HAY! Isn't That A Protist
(Microorganisms Lab)

Introduction:
The category of Protists includes many widely ranging microbes, including slime molds, protozoa and primitive algae. There are 60,000 known species of protozoa—simple one-celled animals too small to be seen with the naked eye. You'll find protozoa wherever you find water.

Like other animals, protozoa need food and water to grow. If conditions dry out, or it food supplies diminish, some protozoa can enclose themselves in **cysts**. A cyst is a protective casing that keeps the animal from drying out and keeps the temperature relatively constant. When favorable conditions return, a protozoan emerges from the cyst and begins feeding and reproducing again.

Protozoa move by beating tiny hair-like structures called **cilia**, or whipping long tail-like structures, called **flagella**. Some protozoa move by making their inner fluids (cytoplasm) flow in a certain direction. This makes one part of them (called a **pseudopodium**) extend in one direction; the rest of the cell follows. Other protozoa don't move at all.

Some protozoa cause disease. One kind of protozoa causes malaria and is transmitted to humans through the bite of an infected mosquito; another causes sleeping sickness in people bitten by the tsetse fly. Fortunately, most protozoa are harmless to humans.

Materials Needed:
Hay infusion
Pond water
Commercial specimens
Slide & coverslip

Procedure:
1. Make a wet mount of a drop of water (pond, hay or commercial). Try to get a little visible sediment from the bottom of the jar, but not too much.

2. Start by looking under the 10X objective for living, moving organisms. Proceed to the 40X objective if you wish. Use the oil immersion objective only if the instructor has given you instructions.

   Try to dim the light or use minimal light when viewing these small organisms, excess light creates heat which can kill small animals in a short time. It may take a bit of practice to follow these fast moving creatures as they may move quickly out of the field of view.

3. Make observations of at least three different types of organisms on your own paper. You should draw the organism, comment on its movements, and attempt to identify it using the following pages or use books in the lab.

   You are likely to see one of the **ciliates** (protozoans with fine hairs) or **flagellates** (protozoans with a whip-like tail). You may even see a larger invertebrate animal (multicellular). The commercial specimens may be the easiest way to find amoeba and paramecium.

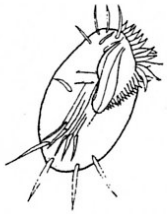
Using a Dichotomous Key

Protozoa Mixture

The illustrations on the following pages depict some common organisms you may observe. You will also want to use other reference manuals. You will have to use some of your imagination since the organisms are not drawn to scale.

After you have located an interesting creature, attempt to "key it out", or identify it by comparing the observed cell to the drawing or by using the key. A **key** is an arrangement of arbitrary characteristics of species that helps in their identification.

While observing an organism, start at #1 and make a choice of a characteristic. Then go to the next number as directed by the key choices. Use additional keys as needed in other books. When you have identified your organism, check with your instructor.



Ward's Dichotomous Key to Protozoa Survey Mixture

87 W 1610
87 W 1618

Instructions

It is suggested that students use an agent, such as Ward's **Detain** — 37 W 7951, to slow protozoa for extended, careful observation. The wet mount preparation should first be "scanned" under low power magnification to initially locate protozoa for observation and identification. In some case, indentification will be made easier if the cells are examined under "high-dry" magnification (450X).

Identification of a protozoan may be made by either comparing the observed cell to the illustrations on the back of this sheet, or by using the key. The key gives the student two choices per number. Start at "1", comparing the observed protozoan to each of the characteristics stated per number in the key. Proceed according to the key until it terminates in the name of a protozoan.

1		
White or colorless		**2**
Colored		**7**
2		
Slow creeping, shape varies by extension or withdrawal of pseudopodia (false feet)		**Amoeba**
Exhibits other motion		**3**
3		
Cell locomotes using a long whip-like flagellum (no cilia)		**6**
Cell locomotes using cilia (short hair-like structures)		**4**
4		
Body entirely covered with cilia		**5**
Body not entirely covered with cilia; has specialized groups of cilia — locomotes by "walking" using cirri (fused cilia)		**Euplotes**
5		
Large elongate cell, "cigar-shaped" with rounded ends, moderately fast swimmer		**Paramecium**
Small oval-shaped cell, fast swimmer. Swims with a corkscrew motion.		**Colpidium**
6		
Cells elongate with narrowed posterior		**Chilomonas**
Elongate with a broad rounded or truncate posterior end during locomotion, highly plastic when stationary, often appears to vibrate when in motion		**Peranema**
7		
Green color		**8**
Color not green		**9**
8		
Spherical colony of many hundreds of cells		**Volvox**
Elongate single cell		**Euglena**
9		
Red or rose-colored		**Blepharisma**
Dark blue-green, trumpet-shaped		**Stentor**

WARD'S
Natural Science
Rochester, New York

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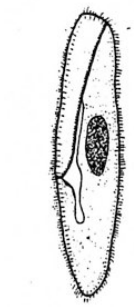
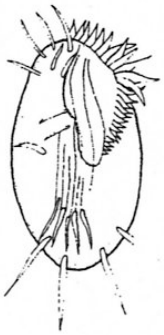


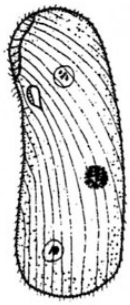
Paramecium caudatum
(180–300 μm)

Amoeba proteus
(up to 600 μm or more, elongated)

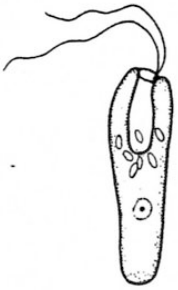


Euplotes sp.
(100–200 μm)

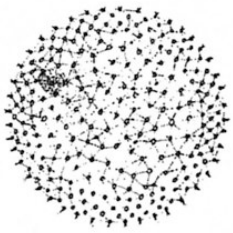
Euglena sp.
(35–55 μm)



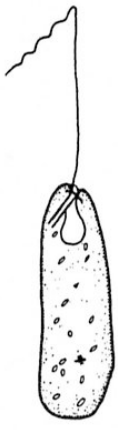
Colpidium sp.
(50–70 μm)



Chilomonas sp.
(20–40 μm)

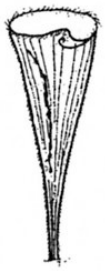


Volvox sp.
(2.5–6.0 μm; cell)
(300–500 μm; colony)



Peranema sp.
(20–70 mm)

Blepharisma sp.
(400–600 μm)

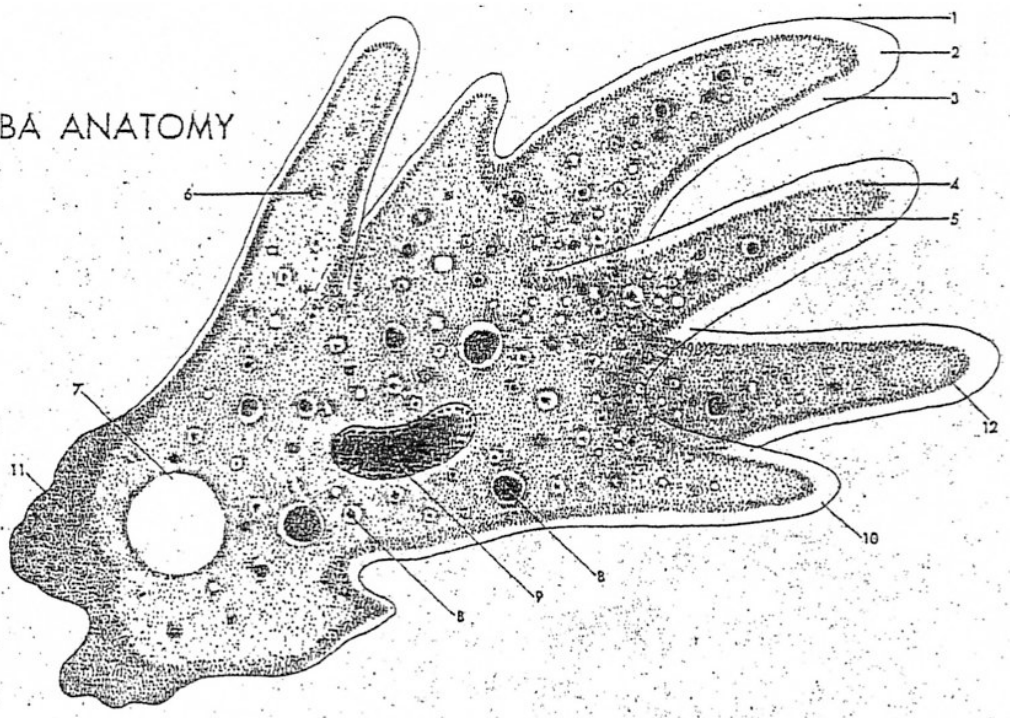


Stentor coeruleus
(1–2 mm, extended)

Please note:
Illustrations are not to scale. Measurements are cell or colony diameter.

Ward's Dichotomous Key to Protozoa Survey Mixture
Ward's Natural Science, Rochester New York

AMOEBA ANATOMY



1. Plasmalemma (cell membrane)
2. Hyaline cap
3. Hyaline layer (ectoplasm)
4. Endoplasm—plasmagel
5. Endoplasm—plasmasol
6. Crystal
7. Contractile vacuole
8. Food vacuoles
9. Nucleus
10. Pseudopodium
11. Region of solation
12. Region of gelation

Paramecium