Comment 1: Diversity of mitotic patterns

The general picture that is emerging on the structural organization in mitosis and meiosis, and even the specific molecules involved, are turning out to apply to a vast range of phyla. Perhaps this is not surprising for such an essential event required for the perpetuation of cellular life. At the same time, it will be well to note those cases which depart from generally conceived patterns. Samples include: partitioning of male from female chromosomes by a monopolar spindle (Fig. 1; Metz 1933; see also Schrader 1923, 1929), formation of multiple spindles which coalesce and complete anaphase within the persistent nuclear envelope (Fig. 2; Hughes-Schrader 1924), and diverse patterns of mitotic organizations found among protists (Fig. 3; Bělař 1926; see also Bělař 1928, Cleveland et al. 1934). Studies of these exceptional cases may well reveal overlooked, important aspects of mitotic mechanisms.

Figures

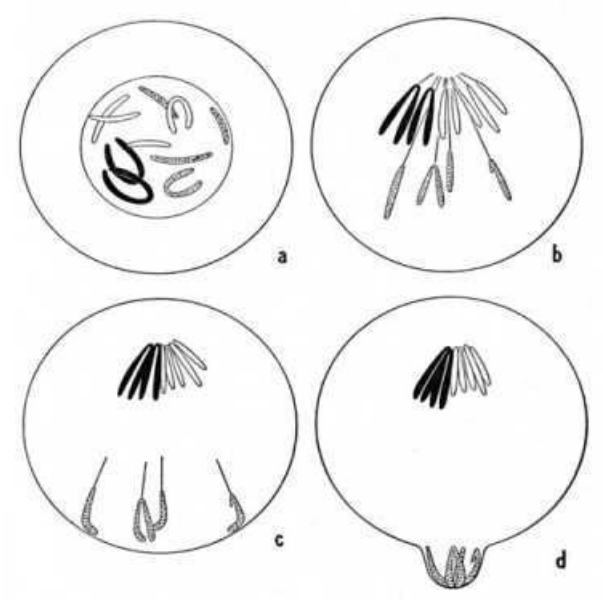

Figure 1. Chromosome segregation on a monopolar spindle in the first spermatocyte division of a dung fly *Sciara* (reprinted from Metz 1933 with permission from the Marine Biological Laboratory, Woods Hole, MA). Paternal chromosomes are stippled; maternal chromosomes are white or black.

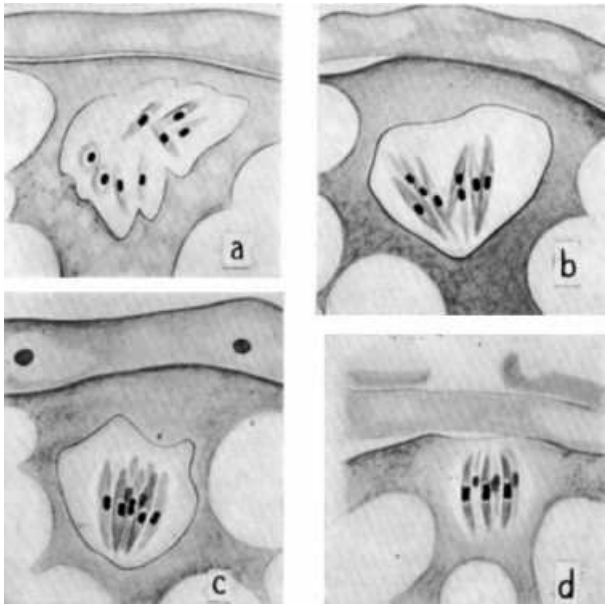

Figure 2. Formation of multiple spindles (around each chromosome) and their bipolarization within the intact nuclear envelope of the egg of a parasitic wasp *Acroschismus sp.* (reprinted from Hughes-Schrader 1924, copyright 1924, with permission of Wiley-Liss, Inc., a subsidiary of John Wiley & Sons, Inc.).

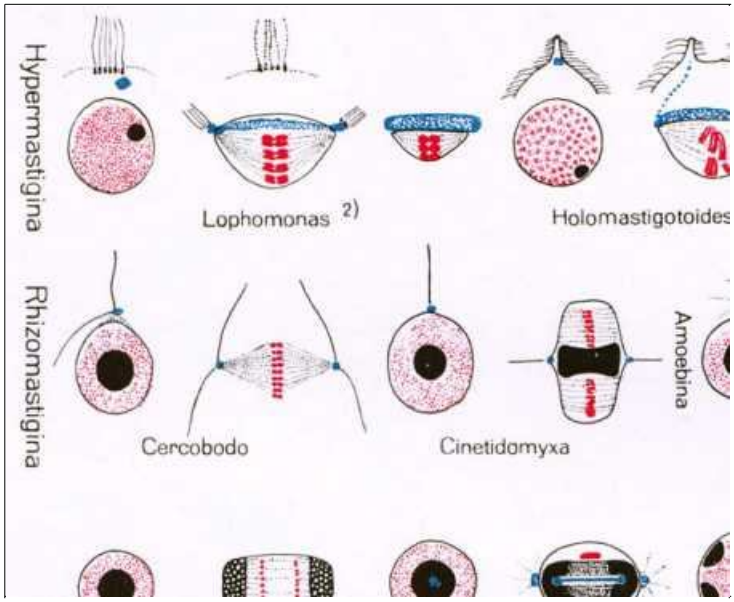

Figure 3. Nuclear components before and during mitosis in various protist genera (Bělař 1926; see also Bělař 1928; Cleveland et al. 1934). While Bělař assigns the following color codes, he qualifies some of the assignments where footnote marks appear: Chromatin, red; "Centrosome," blue; "Nucleolar substance," black. The diagrams also indicate the degree of integrity of the nuclear envelope and nucleoli.

Full page images of Figure 253 from Bělař K 1926: (click on the thumbnail to view)

Belar-1.jpg
732.65 KB

Belar-2.jpg
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Belar-3.jpg
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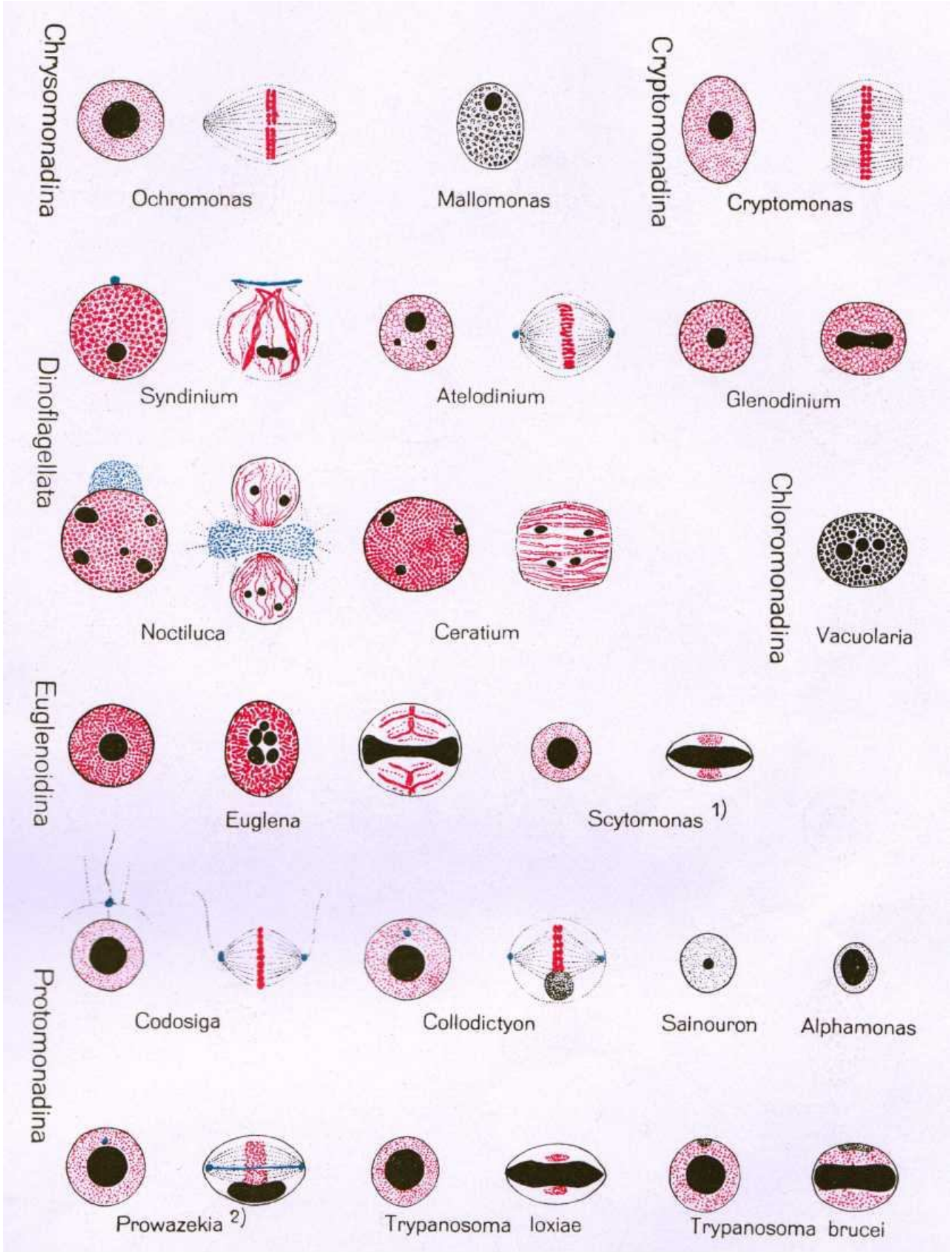
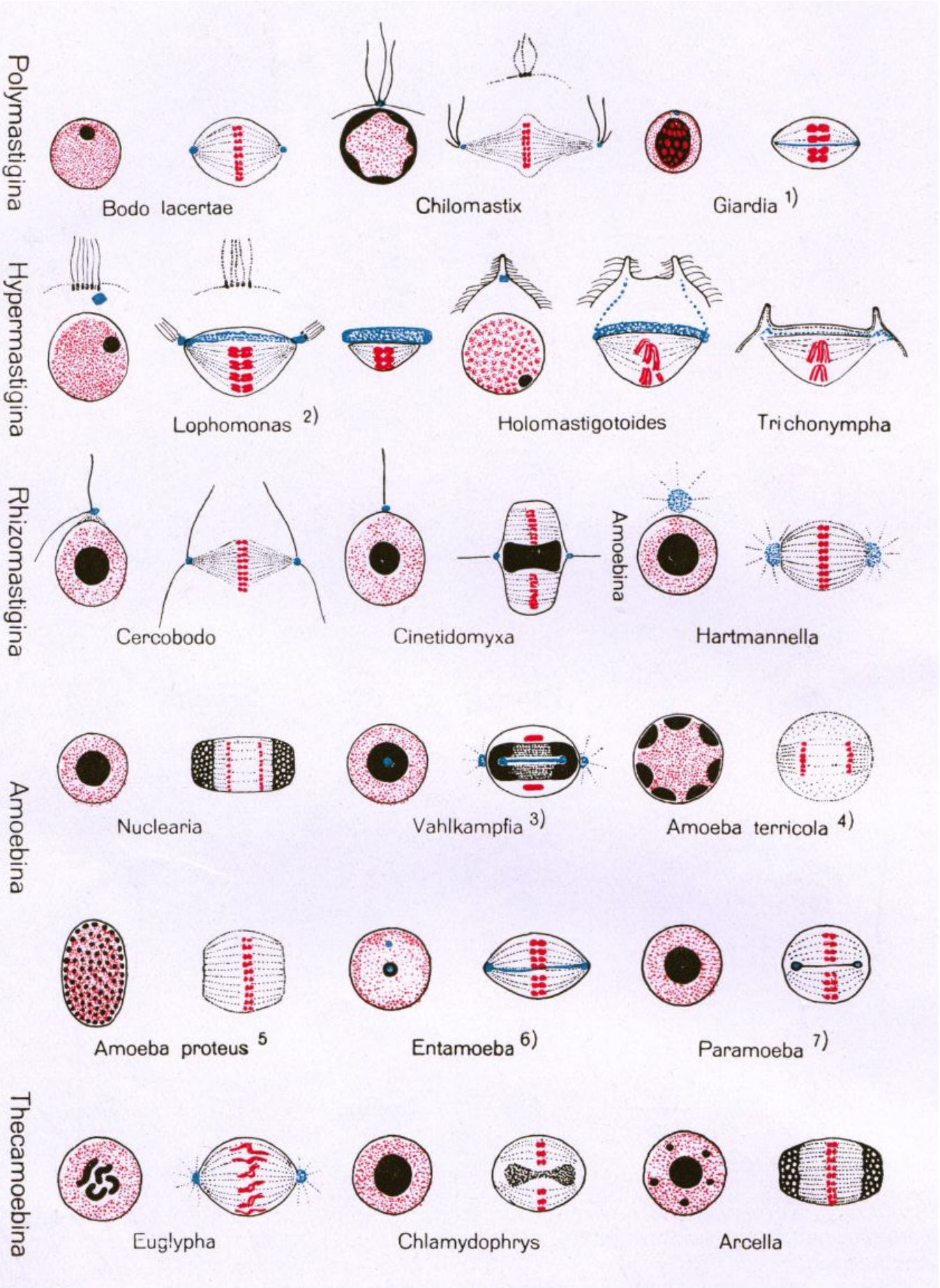
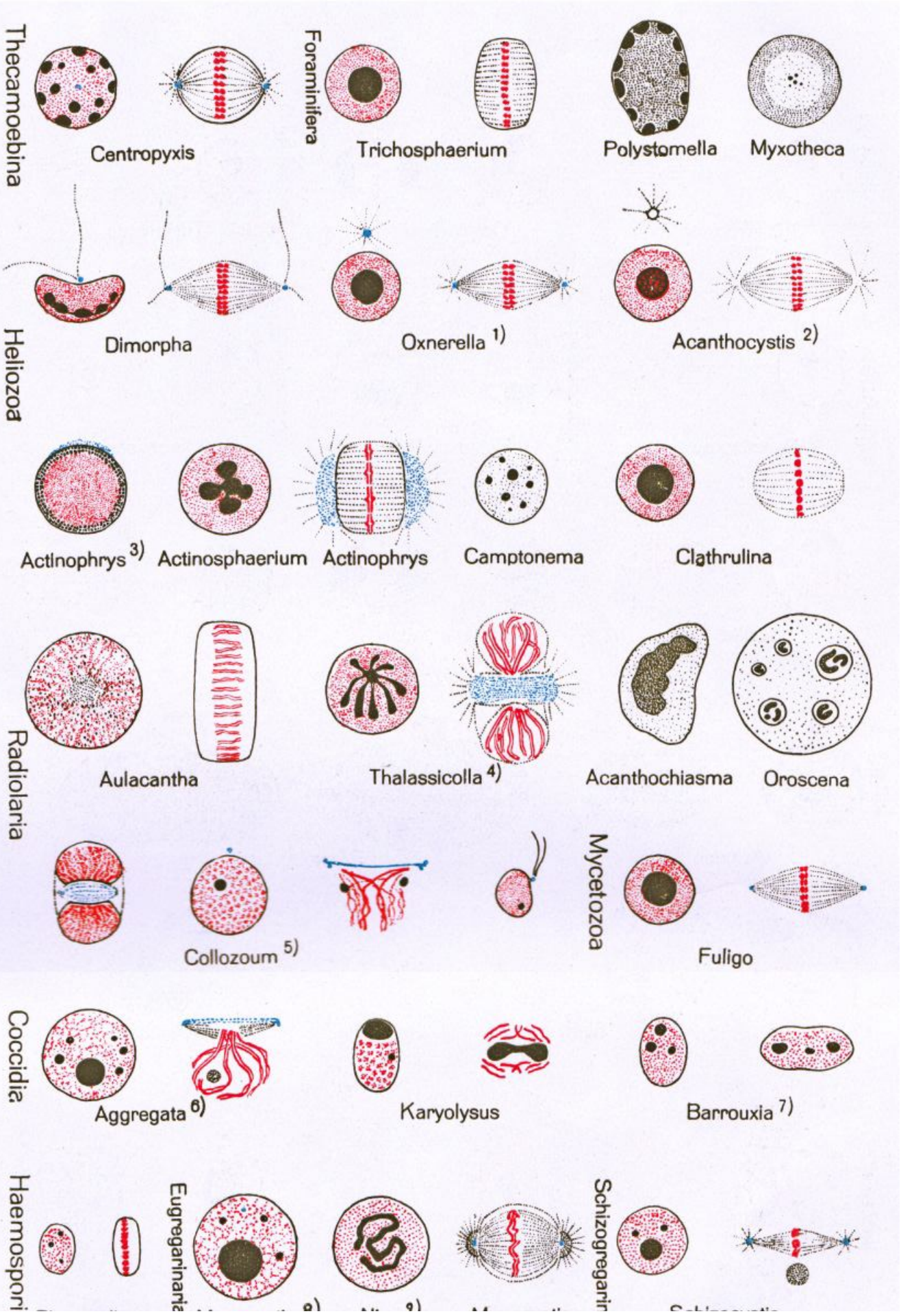
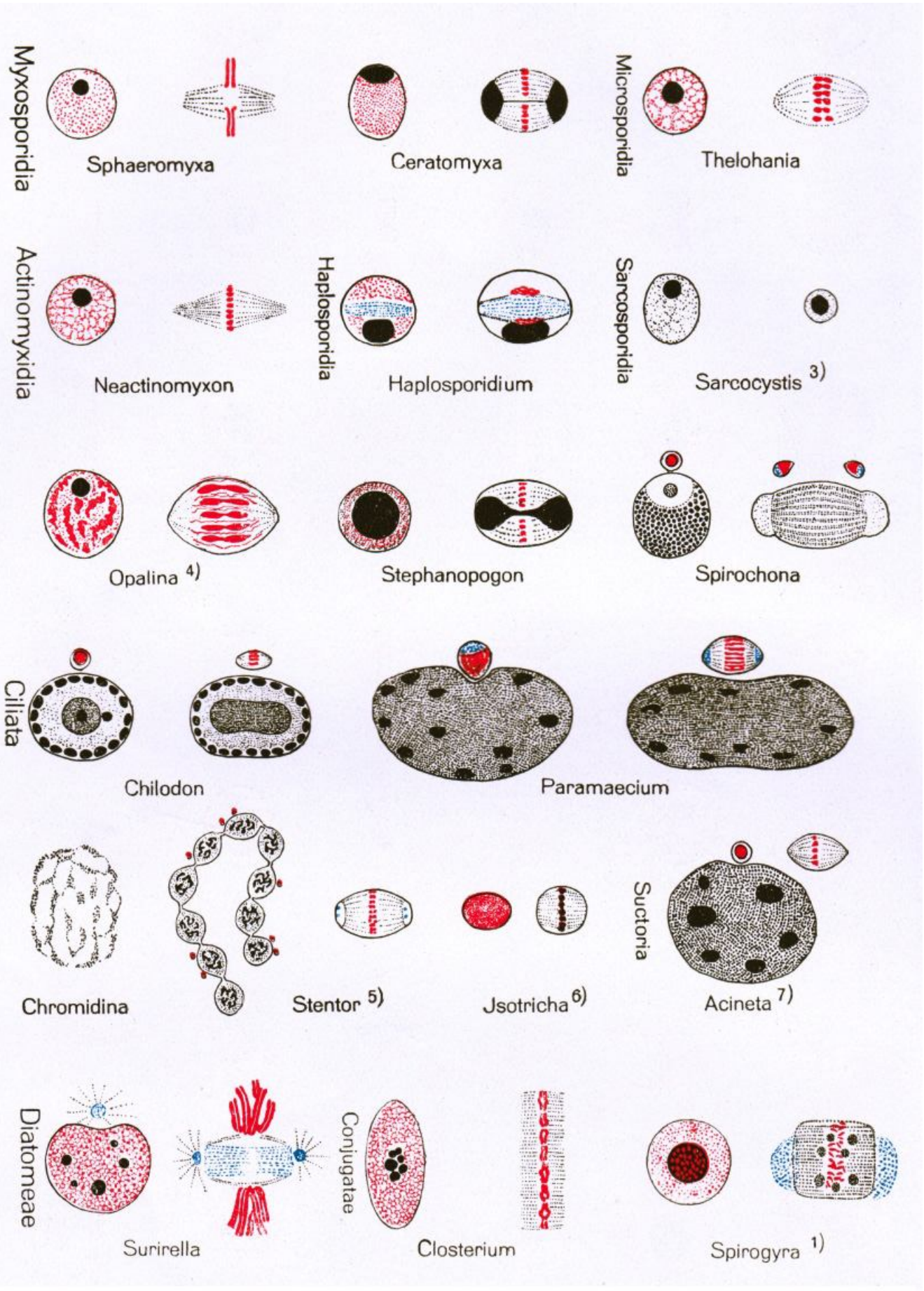


Bělař K 1926, page 303



Bělař K 1926, page 304


Thecamoebina
Centropyxis
Foraminifera
Trichosphaerium
Polystomella
Myxotheca
Heliozoa
Dimorpha
Oxnerella 1)
Acanthocystis 2)
Actinophrys 3)
Actinosphaerium
Actinophrys
Camptonema
Clathrulina
Radiolaria
Aulacantha
Thalassicolla 4)
Acanthochiasma
Oroscena
Collozoum 5)
Mycetozoa
Fuligo
Coccidia
Aggregata 6)
Karyolysus
Barrouxia 7)
Haemospori
Eugregarinaria
Schizogregarin



Bělař K 1926, page 306

Phaeophyta

Dictyota

Rhodophyta

Polysiphonia

Volvocales

Eudorina [2]

Volvocales

Chlamydomonas [3]

Protococcales

Hydrodictyon

Ulotrichales

Oedogonium

Siphonales

Cladophora

Charales

Chara

Oltpidiaceae

Olpidiopsis

Synchytriaceae

Synchytrium

Chlorochytrium

Plasmodiophoraceae

Sorodiscus [4]

Saprolegniinae

Achlya

Ancylistidineae

Ancylistes

Peronosporineae

Albugo

Mucoraceae

Mucor

Entomophthoraceae

Empusa

Basidiobolaceae

Basidiobolus

Ascomycete

Uredinales

Hymenomycet

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A PERSPECTIVES Article in ANNUAL REVIEW OF CELL AND DEVELOPMENTAL BIOLOGY (2008)