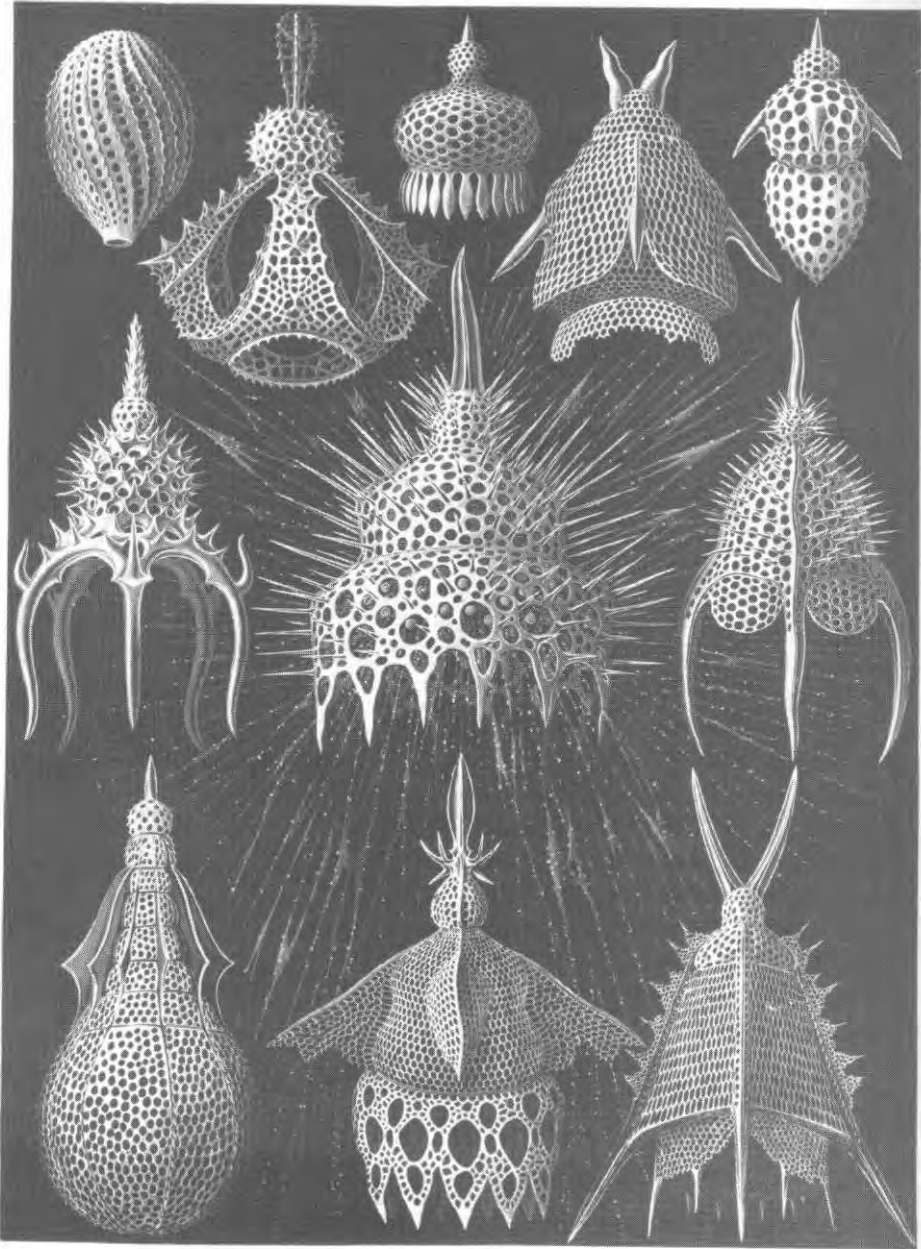
203. Polycystinea:

: 200 .

204. Acantharea:

— ;
 — ; —
 — (—)
 ; —)
 : — 40 .





Cyrtoclema.

„ , • * • ' • ; . »

. 205. Polycystinea: Nasserida (: Haeckel: Kunstformen der Natur. Verlag Bibliogr. Inst., Leipzig and Wien, 1899 1904).

4 : Holocanthida (10),
 Symphyacanthida, Chaunacanthida Arth
 racanthida (20), —

: *Acanthocolla*, *Acantholi*
thium, *Acanthometra*, *Amphiacon*.

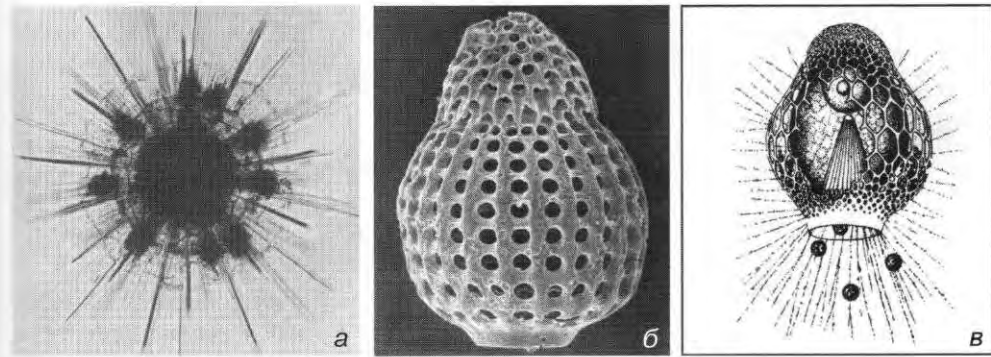
Polycystinea Ehrenberg, 1838 —

30 6
 2 , 12 ;

(. 205).

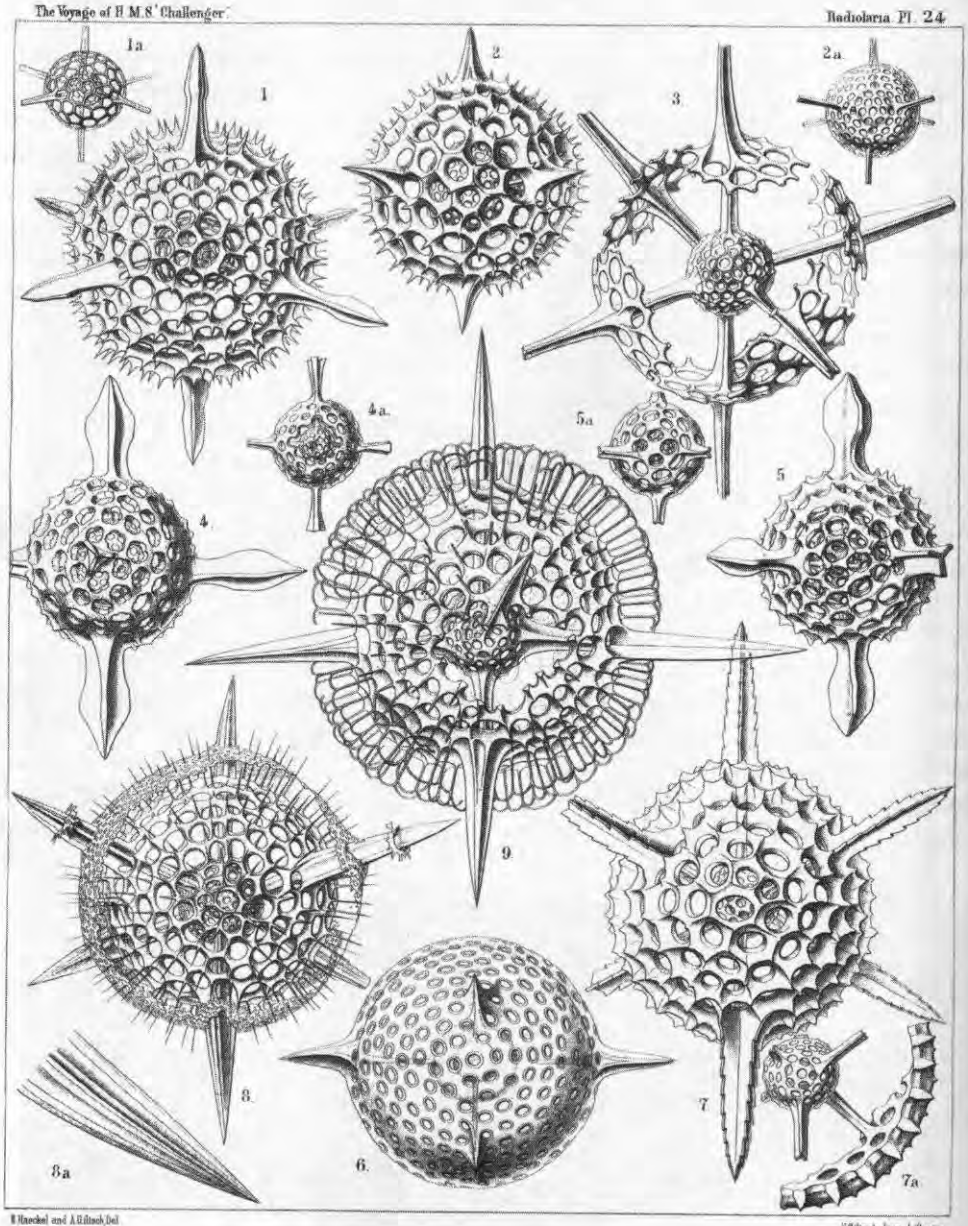
Polycystinea;

(. 206).



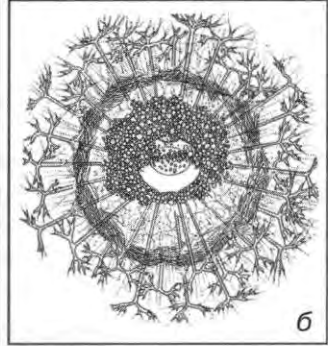
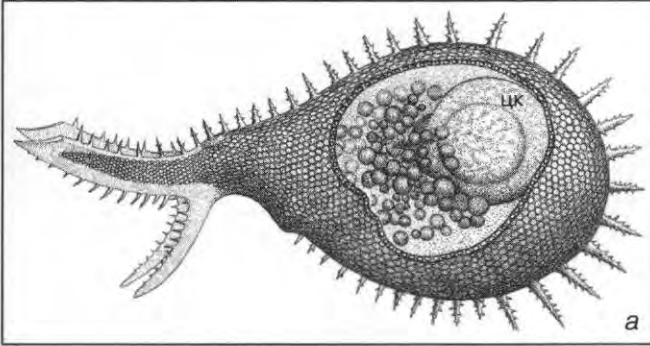
. 206. Polycystinea: — ; — ; —
Cyrtocalpis urceolus (— ; — ; — : K.Q. Qrell:
 Protistology, Springer, Heidelberg 1973). : a — 200x, — 400x, — 260x.

SFUMBBIARIA VASSKXLASXA TAF. IS.



1.7 HEXACANTIUM. 8.0 HEXACROMYIUM

. 207. Polycystinea: (: Haeckel: Die Radiolarien (Rhizopoda, Radiolaria) 2. Theil. Berlin, 1887).



208. Phaeodarea: — Challegeyron wyvillei: () ; — Auloceros elegans (— , —). : — 260 , — 20 .

mellaria

Spu

Nasselaria

(. 2066,).

Spumellaria Nasselaria - 205 207.

(. 208).

: Collozoum, Eucoronis, Thallasicolla.

(Phaeocalpida,

Phaeodarea Haeckel, 1881 —

Phaeoconchida, Phaeocystida, Phaeodendrida, Phaeogromida, Phaeogymnocellida Phaeosphaerida)

darea

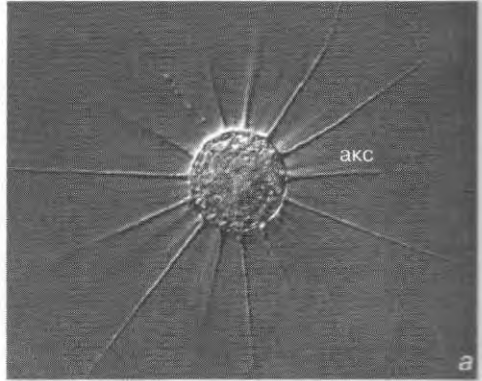
Phaeo-

: Astracantha, Aulacantha, Coelodendrum, Phaeodina.

HELIOZOEAE* Haeckel, 1866

(. . . 202),

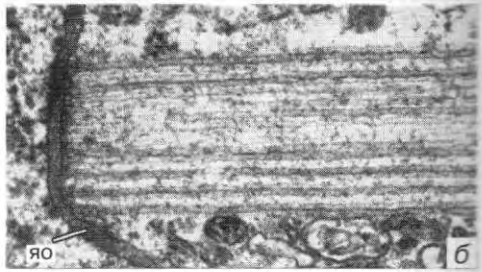
(. . .).



Actinophryida Kuhn, 1926 —

(. . . 202).

(. . . 209).



. 209. Heliozoa: — *Actinophrys sol* (. . .); — (. . .); — (. . .); — (. . .), 6 — 58

(. . . 202).

: *Actinophrys*, *Actinosphaerium*, *Camptonema*.

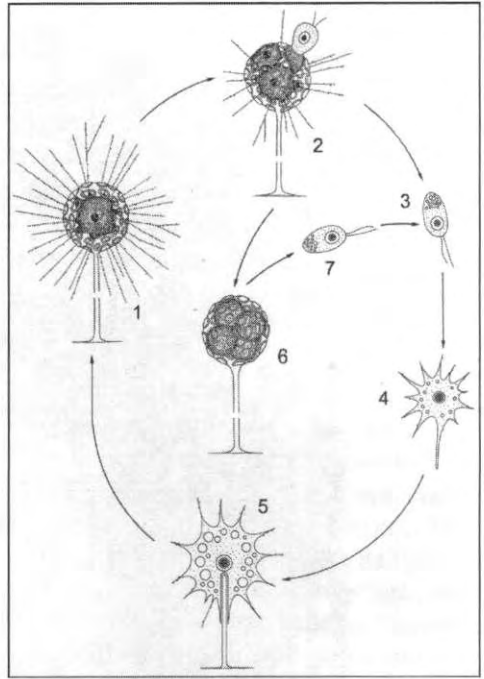
Desmothoracida Hertwig & Lesser, 1874 —

(. 210).
 : *Clathrulina, Hedriocystis, Orbulinella.*

Ciliophryida Febvre Chevalier, 1985 —

(. 202).
 : *Actinomonas, Ciliophrys, Pteridomonas.*

Taxopodida Fol, 1883 —

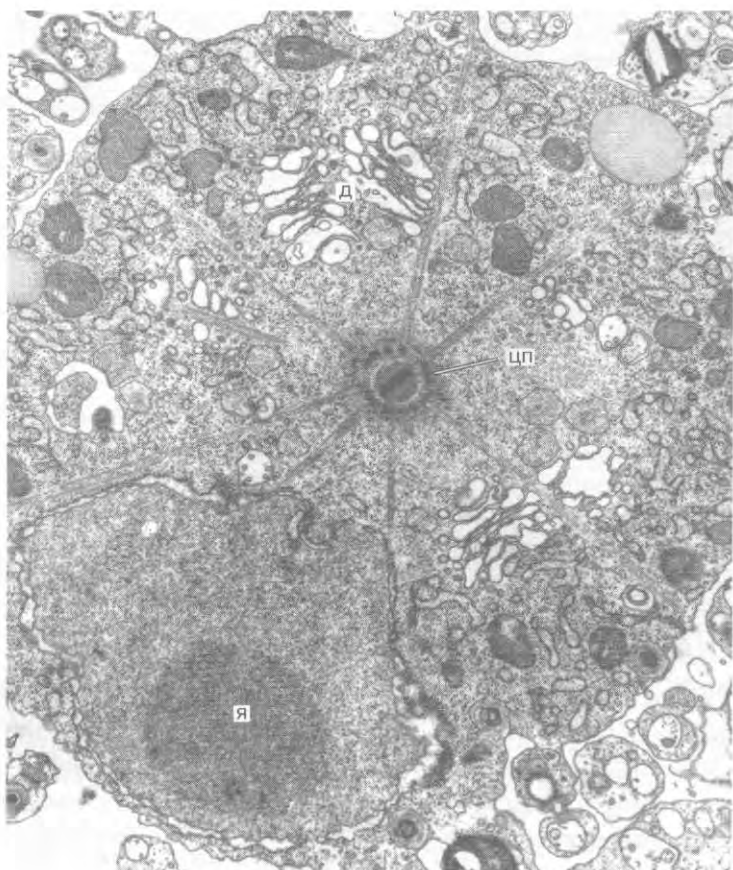


. 210. Heliozoa, Desmothoracida:

Clathrulina elegans.
 (1)
 (2)
 (3),
 (4).
 (5)
 (1).
 (6).
 (7),
 (4),
 ()).

Centrohelida Hartmann, 1913 —

(. 211).



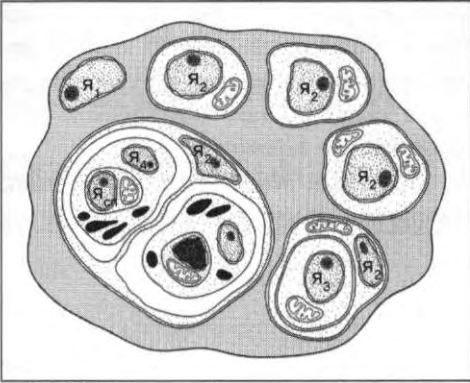
211. Centrohelida: *Heterophrys marina*; (). — (: Bardele: Cell Tiss. Res. 161 [1975] 85). 40 000x.

(. . 202).

: *Acanthocystis*, *Gymnosphaera*, *Hedraiphrys*, *Heterophrys*.

PARAMYXEA Levine, 1979 —

(. 212).



212. Paramyxea:

Paramarteilia orchestiae.

Paramarteilia.

Haplospora.

(9x1+0).

30

teilia

(*Ostrea edulis*).

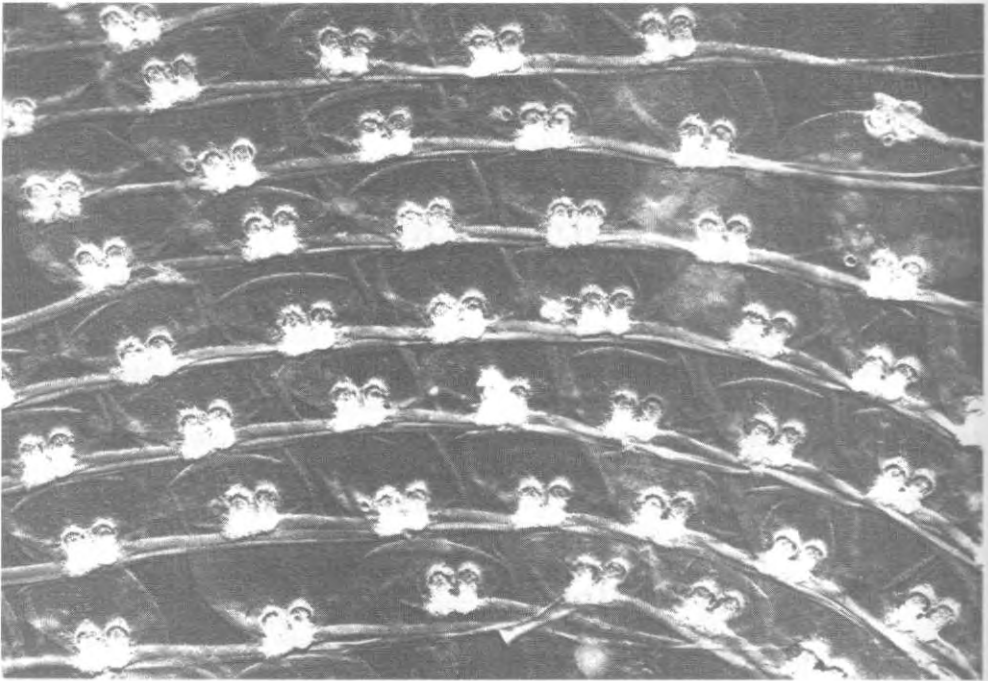
Para-myxea

Chytri

diomycota, Microsporea,

Labyrinthomyxa, Myxozoa

(Haplospora) -
 Ascetospora. -
 -
Marteilia refringens ,
 ,
 Haplospora. Paramy *Paramyxa*. : *Marteilia*, *Paramarteilia*.



213. *Paramecium*
 : 12 000 .

()

(. . 168),

¹ (. . 9, 176).

² (. 218)

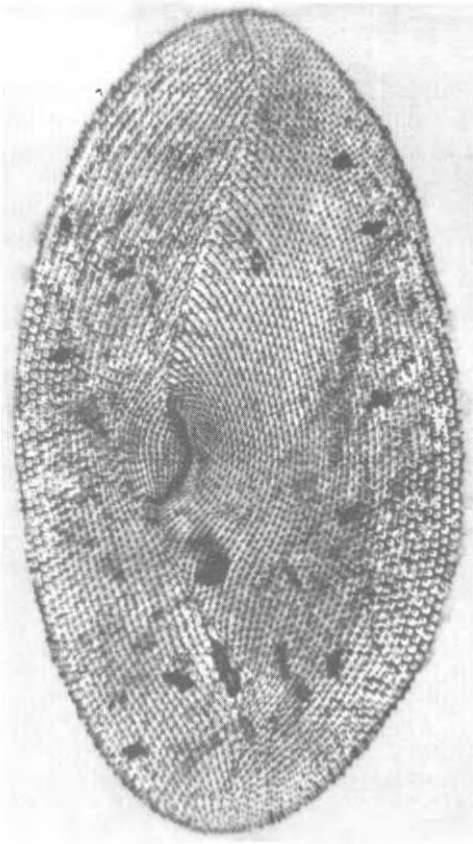
(,)

(,), () ,

(. 217).

1

2



. 214.
Paramecium (

Pleurochrysis

(. 219).

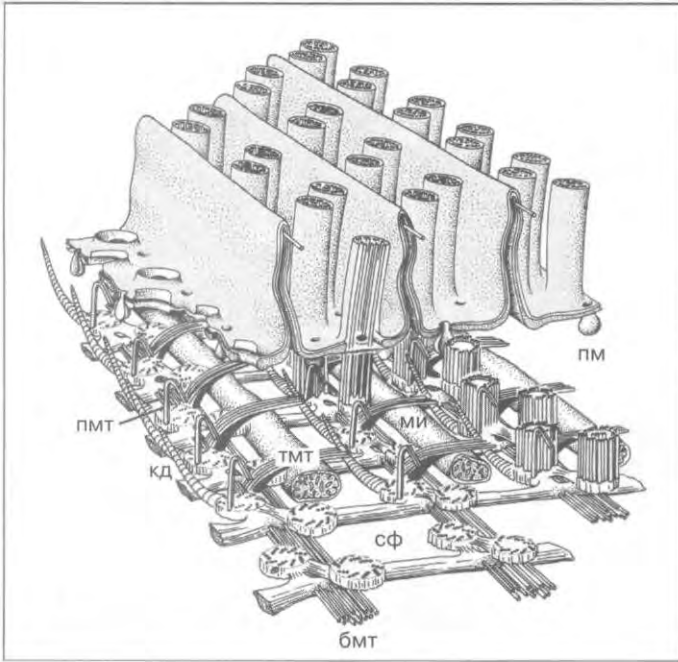
Eufolliculina uhligi (. 220).

(. 221).

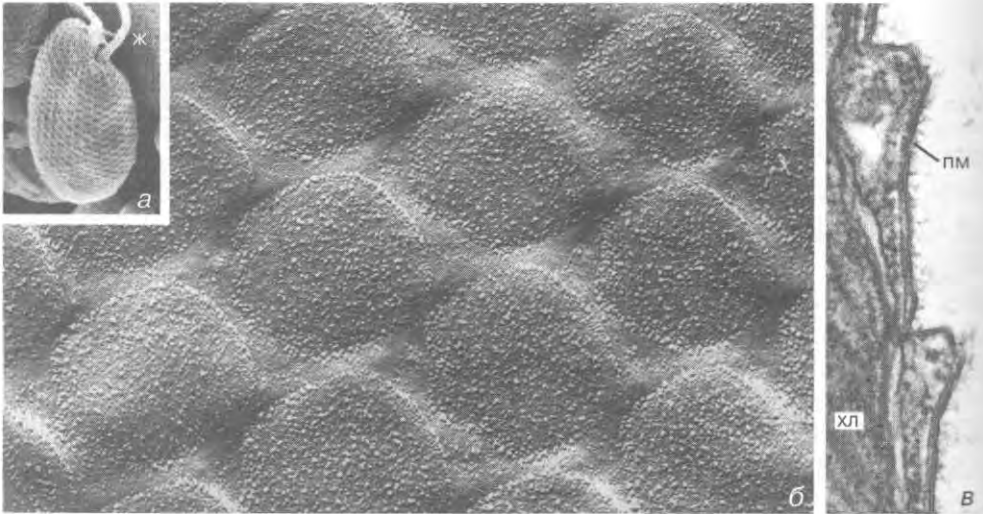
, *Actinophrys*.

15

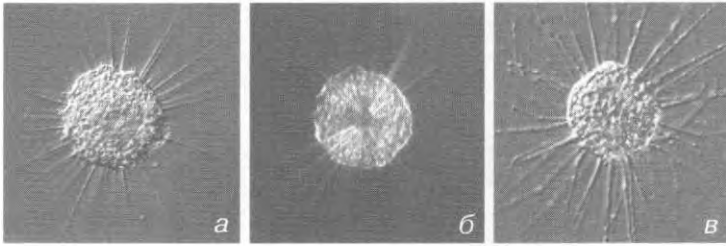
1



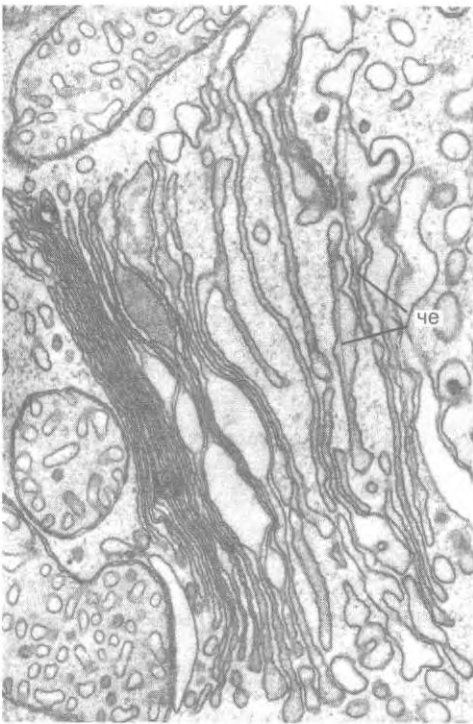
215. *Conchophthirus curtus*.
 — ПМ
 — ПМТ
 — КД
 — ТМТ
 — МИ
 — сф
 — БМТ
 ()



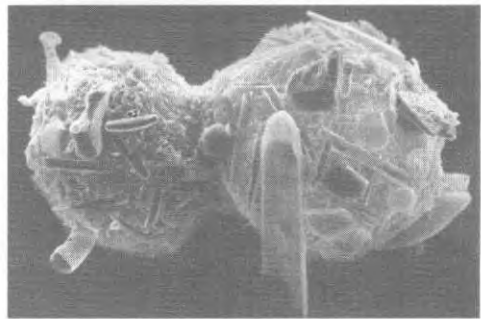
216. *Rhodomonas*.
 ()
 — ПМ
 — ХЛ
 (: Hausmann and Walz: Protoplasms 101 [1979] 349).
 : a 2 800x, б 4 8 000x, в 80 000x.



217. *Actinophrys sol* (); (); ().

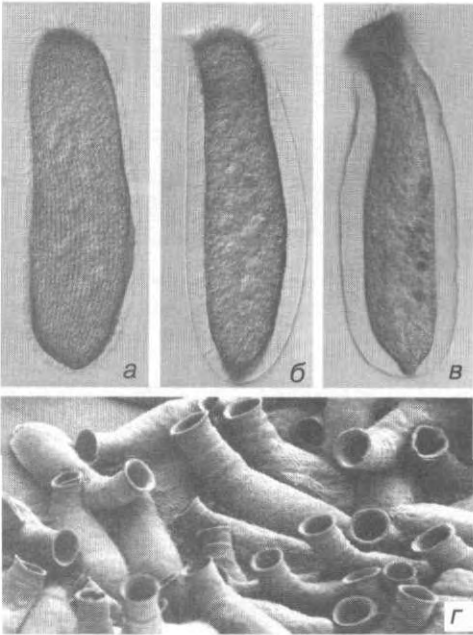


218. *Pleurochrysis* () ().



219. *Diffflugia*; ()

270



220. *Eufolliculina*
 ()
 (,).
 () (: Mulisch and Hausmann: J. Protozool. 30 [1983] 97).
 — 140x, — 80x.

),

Paramecium.

Paramecium.

Amoeba proteus.

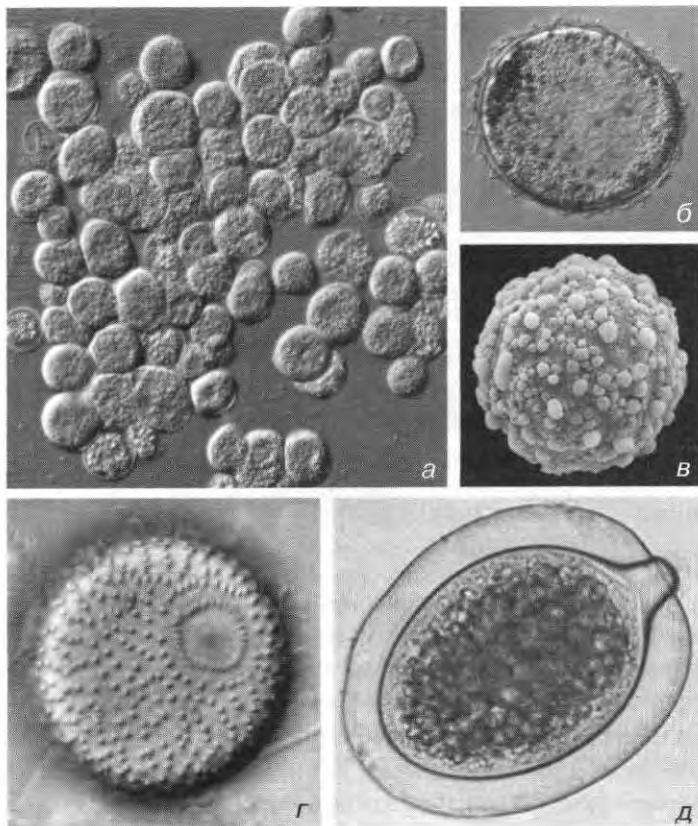
Stentor

(*Vorticella, Carchesium, Tokoph*) (. 141, 142, 144),

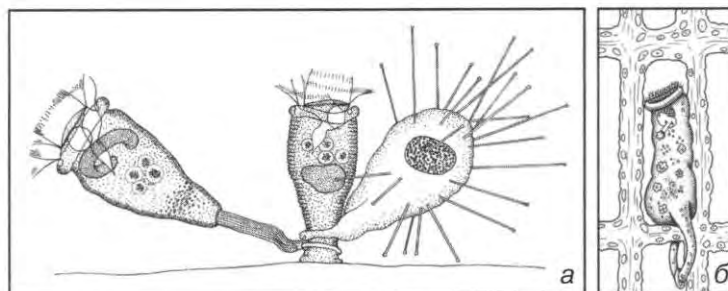
(. 222)

(*Tricho*

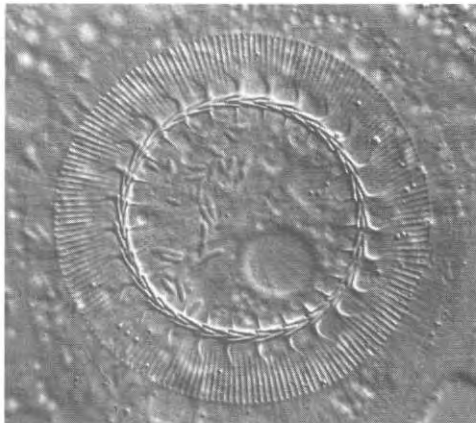
. 221. *Acanthamoeba* (a), *Climacostomum* (), *Actinosphaerium* (), *Frontonia* () (—



Hausmann and Rambow: Mikrokosmos 74 [1985] 208; — : Hausmann and Foissner: Mikrokosmos 75 [1986] 193).
 .: a 500x, 250x, 700x, 600x, 400x.



. 222. *Erastophrya chattoni* (), *Ellobiophrya donacis*, *Donax vittatus* (— ; —) . *Epistylis lwoffii* () *Apiosoma amoeba*; — .
 .: — 550 , — 450 .



. 223. *Trichodina*
(: Hausmann and Hausmann: J. Ultrastruct.
Res. 74 [1981] 144). : 850x.

dind) (. 223).

(. . 39),

(. . 91)

()

Poteriochromonas,

224),

225.

¹ (. . 210).

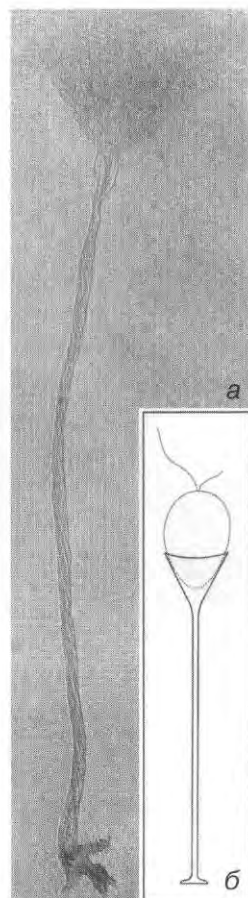
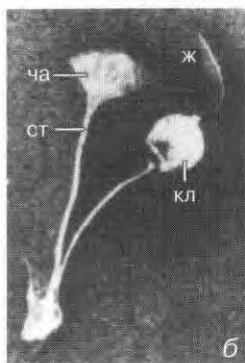
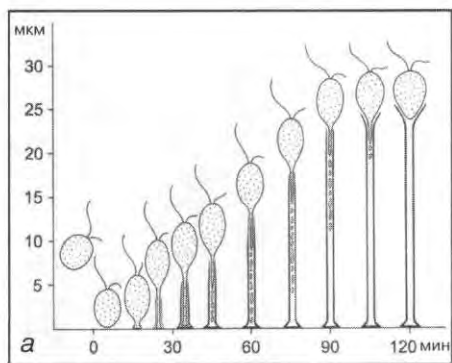
. 224.

monas malhamensis (Chrysoomonadea) ()
 (: Schnepf et al.: Planta 125 [1975] 45).

Poterioochro

()

: 4,000 .



. 225. —

monas; —

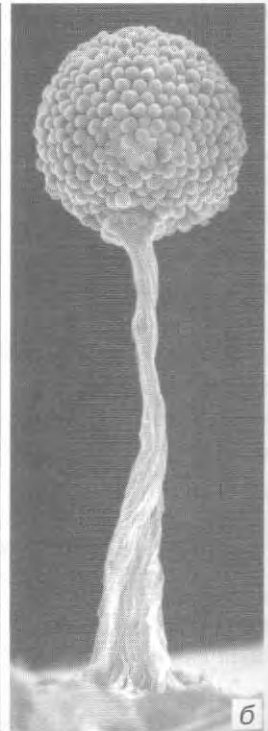
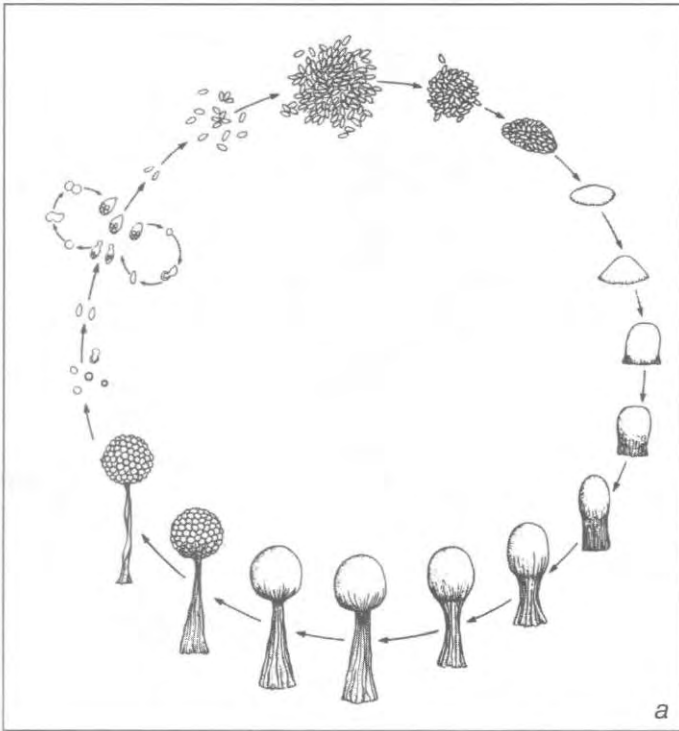
Poterioochro

(— , — ; —)
). : — 1 .

Sorogena (. 226).

60

30

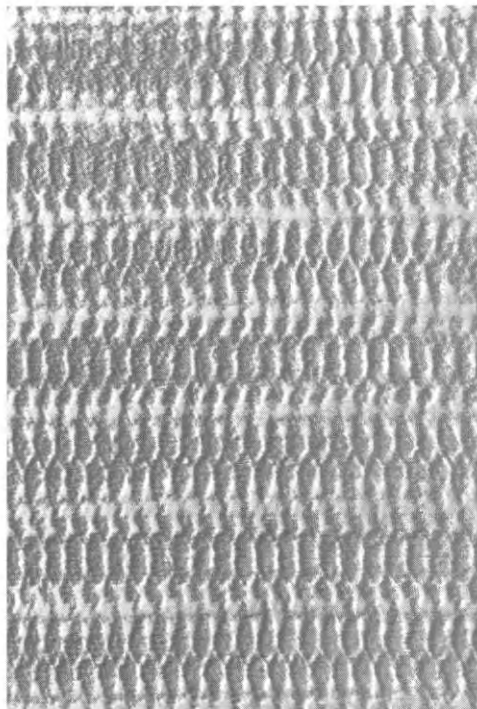


226. — *Sorogena*; — *Sorogena* (— ; — : Olive and Blanton: J. Protozool. 27 [1980] 293). — : — 120x.

chodind)

(. . 223).

(. 196, 197),



. 227.
Paramecium (: Hausmann: Ann. Stat.
 Biol. Besse en Chandesse 7 [1973] 331).
 .: 260 000x.

15

Paramecium (.

17, 227).

16

).

16.

			(?)	

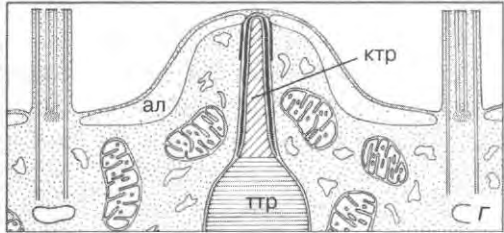
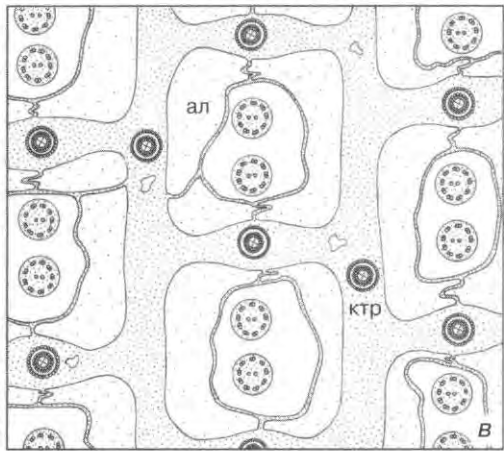
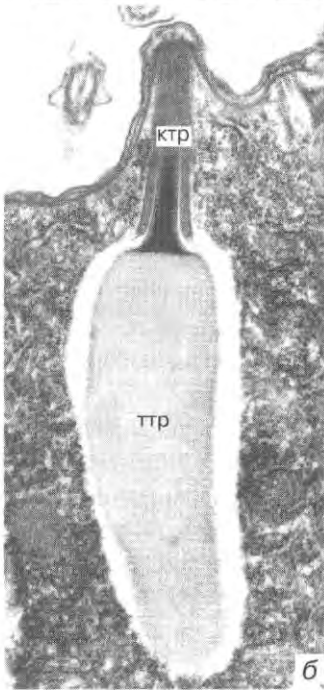
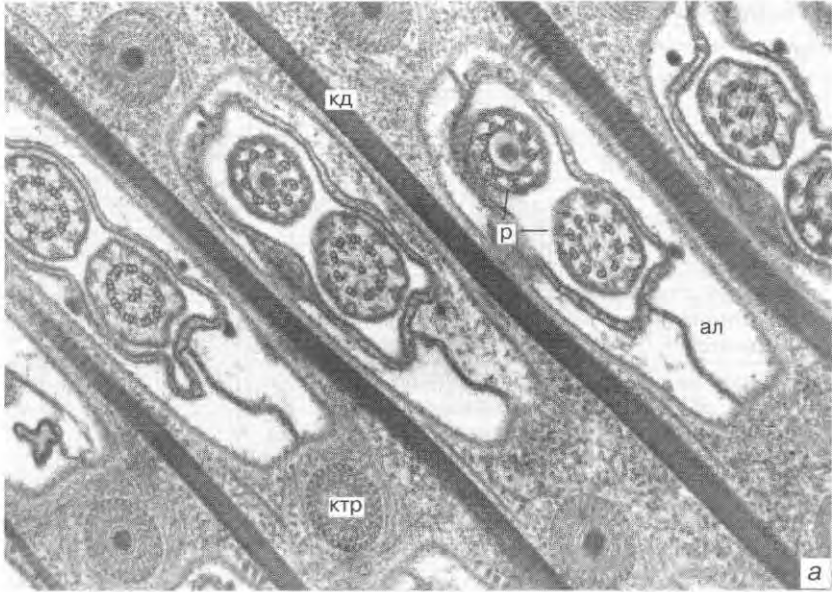
(. 228).

Paramecium

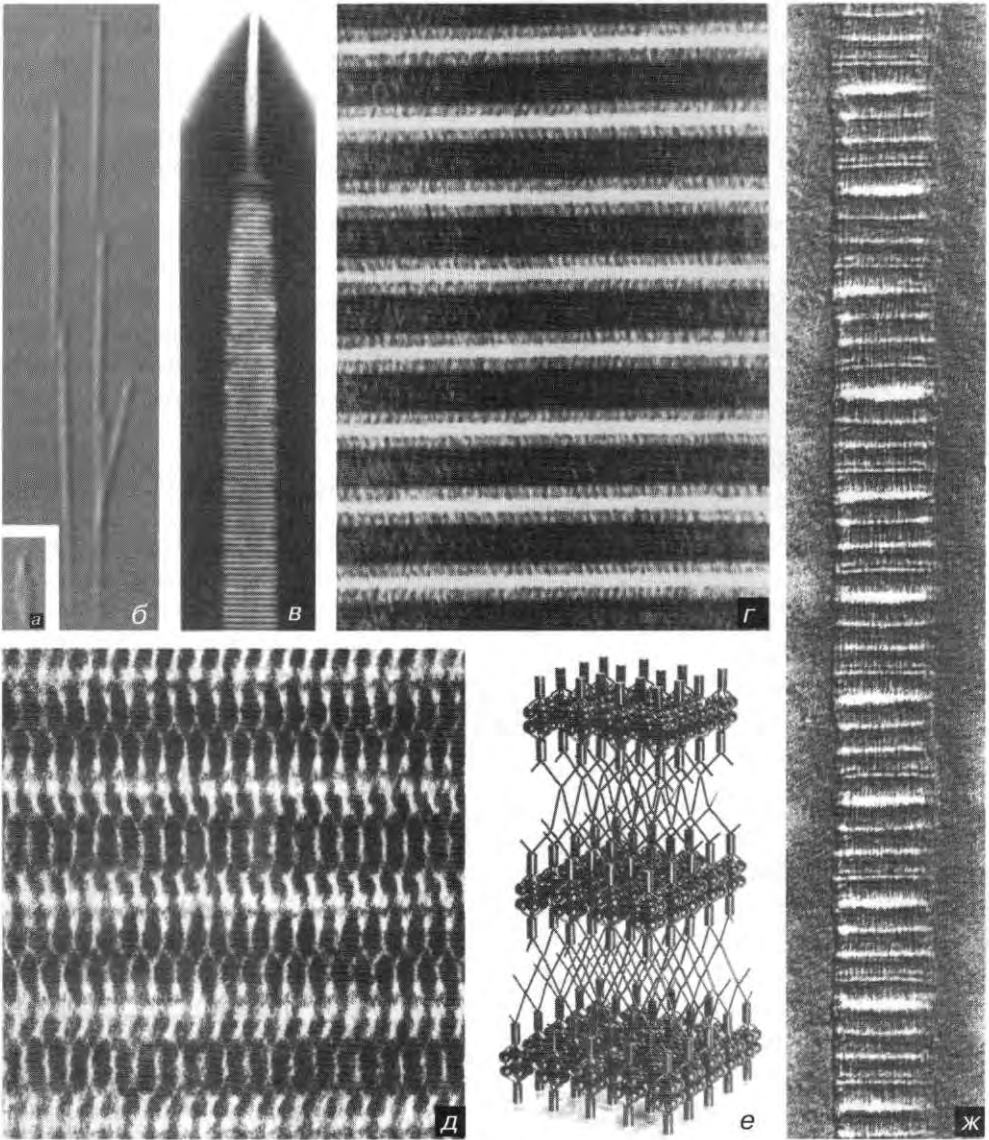
7

8
;
(. 229).

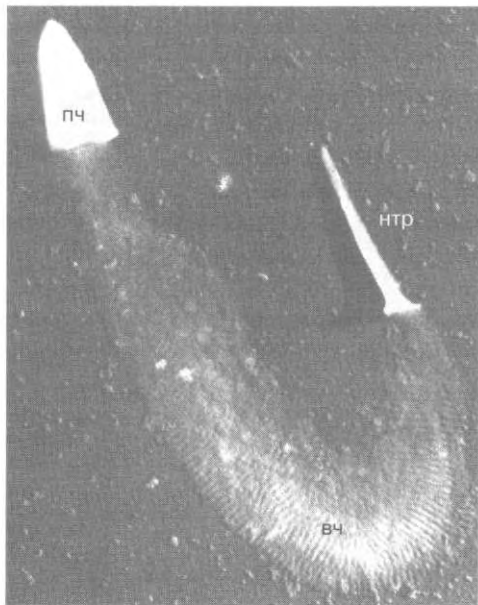
56



228. *Paramecium*: (), — () (: Hausmann: Int. Rev. Cytol. 52 [1978] 197). : a 52 000x, 6 — 24 000x.



. 229. *Paramecium* () *Oxyrrhis* (): — —
 ; — (— —
 , —); — —
 ; — ; — —
 (: Hausmann: Int. Rev. Cytol. 52 [1978] 197). : а 900x, 900x, s
 11 000x, 220 000x, 330 000x, 200 000x.



Paramecium

58

Para-

. 230.

)

Paramecium,

(: Hausmann: Int. Rev. Cytol. 52 [1978] 197). : 15 500x.

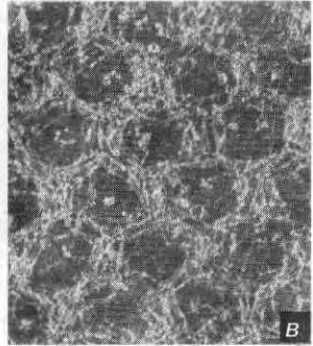
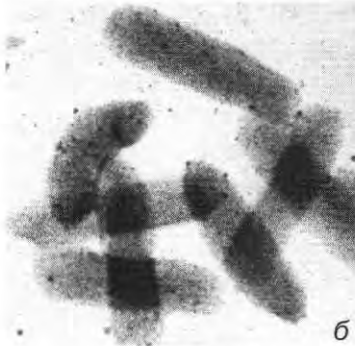
(. 231),

(. 230).

(, *Didinium*)

Paramecium.

« — »

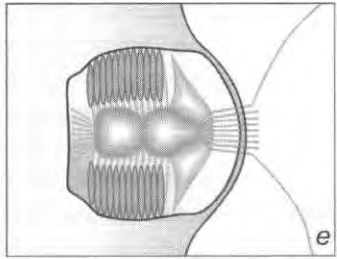
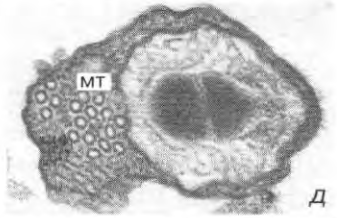
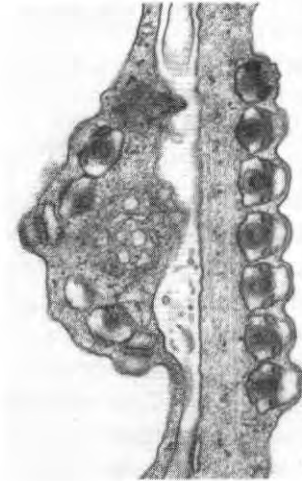


. 231.
Loxophyllum
 ()
 (,);

(), —
Clathrulina ()
Acanthocystis (), —

Raphidiophrys contractilis

— ()
 — : Hausmann: Int. Rev. Cytol. 52 [1978] 197;
 : Bardele: Z. Zellforsch. Mikrosk. Anat. 130 [1972] 219; e — : Sakaguchi et al.: Europ. J. Protistol. 37 [2002] 453). : a 57 000x, b 7 200x, c 132 000x, r 38 000x, s 73 000x.



Euglenida

Oomycetes

87). (. 86,

(. 88, 98)

()

(, *Blepharisma*

Stentor)

(, *Loxodes* *Trachelonema*).

. *japonicum*

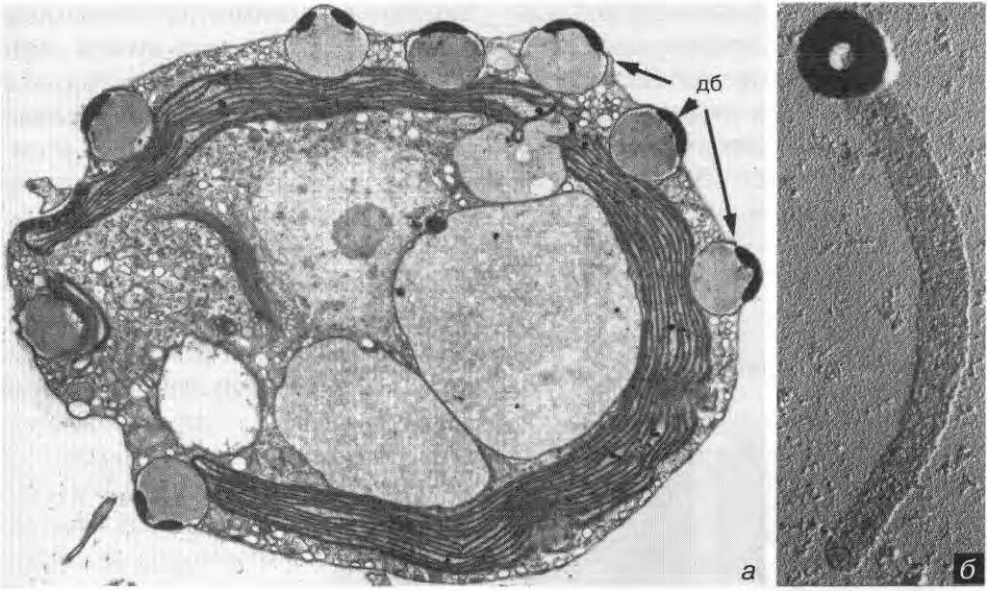
0,3

0,6

Dileptus,

Apicomplexa

Stentor coeruleus



. 232. : — *Ochromonas tuberculatus*
 (); — (: Hibberd: Brit. J.
 Phycol. 5 [1970] 119). : a — 7 000x, б — 11 000x.

Stentor

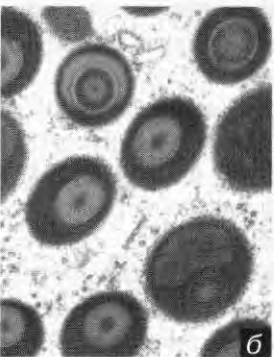
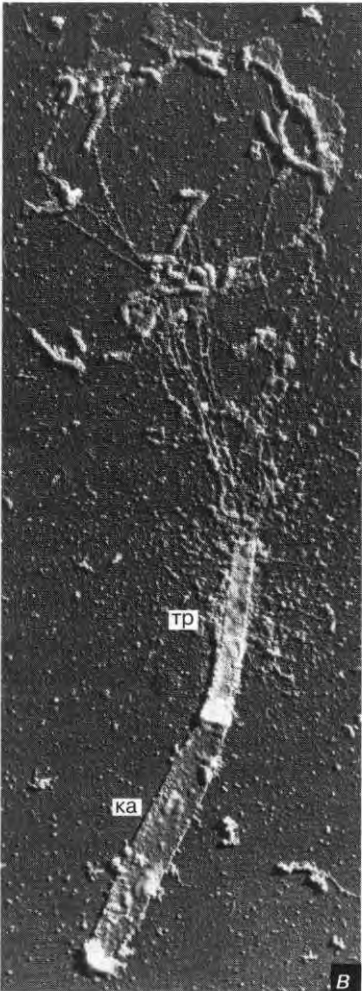
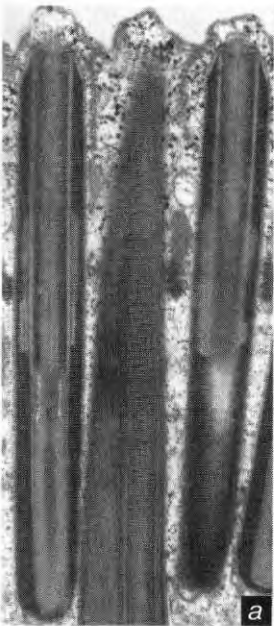
Blepharisma

virens

Climacostomum

(. 232).

() ,



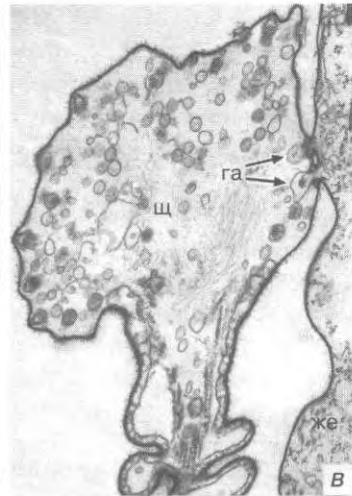
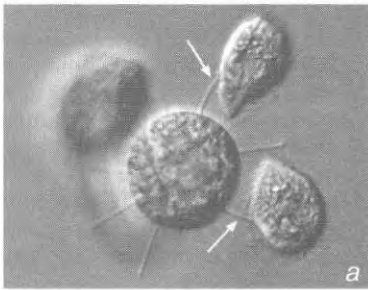
. 233. *Homalozoon* (,)
Loxophyllum () :
 () ; —
 — : Kuhlmann and Hausmann: *Protistologica* 16 [1980] 125; — : Hausmann and Wohlfarth Bottermann: *Z. Zellforsch. Mikrosk. Anat.* 140 [1973] 235). : a 35 000x, 6 3 5 000x, s 15 000x.

233).

(. 234).

Haptoria

Trachelonema sulcata *Tracheloraphis dogieli* *Trachelonema*



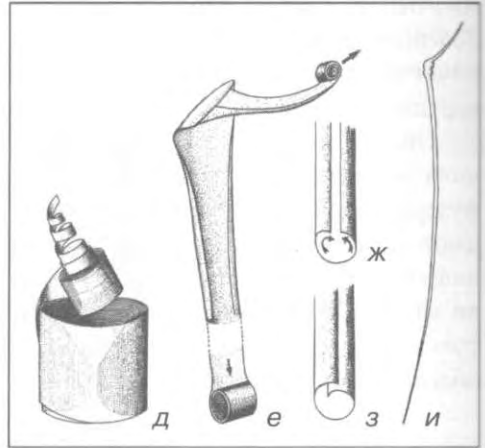
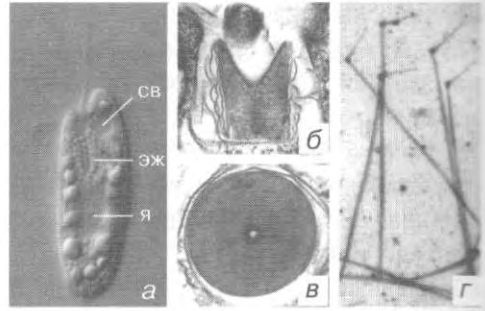
. 234. () ; — () ; — () ; — () () — : Bardele and Grell: Z. Zellforsch. Mikrosk. Anat. 80 [1967] 219). : a 250x, 6 2 2 000x, 22 000x.

(. 235).

R (refractory,

Paramecium.

R



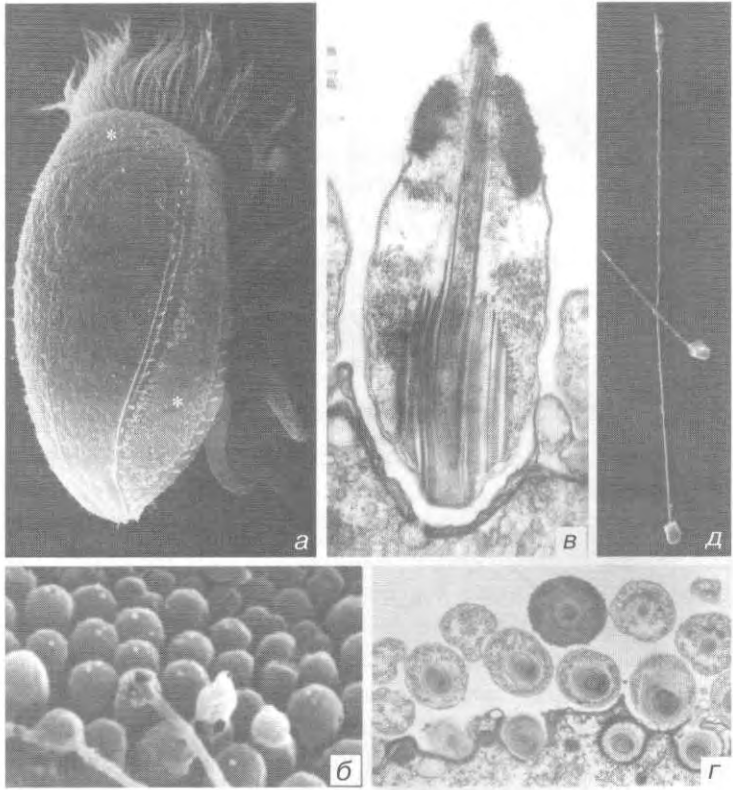
. 235.

Chilomonas Paramecium:

() () () ;
 ;
 ()
 () (: Hausmann: Int.
 Rev. Cytol. 52 [1978] 197). : a 2 600x,
 6 1 9 000x, — 30 000x, — 5 000x.

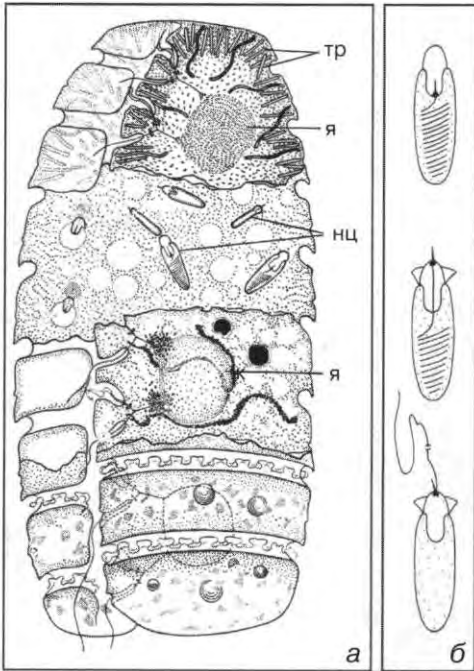
(. 236).

. 236. -
 : , — *Euplo-*
tidium itoi
 (*); -
 () ()
 ; — -
 (: Verni and
 Rosati: J. Protozool. 37
 [1990] 337). : a
 580x, 6 6 000x, e
 20 000x, 7 000x,
 2 000x.



237).

(*Haptoglossa*),



. 238),

(. . 150, 183, 184).

Haptoglossa mirabilis
Adineta

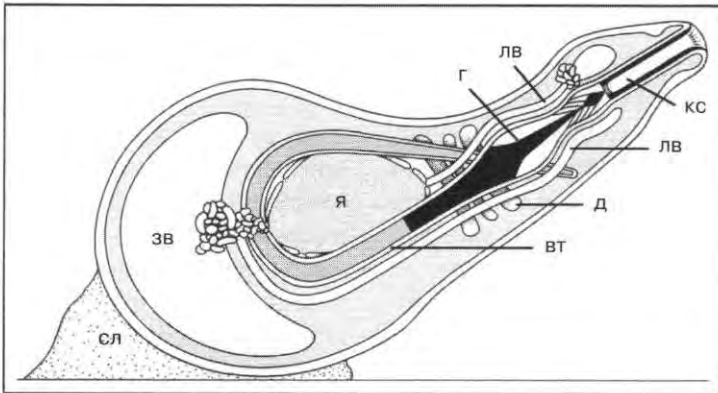
. 237.

Polykrikos.

(1 3) (— : Chatton and

Grasse: . R. Soc. Biol. 100 [1929] 281).

∴ a 600x.



. 238.

Haptoglossa mirabilis.

(. .) . ∴ 6

(. 238).
15

() (. 239),

(),

().

100

— , *Paramecium* (. 240) —

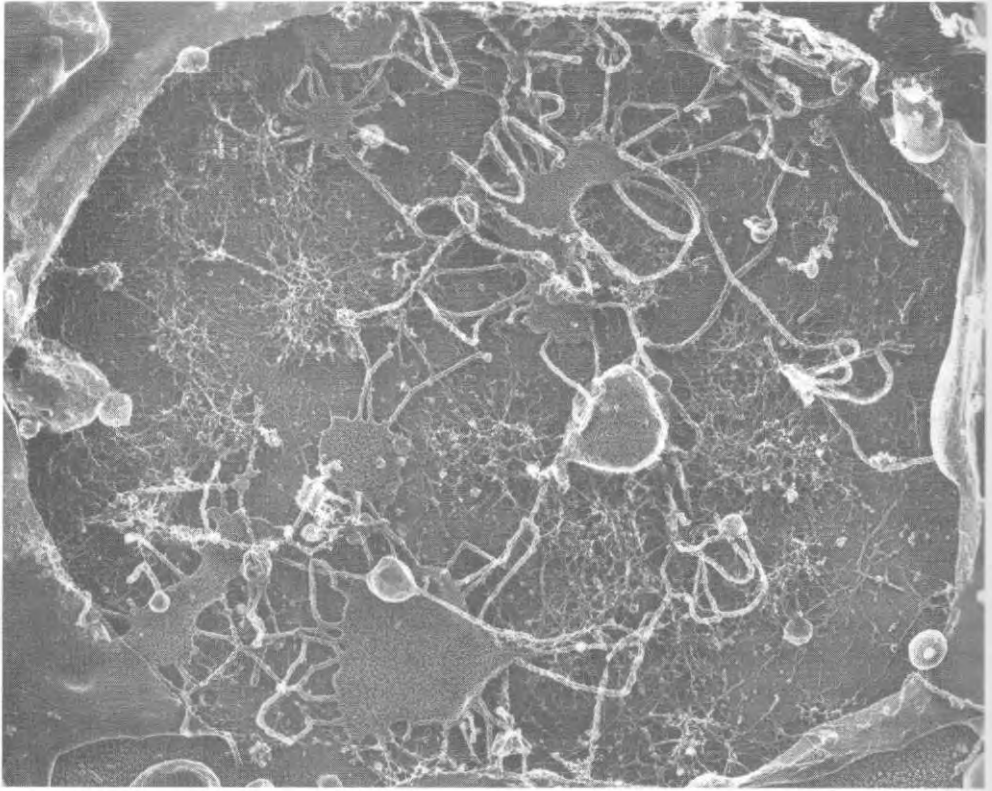
(15 20)

Homalozoon ¹

Dileptus

Loxophyllum Spirostomum,

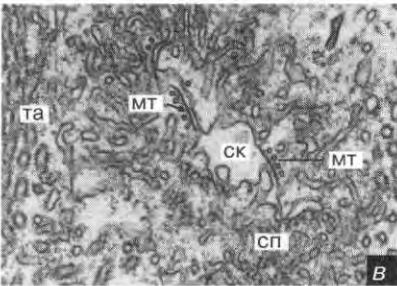
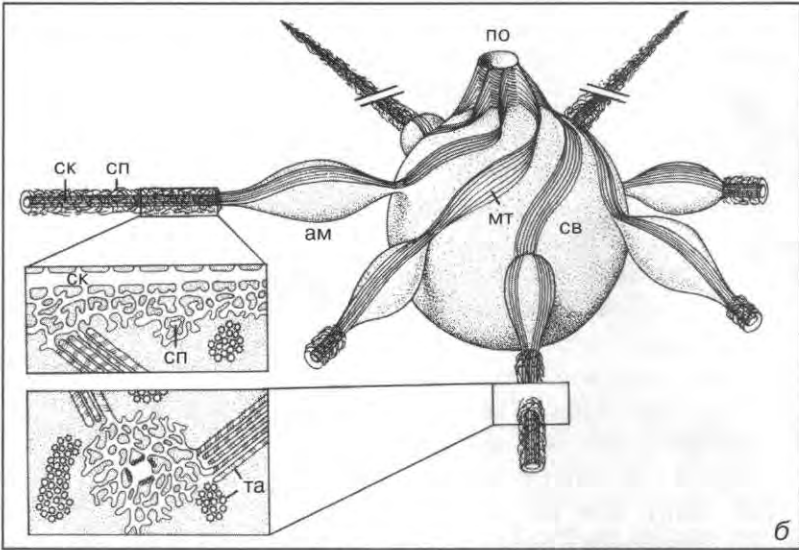
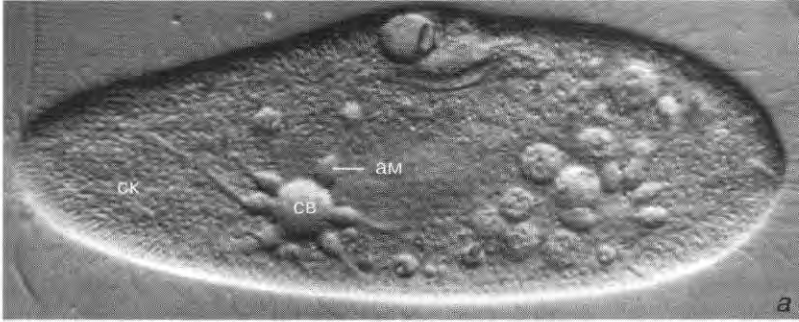
1



. 239.
Dictyostelium.
[1993] 1311). : 19000x.

(: Heuser et al.: J. Cell Biol. 121

(. 240).



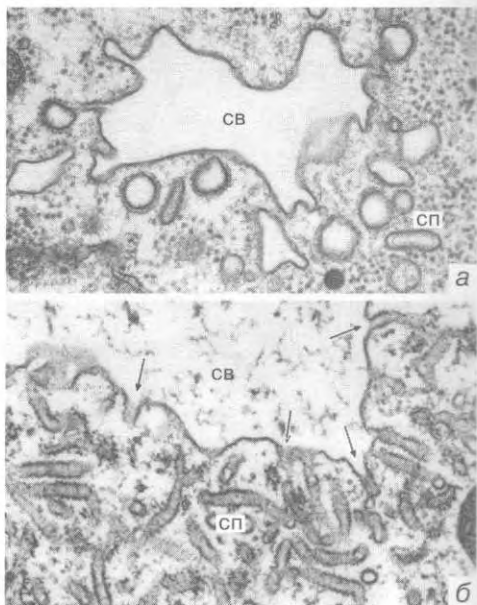
. 240.

Paramecium: — ; — ;
 (), (),
 () ().
 ().
 () () () () — : Hausmann and

Allen: Cytobiologie 15 [1977] 303). : a 650x, —40 000x.

(. 241).

(. 2416).



. 241.

()

() *Goniomonas*
() *Pseudomicrothorax* ().

() (— : Hausmann
and Patterson: Exp. Cell Res. 135 [1981] 449:
— : Hausmann: Arch. Protistenk. 127
[1983] 319). . : a 35 000x, б 40 000x.

¹ *Paramecium* (. 240)

[Faint, mostly illegible text on the left side of the page, possibly bleed-through from the reverse side]

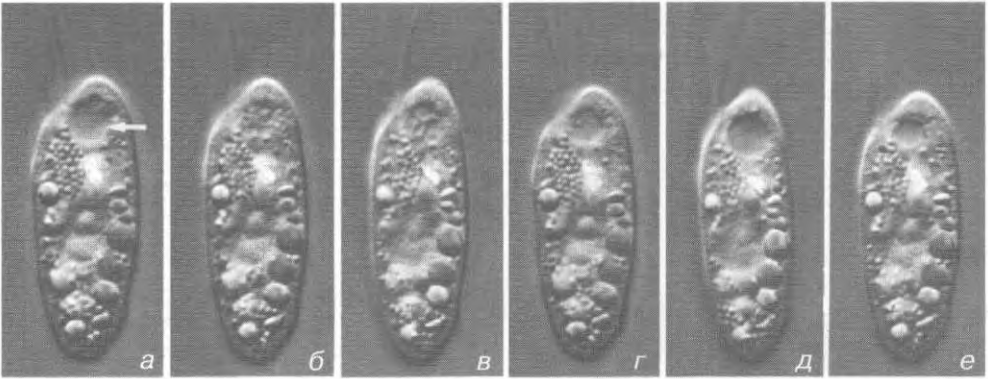
Chlamydomonas

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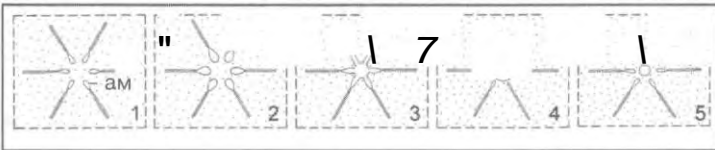
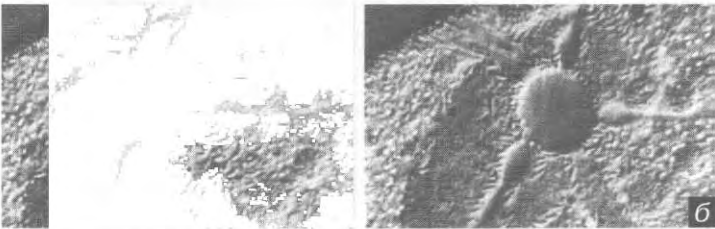
(45 117 /)
()
7 />

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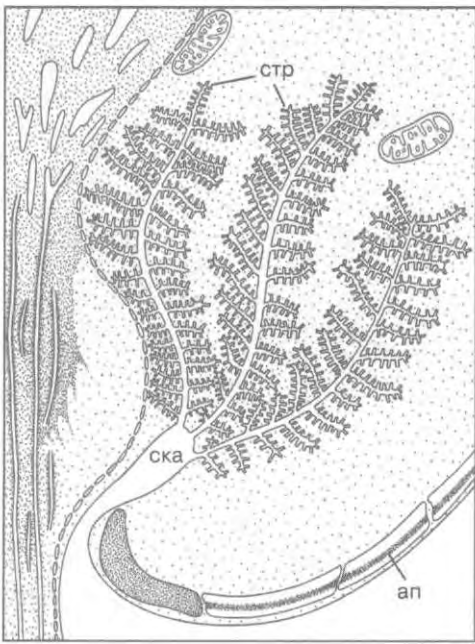


242. () () *Chilomonas*
 () ; 10 () (: Patterson and Hausmann: Br. phycol.
 J. 16 [1981] 429). : a e 3 000x.



243. -
Paramecium:
 - ; -
 ; -
 (1 5) ,
P. caudatum
 8 -
 , -
 - ; -
 : -
 750 .

(. 244).



. 244.
Oodinium. an —
 (=)



. 245.
Paramecium

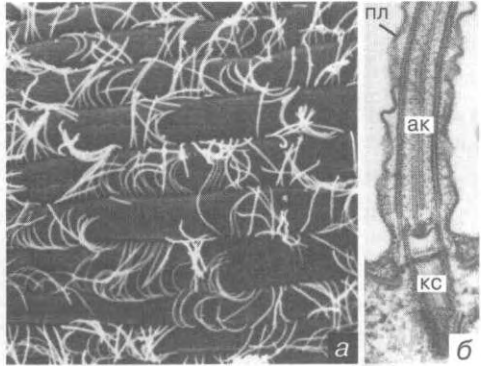
(2,5)

4 * =

245).

0,3

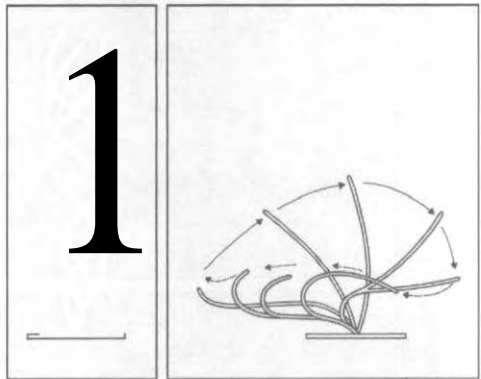
()
(. 246).



. 246.
Homalozoon ()
Paramecium (),

1 200 , 6 3 2

(. 247).



. 247.
() () () .

()¹) 13

9x2+2;

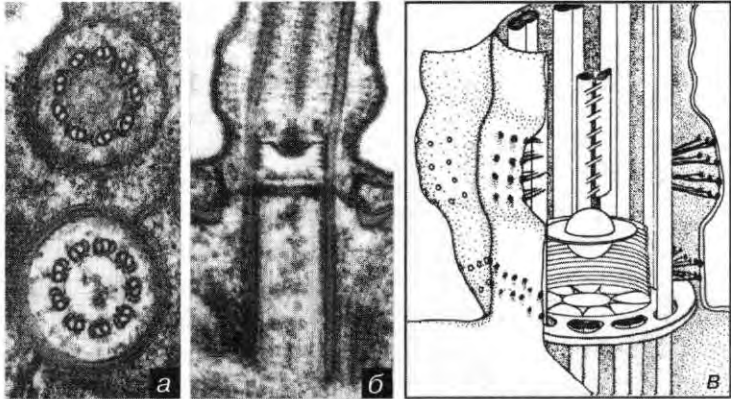
() 10
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(. 248).

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() .

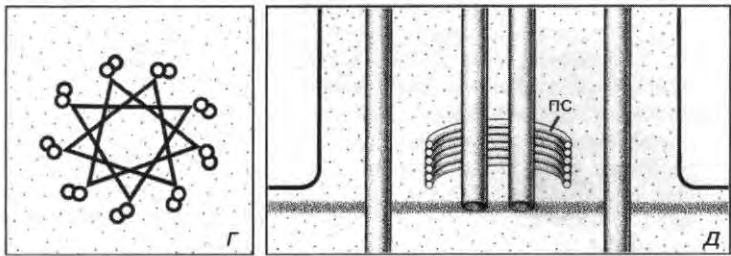
), (

. 249.



Chlorophyta

() Heterokonta (—
 : Dentler: Int. Rev.
 Cytol. 72 [1982] 1).
 ∴ 6 0 000x.



249).

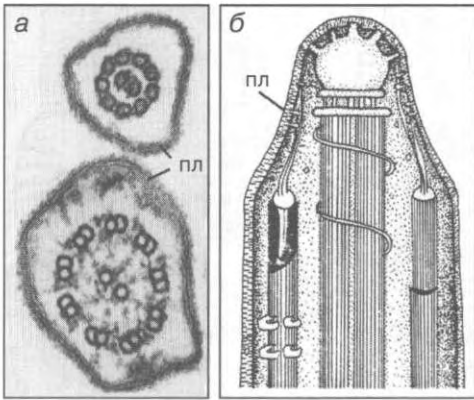
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250).

. 250.

Dentler: Int. Rev. Cytol. 72 [1982] 1).
85 000x.

(. 2506).

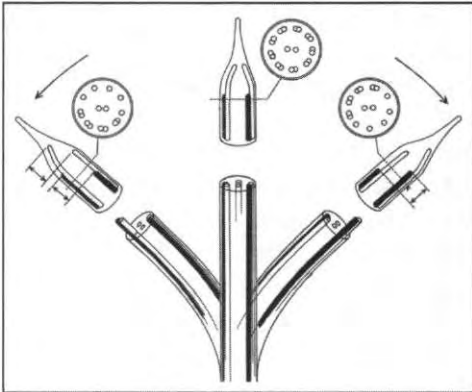
$$9x2+2$$

0,25 мкм.

$$: 9x2+5, 9x2+0, 6x2+0$$

$$3x2+0.$$

(. 251).



. 251.

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(. 252).

()

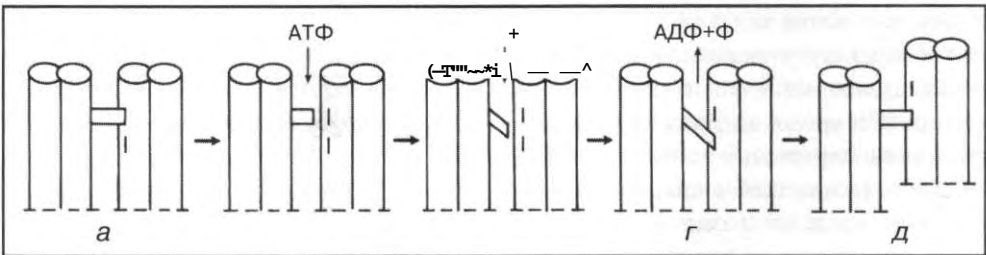
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40°.

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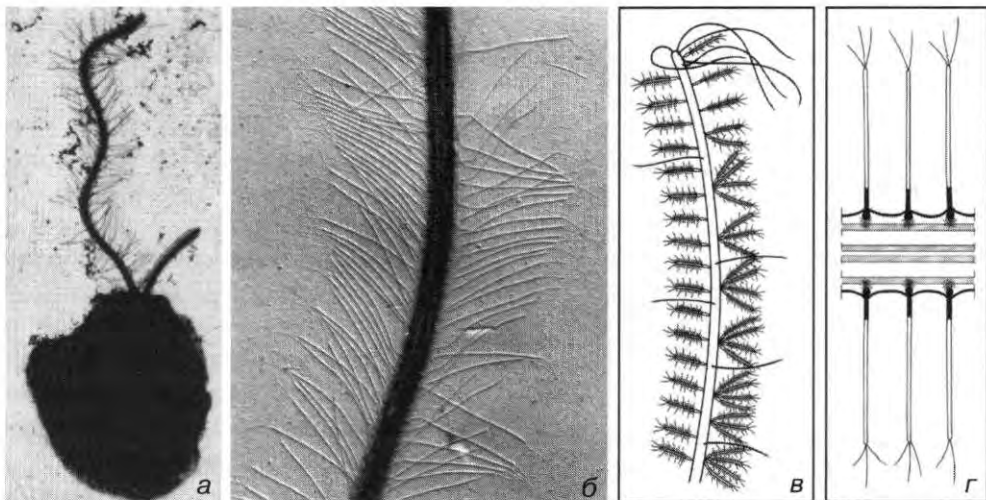


. 252.

40'

()

() .



. 254.

Poterioochromonas; —

Paraphysomonas cyllicophora; —

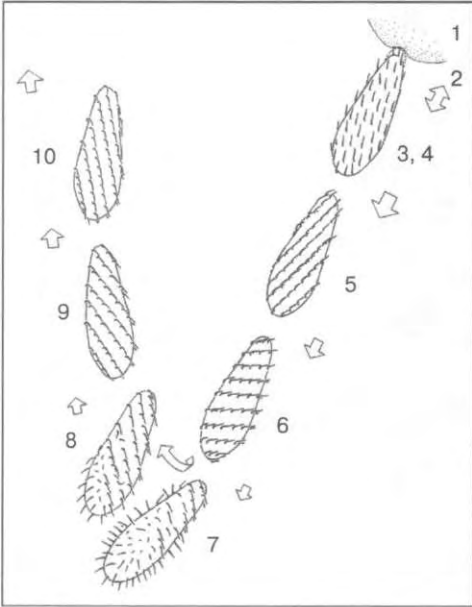
Ochromonas danica; —

(. 255). *Paramecium*

1

2 4

2



. 255.

mecium,

Para-

Paramecium

Opalina.

Paramecium

(: (4)

(7, 8).

(4 7)

(7, 8) (: Machemer and de Peyer: Verh. Dtsch. Zool. Ges. 70 [1977] 86).

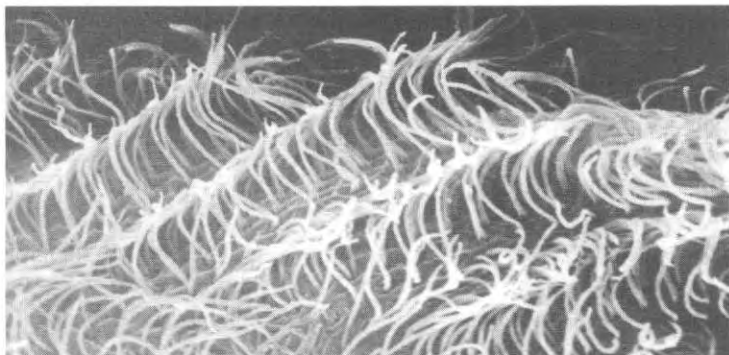
(. 256).

).

()
nophorea

Oligohyme

(. 249).



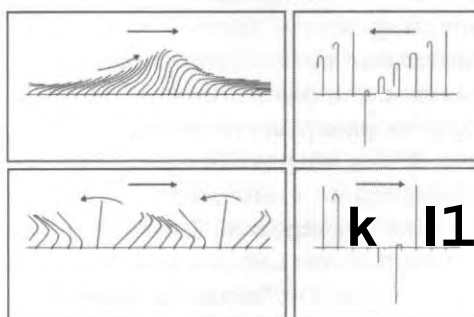
. 256.

Paramecium
 (: Hausmann: Mikro
 kosmos 63 [1974]
 165). : 2 000x.

Mixotricha paradoxa.

Opalina.

(. 257).



. 257.

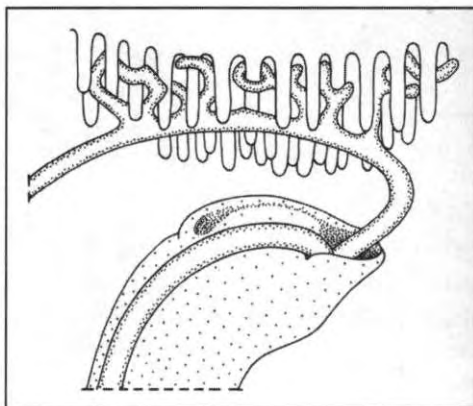
().

Opalina *Isotricha*.

mecium.

Para-

Paramecium



. 258.

Cryptobia

()

(. 258).

(. . 21, 40).

246).

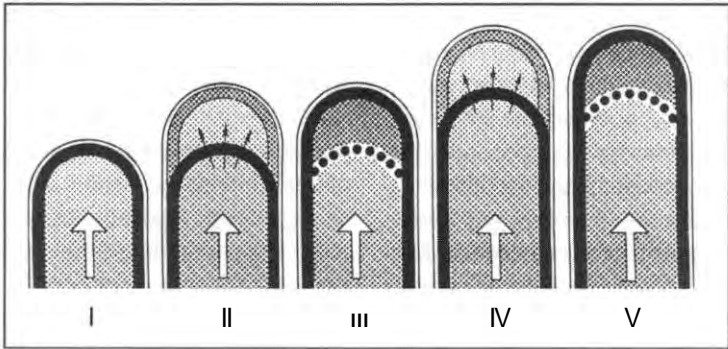
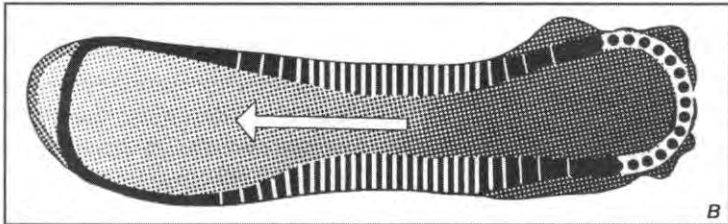
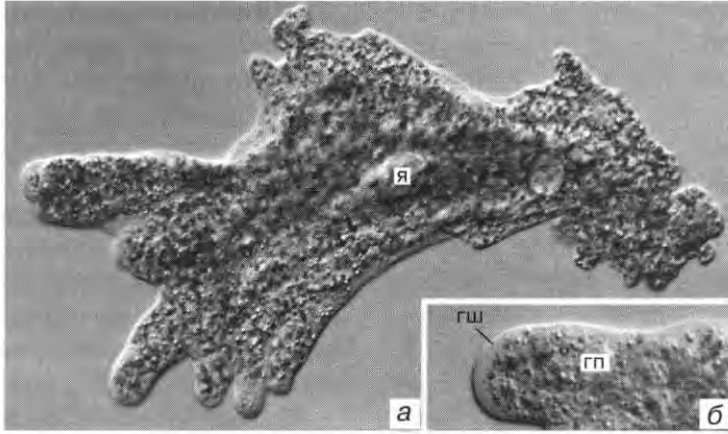
24 , 254)

(. . 168).

(. . 50),

Crypto

Triadopsis *Helix*.



259. : — *Amoeba proteus*. — () . — () ; — (II, IV), (III, V), () (: Stockem and Kloposca: Int. Rev. Cytol. 112 [1988] 137). : a 350x, б 400x.

8

0,5).

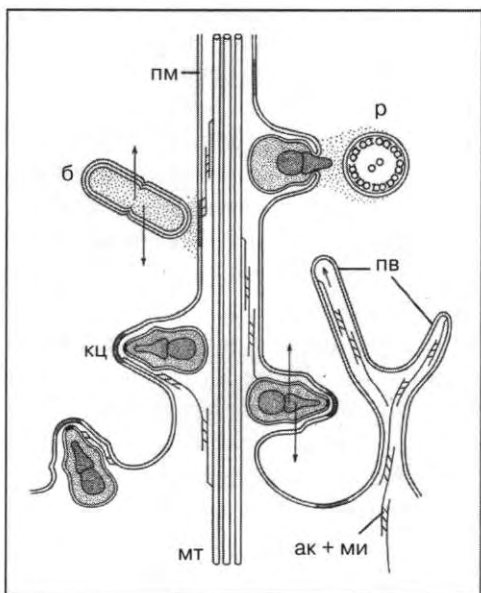
F

Physa

(I,
II),

(

Physarum.



Physarum

2*

27

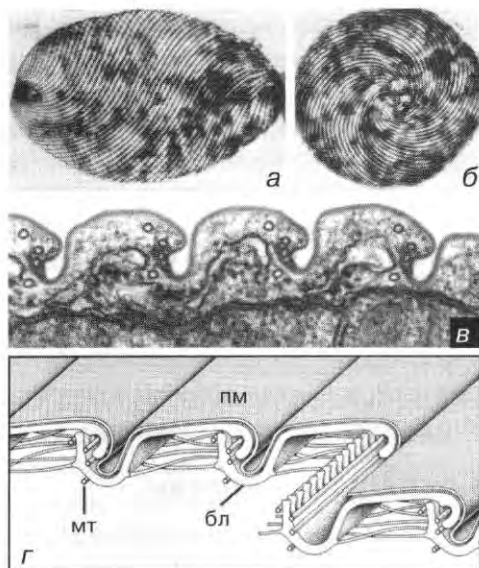
. 260.

() .

() ,

Actinopoda

(. 260).



261). *Distigma*

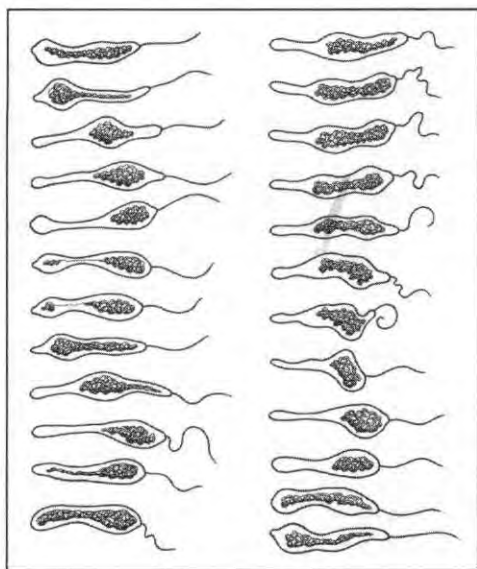
. 262.

Euglena; —

; — *Astasia longa*; —

(— : Foissner: Acta biol. Acad. Sci. Hung. 28 [1977] 157; —

). . : — 720 , 65 .



. 261.

() *Distigma*.

— 2 —

(: Hausmann and Hulsmann: Photo Med'4[1981] 253).

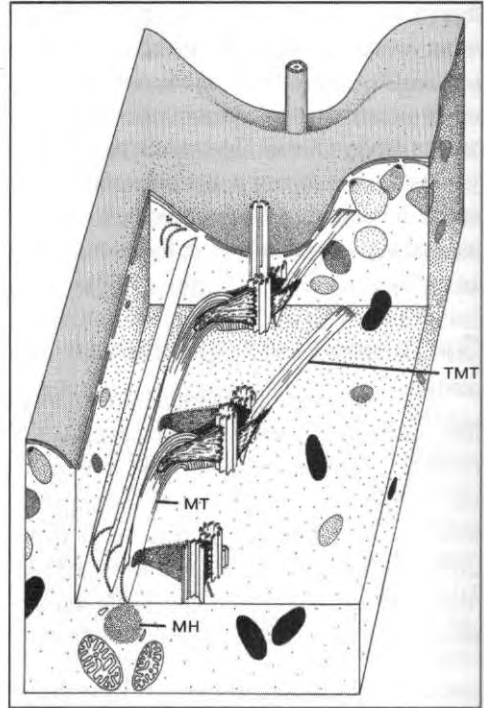
(. 262).

Distigma

, *Stentor*

5 10

() ,



. 263.

Eufolliculina.

() —

() —

(: Mulisch et al.: Protistologica 17 [1981] 285).

4

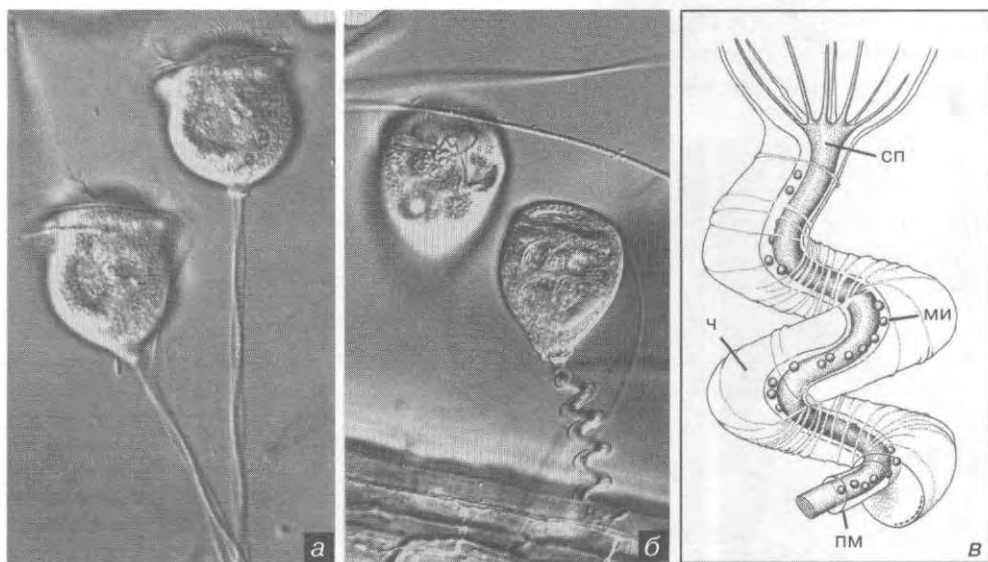
(. 263).

() ,

(10 12)

Heterotrichea.

()



. 264.

Vorticella ()

(); ():

(), — ; —

(— : Kleinig and Sitte: Zellbiologie, Stuttgart 1992; —

). : — 220 .

(. 264).

2

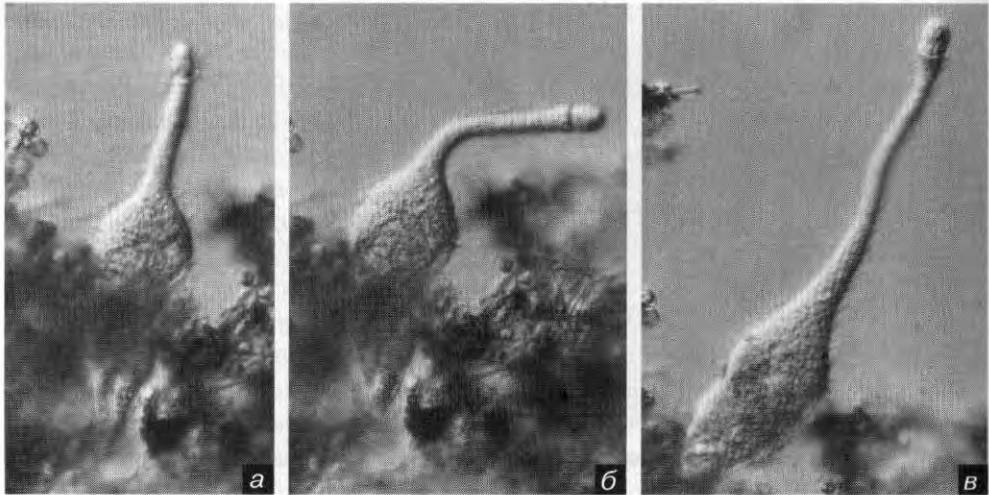
3 ()

Vorticella

1

5 7

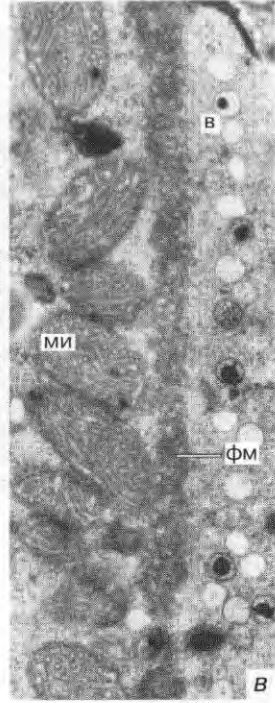
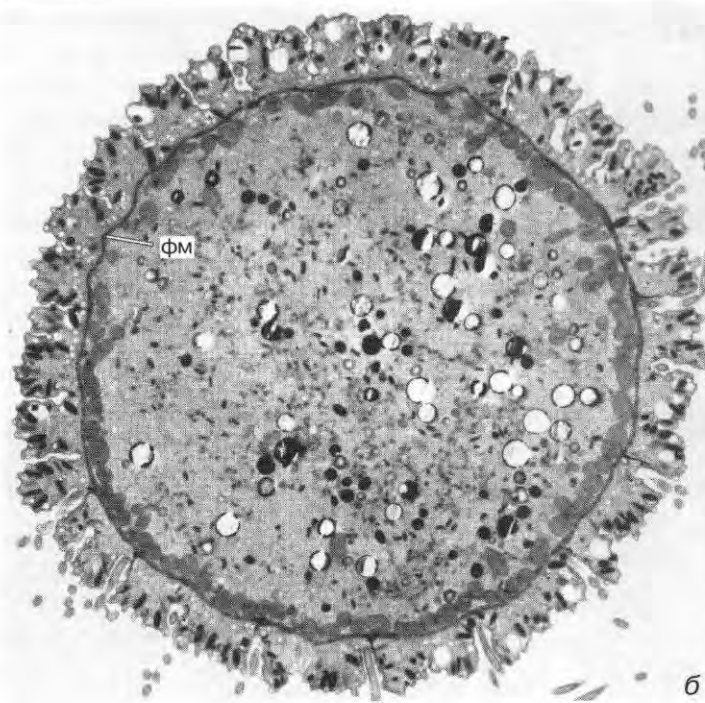
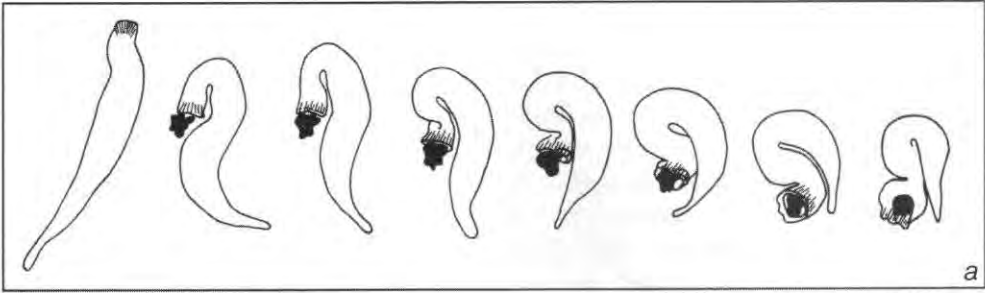
(. 265).



. 265.
Hausmann: Mikrokosmos 76 [1987] 176).

Lacrymaria olor () (:

— 200 .

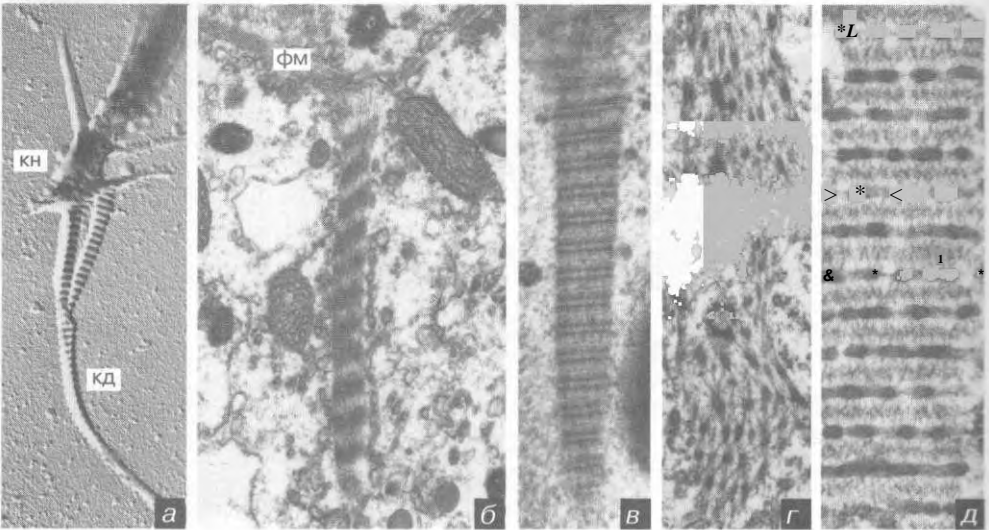


266. (); , — Homalozoon (), — (: Kuhlmann et al.: Protistologica 16 [1980] 39). : 6 5 500x, — 30 000x.

(. 266).

267).

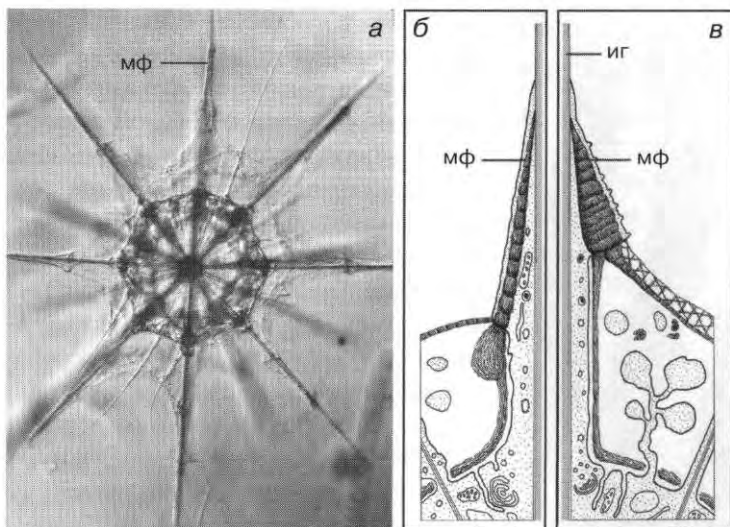
(. 267) .



. 267.

Chilomonas; —
 Trichodina. : 25 , 6 2 0 , — 60 , 30 , 65

Loxophyllum; —



. 268.
 () ()
 (), -
 () -
 () -
 (-
). ∴ - 160 .

() Acantharea,

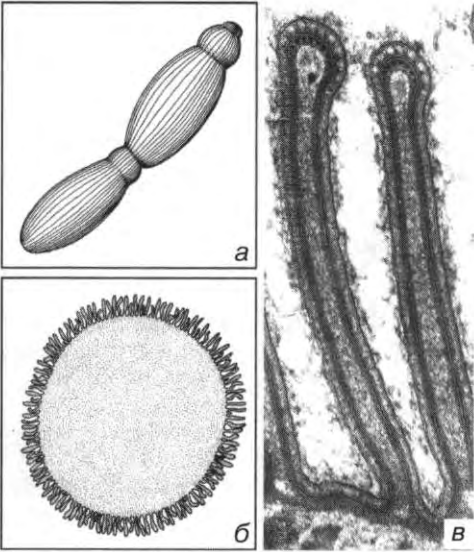
(. 268).

Noctiluca scintillans.

Paramecium

(. 111).

Trichodina,



. 269.

() ; —
Gonospora beloneides
 (—) . : 48

(. 269).

Plasmodium ()

(throm
 bospondin related anonymous protein —
 TRAP),
 Apicomplexa. TRAP

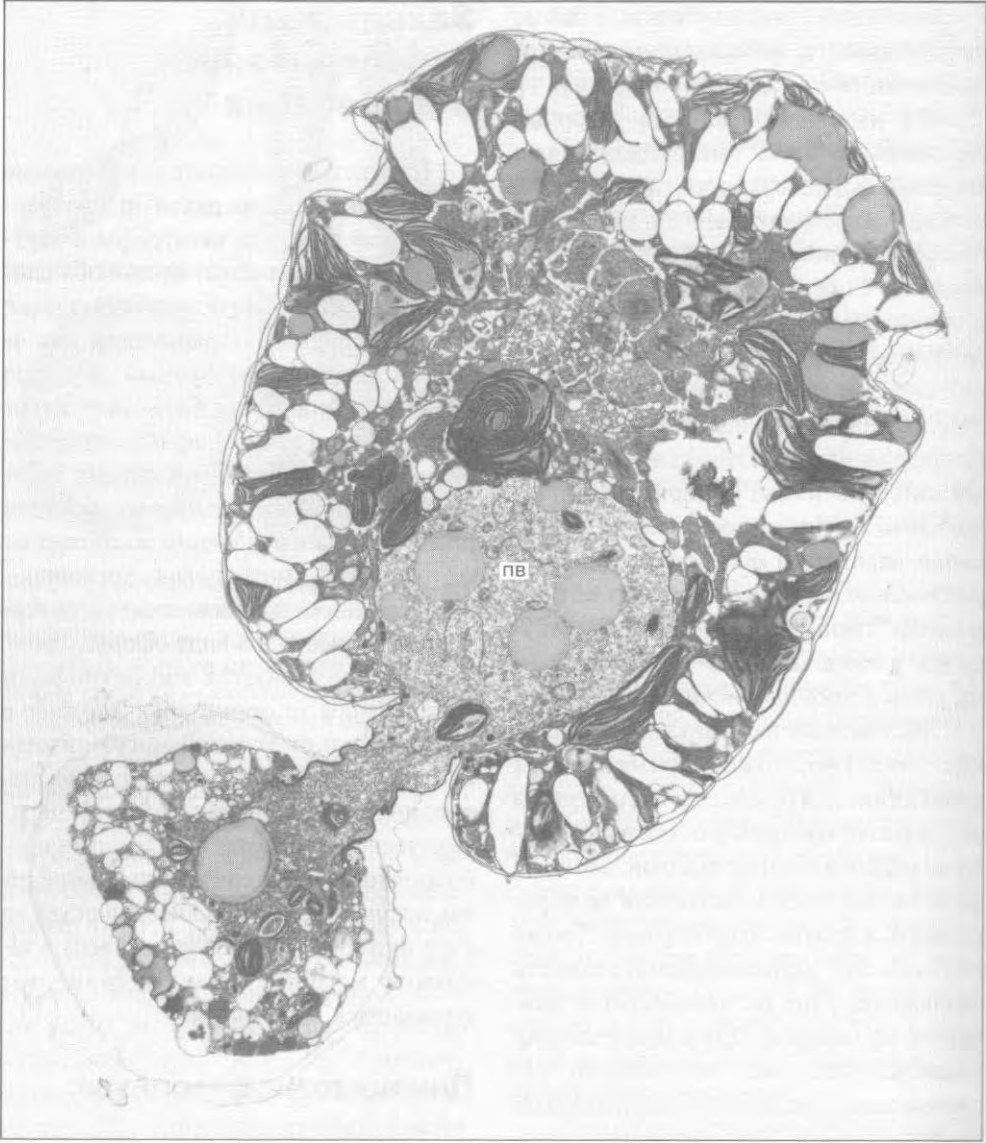
, TRAP

),
 (. 270),

(. . 174)

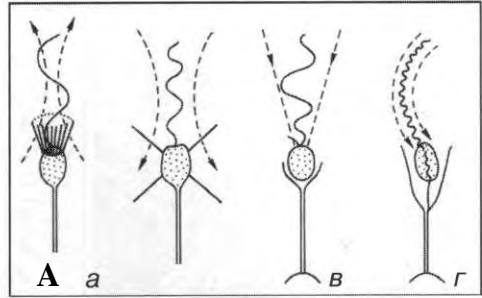
1

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. 270.
27 [1981] 600). : 4 000x.

Amphidinium cryophilum,
(: Wilcox and Wedemayer: J. Phycol.



273.

nosiga, — Actinomonas, — Ochromonas,
— Bicosoeca. ()

273 276).

274.

Prymnesiomonada

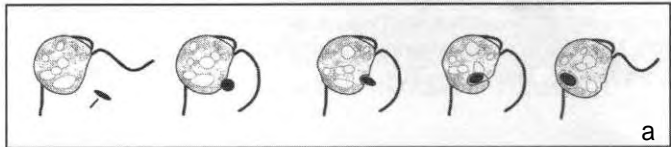
(. 277; . 60).

274.

Opisthokonta

Cafeteria roen

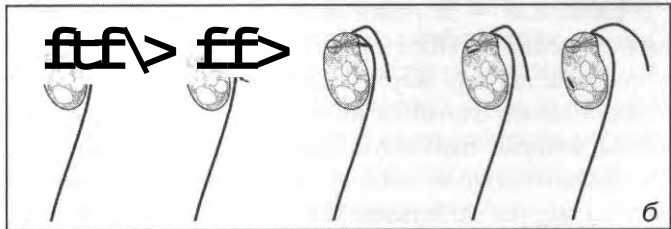
bergensis () Bodo saltans ()



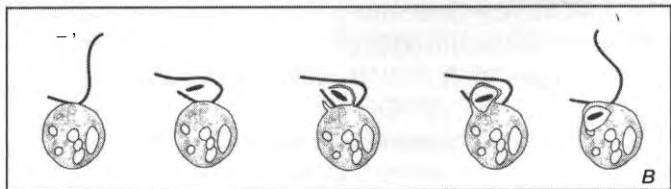
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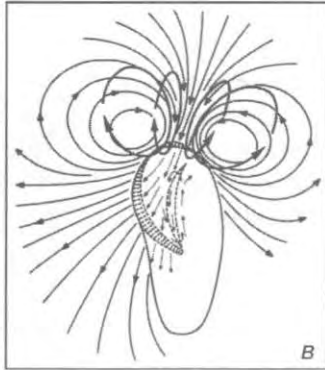
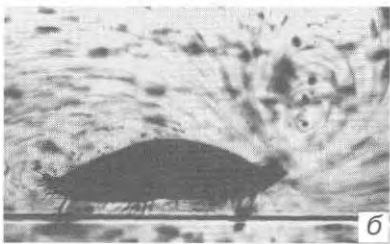
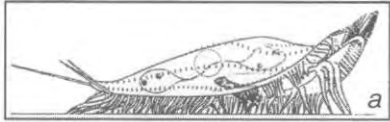
{Cafeteria} {Bodo}

Spumella sp. ()

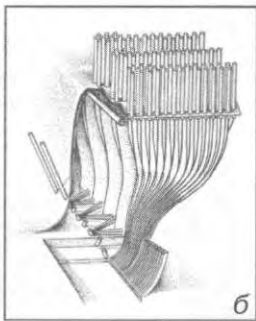


(: Boenigk and Arndt: J. Eukaryot. Microbiol. 47 [2000] 350).





. 275. -
 Sty
 (,
 lonychia:
)
 ().



1
 (. 279),
 (. . 131).

. 276. *Eufolliculina*, -
 ()
 (),

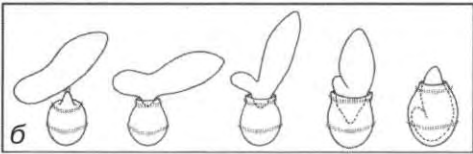
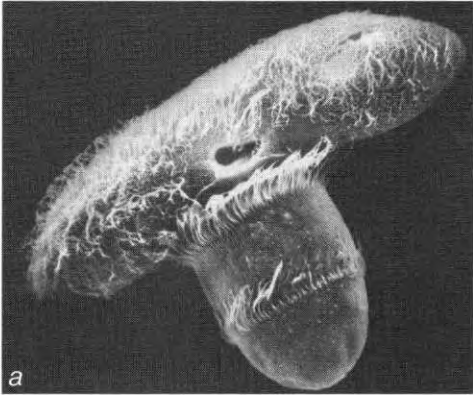
(: Mulisch and Hausmann: Protistologica 20
 [1980] 415). : a 70x.

Pseudomicrothorax

5
Oscillatoria

(. 280, 281).

(. 278).



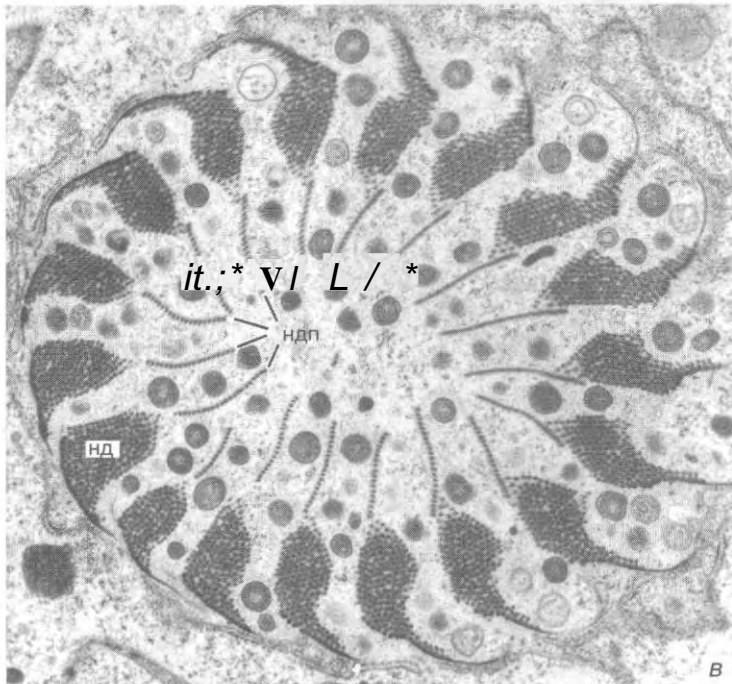
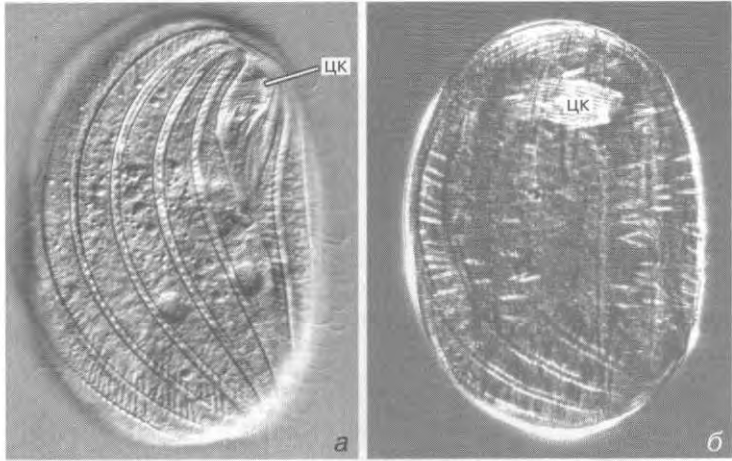
278. *Didinium nasutum* Paramecium (—). : — 290 .

Grossglockneria Pseudoplatyophrya,

Gymnodinium, Paulsenella Peridiniopsis.

Aconchulina

(*Gobiella, Hyalodiscus, Lateromyxa, Vampyrella*)

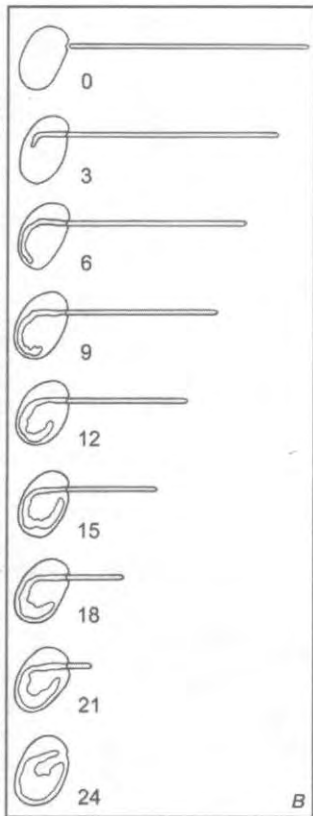
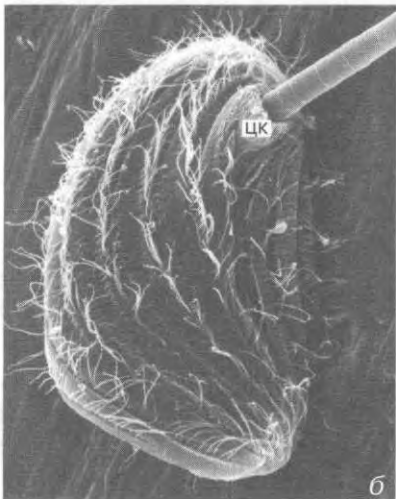
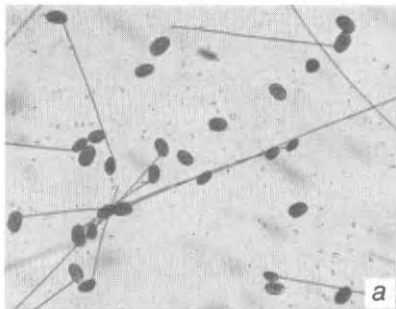


.279. ()
Pseudomicrothorax
 (), -
 () -
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 () (),
 (: Hausmann and Peck: Differentiation 11 [1978] 157). :
 800 , — 15 .

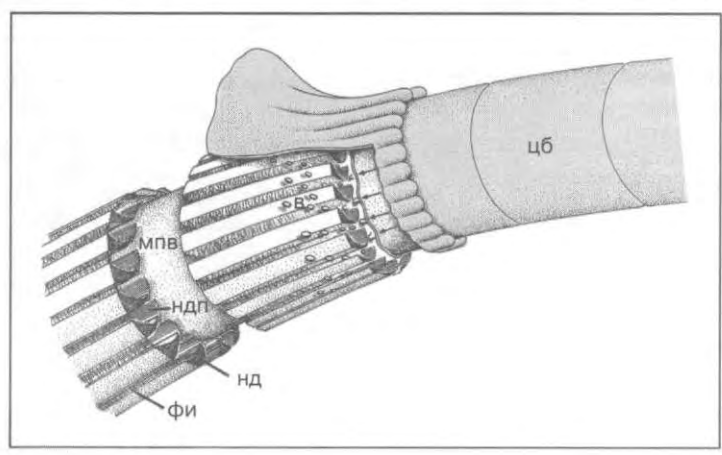
(*Oedogonium*, *Spirogyrd*),

283).

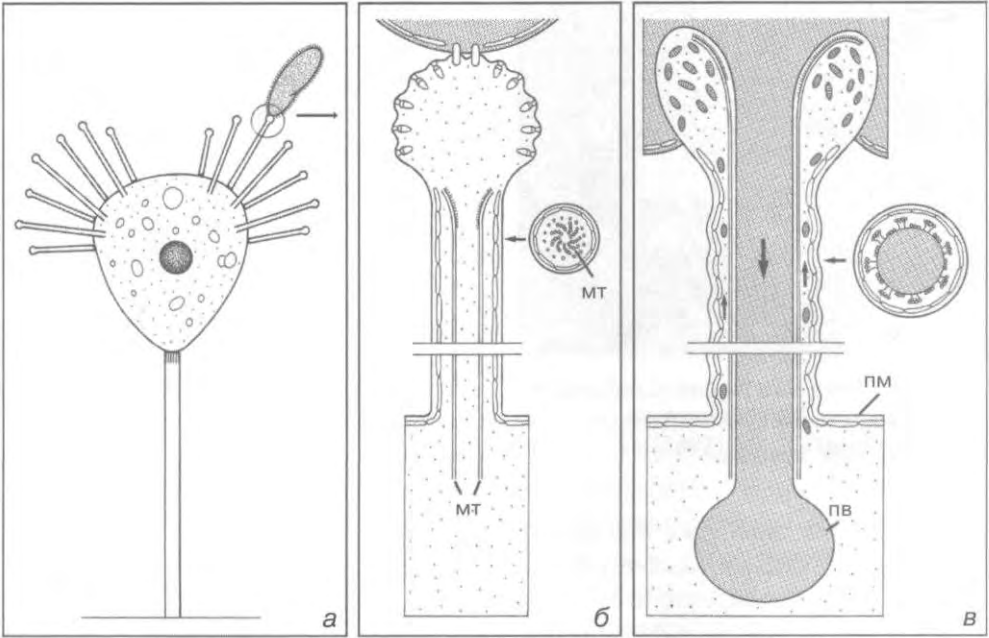
(.



280.
Pseudomicrothorax
Oscillatoria. —
 — *Oscillatoria*
 (),
 ; —
 5 (:
 Hausmann and Peck:
 Differentiation 14 [1979]
 147). : a 40x,
 1 000x.



281.
Pseudomicrothorax
 () ()
 () —



. 282.

();

: ()

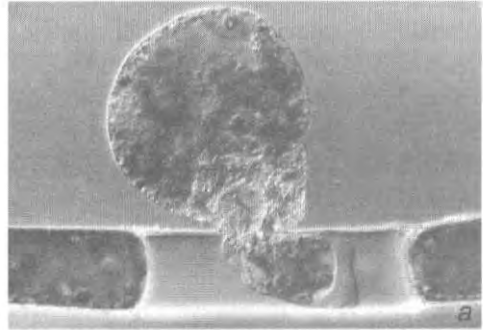
()

()

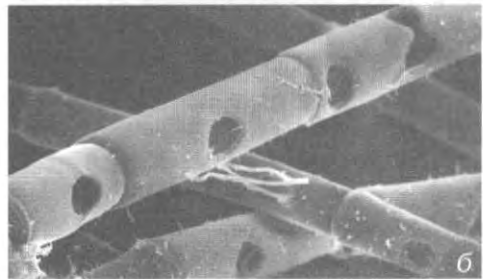
(),

() (), —

(, ,).



a



б

. 283.

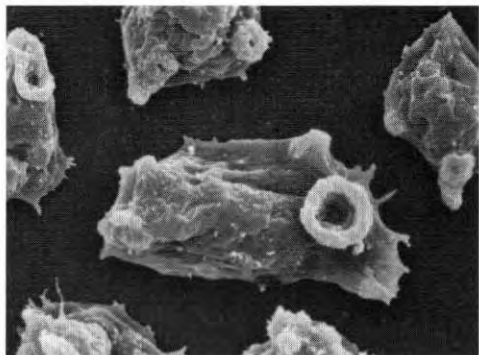
— *Hyalodiscus*

Oedogonium; —

Gobiella

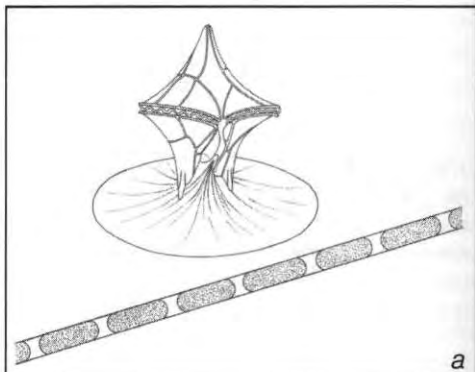
Oedogonium. ∴ —

400 ,

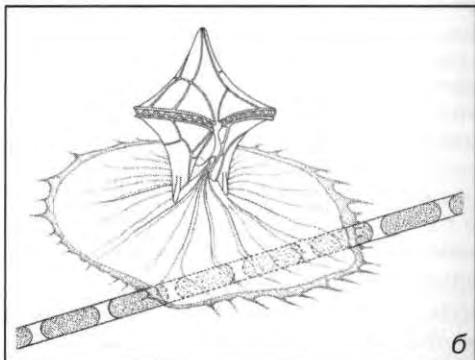


284. *Naegleria fowleri*
 () (: John
 et al.: J. Protozool. 32 [1985] 12). :
 1 800x.

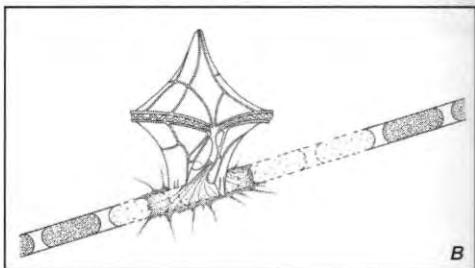
(. 284).



a



b



B

Protoperidinium conicum

(. 285),

(

).

20 30

. 285.

Protoperidinium

conicum.

(),

()

() (

). : 400 .

, *Trichonympha*).

215). (. . . 102, 103, 111,

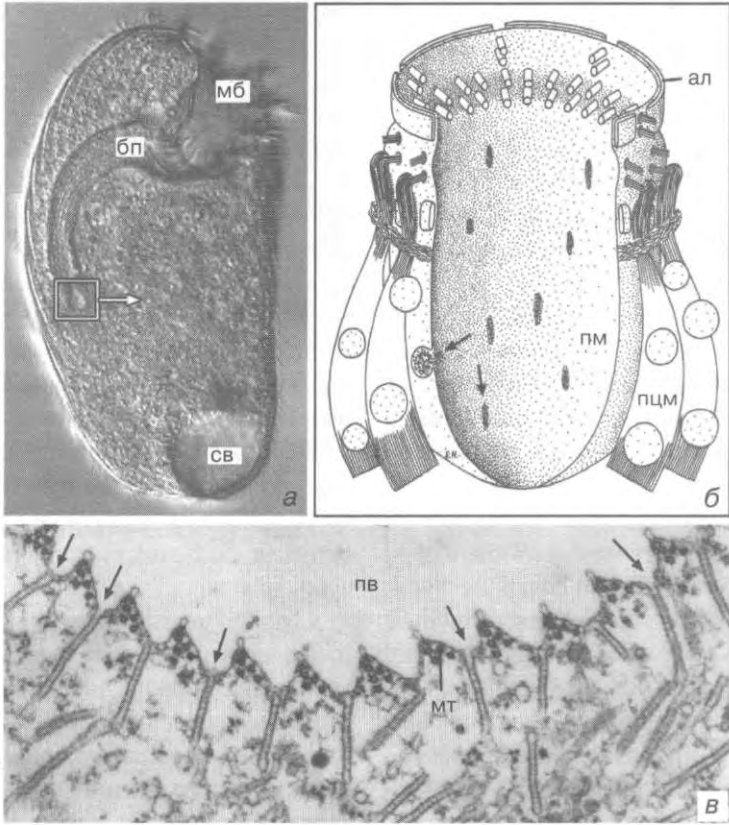
(. . .)

).

(. . . 279),

(. . . 286).

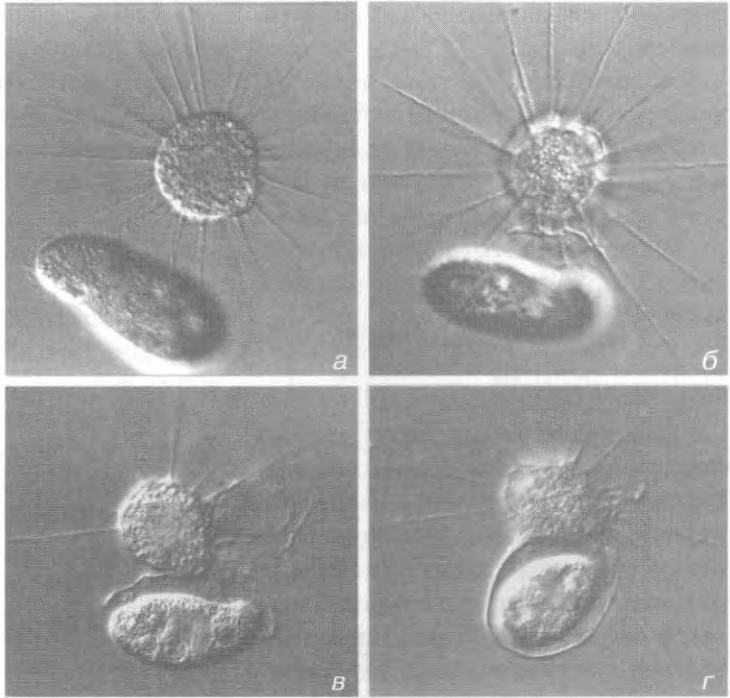
(15 /)



286. : , — *Climacostomum*
 () ()
 ()
 ()
), — , —
 ; — ()
Trichodina. — (— : Fischer Defoy and
 Hausmann: Differentiation 20 [1981] 141; — : Hausmann and Hausmann: J. Ultrastruct. Res.
 74 [1981] 131). . a 500x, 55 000x.

Pseudomicrothorax dubius

Pseudomicrothorax



. 287.
Actinophrys sol -
 () -
Colpi
dium (). -
 15 -
 (: Hausmann
 and Patterson: Cell
 Motil. 2 [1982] 9).
 ∴

. *Actinophrys sol* -
 (. 287).

15

()

20

(. 289).

Paramecium.

I (1).

(. 288).

15

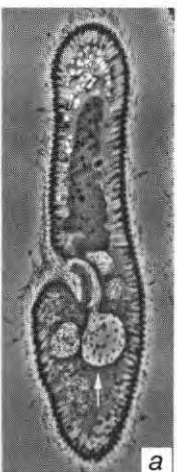
6

1

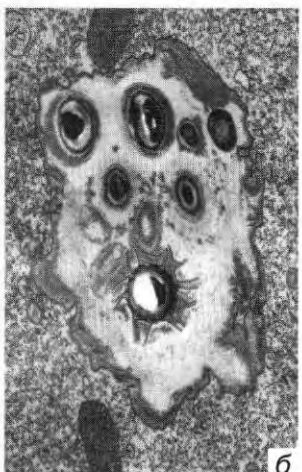
0,1

0,4

0,8



a



b

. 288.

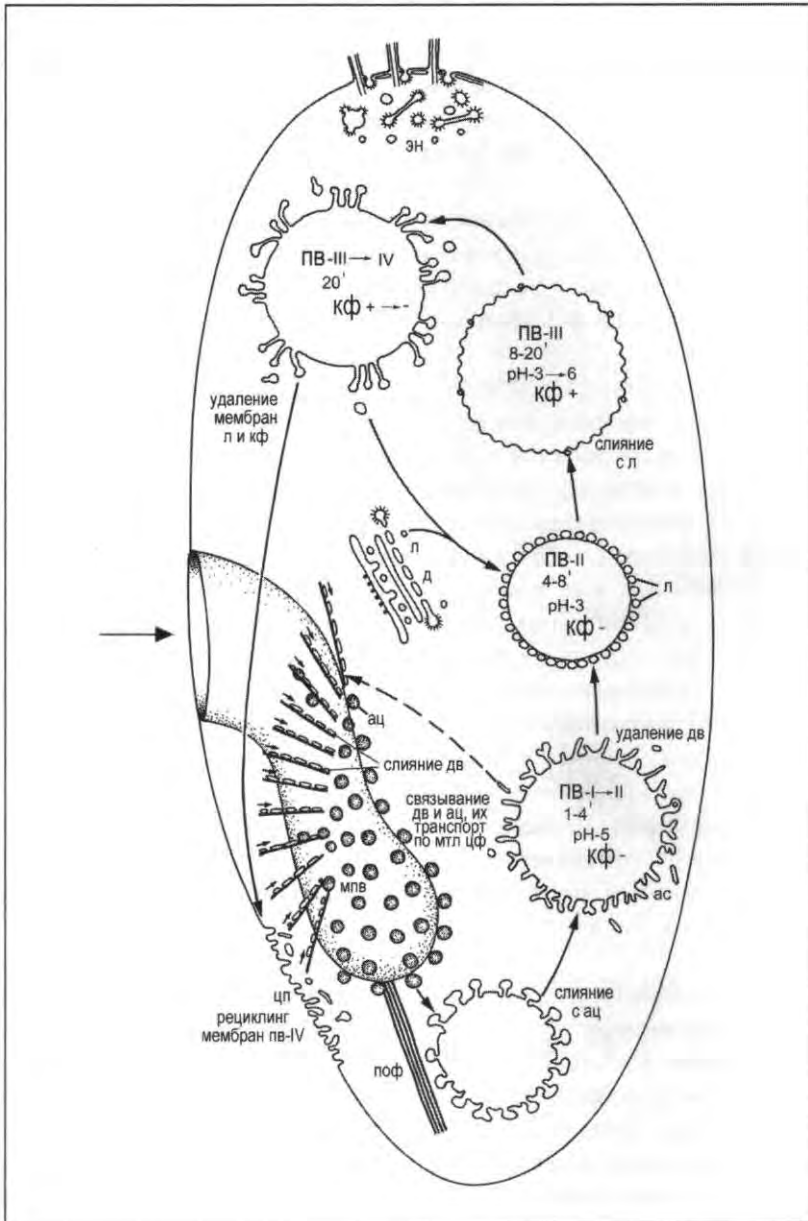
Paramecium.

() ,

(-

, -) .

13 000 .



. 289.

Paramecium,

1— IV —

()

1 -

1 . -

6 , 1 -

() . - () .

() -

1. -

(,)

0,2 0,4 -

1, -

() ,

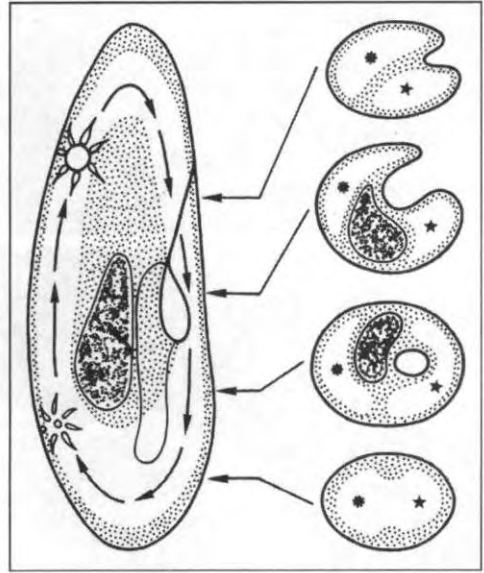
() ,

IV.

1

mecium,

Para-



. 290.

Paramecium

mecium

Para-

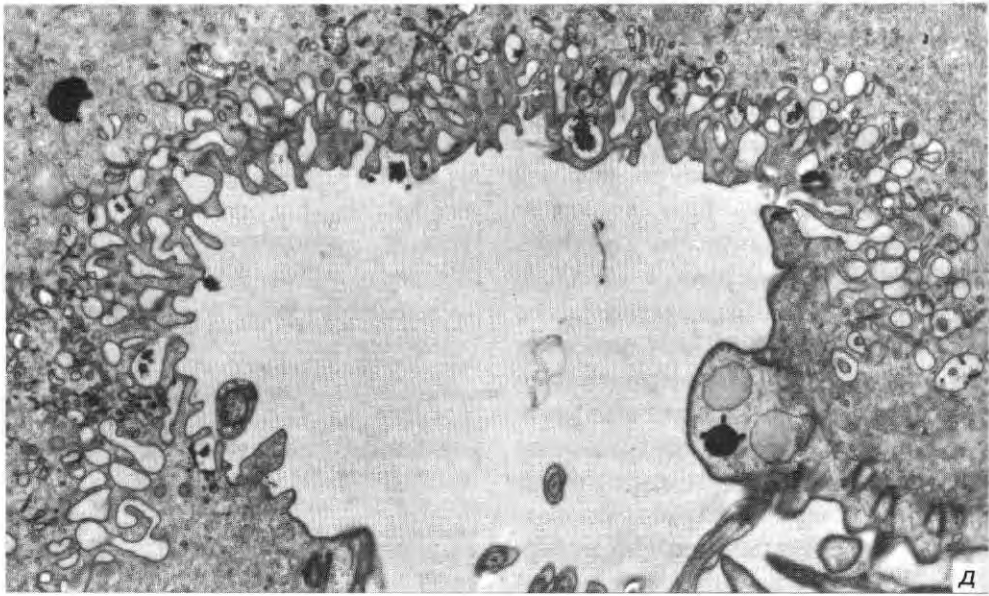
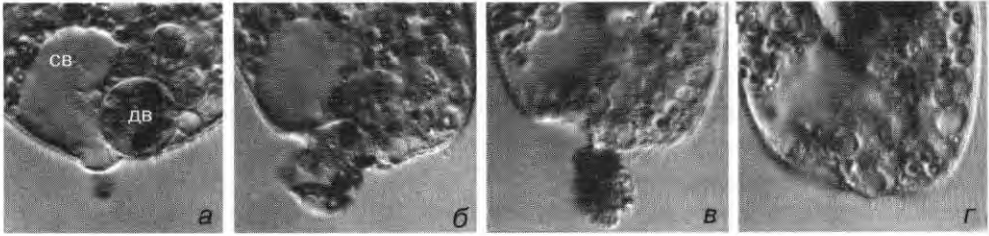
290).

()

() 2 3 ()

3

(. 291).



291. *Climacostomum*. — ()
). — ()
).
 (: Fischer Defoy and Hausmann: Zoomorph. 100
 [1982] 121). : — 470 , 13 000 .

()
 (. 292).

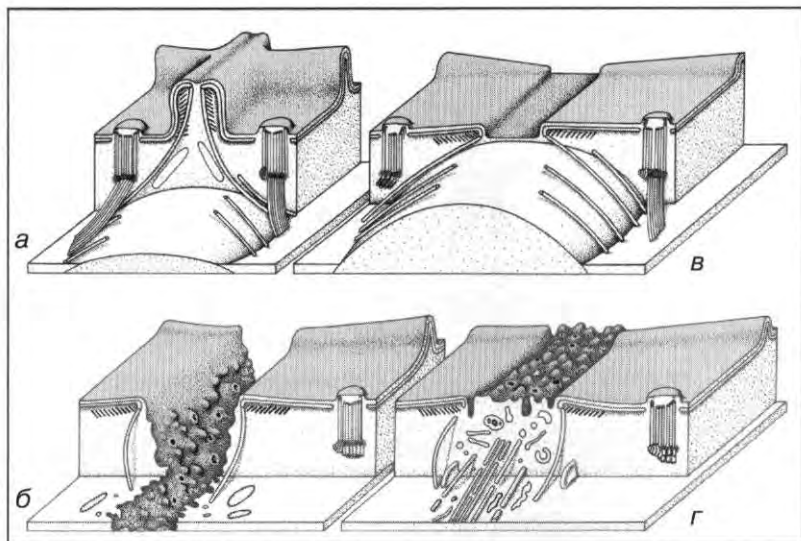
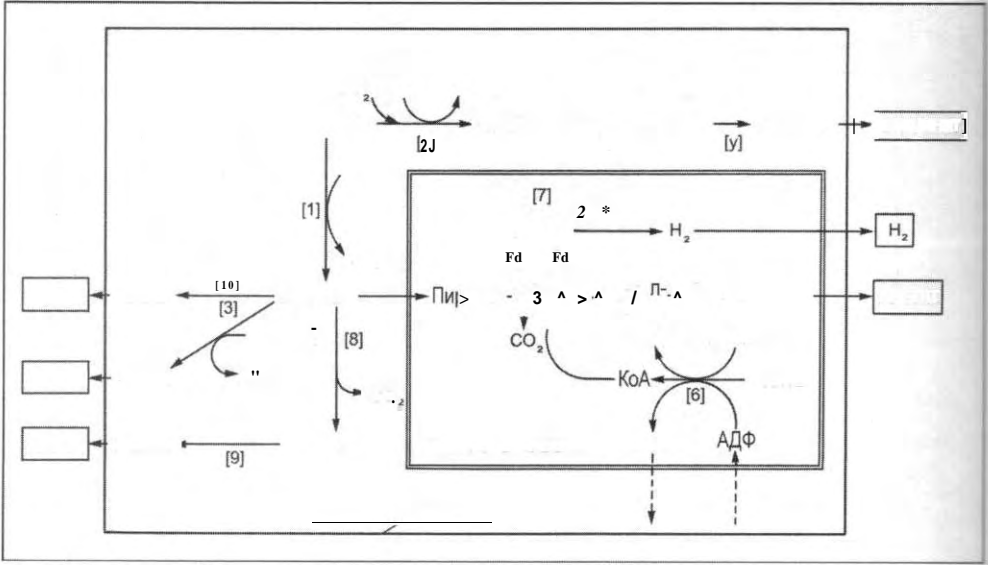


Рис. 292. Схема функционирования цитопрокта у *Paramecium*: приближение дефекационной вакуоли к цитопроктору (а, б) и везикуляция мембраны дефекационной вакуоли после слияния с поверхностью клетки (в, г) (по Аллену и Вольфу).

Microspore¹, *Entamoeba*,

(. 291, 292).



293.

Trichomonas vaginalis *Tritrichomonas foetus*.

(), [3] , [1] , [2]
 , [5] / , [4] , [7]
 [8] , [9] , [10] (*Trichomonas vaginalis*), [] (*Tritrichomonas foetus*), []
 (*Tritrichomonas foetus*), [Fd] (: Miiller, 2002).

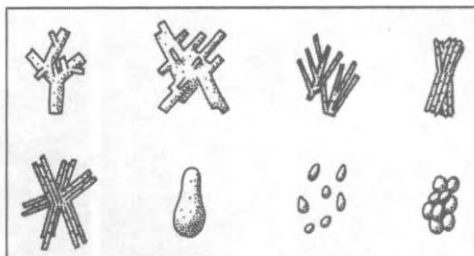
02, (. 293).

0

02.

I (, *Giardia intestinalis*, *Entamoeba histolytica*)

basalea) II (15).

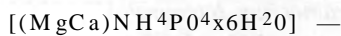


294. *Paramecium* ().

02 2.

5

Paramecium tetraurelia



294),

1

Paramecium,

()

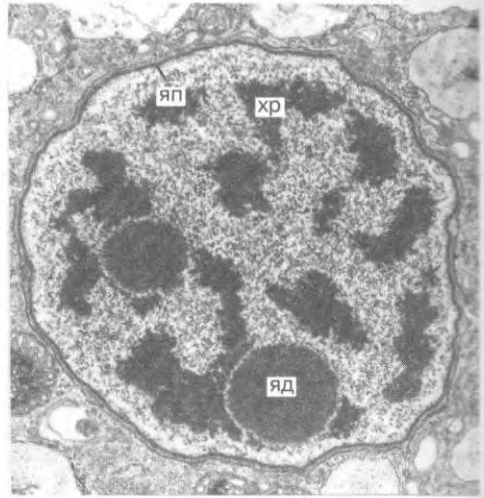
(. 296)

Chaos, Pelomyxa, Actinosphaerium, Opalina

(, Api

complexa)

Coccidia,



. 296. *Lateromyxa gallica* (Vampyrellidae)

15 000 .

Peridinium balticum)

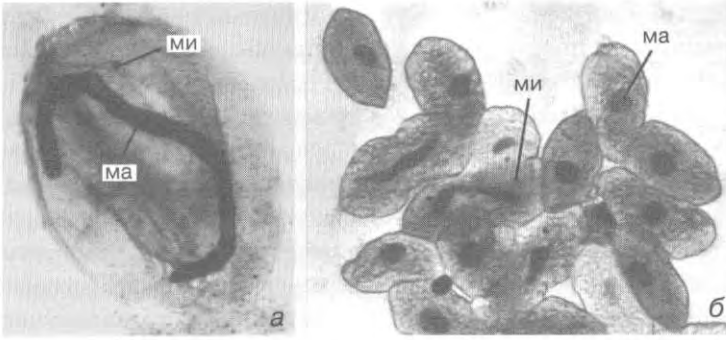
(. 112, 113,

297)

()

(, *Rotalliella*

heterokaryotica; . 162).



297. -
Euplotes ()
Tetrachymena ()¹
 -
 -
 -
 -
 -
 500 , 200 .

100 * .

(. 7, 18, 296)

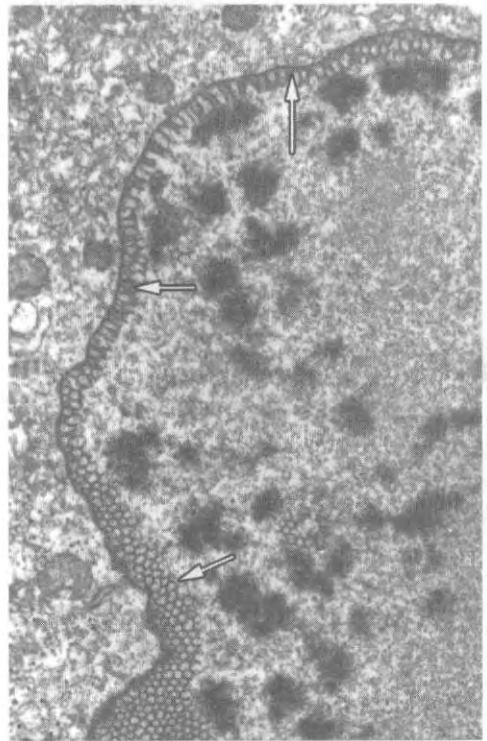
proteus

(. 296). *Amoeba*

(. 298), —

phrys)

(, *Actino*



298. ()
Amoeba proteus ()
 ,). : 12

1

2976 —

*

600 . —

(. 296).

Apicomplexa

(, *Barbulanym*
pha, Trichonympha)

Tetrahymena.

(Vol
vocida,
, Apicomplexa),
(
Actinophrys, Noctiluca)

().

1,

(

. 2).

hymena thermophila 10 20

5%

1
Paramecium caudatum *Paramecium aurelia*
)

-
-

(. . . 321).

(S)
G, G²,

() ().

-
-
-
-
-
-

Parame-
cium S

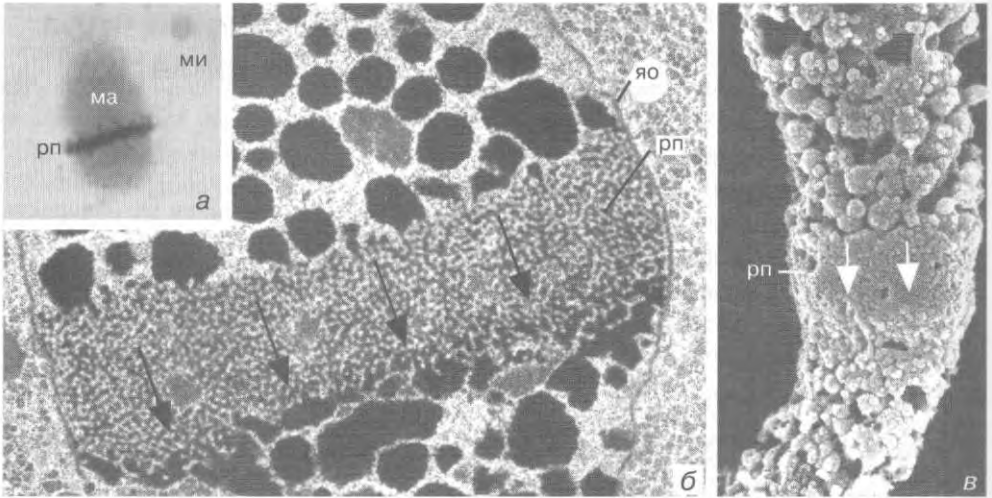
Paramecium

(. . . 299).

(. . .)

).

-
-
-



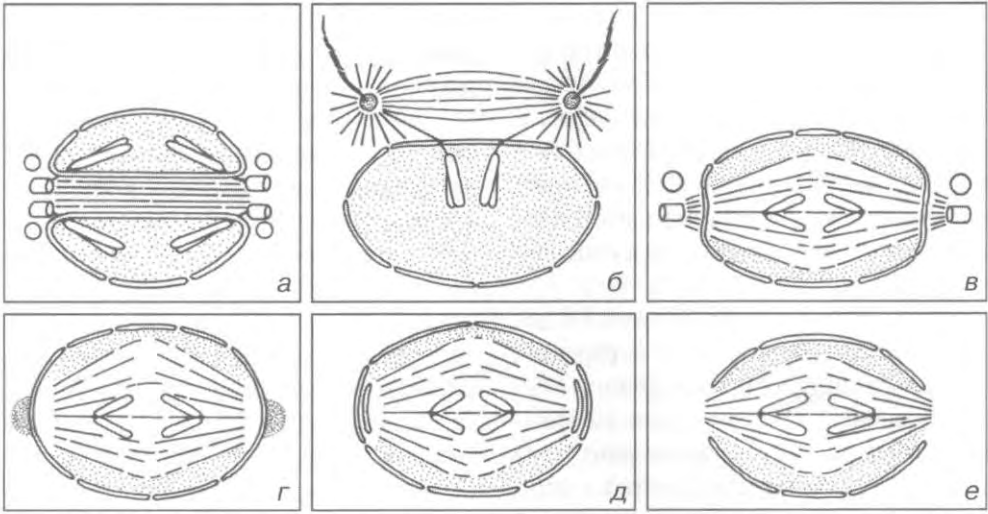
299. () () *Stylonychia* () () *Euplotes* () ()
), — (— : Steinbruck: *Europ. J. Protistol.* 26 [1991] 2; —
 40). : а 650x, б 13 500x, — 7 000x.

(. 300).

Monocystis)

(()

)



. 300.

(
 () ; —
 () ; —
 () ; —
) () .

(Volvocida)

(*Amoeba proteus*),
 (*Monosiga ovata*),
Deplauxis)
 (, *Actinophrys*).

Apicomplexa.

{*Euglypha*, *Arcella*},
 , *Arachnula*, *Lateromyxa*, *Vampyrella*)

(, *Trypanosoma cruzi*)
 () , () ,
 . *raiae*)

Stentor

I

(. 301).

, *Bursaria*, *Paramecium*),

()

I

(I).

, *Urostyla grandis*.

, *Homalozoon*

to cruzia

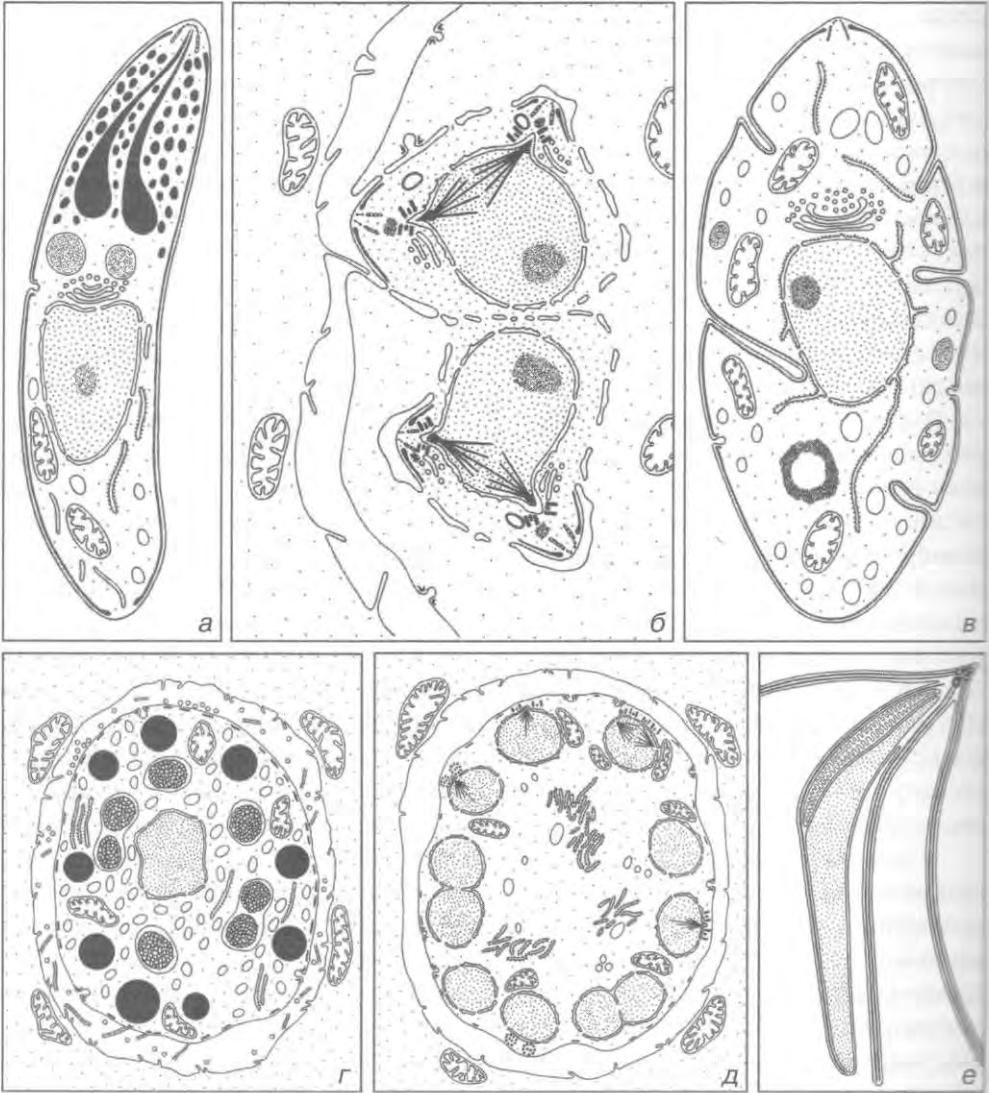
(*Arcella*, *Lateromyxa*

gallica),

(*Amblyospora*),

Myxozoa (*Aurantiactinomyxon*),

(*Prorocentrum*),



. 303.

— ; — ; — ; — ; —
 — ().

Apicomplexa:

— /ОНТ;

Apicomplexa

(. 303), -

(-

),
 СТ-
 СТ-
 СТ-
 СТ-
 СТ-

plexa

Apicom-

(. 3036).

phrys sol
(. 304)

Actino-

(. ,),

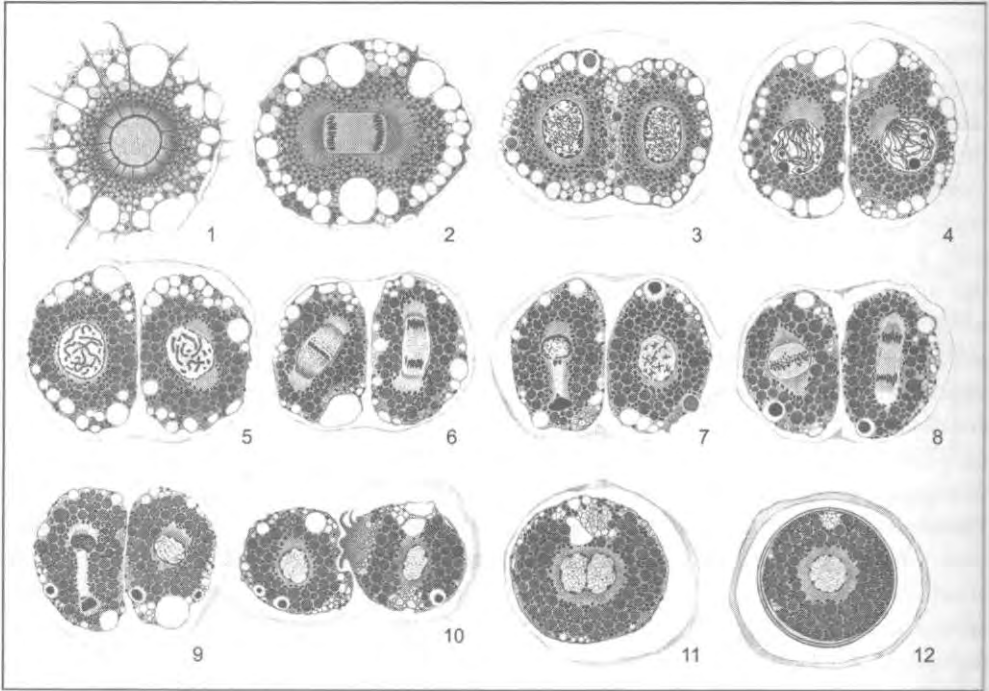
Arcella.

Opalina ranarum (. . 64)

(*Elphidium crispum*),
(*Glabratella sulcata*)
(*Rotaliella*).

(. 646).

Apicomplexa.



304. (=) *Actinophrys sol* (1); (2 9)'; (10) (11) (12) (). : 540 .

) ,
(-
)² (. 305). -

Foraminifera. *Hetero*
stegina depressa

1

Actinophrys sol

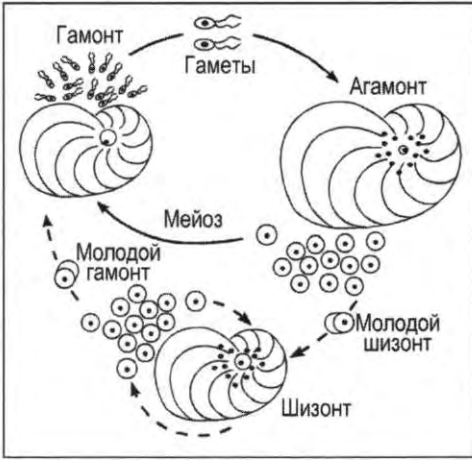
: 2 3 —

; 4 7 —

; 8 9 —

2

(),



. 305.

()

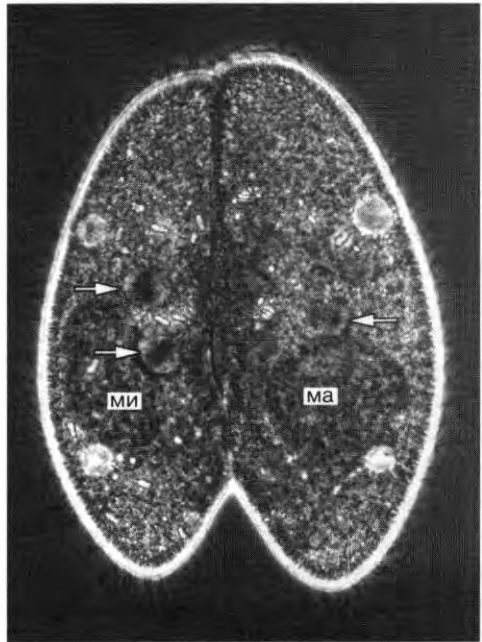
()

Hymenomonas carterae

, *Cladophora*).

(. 306)

Paramecium cauda
tum 16

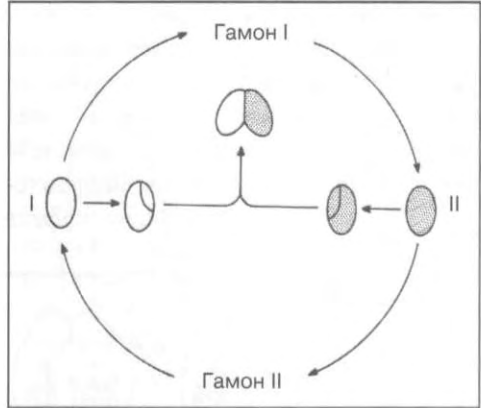


. 306. *Paramecium cauda*
tum: ()

()

.: 350 .

crassus, Tetrahymena thermophila)



307. *Blepharisma*

Paramecium

caudatum

3

(306).

I, II, I ()

II;

G, R²,

II

G² R^r

Euplotes octocarinatus

10

G⁴,

(G., G², G³,

(R, R², R³, R⁴).

(1) « *Blepharisma japonicum*,

Blepharisma

japonicum

(G¹⁵ G²),

1 2
3 4,
GP G², R³, R⁴;

R., R², R³, R⁴.

(R_j, R²).

I

I

(2)

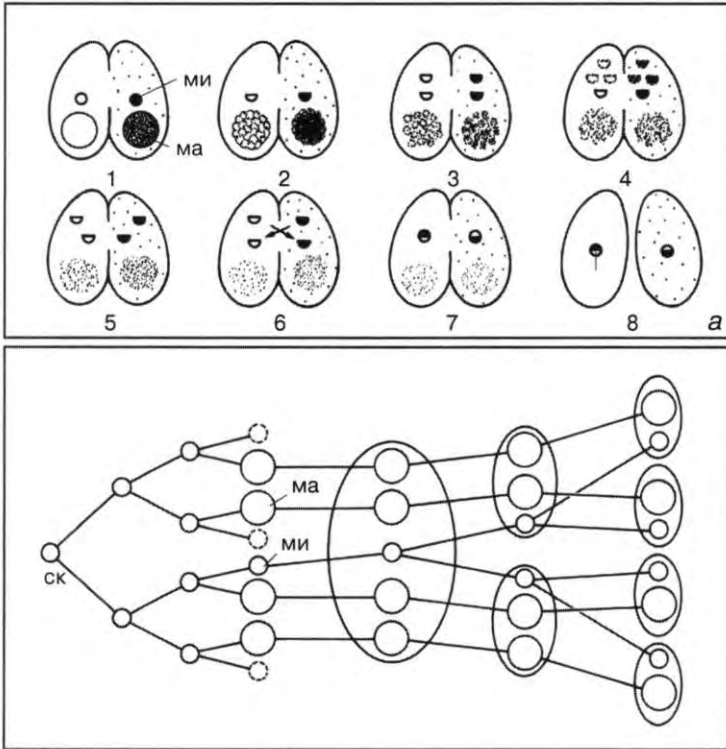
() .

Euplotes raikovi.

()

raikovi

Euplotes



308.

Paramecium caudatum ():

() (2 4);

) (5);

(6),

(7);

()

1,

(8)

() .

() .

(
)
(. 308).

(, -
, -
, -

Paramecium

()

(. 3086).

()

1

1

« »
« Ciliophora: «

» — , , ».—

()

sea, Myxogastrea, Dictyostela; . 56, 179, 180) Sorogena (. 226)

(. 309).



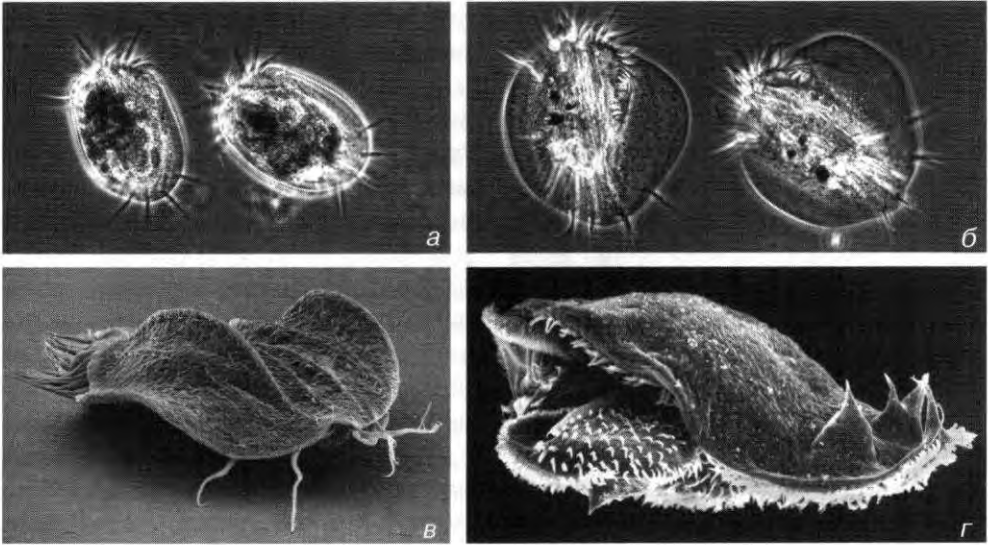
. 309.

Paramecium

(, Apicomplexa),

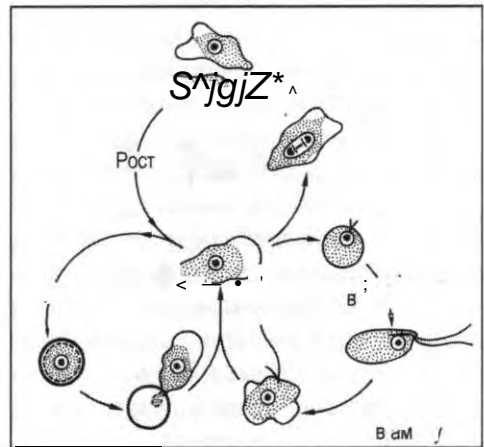
(: Iftode et al.: Development 105 [1989] 191). : 600x.

	-	(<i>Stentor</i> , <i>Fabrea</i> , <i>Blepharisma</i>)	-
	-	(<i>Epistylis</i>),	-
	-	<i>Hyalophysa chattoni</i>	-
	-	<i>Euplotes muscicola</i> .	-
	-	<i>Lateromyxa gallica</i> ,	-
	-		-
	-		-
	-	<i>Naegleria gruberi</i>	-
	-	(-
	-	<i>Acantha</i> 80%),	-
<i>moeba</i>	-		-
	-		-
	-		-
	-		-
S	-		-
	-		-
	-	<i>Acanthamoeba</i>	-
	-	(-
	-)	-
	-	<i>Euplotes</i>	-
	-	, <i>Pseudomicrothorax</i>	-
	-		-
	-	<i>Bursaria</i>	-
	-	, <i>Colpoda</i>	-
	-		-
	-		-
	-		-
	-		-
	-		-
	-	<i>Colpoda</i>	-
	-		-
	-		-
	-	<i>Giardia</i>	-
<i>lamblia</i> ,	-		-
<i>Actinophrys sol</i> ,	-		-



311. *Euplotes octocarinatus* (Lembadion) —
Onychodromus quadricornutus (Lembadion) — Kuhlmann and Heckmann: Science 227 [1985] 1347;
 Wicklow: J. Protozool. 35 [1988] 137. 270, 760, 280.

Euplotes
 (311).
Lembadion *Euplotes*
octocarinatus
 (3116),
Euplotes.
Naegleria
Tetramitus



312. *Naegleria gruberi* (Naegleria)

()

Clathrulina elegans

()

(. . 210).

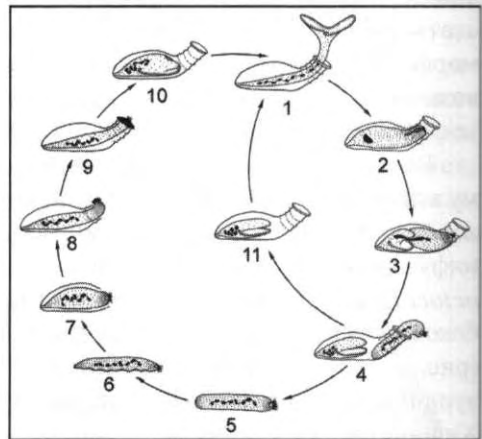
Naegleria

Suctororia (. . 130, 131)

Tetramitus,

)

(. . 118)

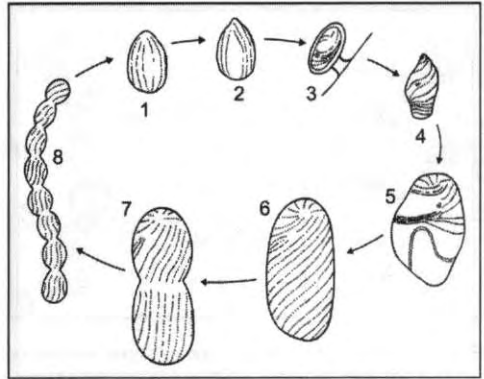


. 313.

Eufolli

culina uhligi: 1 — , 2 4 —
5 — , 6 10 —
, 11 —

(: Mulisch and Patterson: Protistologica 19 [1983] 235).



. 314.

Polyspira delagei: 1 —

, 2 —

, 3 —

, 4 —

, 5 —

, 6 —

, 7-8 —

() ().

Spirophrya subparasitica

Zoothamnium alternans *Z. arbus*

cula (. 144).

()

(. 313).

(. 220),

(. 313).

(. 51, 52).

Trypanosoma

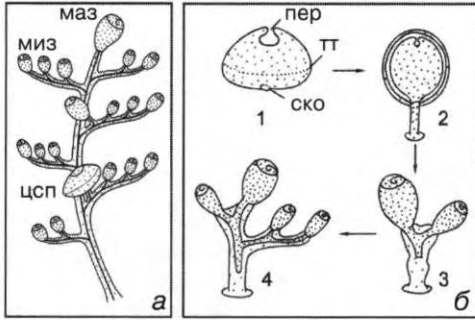
(. 51).

Trypanosoma

mega

(. 314).

(



(. 316).

Dictyostelium discoideum (. . 180)

. 315.

Zoothamnium: —

Z. alternans

()

(),

(); —

Z. arbuscula: 1 —

(),

() (); 2 —

; 3 —

; 4 —

(—

, —).

().

315).

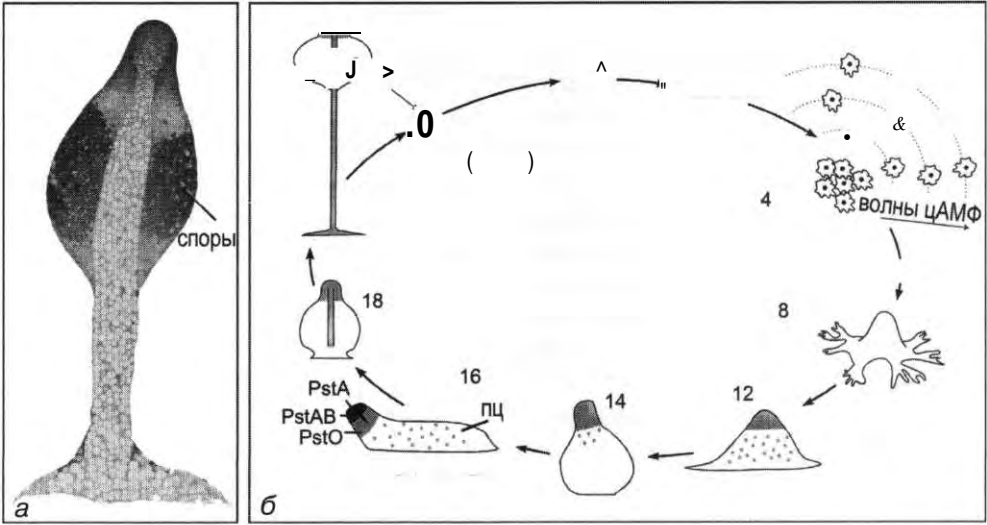
()

().

deum

Dictyostelium discoi

1



316. *Dictyostelium discoideum* ():

() *Dictyostelium*

PstA, PstAB, PstO —

(— 60)

(pstA pstB).

(pstAB)

Myxogastrea,

2.

179).

DIF (differentiation inducing factor — DIF I

lina; . . . 313)

Eufollicu

Apicomplexa).

Discoideum murocoides

) (. . . 80), 146).

, *Toxoplasma*;

Dimorpha mutatis

() ,

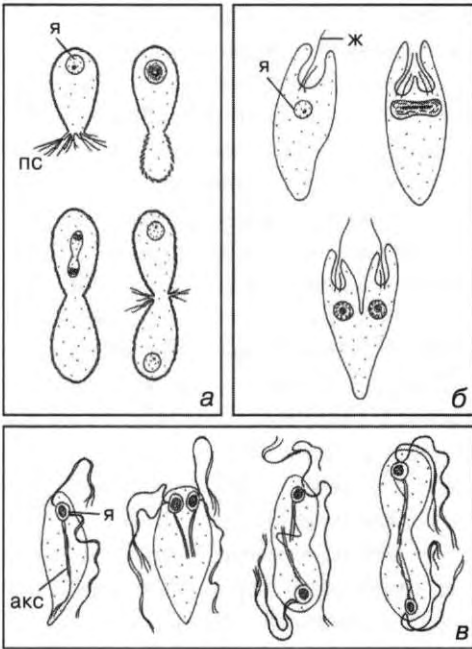
()

() .

(. 317) .

Amelia vulgaris

()



. 317 .

(*Euglypha*,) ,

(*Euglena*,)

{*Devescovina*,

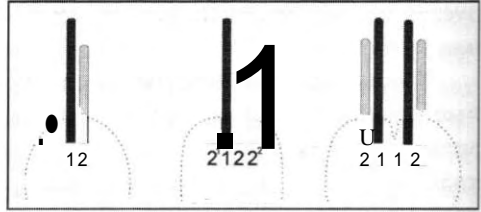
), — () .

Euglena,

3176).

318).

Neph



318.

Nephroselmis olivacea:

(1)

(2)

(2'

2²).

() .

roselmis olivacea

Hypermastigida

Joenia;

44).

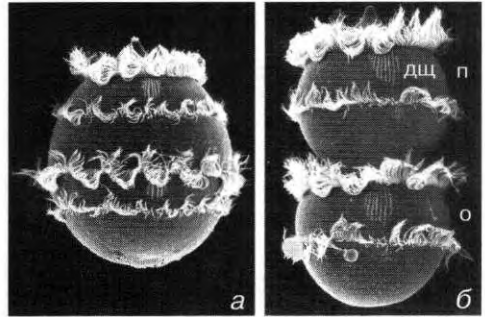
(. 317) .

Volvox

Volvox carteri

(

)



. 319.

Didinium nasutum:

Volvox carteri

Ephelota gemmipara

, *Tachyblaston ephelotensis*,

(. 3206).

Suctorio.

Acineta tuberosa

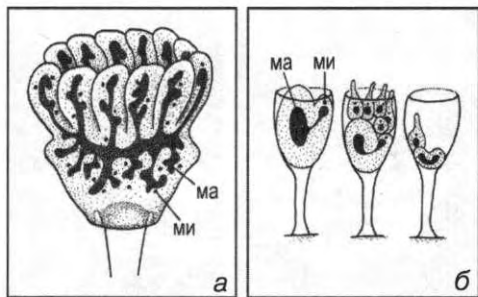
114).

2+

319).

(, *Halteria*, *Tintinnidium*).

Opercularia *Tintinnopsis subacuta*



. 320.
lota () *Tachyblaston* (), —
 , — () .

. 129).

. 89)
 complexa

(, *Eimeria*,
 Api-

Eimeria

. 3036.);
)

(. . 90);

(, *Sarco*
cystis)

Pelomyxa,

()
 (. . 162).

Astomatia *Apostomatia* (. . 314)

(, *Radioph*
rya)

(. . 146);

(, *Haptophrya*).
Foettingeria

321).

(cyclin dependent protein kinases, Cdk).
Cdk

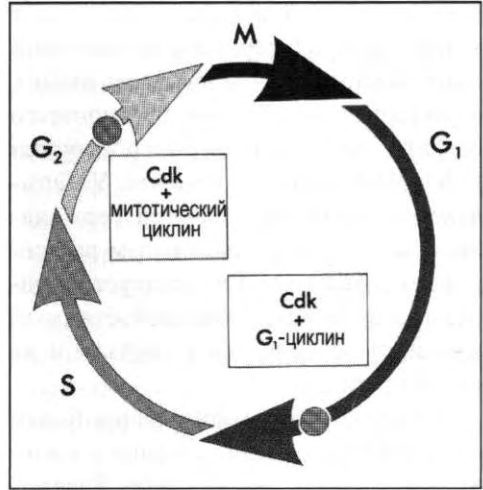
G₂ S
(. 321).

Cdk, G_k
(M phase promoting factor, MPF),

MPF,
Cdk G_r УНК

Cdk,

Cdk



. 321.
(
)
(S) (). (Cdk)

. G, G₂ —

Tetrahymena

Tetrahymena pyriformis, *thermophila*
Paramecium caudatum

(meiosis reinitiating factor, MRIF),
MPF.

Tetrahymena *Paramecium.* *Tetra-*
hymena MRIF₂₊ -

()

Cdk,

(*Tetrahymena thermophyla*, *Parame-*
cium tetraurelia),

Dunaliella tertiolecta, *Dictyostelium*
discoideum *Plasmodium falciparum.*
Cdk,

(. . . 102).

Paramecium.

(. . . 105),

), , ,

(*Leishmania mexicana*, *Trypanosoma*
brucei),

(*Paramecium tetra-*
relia, *Stylonychia lemnae*, *Tetrahymena*
thermophila), (*Pro*
rocentrum minimum, *Alexandrium tama*
rense), *Dunaliella tertiolecta*, *Physarum*
polycephalum *Dictyostelium discoi-*
deum. *Eufolliculina uhligi*

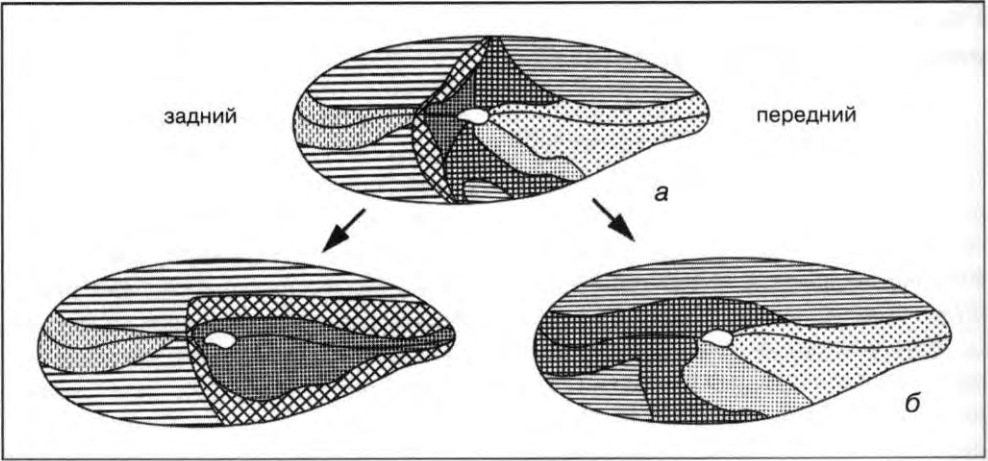
Stentor, *Paramecium*, *Tetrahymena*

()

Cdk,

Cryptothecodinium cohnii

, (, -
).
 , ,
 -
 -
 , ,
 -
 -
 ,
 -
 , Stentor (-
 -)
) , Paramecium -
 -
 , Stentor Tetrahymena (. 322).
 (, -
 , Paramecium —) Paramecium -
 -
 , , -
 -
 -
 -
 -
 -
 Stentor, , -
 -
 (,
 -
 , -
).
 — , -
 -
 -
 : , -
 - ,



. 322.

Paramecium () ;

() :

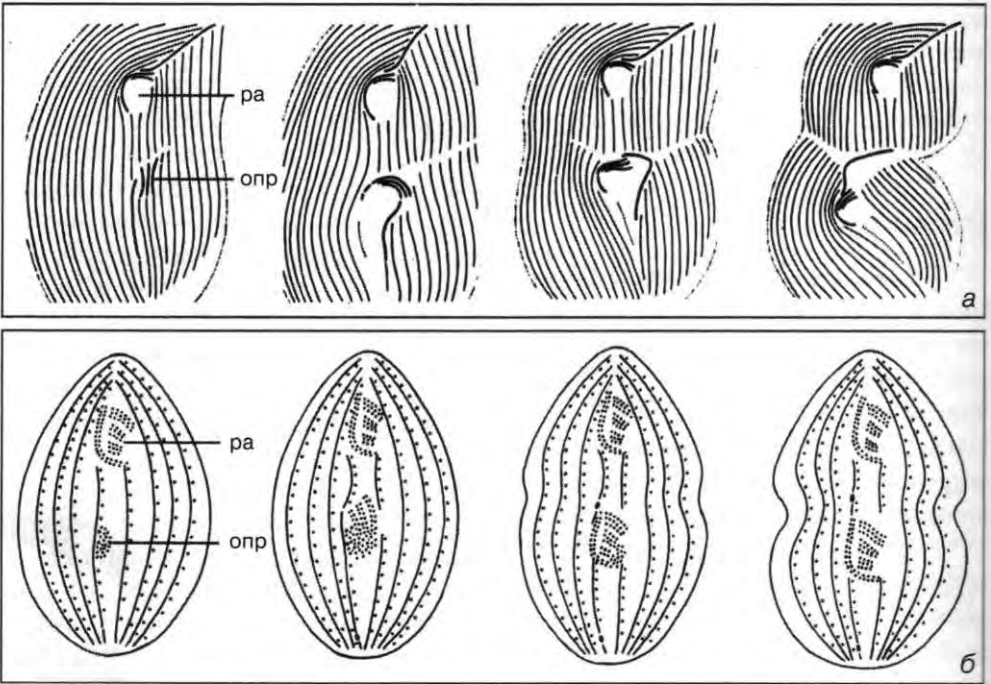
Oxytricha.

Stentor

Paraurostyla weis

sei

« »



. 323.

Trithigmostoma steini; —

Tetrahymena. —

(— : Hofmann and Bardele: Europ. J. Protistol. 23 [1987] 2).

(. 324).

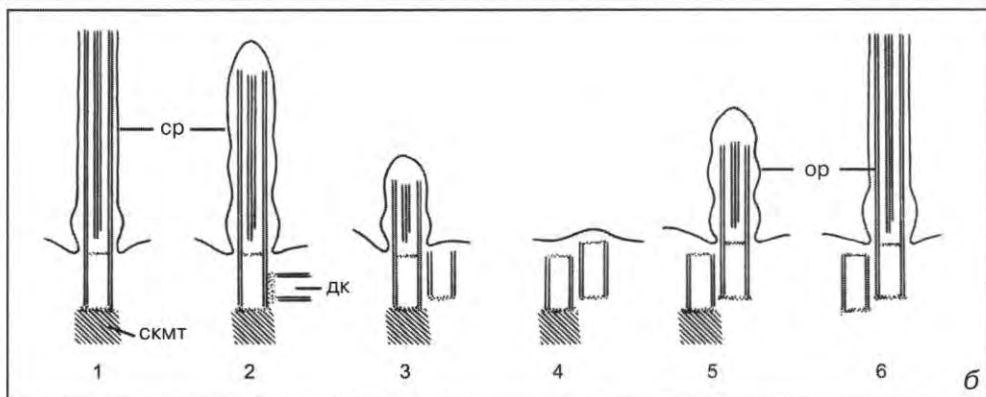
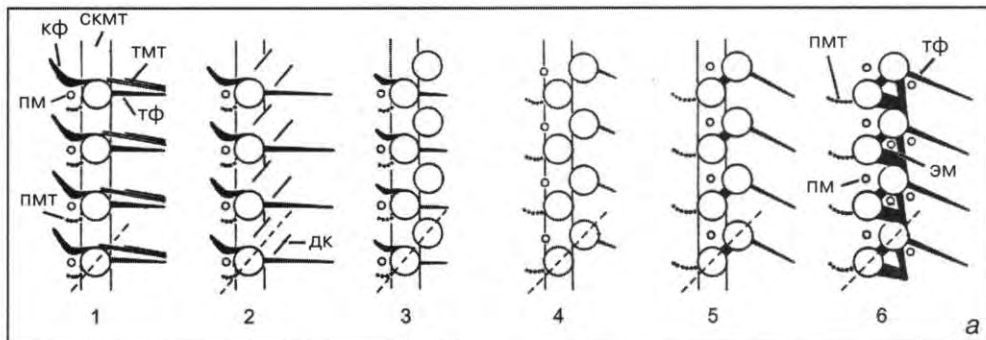
Oxytricha

fallax

de 324, 325).

novo.

Tetrahymena Paraurosyella



. 324.

Trithymostoma steini (—

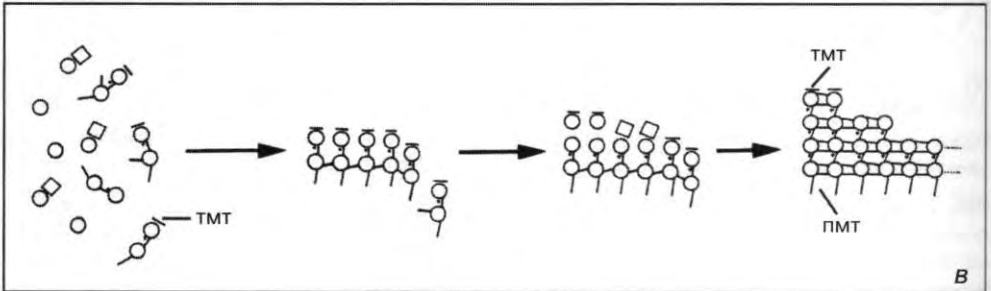
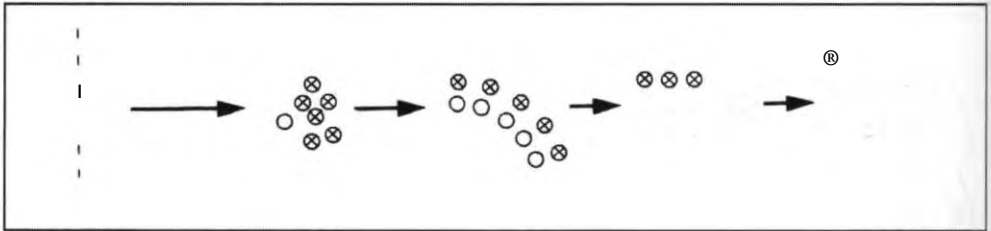
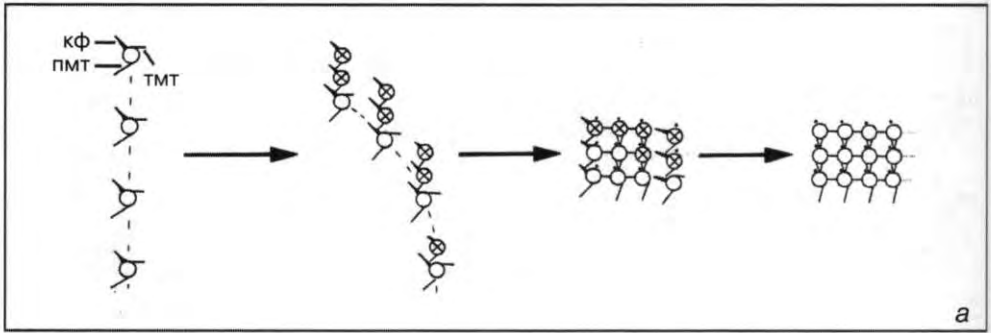
; 2 4 — () ; 5 — () ; 6 —

Protistol. 23 [1987] 2).

(: Hofmann and Bardele: Europ. J.

(. 325).

Stentor



325. : — *Furgasonia blochmanni*; — *Tetra-*
hymena thermophila; — *Paraurostyla weissei*.

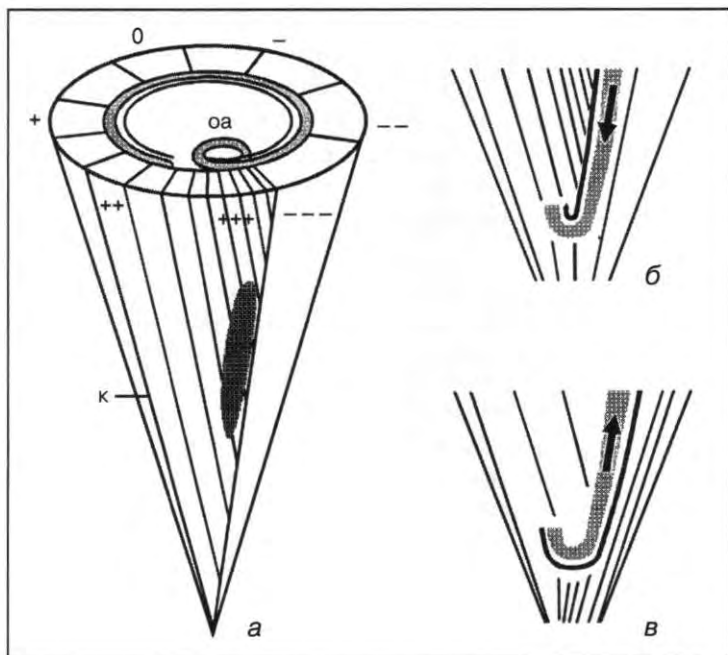
(: Eisler: *Europ. J. Protistol.* 24 [1989] 181).

(. 326).

(),

(. 326).

Stentor



. 326.

) *Stentor*.

—

()

(—

).

(—/+++).

, —

—

()

()

()

;

—

).

(

)

).

(

Tetrahymena,

Paramecium.

()

10

vitro.

in

soma brucei

Trypano-

(. . . 51).
 « . . . » (variant surface glycoproteins — VSG).

14
 VSG.
 « » VSG
 1000
 VSG
 327).
 . *brucei*

VSG
 10^{-2} 10^{-6}

VSG

VSG,

327. . . *brucei*
 20 100

1000

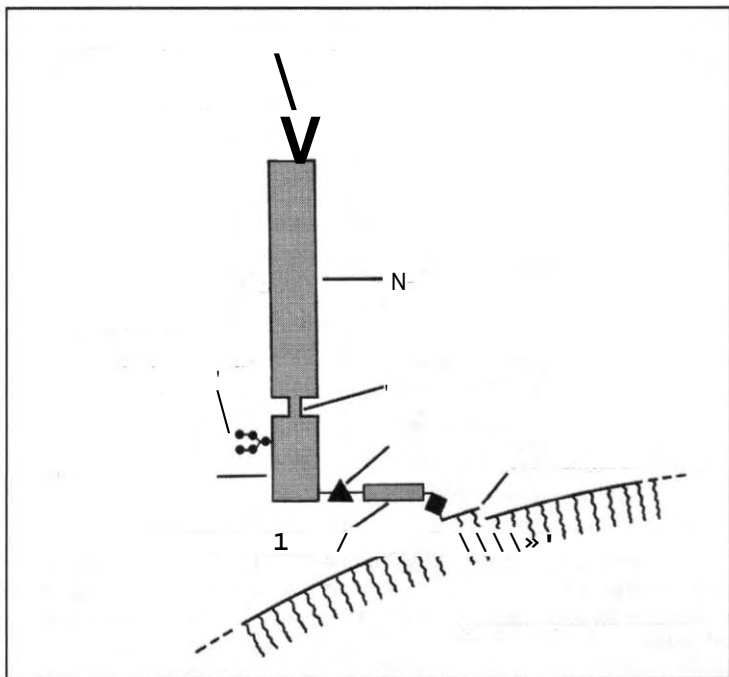
VSG.

1
 VSG

VSG

(ELC VSG

VSG:
 3



. 329.
VSG *Trypano-*
soma congolense (по
).

() .

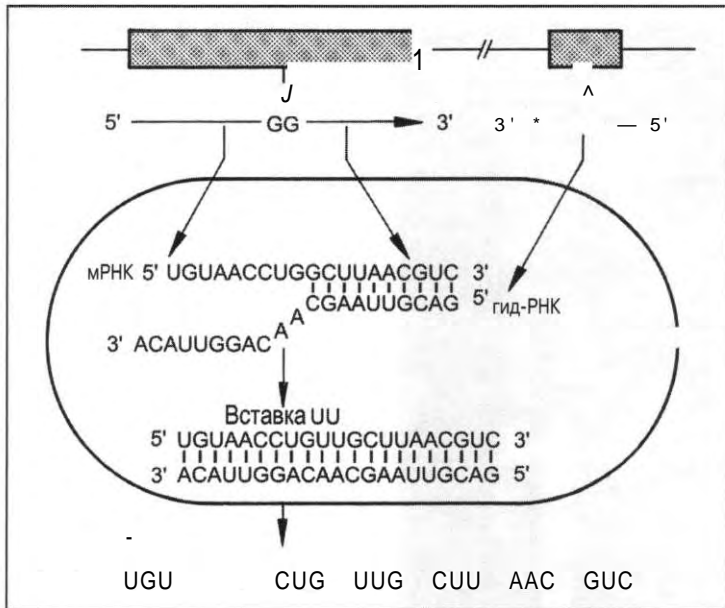
()

50%

(guide RNA,

(. 330).

Physarum



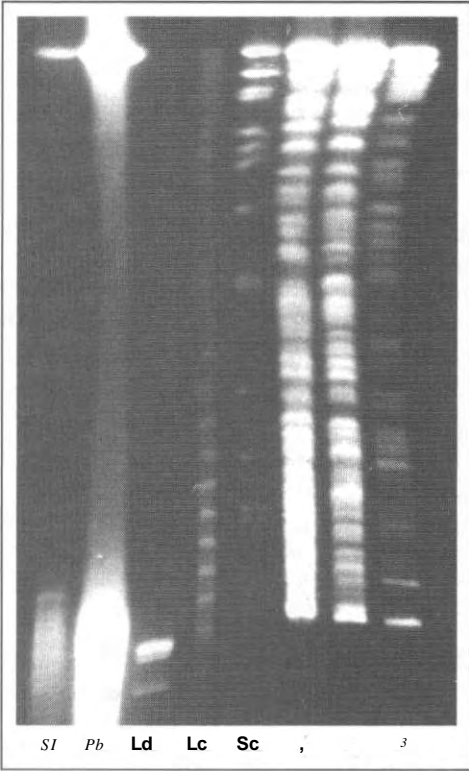
. 330.

() .

(

),

?



Hymenostomata (

Tetrahymena

Paramecium)

Stichotrichia Hypotrichia (

, *Stylonychia*, *Oxytricha* *Euplotes*).

(
).

. 331.

Tetrahymena

hymena 10 20%

thermophila (₂)

pyriformis (₃)

Stylonychia lemnae (SI) *Paramecium*

bursaria (Pb),

{*Saccharomyces cerevisiae*, Sc),

(Lc)

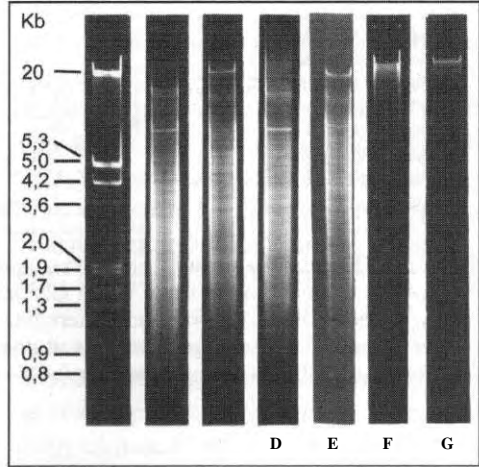
(Ld).

331).

49

Tetrahymena

20 1000



(. . . 302).

Stylonychia

98%

100 15
hymena

(. . . 332). *Tetra-*

. 332.

mecium

F —

G —

Para-

0,5

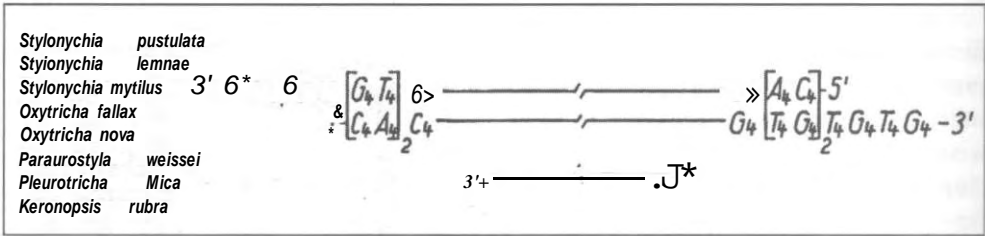
10

333.

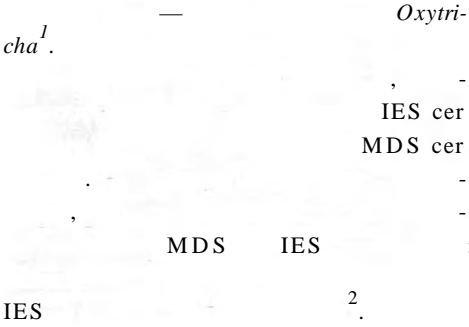
50 -

(internal eliminated segments, internal eliminated sequences — IES),

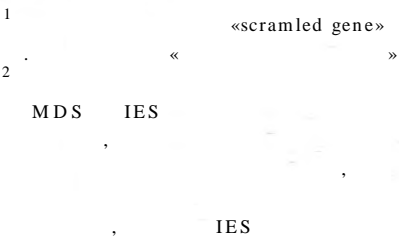
(macronuclear destined sequences — MDS), —



. 333.



Hymenostomatia, Stichotrichia



Tetrahymena

Tetra-

hymena

(. 17).

Tetrahymena Euplotes.

Tetrahymena

TTGGGG

Tetrahymena.

Euplotes

TTTTGGGG

Euplotes.

Tetrahymena

3'

17.

Didymium

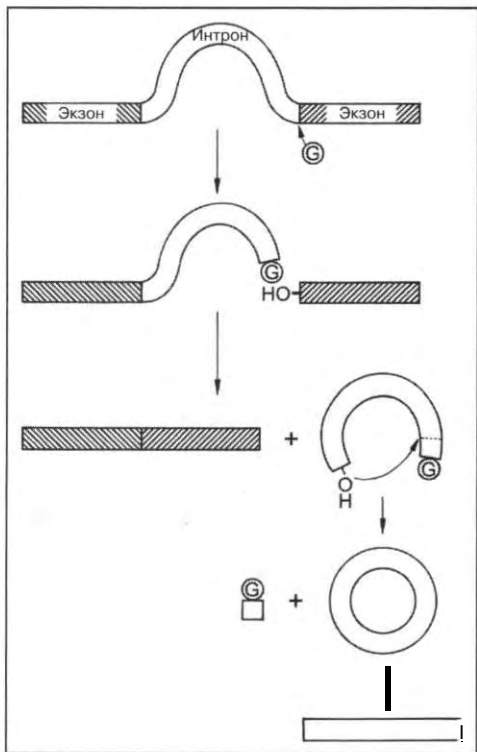
Ciliophora	<i>Tetrahymena</i>	TTGGGG
	<i>Glaucoma</i>	TTGGGG
	<i>Paramecium</i>	TT(T/G)GGG
	<i>Stylonychia</i>	TTTTGGGG
	<i>Oxytricha</i>	TTTTGGGG
	<i>Paraurostyla</i>	TTTTGGGG
	<i>Onychodromus</i>	TTTTGGGG
	<i>Urostyla</i>	TTTTGGGG
	<i>Keronopsis</i>	TTTTGGGG
	<i>Pleurotricha</i>	TTTTGGGG
	<i>Euplotes</i>	TTTTGGGG
Kinetoplastidea	<i>Trypanosoma</i>	TTGGGA
	<i>Crithidia</i>	TTGGGA
Apicomplexa	<i>Plasmodium</i>	(C/T)TTGGGA
Myxogastrea	<i>Physarum</i>	TTGGGA
	<i>Didymium</i>	TTGGGA
Dictyostelia	<i>Dictyostelium</i>	AG,,,
Chlorophyta	<i>Chlamydomonas</i>	TTTTGGGA

vitro

G

() ,

in



334.
thermophila.

Tetrahymena

(G)

2.

G

(

(334).

Tetrahymena, Paramecium, Stylo-
nichia Oxytricha —
 TAG, —

Physarum

18. TAG TGA,

	TGA	TAG
<i>Tetrahymena</i>		Gin Gin
<i>Paramecium</i>		Gin Gin
<i>Stylonychia</i>		Gin Gin
<i>Oxytricha</i>		Gin Gin
<i>Paraurostyla</i>		Gin Gin
<i>Euplotes</i>	Cys	
<i>Blepharisma</i>	?	?

(. 18).

, — TGA. *Tetrahymena ther*
mophila

TGA.

Apicomplexa:

Plasmodium falciparum, *P. vivax*, *P. ovale*
P. malariae.

Plasmodium,

. *Euplotes* *Blepharisma*

TGA (

)

Euplotes.

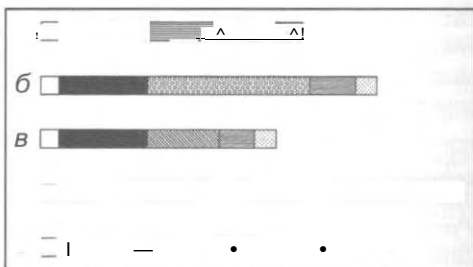
Euplotes

Hypotrichia

Stylonychia

Oxytricha,

TGA



. 335.

Plasmodium falciparum.

() .

P. falciparum

96).

(. . 97, 98).

dium

Plasmo-

20

(S 1).

VSG

(. . 335).

S

P. falciparum

■

Chlamydomonas.

tyostelium *Entamoeba*

Dic

1

()

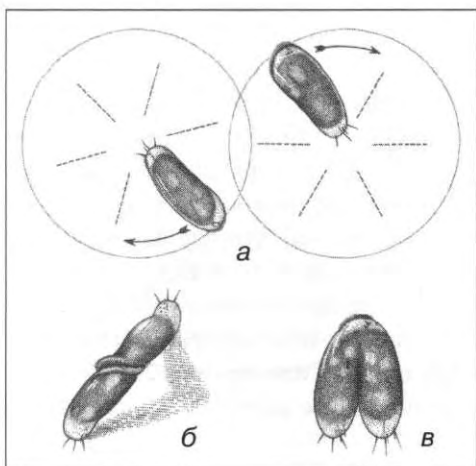
()

(. 336).

nychia Euplotes)

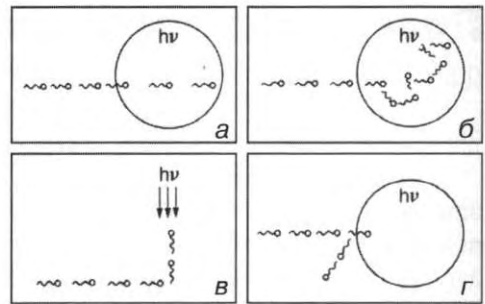
2+

(Stylo



. 336. «
Stylonichia mytilus:

()



. 337.

(...)

($h\nu$): — ()

(...)

); — :

),

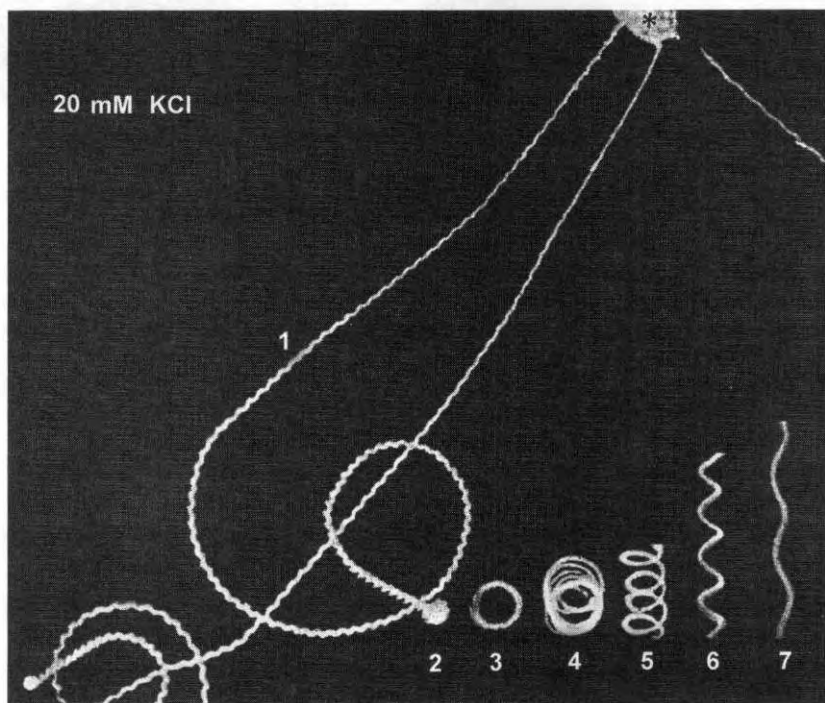
()

(. 337).

(...).

(. 337 , ,).

, , -
 , , -
 (. 337). -
 (. 3376). —
 - ,
 - ;
 - — (.).
 (- -
 ; . 337 ,) , -
 (; . 337). -
 — (,
 — ; .). ,
 , ,
 - -
 — -
 , -
 - -
 , -
 - -
 , -
 , -
 , -
 , -
 , -
 — -
 , -
 - ()
 (. 337). , -
 — -



338. *Paramecium*

20 mM KCl

(*)

(1).

40

(2).

(3)

(4-7).

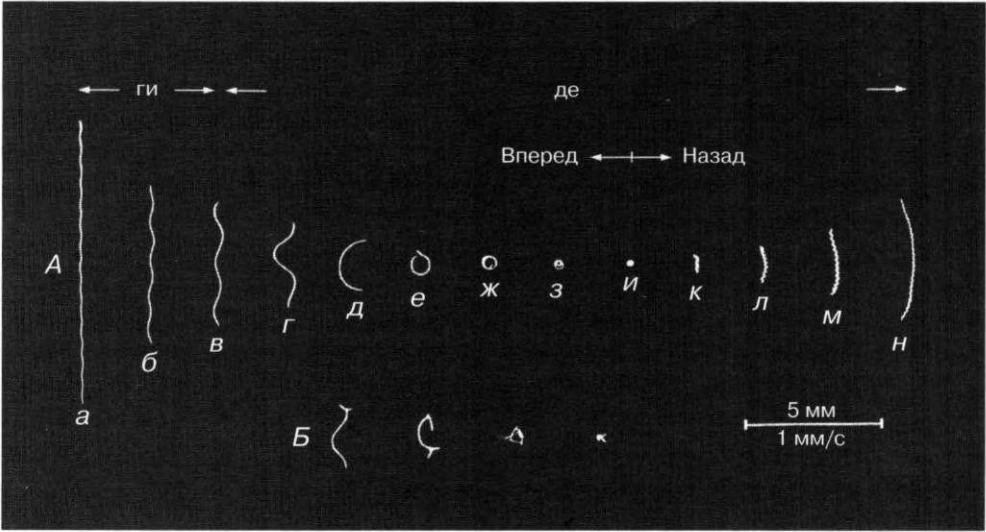
7-

463).

339,

(: Machefer: J. Protozool. 36 [1989]

Paramecium.

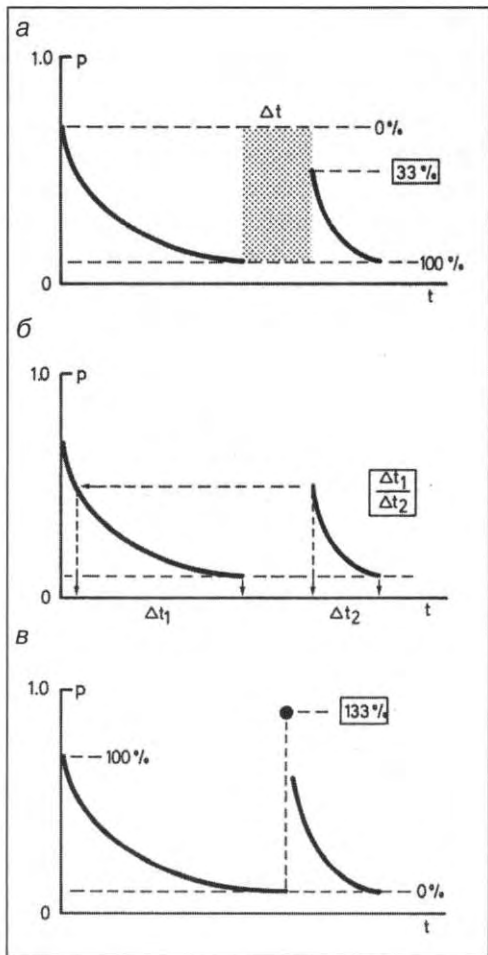


339. *Paramecium*
 ()
 ()
 () ; () ; ()
 ()
 (: Macheimer and Sugino: . Biochem. Physiol. 94A

[1989] 365).

338).

(. 339)



340.

Spirostomum

()
 ;
 (t)
 12 , —
 ;
 100% ;
 (At),
 (33%) , —
 ;
 100% ;
 () —
 () ;
 (: Macheimer:
 BIUZ 18 [1988] 122).

chia

Stylony-

340).

Spirostomum Stentor,

. 339),

Paramecium,

()

(),

(),

(. 3416,1).

(. 341).

2

II-I, III-I).

(. 3416,

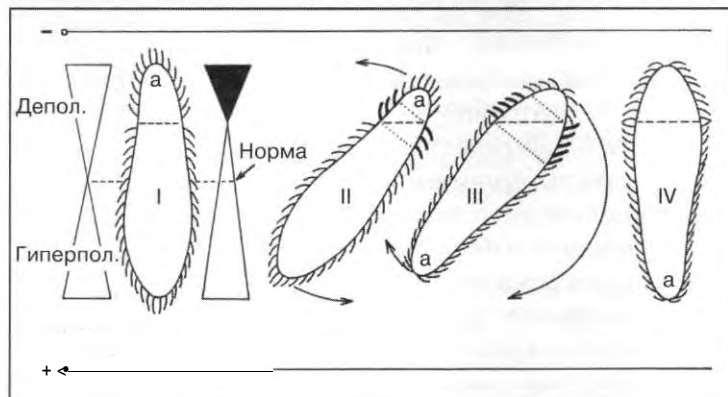
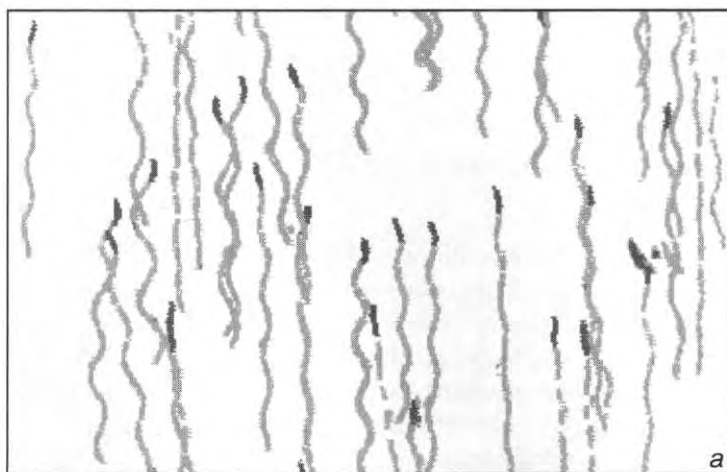
(. 3416).

();

(*Opalina,*

Chilomonas).

(



. 341.

Paramecium, —

() , —

) () , —

() () .

(. — , — ; —

) . , . II,

III: , () , () ,

, . IV:

(+),

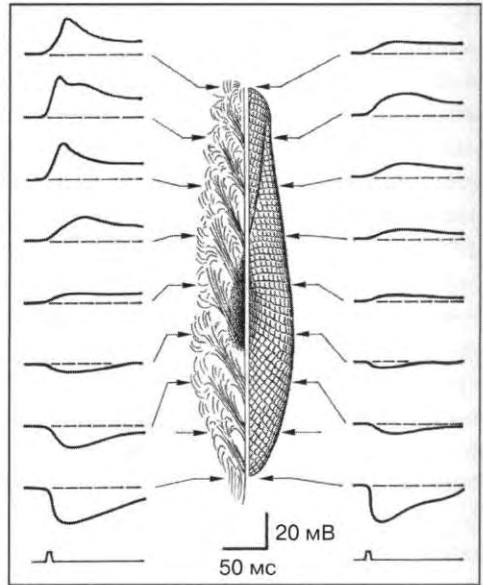
III

I (: Macheimer: Galvanotaxis: Grundlagen der elektro-
mechanischen Kopplung und Orientierung bei *Paramecium*. In: Praktische Verhaltensbiologie,
ed. by G.H.K. Zupanc, Parey, Berlin 1988).

(*Spirostomum, Cli
macostomum*)

(*Spirostomum, Cli*

(*Loxodes*).



Stentor

Paramecium

. 342.

Paramecium (

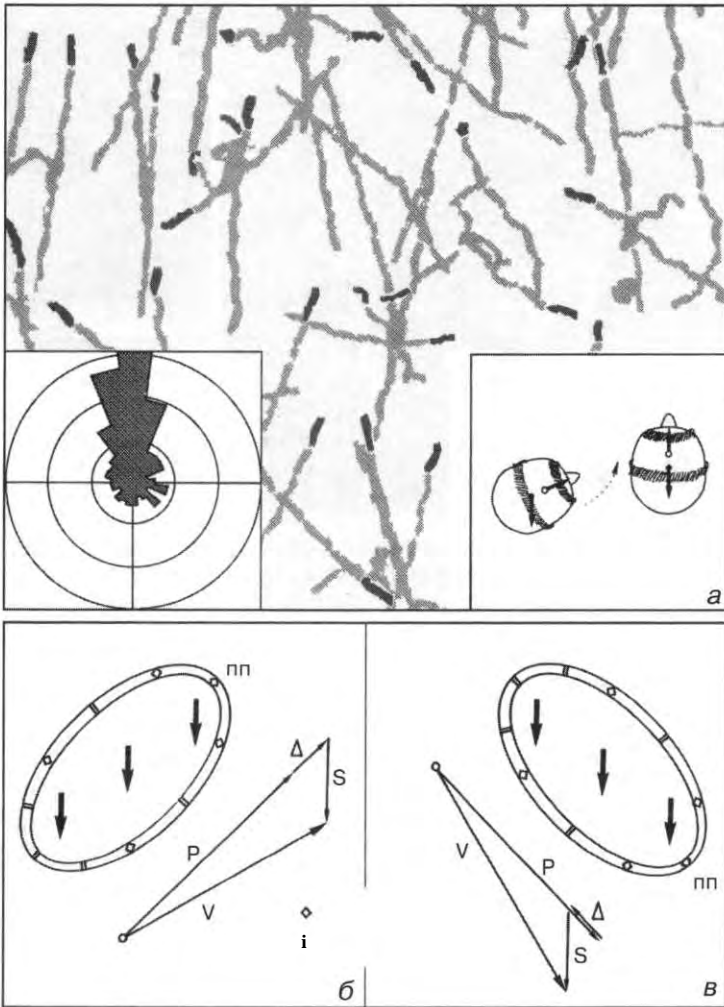
(. . . 255).

(*Paramecium, Stylonychia*)

342).

Paramecium

(: Ogura and Machemer: J.
. Physiol. 135 [1980] 233).



. 344.

Didinium.

(), (), , -
 (), (-) .
 ; 2+ ;
 342). -
 (- propulsion) (V) -
 (S)
 V, S. () . ()

(: Machefer and Braucker: Acta Protozool. 31 [1992] 185).

(. 342)

(. .

Loxodes

339).

,

.

,

(g),).

(

+

. .)

(-

. —

2

). —

(.

« »

Loxodes

; . . 116, 117).

(

)

Paramecium

(. 3446),

1

Loxodes

2

Paramecium

Paramecium

2+

^

(« »),

Paramecium

(

)

12

. *Didinium*,

: (1)

; (2)

0²

».

; (3)

Paramecium.

Paramecium

1

(. . . 307),

+

(*Paramecium*),

(*Blepharisma*,

Plasmo-

Euplotes).

Chlamydomonas

dium

()

($\geq 10^3$)

Paramecium

Amoeba proteus

(
) 10

Paramecium bur

saria,

(

)

(

).

(
, —).

(
—).

mydomonas (. 345).

mecium bursaria
cium multimicronucleatum

Para-
Parame-

2+

2+

10"

).

Paramecium

2+

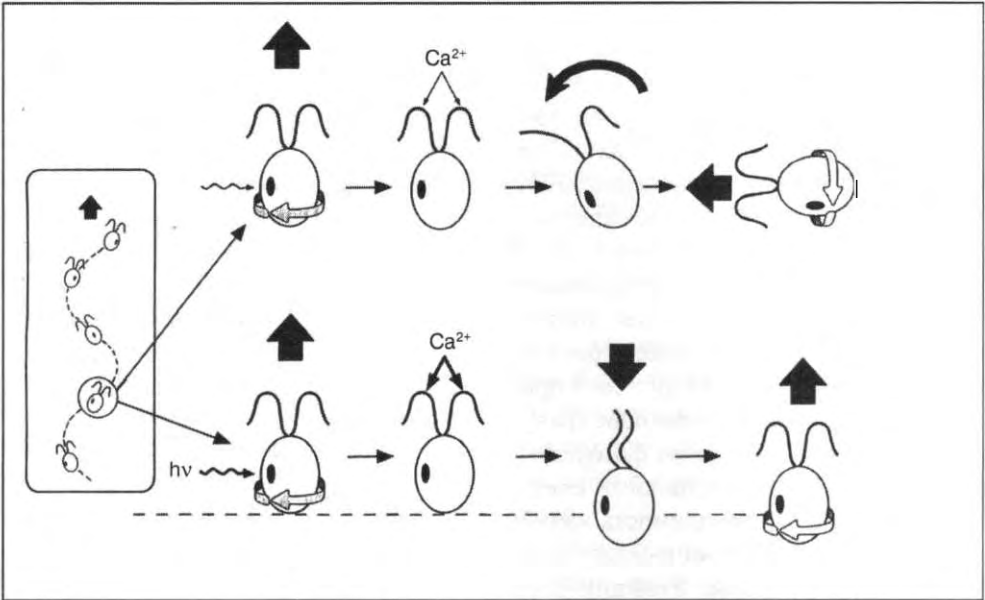
(10^8).

Paramecium (. рнс:

255),

Paramecium bur-

saria



345.

Chlamydomonas.
().

().

2^+

().

2^+

().

().

()

2^+

().

().

2^+

() (: Witman: TICB 4 [1993] 403).

1

1

().

(

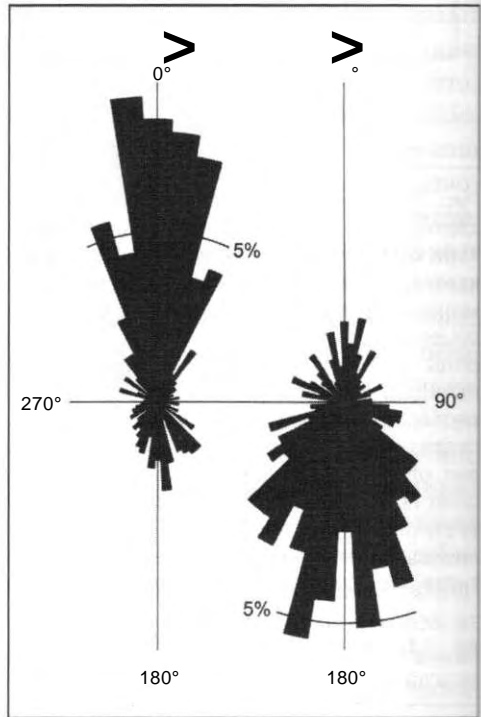
).

Chlamydomonas

Ophryoglena,

(. 345).

2+



. 346.

Ophryoglena

()
Ophryoglena (: Kuhlmann: Europ. J. Protistol. 29 [1993] 344).

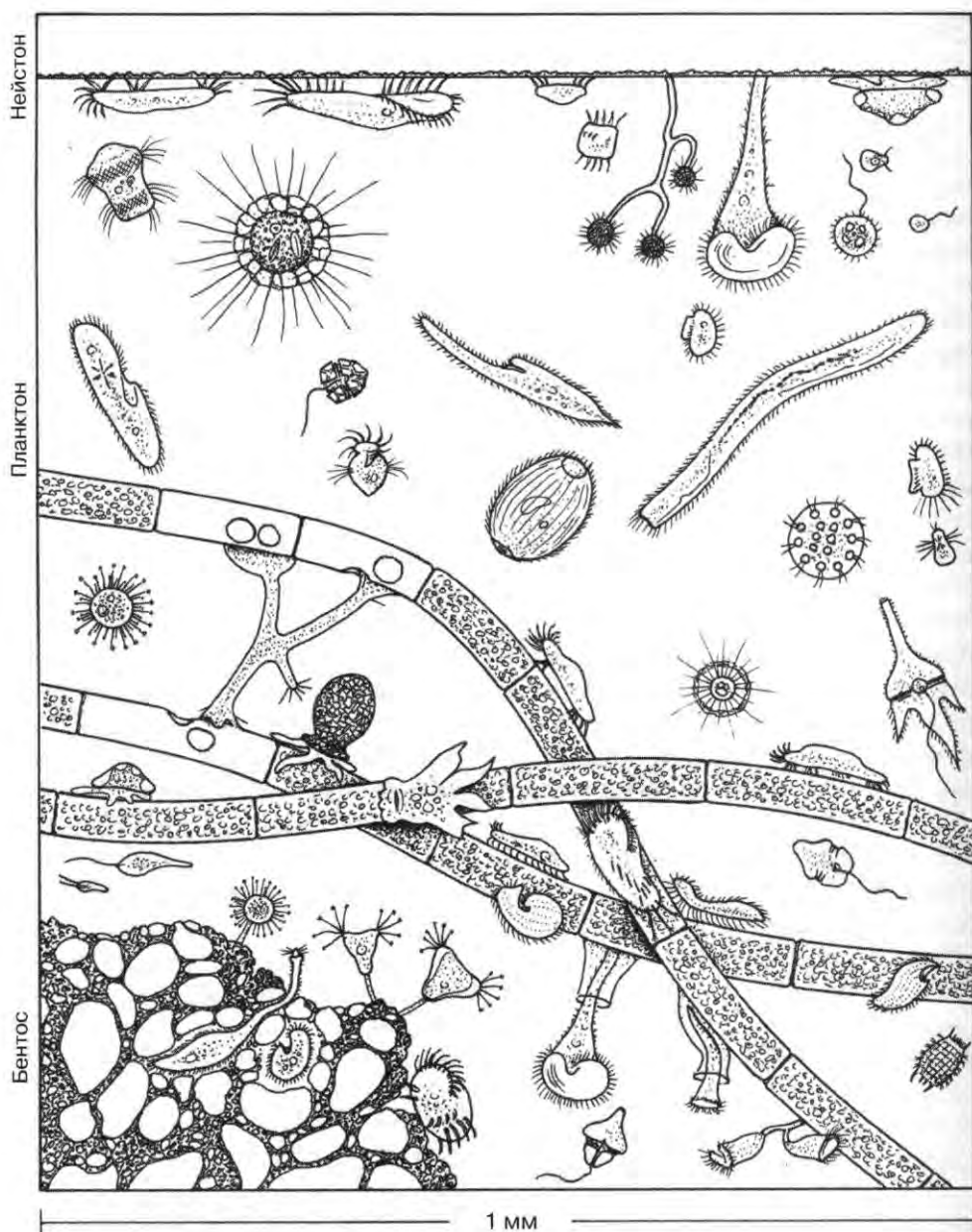
Chlamydomon —

— *Ophryoglena*.

— *Stentor*, *Fabrea*

(. 346).

(. 347).

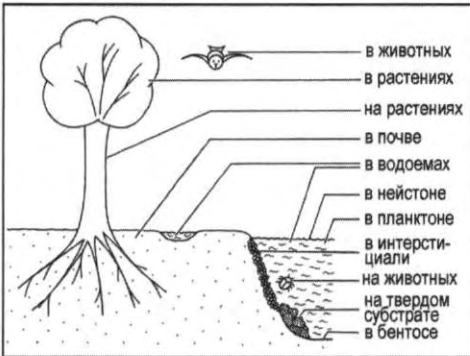


Colpoda

Colpo-

da

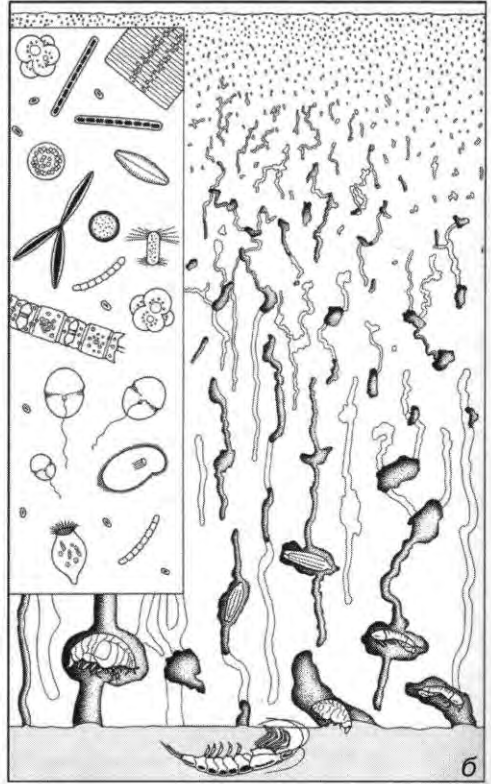
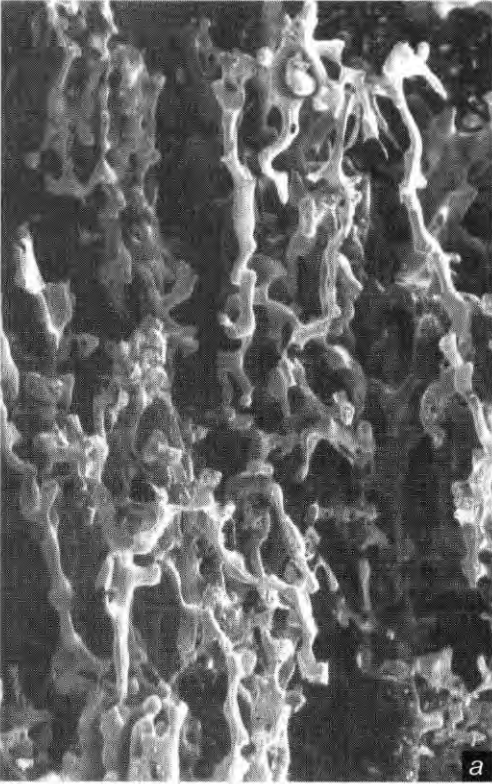
(. 348).



Paramecium multimicronucleatum

()

348.



349. (a) —
);
 —
 ;
 Limnol. Oceanogr. 37 [1992] 179; —

(b) —
 (— : Weissenberger et al.:
). : 15 .

Thecamoeba terricola.

Colpoda,

20,

(. . . 56, 179, 180)

Sorogena (. . . 226)

100

(. . . 349).

NaCl¹

144% (10 °);

38% ².

¹ NaCl,

² 35% ,

38%

Amphidinium, *Gymnodinium* — *Glenodinium*,

Oxytricha fallax

41 56 ° ,

Euplo-

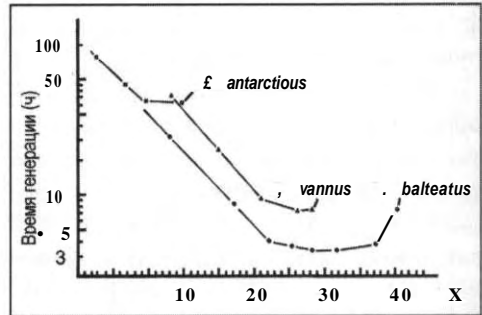
tes

2 ° (. 350).

35 °

Dunaliella (Chlorophyceae),

Trimyema minutus



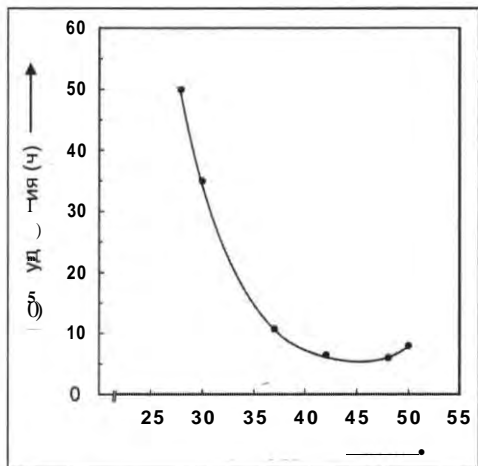
. 350.

Euploetes: . *antarcticus* (. . .) ,

. *vannus* (. . .) , £. *balteatus* (. . .) .

40 ° .

(. . .) .

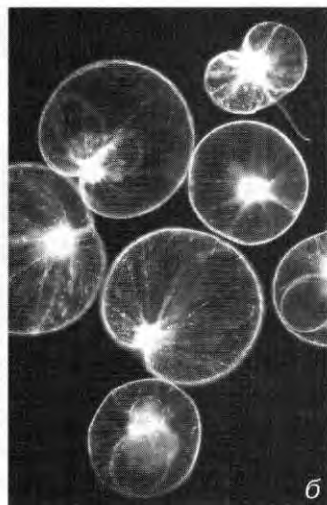
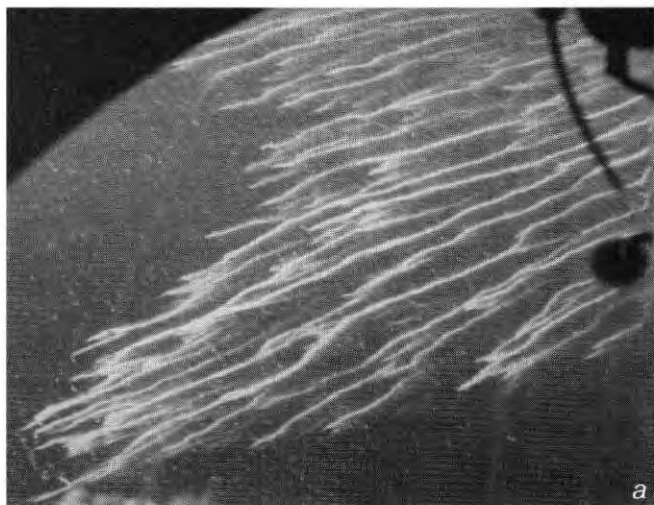


50 ° ;
 — 6 —
 48 ° (. 351).
 (Schizopy
 renida, Heterolobosea)
 40 °
 (*Naegleria fowlery*, *N. australiensis*)
 (. 19).

. 351.
 EV10
Trimyema minutum.

28 ' 52 " (: Baumgartner et al.:
 J. Eukaryot. Microbiol. 49 [2002] 227).

Noctiluca scintillans (. 352),



. 352. *Noctiluca scintillans* (); —
Noctiluca (—) . . — 25 .

19. *Naegleria* -

4 ° (: de

Jonckheere: Acta Protozool. 41 [2002] 309)

<i>Naegleria</i>	(°C)
<i>N. andersoni</i>	40
<i>N. australiensis</i>	42
<i>N. carteri</i>	45
<i>N. chilensis</i>	30
<i>N. clarki</i>	37
<i>N. fowleri</i>	45
<i>N. fultoni</i>	35
<i>N. galeacystis</i>	35
<i>N. gruberi</i>	39
<i>N. indonesiensis</i>	38
<i>N. italica</i>	42
<i>N. jadini</i>	35
<i>N. jamiesoni</i>	42
<i>N. lovaniensis</i>	45
<i>N. minor</i>	38
<i>N. morganensis</i>	44
<i>N. niuginensis</i>	45
<i>N. pagei</i>	37
<i>N. pringsheimi</i>	37
<i>N. pussardi</i>	41
<i>N. robinsoni</i>	38
<i>N. sturti</i>	44
<i>N. tihangensis</i>	42



. 353.

(),

Phaeo

cystis

1981

(

X.

).

Chrysochromulina polylepis,

« »

1988

Phaeocystis.

(. 353).

Metopus

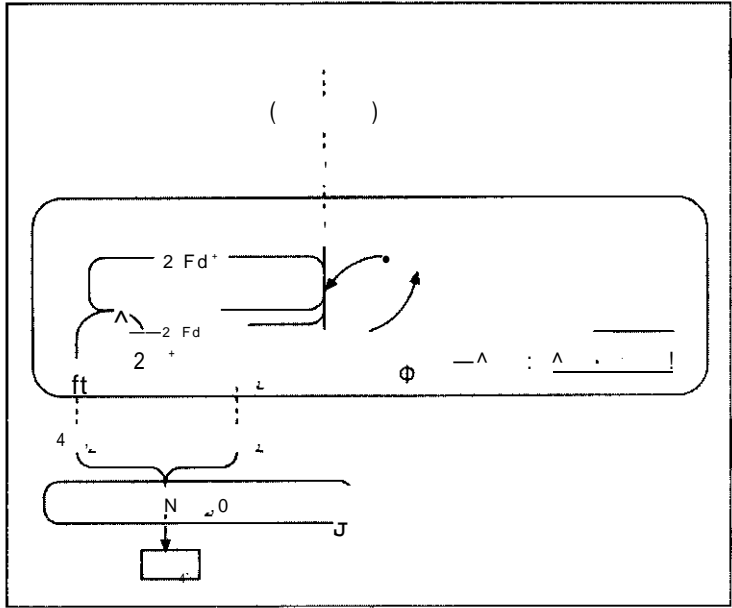
nomorpha

Trepomonas

mita.

2,

(. 354).



. 354.

() .

(, *Loxodes Spirostomum,* -

.)

Chlorella Trebouxia, -

(. 355).

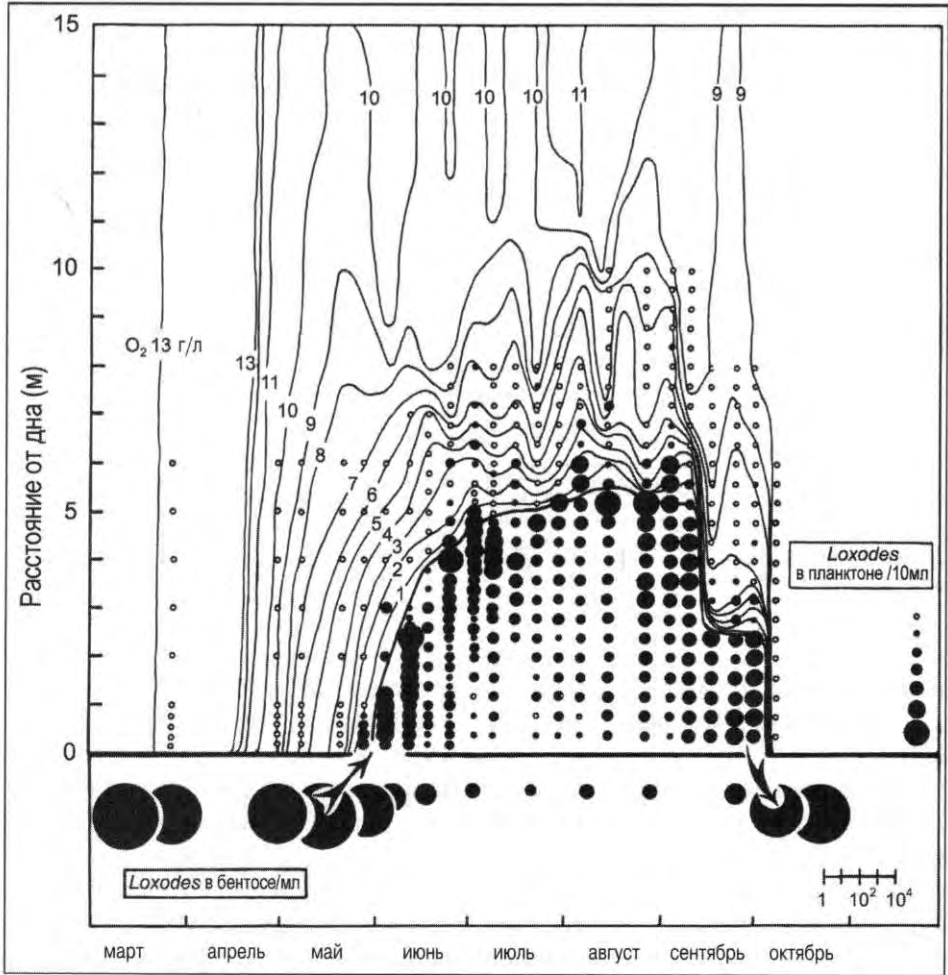
Loxodes

Climacostomum virens Paramecium , , -

bursaria, -

Vorticella Frontonia. (. . 116, 117).

(. . 116, 117).

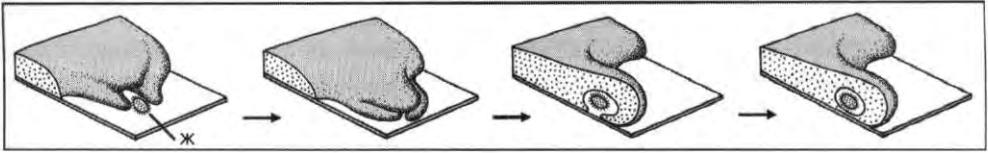


355.
 Water, Lake District, England
 (0 2 /)
 Loxodes

Loxodes (Esthwaite
 O₂)

5 6

Finlay and Fenchel: Freshwater Biological Association Annual Report 54 [1986] 73).



. 356. *Amoeba proteus*. — ().

(. 356). *Reti*
culomyxa (Foraminifera)

Volvox (. 357).

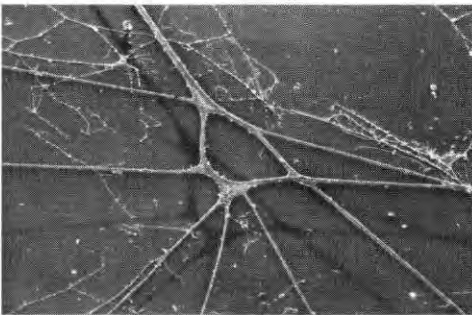
358).

Spirochona,

Vorti

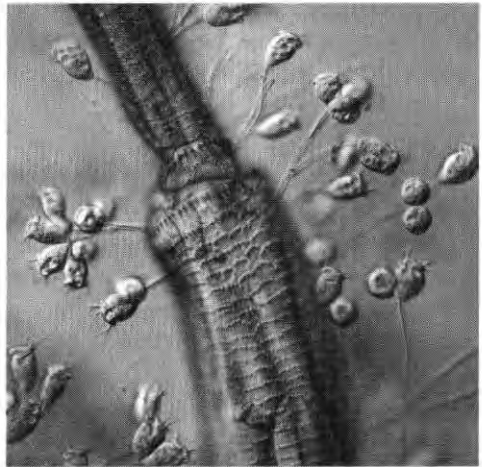
cella Stentor

Ophrydium versatile.



. 357.
culomyxa filosa,

: 200 .



Reti

. 358.

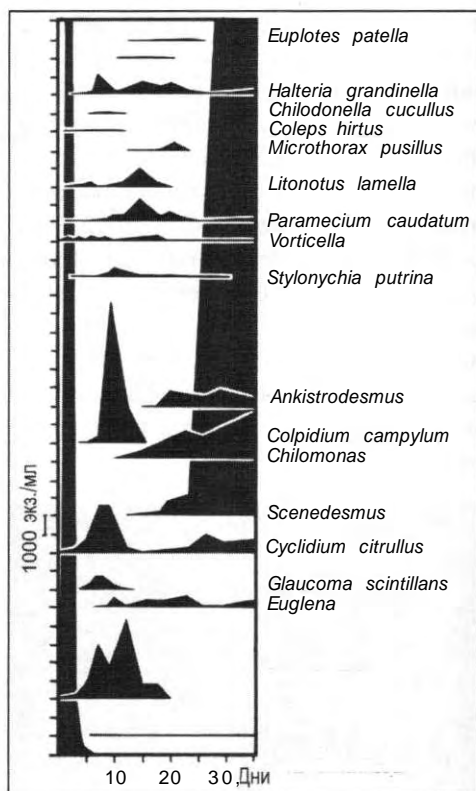
(: Hausmann
and Rambow: Mikrokosmos 74 [1985] 208).
: 110x.

1963 :

Tokophrya lemnae

(*Lemna minor*).

15



60

359.

35 ().

Didinium nasutum *Paramecium caudatum*,
Trachelius ovum *Ophrydium*
versatile.

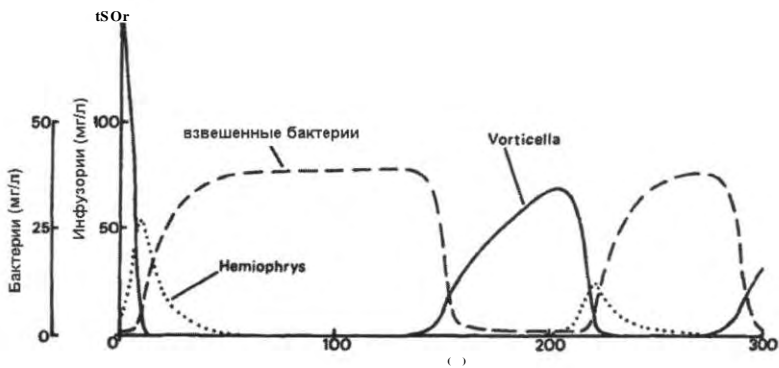
(. 359).

(. 361).

(. 360).

Vorticella
Hemiophrys,

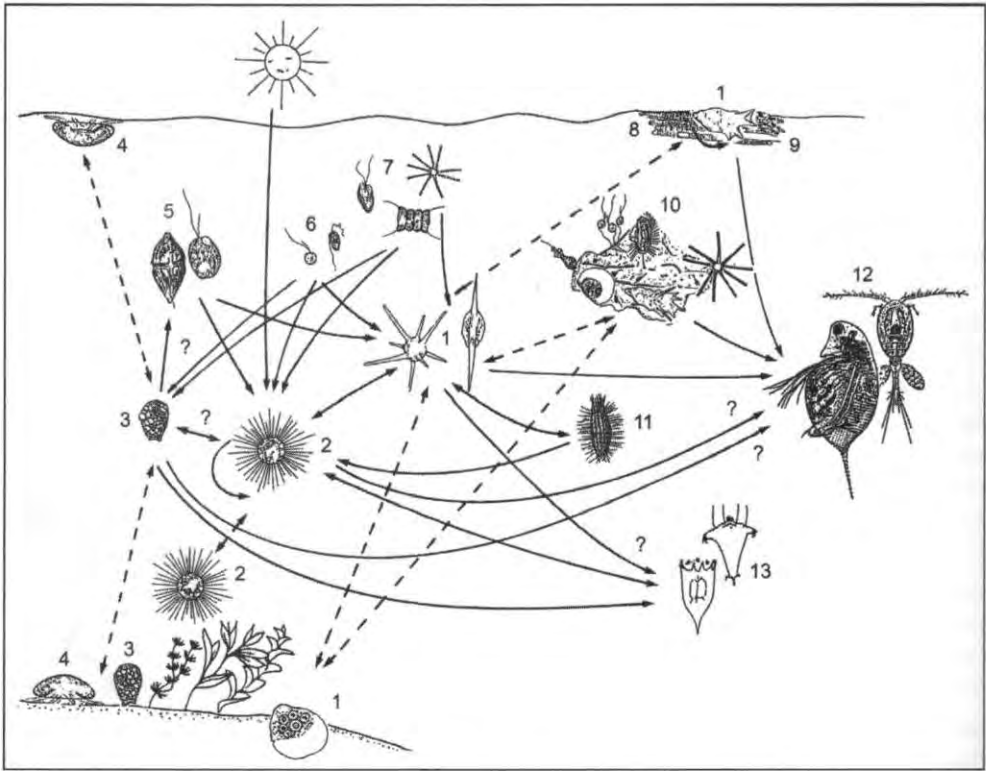
Hemiophrys



. 360.

Vorticella

Hemiophrys () .



. 361 .

-
- . 1 —
- , 2 —
- , 3 —
- 4 —
- , 5 —
- , 6 —
- , 7 —
- , 8 —
- , 9 —
- , 10 —
- , 11 —
- , 12 —
- , 13 —

(: Arndt: Marine Microbial Food Webs 7 [1993] 3).

(. . 142),

(. . 55, 312)

(. . 26).

2 4%

(,)

—

(. . 310).

Chlorella

(. . 362),

40%

(

Vorticella

Hyalosphenia papilio,

Mayorella viridis,

cystis turfacea

costomum virens.

Acantho

Clima

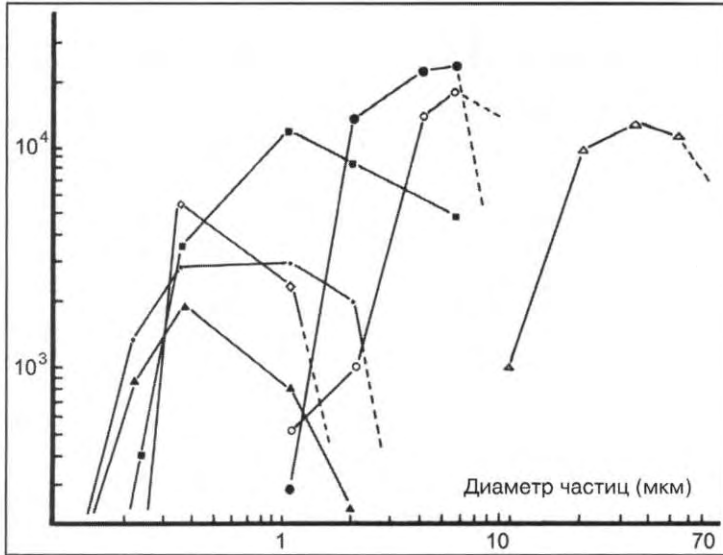
Amoeba proteus *Chaos*

chaos

Pseudomicrothorax

dubius,

Vampyrella,



. 362.

Glaucoma scintillans, • — *Paramecium caudatum*, — *Blepharisma americanum*, • —
Colpidium campylum, 0 — *Cyclidium glaucoma*, • — *Euplotes moebiusi*, — *Bursaria*
truncatella ().

100%

: 500

(. . 347, 348)

20

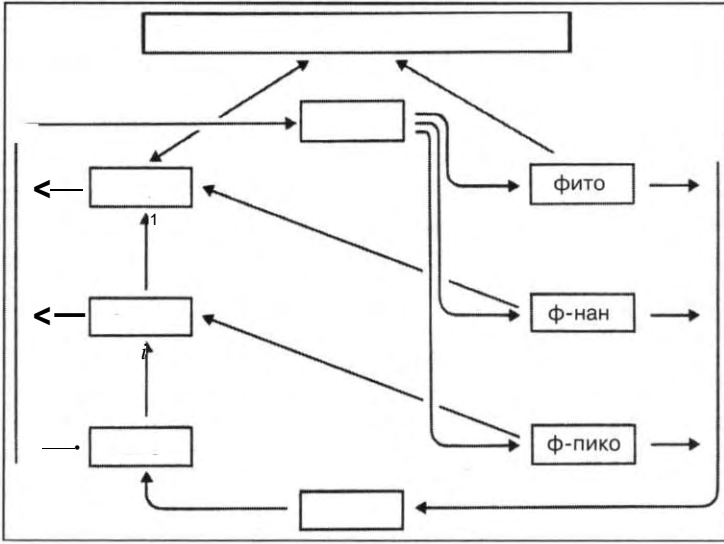
(2 20) 50%

(20 200)

(

20.

1	0.2 2	
2	2 20	()
3	20 200	()
4	200 2 000	()
5	2 20	()
6	20 200	()
7	200 2 000	
8	2 20	



363.

2 (2 20), (0,2
 (20 200), ()
).

(3)

100 ;

180

350

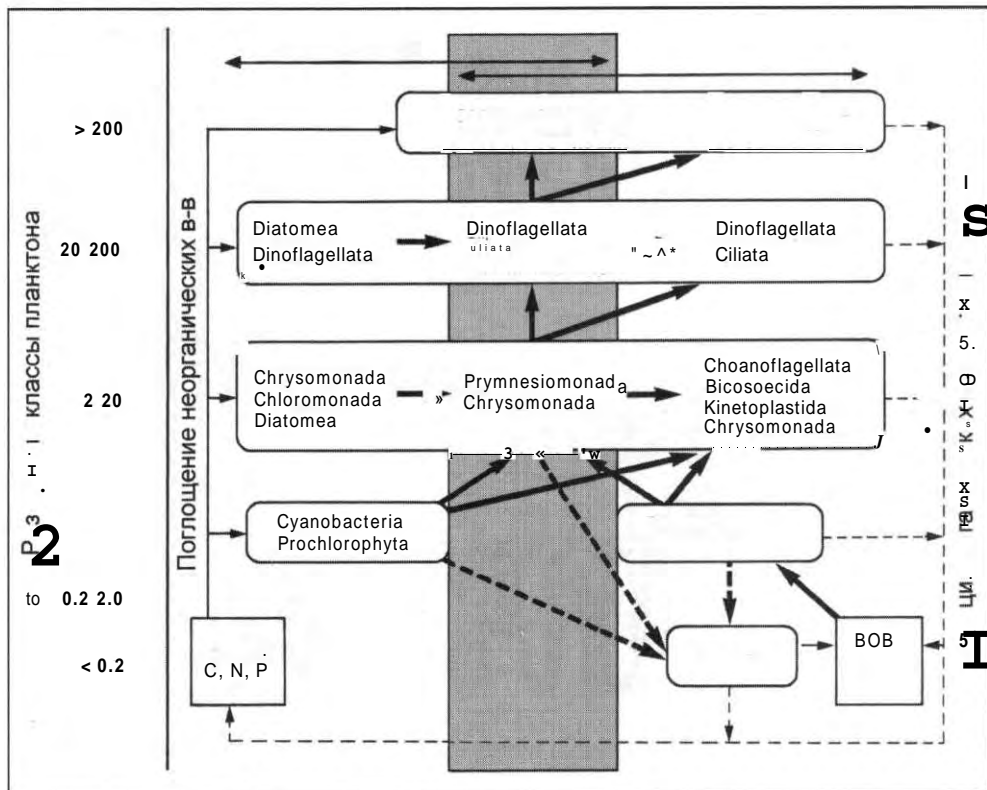
(363).

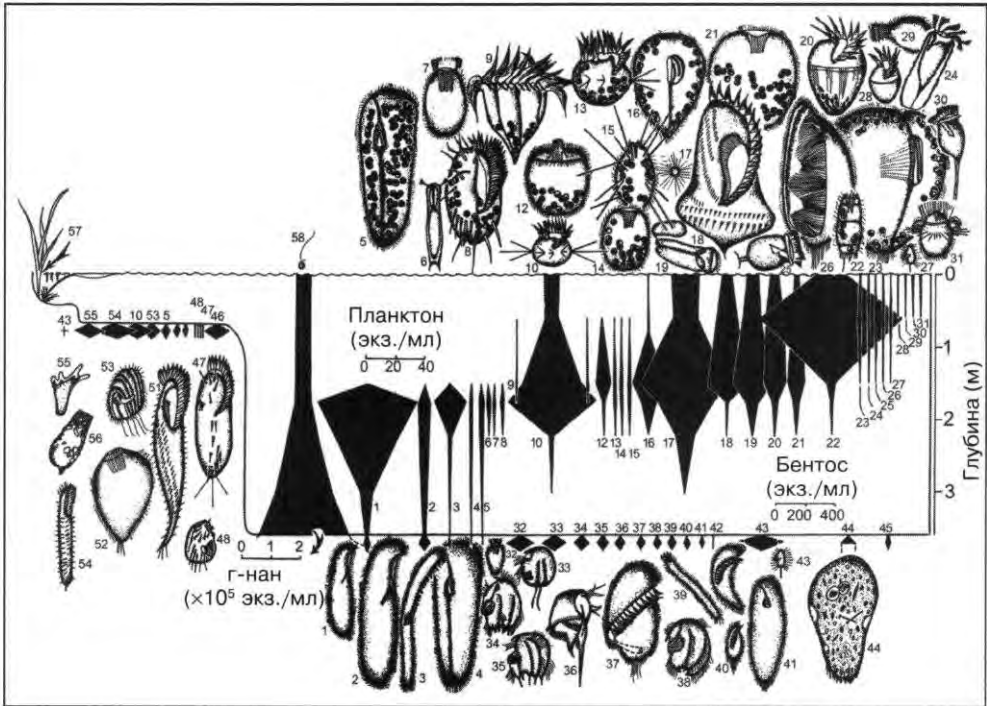
364.

1 (365). (1)

, (2)

100 250



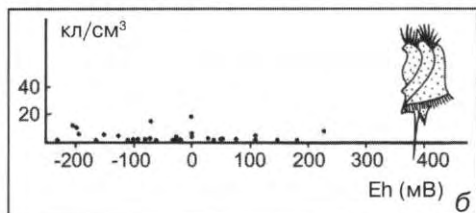
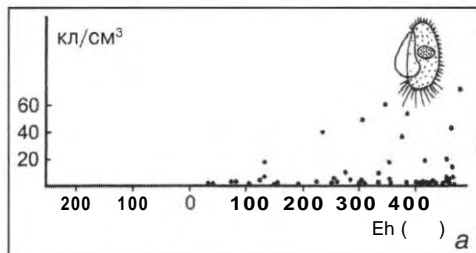


. 365.

(,).
 , [S] (sequestered) — , [Z]
 ; — (1 5 44), (: Finlay et al.: Europ. J. Protistol. 23 [1988] 205).
 1 — *Loxodes striatus* (200; ; 5 50); 2 — *Loxodes magnus* (400; ; 5 50);
 3 — *Spirostomum teres* (300; ; 2 10); 4 — *Frontonia leucas* (300; ; 3 50);
 5 — *Frontonia vernalis* (300; [Z]; 3 50); 6 — ; 7 — *Enchylis* sp. (60; ; <5);
 8 — *Euplotes daidaleos* (80; [Z], ; <5); 9 — *Strombidium velox* (50; [Z]; 5 10);
 10 — *Halteria grandinella* (50; [Z]; 5); 11 — ; 12 — *Monodinium balbiani* (75; [Z]; 5 10);
 13 — *Halteria grandinella* var. *chlohgella* (50; [Z]; 5); 14 — *Prorodon* sp. 1 (50; [Z]; 2 5);
 15 — *Actinobolina radians* (60; [Z]; 5); 16 — *Disematostoma* (75, 100; [Z]; 3 20);
 17 — *Acanthocystis pantopodeoides* (18; ?; <5); 18 — *Hypotrichidium conicum* *H. geleii* (120/100; ; 3 25/2 10);
 19 — ; 20 — *Strombidium viride* (70; ; 2 10); 21 — *Prorodon* sp. 2 (80 100; [Z]; 2 15);
 22 — *Coleps hirtus* (45; [Z]; 2 5); 23 — *Stokesia vernalis* (150; [Z]; 3 30);
 24 — *Tintinnidium* sp. (75; ; 2 5); 25 — *Vorticella bosminae* (20; ; <2);
 26 — *Lembadion magnum* (120; ; 5 25); 27 — *Cyclidium* sp. (20; ; <2);
 28 — *Strombidium* sp. (30; ; 2 5); 29 — *Enchelydium clepsiniiforme* (60; ; 2 5);
 30 — *Vorticella* sp. (40; ; <2); 31 — *Askenasia volvox* (40; ; 2 5);
 32 — *Enchelydium amphora* (35; ; <5); 33 — *Mylestoma anatinum* (25; ?; ?);
 34 — *Epaxella* sp. (30; ?; ?); 35 — *Saprodinium*

1

(. 366).



. 366.

Pleuronema coronatum ()

morpha levanderi ()

(Eh) ().

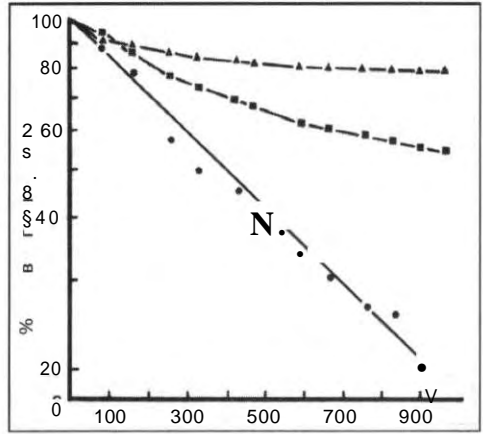
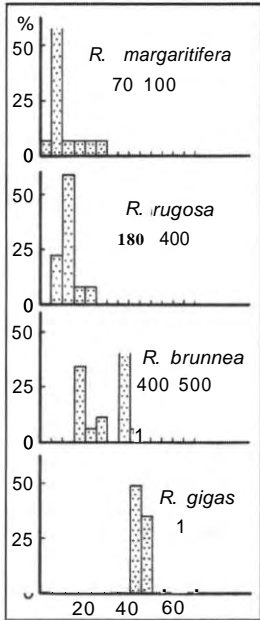
Remanella,

(. 367).

(. 368).

1

sp. (40; ; <2); 36 — *Caenomorpha lauterborni* (70; ; 5); 37 — *Brachonella spiralis* (120; ; 5 20); 38 — *Pelodinium reniforme* (50; ?; ?); 39 — *Chaenea sapropelica* (100; ?; ?); 40 — *Metopus undulans* (70; ; <2); 41 — *Loxocephalus luridus* (150; ?; ?); 42 — *Metopus curvatus* (60; ; <2); 43 — Scuticociliata; 44 — *Pelomyxa palustris* (100 700; ; > 200); 45 — *Acanthamoeba*, *Vahlkampfia*; 46 — Scuticociliata; 47 — *Stylonychia* (70/130; ; 2 10); 48 — *Aspidisca cicada* (30; ; <2); 49 — 12; 50 — 30; 51 — *Paruroleptus* sp. (130; ; <20); 52 — *Rhagadostoma* sp. (100; ; 5 10); 53 — *Cinetochilum margahtaceum* (30; ; <2); 54 — *Holosticha* sp. (80; ; 2 10); 55 — *Oscillosignum*, *Vahlkampfia*; (25/7; ; 2 5); 56 — *Centropyxis*, *Diffflugia*; ; 57 — *Vorticella*; 58 — (1 5).



368.

(),

(•),

(•) () .

367.

Remanella.

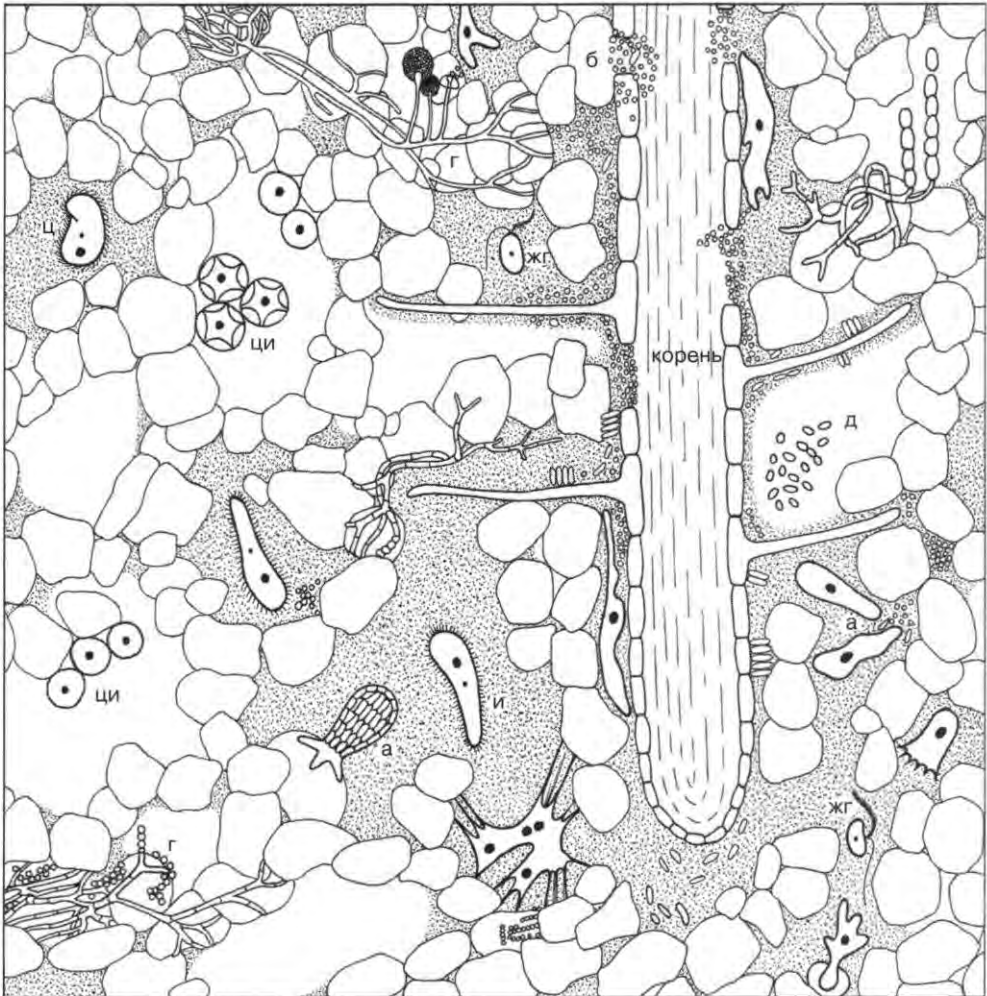
() .

Ophryoglena
Tetrahymena].

1

(« ») . —

30 (. 369).



. 369.

() ;

(' -).

5

35 70%

(. 370).

Colpodea, Hypotrichia Prostomatea.

80 90%

10 20%

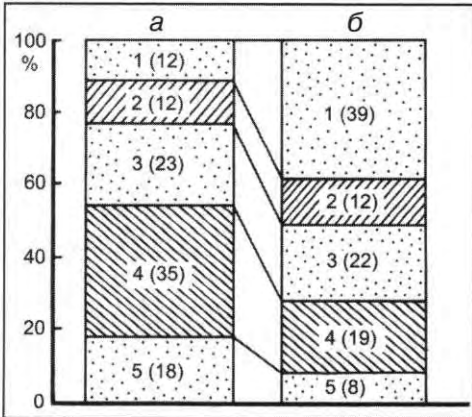
30%

10—

20

20 200

: 2



40

(. . 28).

14 000

. 370.

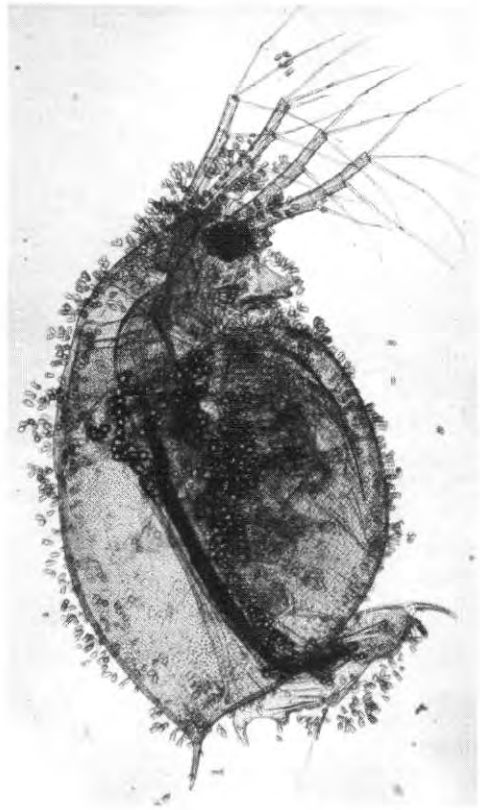
()

). 1 — , 2 —

, 3 — , 4 —

, 5 — ;

).



. 371.
 (: Hausmann and Rambow: Mikro
 kosmos 74 [1985] 208). : 50x.

(. 371, 372).

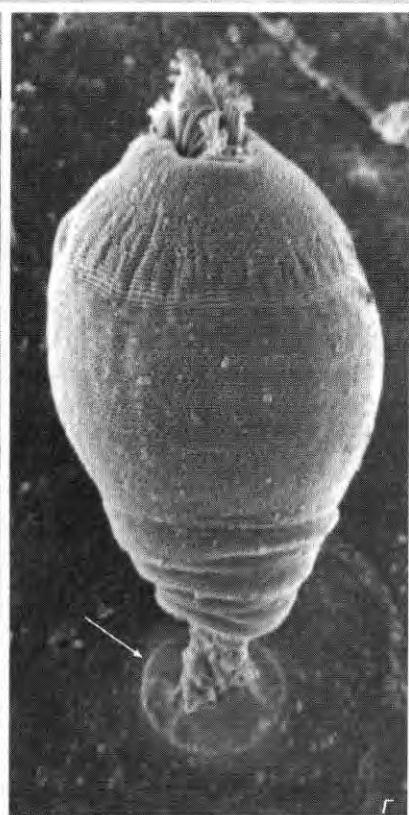
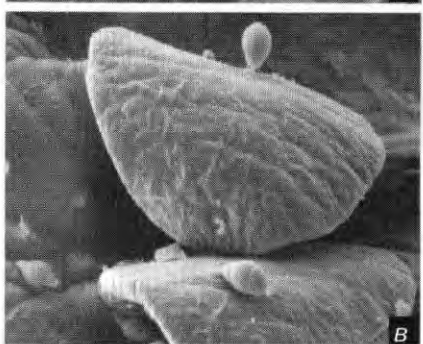
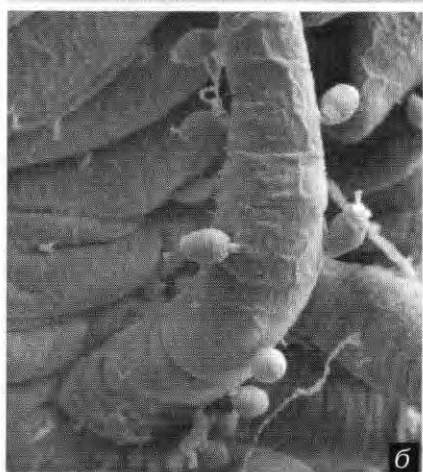
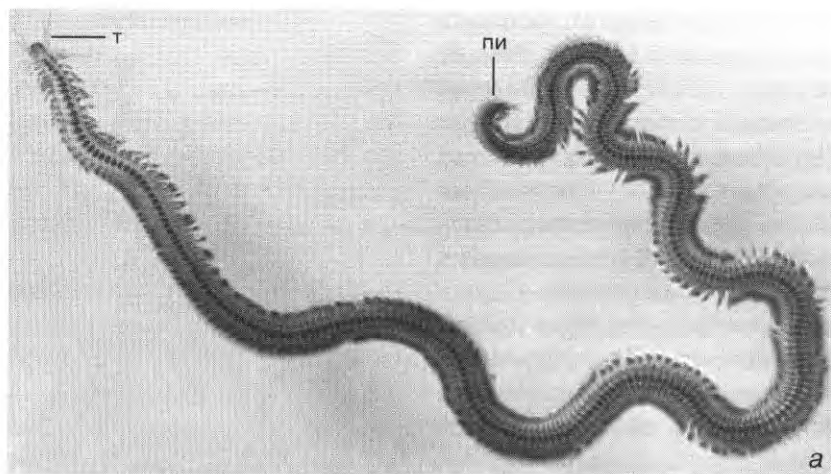
(, *Ichthyophthi*
rius multifiliis, . 139).

1

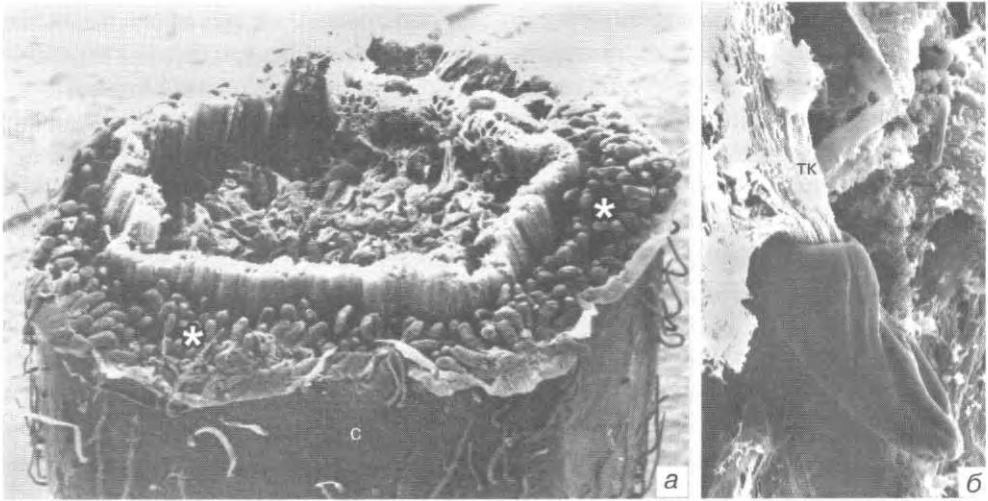
2

Amphipoda —

Dendrocometes paradoxus —



372. *Anaitides mucosa* ()
 () () (,) — — , —
 (: Hausmann: Mikrokosmos 69 [1980] 156). : 2,2 , 180 , —150 , 1 800 .



373. () (*Medicago sativa*),
Epidinium (, *);
 () (: Bauchop: Appl. Environ. Microbiol. 37
 [1979] 1217). : a 40x, 350 .

Entodi
 niomorpha (. 126)
 leu
 cocephala,

Metopus,

(— — —) — — — , — — —

(,

).

03

(,)

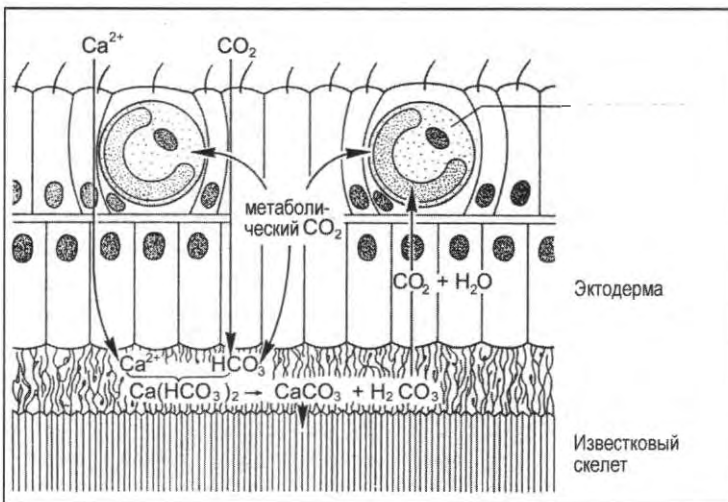
(,)

(),

02

(. 374).

02,



. 374.

(.).

(,)

(,)

(,)

1

2

(,)

« »

Naegleria

Acanthamoeba

1 (0 150)

2

(= *Spiromonas*) *gonderi*,

(. . . 83),

Apicomplexa.

Colpodella

Asterias amurensis

Orchitophrya stellarum.

Cryptosporidium parvum

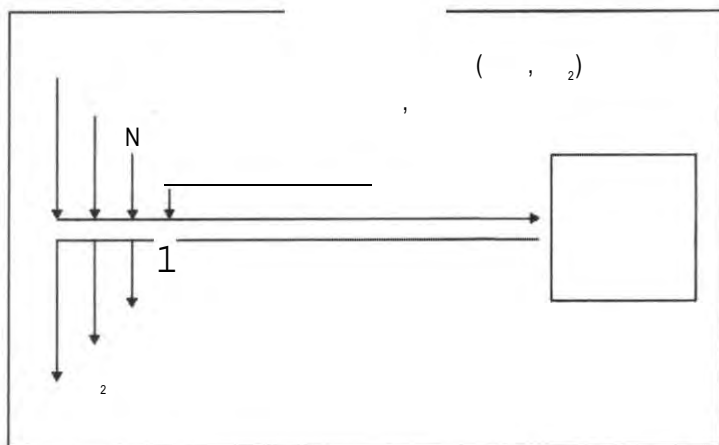
, a *Pneumocystis* —

(. . . 375, 377).

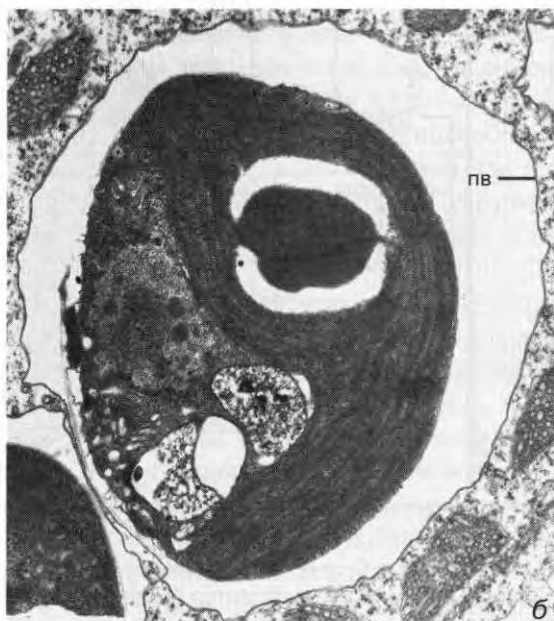
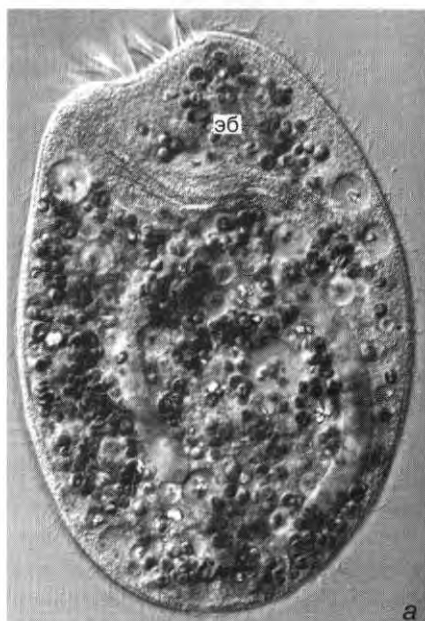
Paulinella chromatophora.

Chlorella Trebouxia

(. . . 376, 377).



. 375.



. 376.

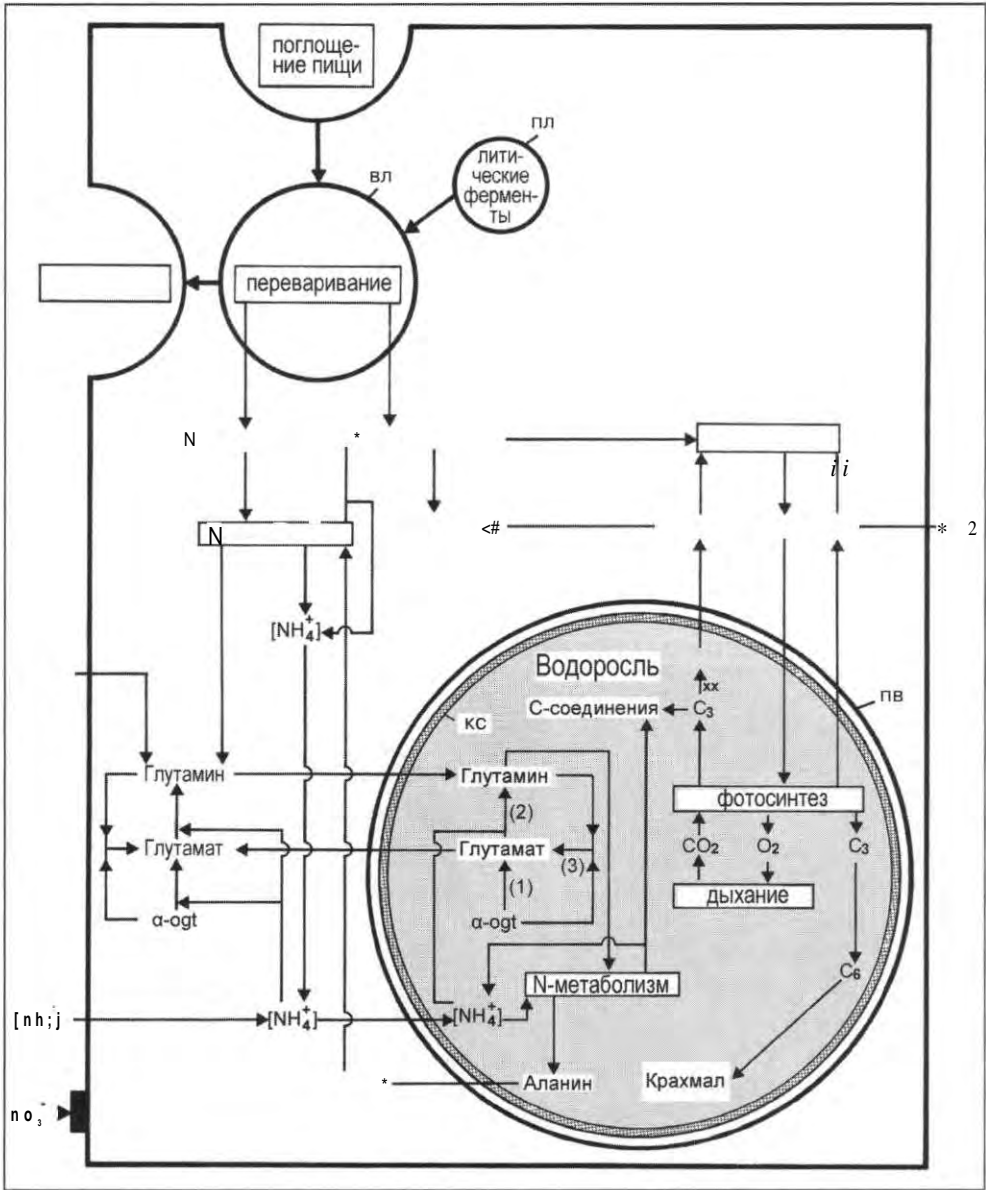
Climacostomum virens

Chlorella: —

() (: Reisser et al.: Protoplasma 119 [1984] 93).

.. a — 500x, —

24 000x.



377. *Chlorella* sp.

N

Paramecium bursaria

Chlorella,

, 3 —

, 1 —
, ос ogт —

, 2 —

().

1 *Chlorarachnion*

(. . . 29 31).

Peridinium balticum,

Euplotes aediculatus

(. . . 31).

(*Polynucleobacter necessarius*).

Myrionecta (Mesodinium) rubra (. . . 29).

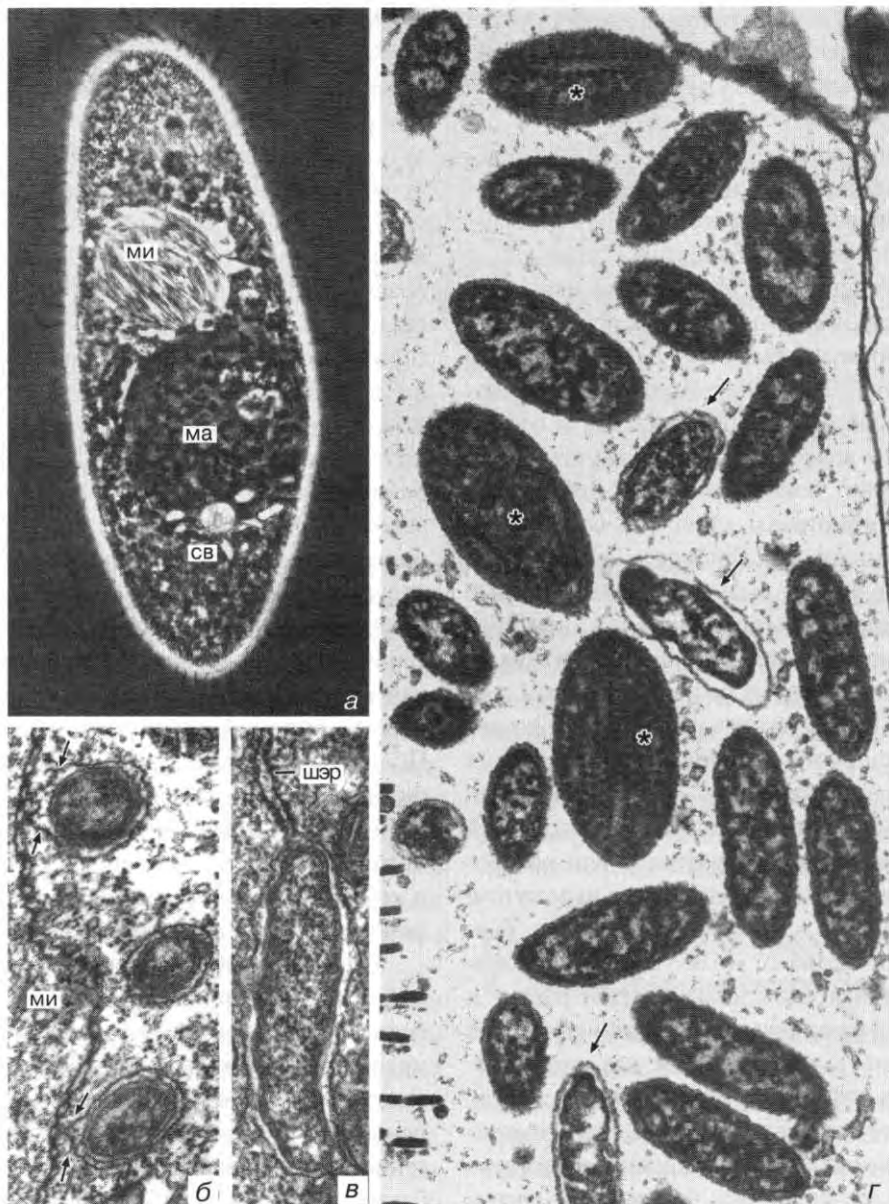
Paramecium

Paramecium aurelia,

P. aurelia

— « » « »
(«bright» « bright»).

R (refra
ctile) «



378. *Holospira elegans* () *Paramecium caudatum* ()
Paramecium caudatum () ;
Entosiphon sulcatum () () ;
 () *Trichodina pediculus*,
 (*) () , — (—
 , . : 520 , 14 000 , — 15 000 , 11

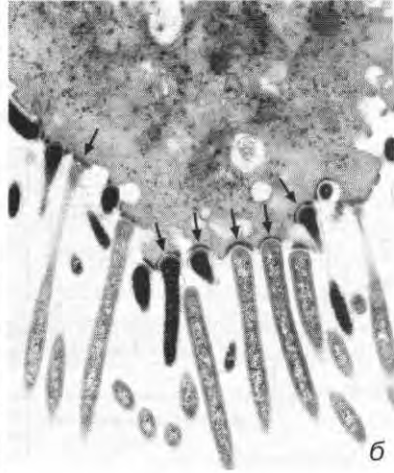
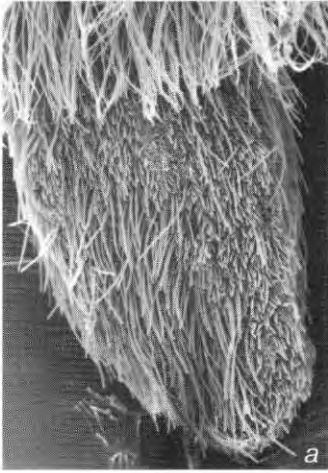
13, (*thamoeba castellanii*, *A. palestinensis*, *Hartmanella vermiformis*, *Naegleria* spp.) (, *Tetrahymena thermophila*).

Legionella pneumophila,

Aeromonas salmonicida, *Edwardsiella tarda*, *Listeria monocytogenes*, *Mycoplasma Vibrio cholerae*,

: *Pseudomonas* spp., *Salmonella* spp., *Shigella* spp.

Amoeba proteus, (X



. 379.

Joenia (),

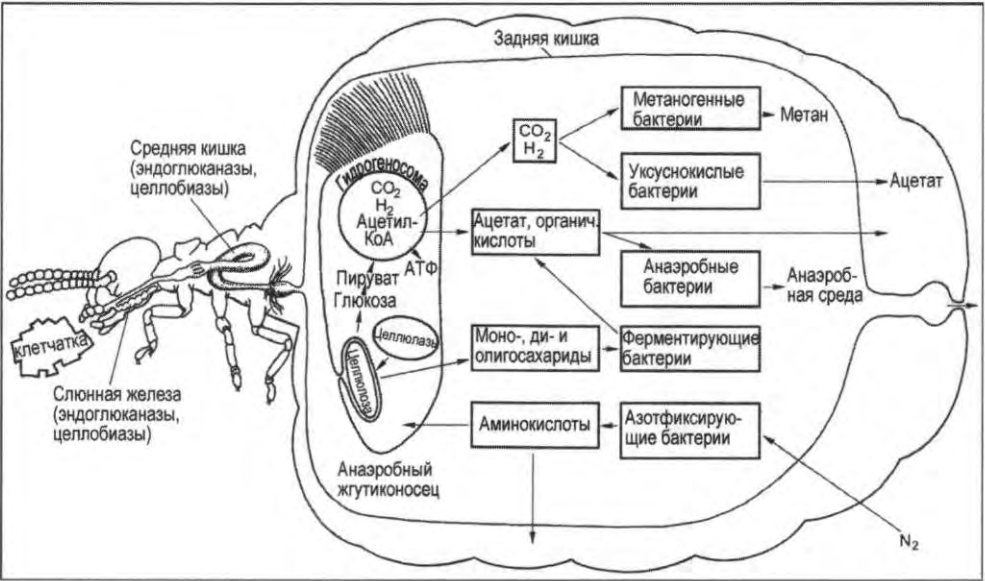
(,
)(: Radek
 and Hausmann: Acta
 Protozool. 31 [1992]
 93). : a 1 000x,
 b 8 000x.

Joenia,

(. 379).

(. 380).

Mixotricha paradoxa



. 380.

(: Radek: Ecotropica 5 [1999] 183).

Heterosigma akashiwo
Phaeocystis

Plasmodiophora
(*Polymyxa*, *Spongospora*)

(peanut clump

), virus),

(potato mop top virus)

(broad bean

myxa Chytridiomycota.

Phyto

necrosis virus).

(oat mosaic virus).
Olpidium brassicae

(tobacco
 (melon

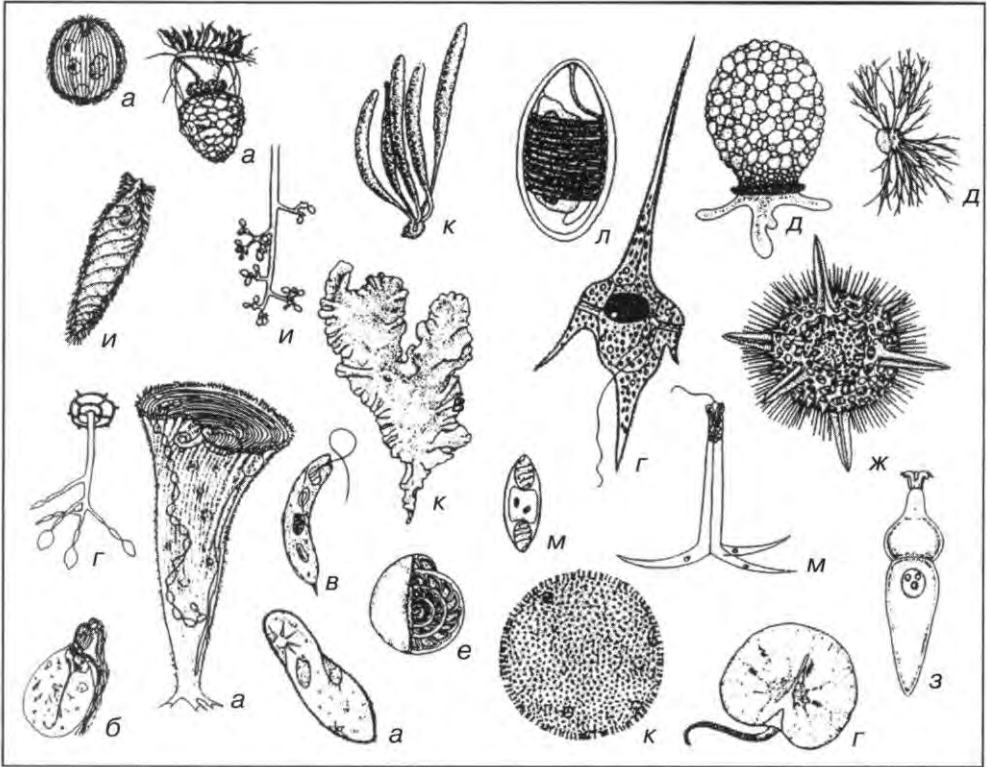
necrosis virus)
 necrotic spot virus).

1)
 (< 1),
 ; 2)

(. 381).
 213
 3 ; 3)

100
 ,

89% (. . « » — everything
 , 65% is everywhere).
 , 55% 1 650
 , 25% , 15% , 95
 , 15% ;
 2,5%
 (,)
 ()
 85%



. 381.

); —

(,) ; — ; —

); —

()

(); —

Myxozoa (

) (: Corliss: Acta Protozool. 41 [2002] 199).

15% 30, 50%

30

12 *Tetrahymena*

(. 382); , . *australis*

. *capricornis*

Chaos carolinense Ch.

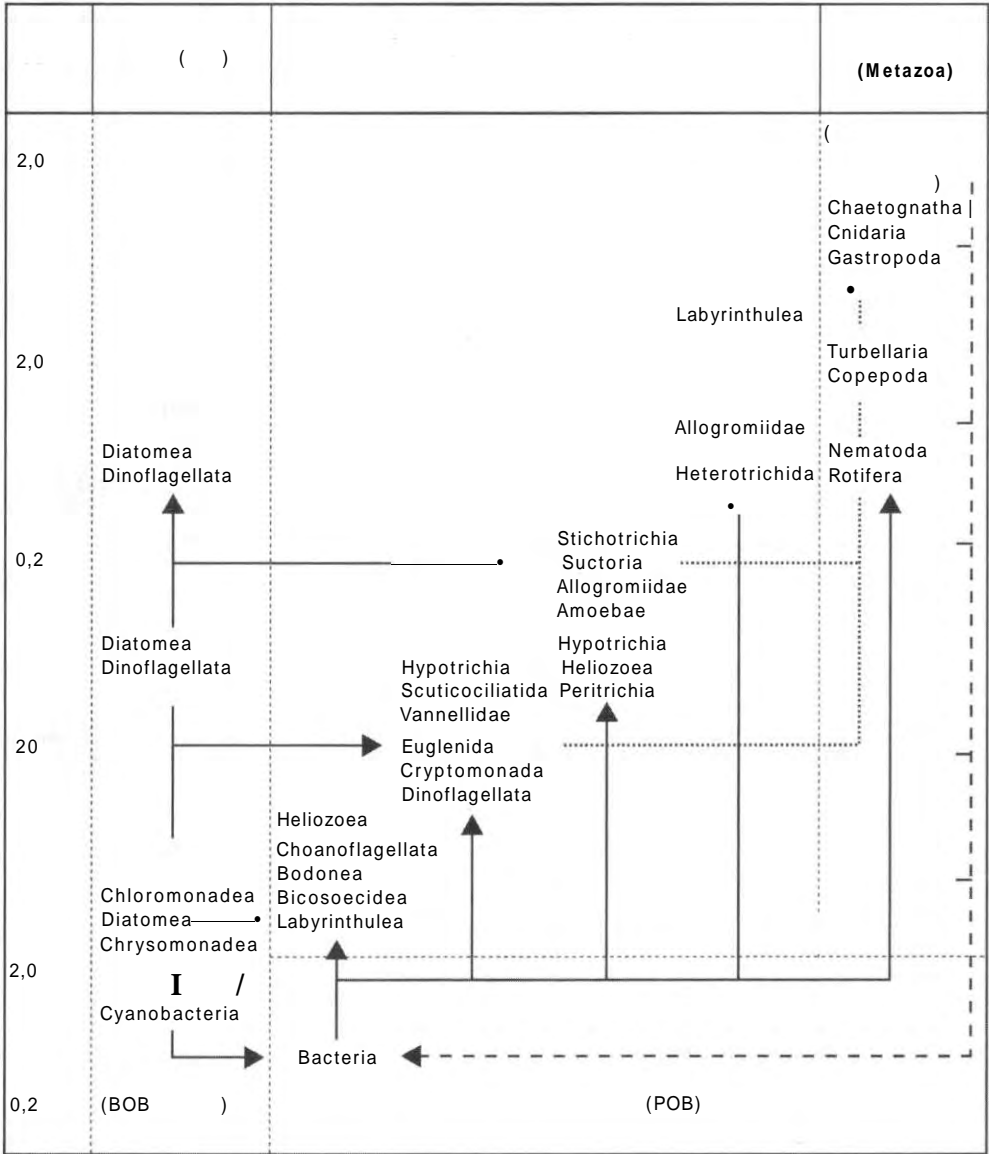
illinoisense



. 382.

Tetrahymena pyriformis. 1 — . *thermophila*, 2 — . *americanis*, 3 — . *borealis*, 4 — . *cosmopolitana*, 5 — . *pigmentosa*, 6 — . *canadensis*, 7 — . *tropicalis*, 8 — . *hyperangularis*, 9 — . *australis*, 10 — . *capricornis*.

21.



() ;
 ; -
 () (),
 () ,

Folliculina boltoni —

300

Reticulo

filosa —

60 ()

1000
150

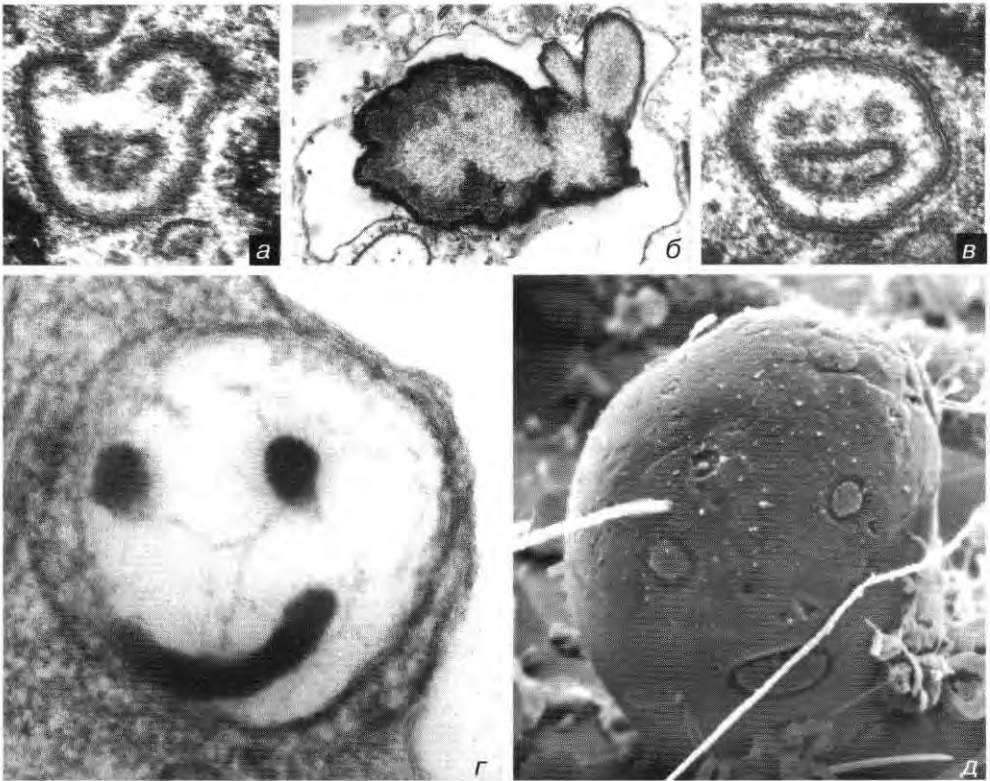
1

Odontella
(= *Biddulphia*) *sinensis* *Coscinodiscus*
walesii

XX

1 « » («larger foraminifers») «large foraminifers»
);
;

(), ()
()
()

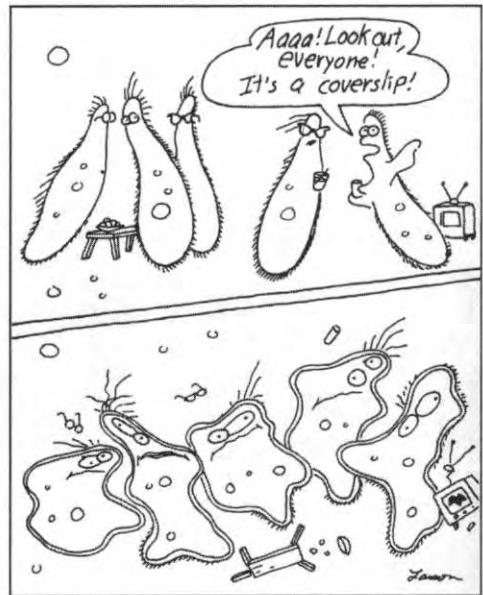


383.
 (,),
Pseudomicrothorax dubius, —
Actinophrys sol, —
 (— 20 , — 80 , 55 , 4

(,)
 (): —
Climacostomum, —
 , () . : — 80 , —

(. 383)...

(. 384).



. 384.

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