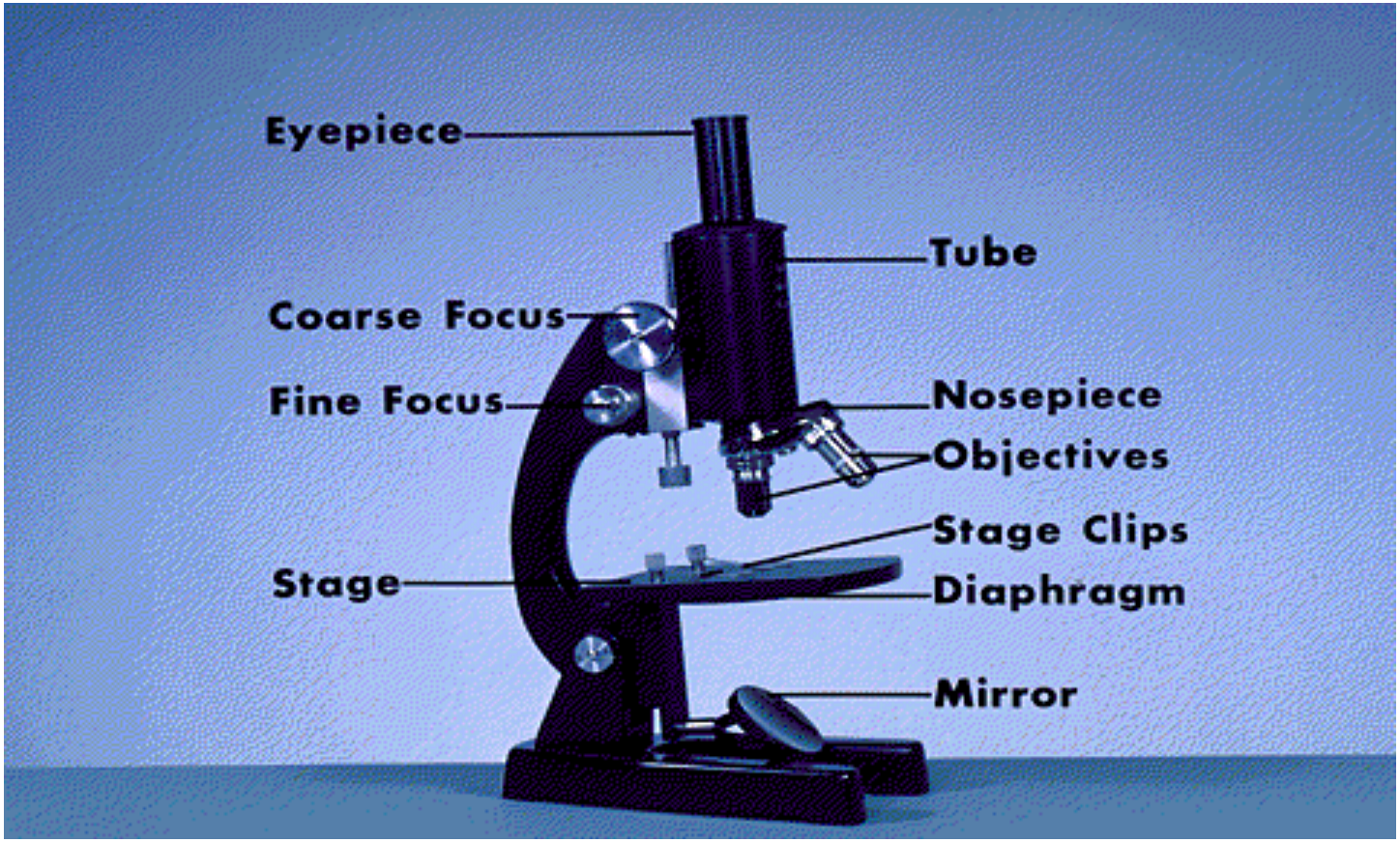
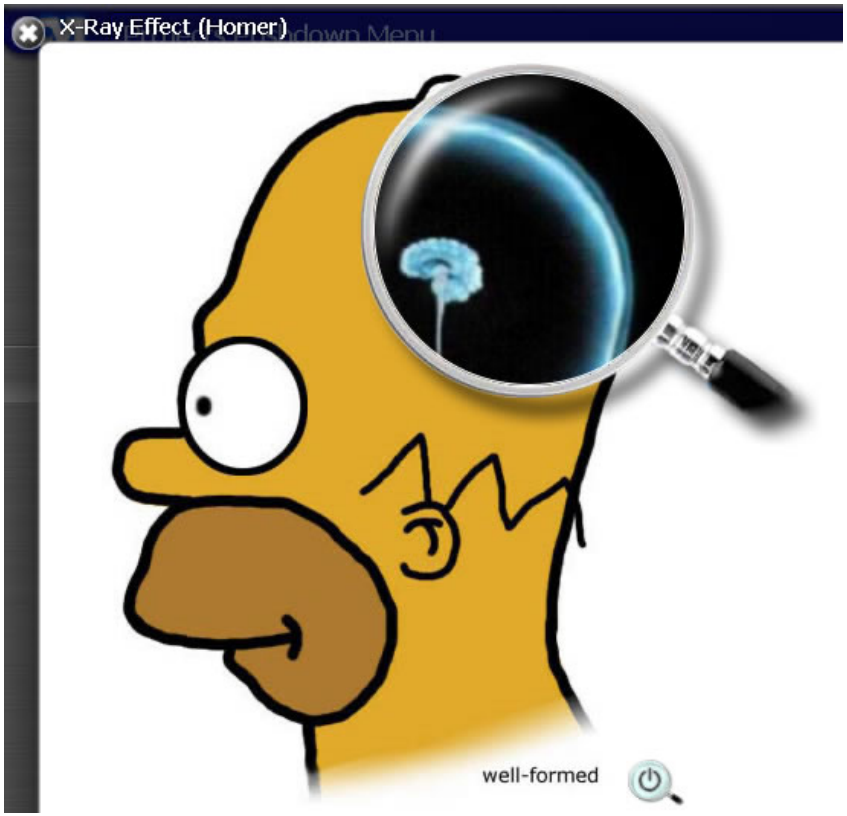
Microscope

One or more lenses that make an enlarged image of an object.



Simple Microscope

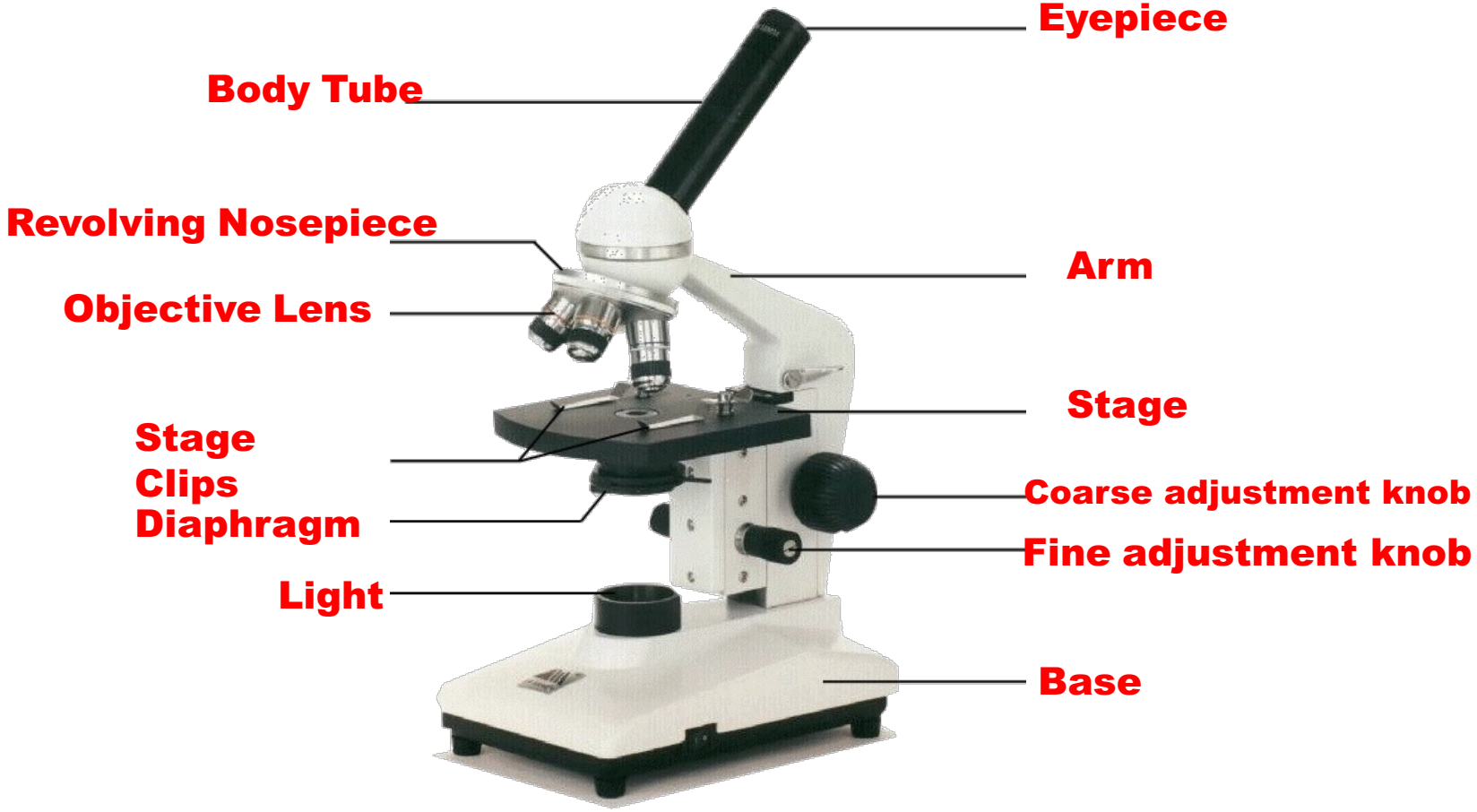
- **Light passes through only 1 lens.**
- Example: magnifying glass



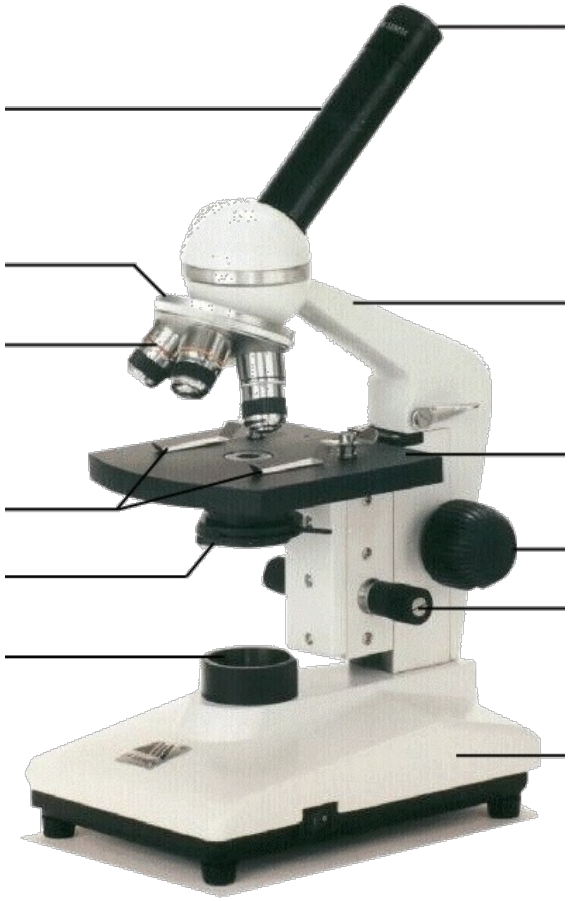
Compound Microscope

- Lets light pass through an object and then through two or more lenses.

Microscope Parts



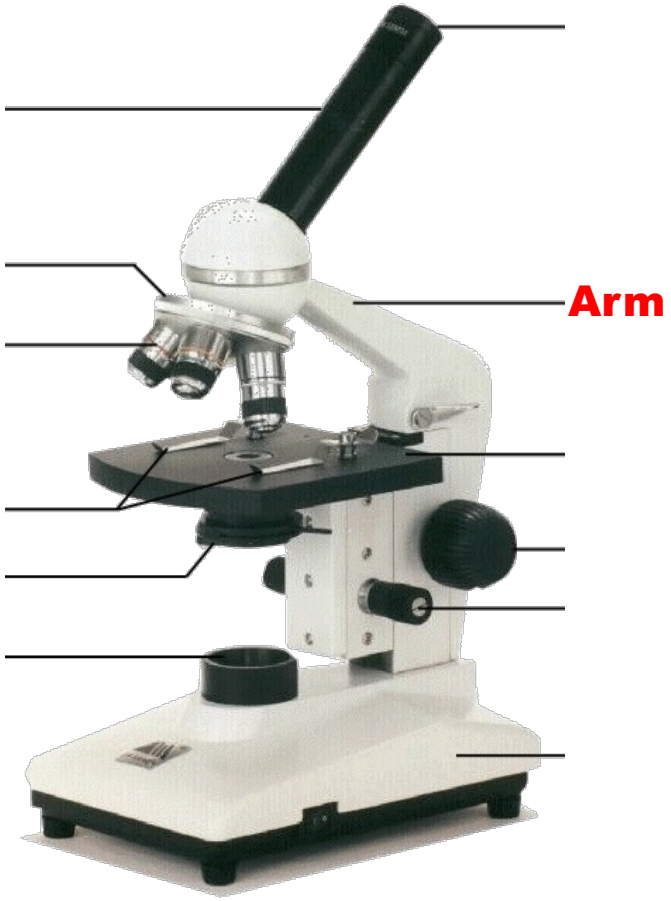
Eyepiece



Contains the ocular lens where you look through to see the image of your specimen.

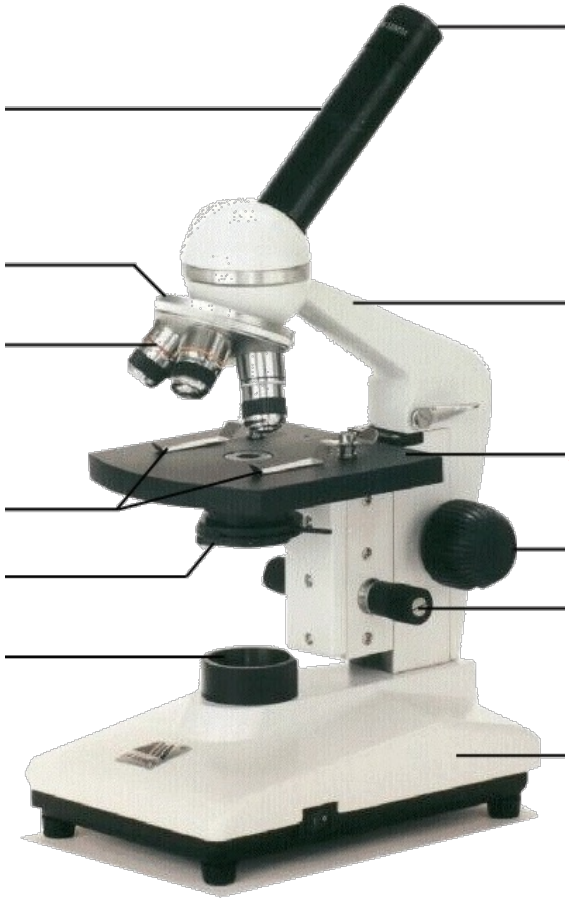
They are usually 10X or 15X power. Our microscopes have an ocular lens power of 10x.

Arm



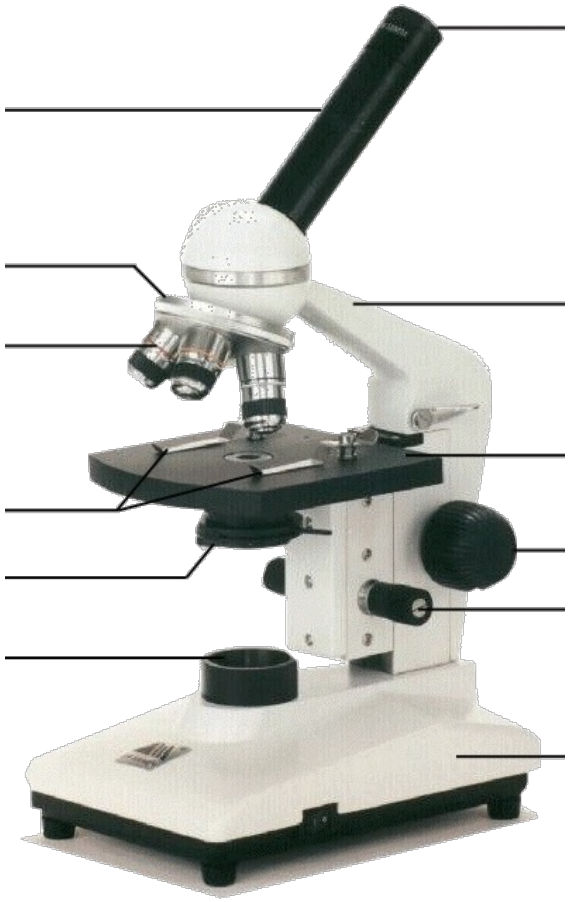
Used to <u>support</u> the microscope when carried

Stage



Supports the slide being viewed

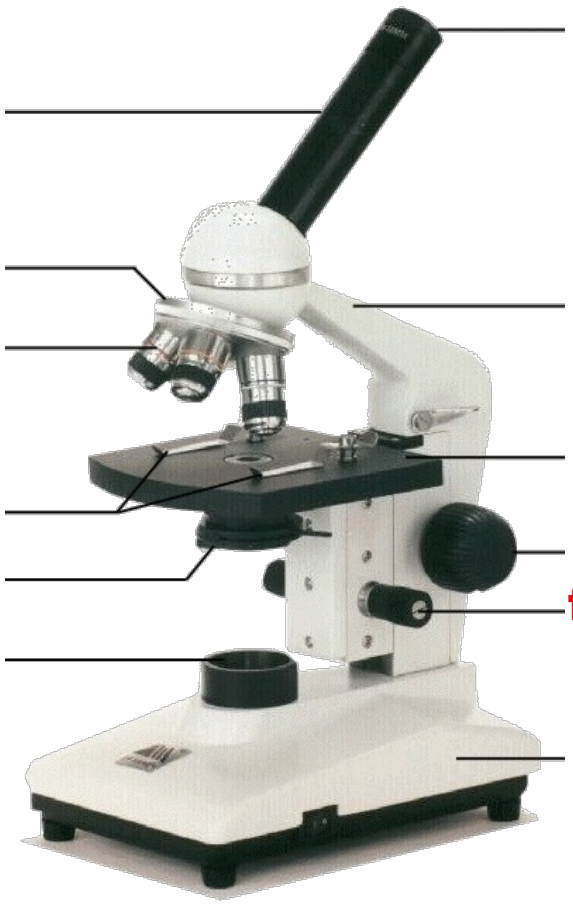
Coarse adjustment knob



Moves the stage up and down for <u>focusing</u>

coarse adjustment knob

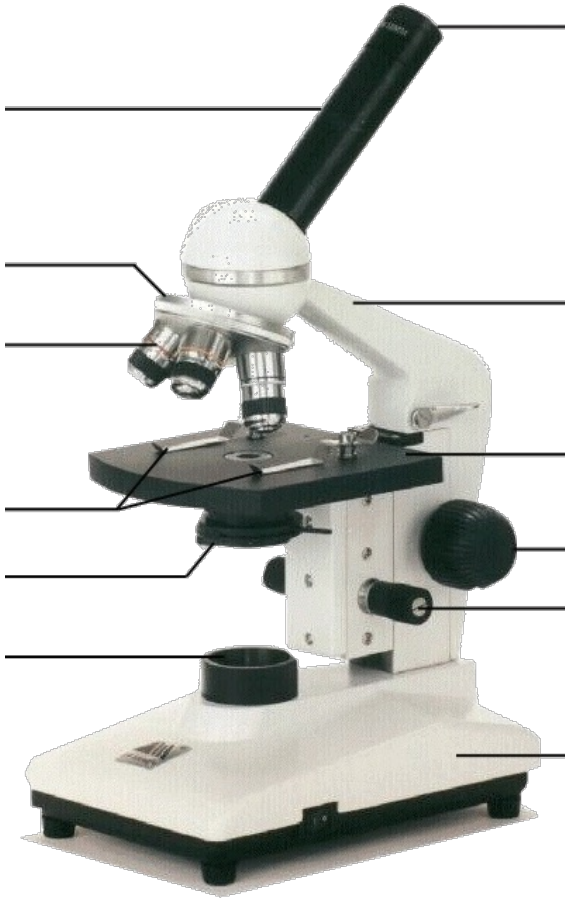
Fine adjustment knob



Moves the stage slightly to <u>sharpen</u> the image

fine adjustment knob

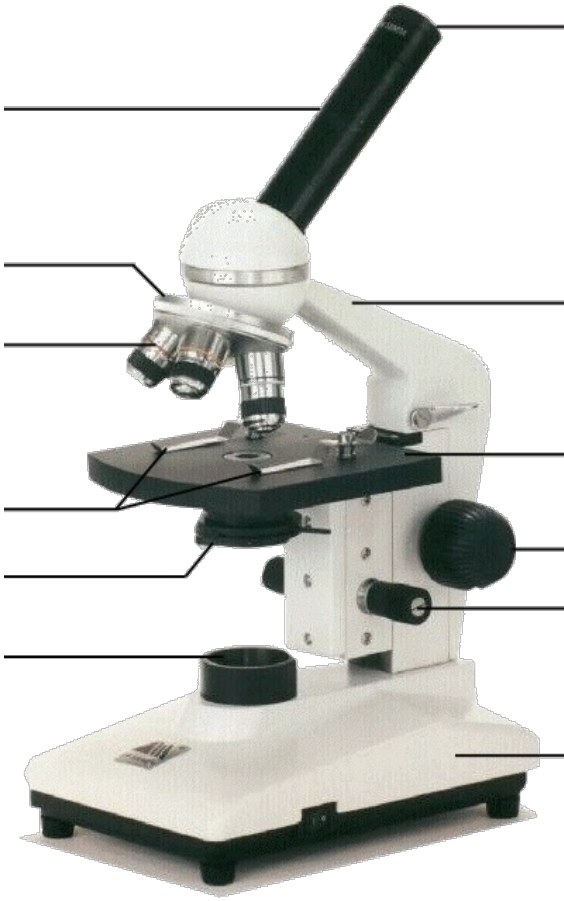
base



Supports the microscope

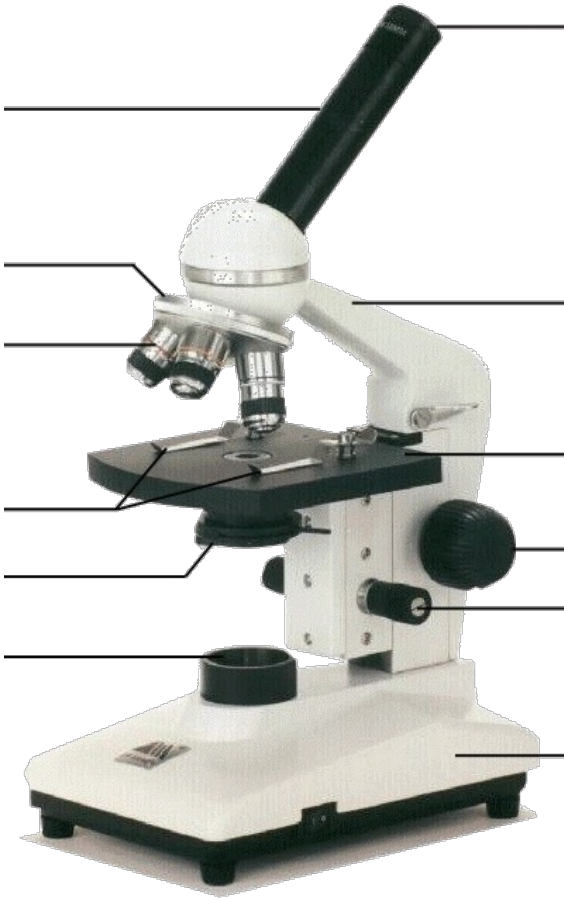
Nosepiece

Holds the high and low power objective lenses; can be rotated to change the magnification



objective lenses

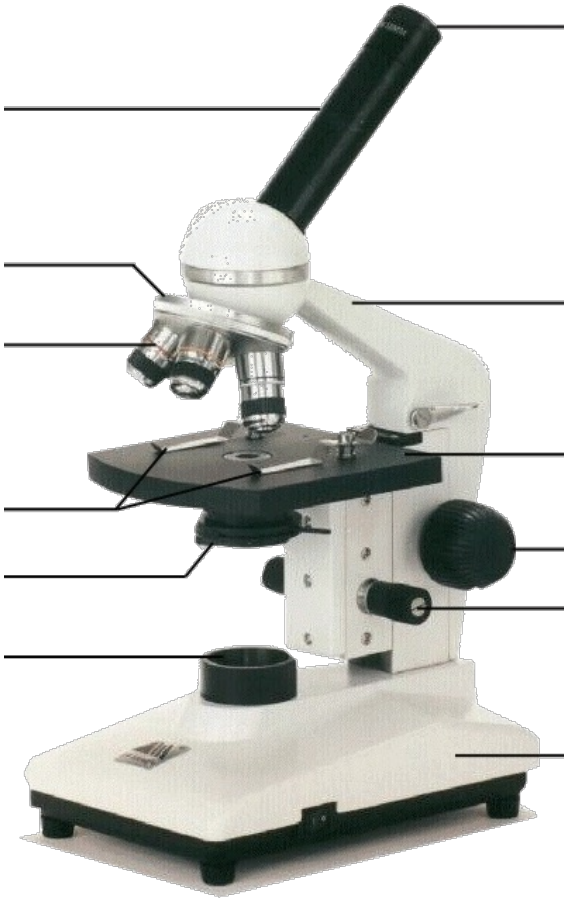
Magnification ranges from 10x to 40x



The shortest lens is the lowest power, the longest one is the lens with the greatest power.

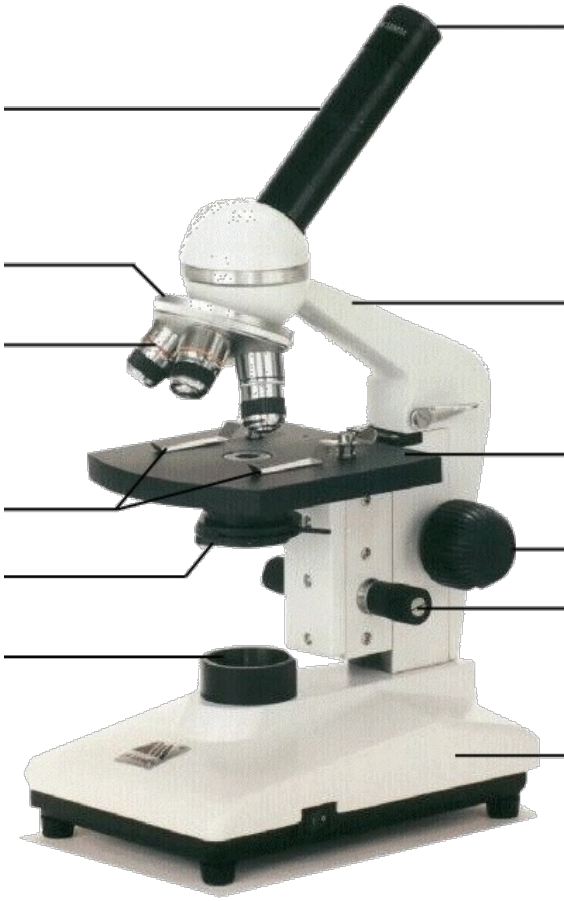
stage clips

Hold the slide in place



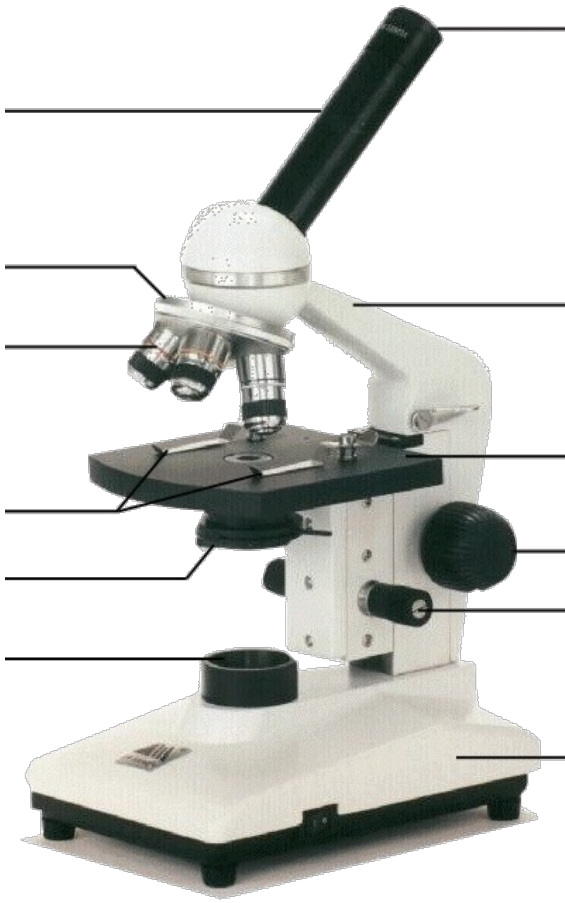
diaphragm

Regulates the amount of light on the specimen



Light source

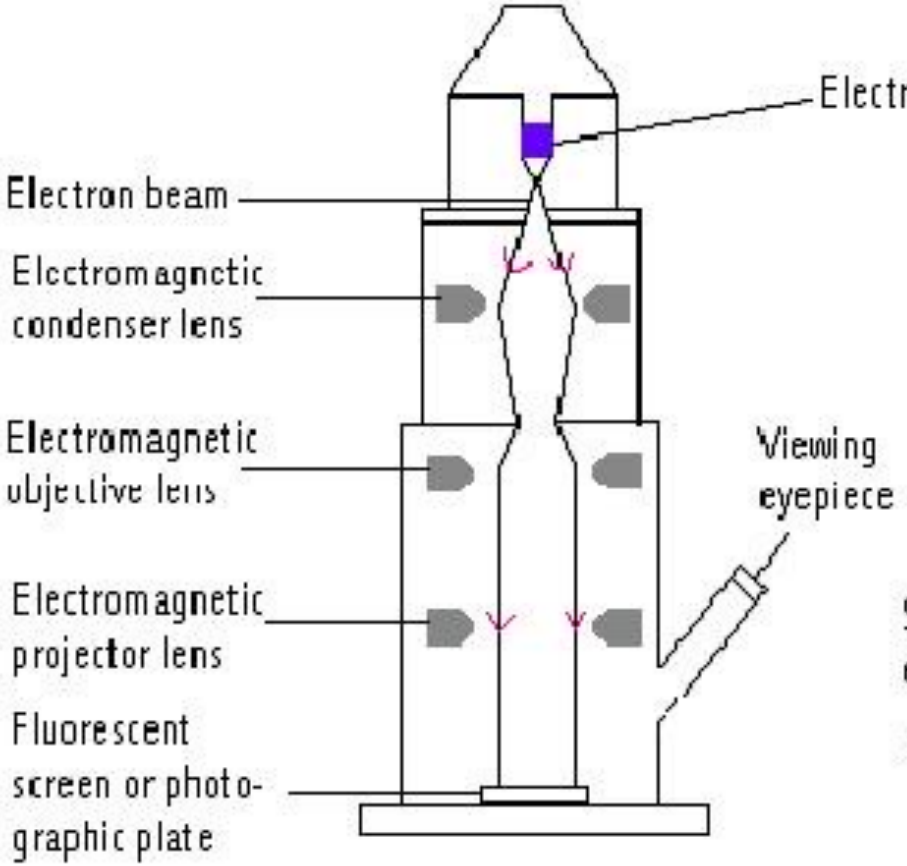
Projects light upwards through the diaphragm, the specimen, and the lenses



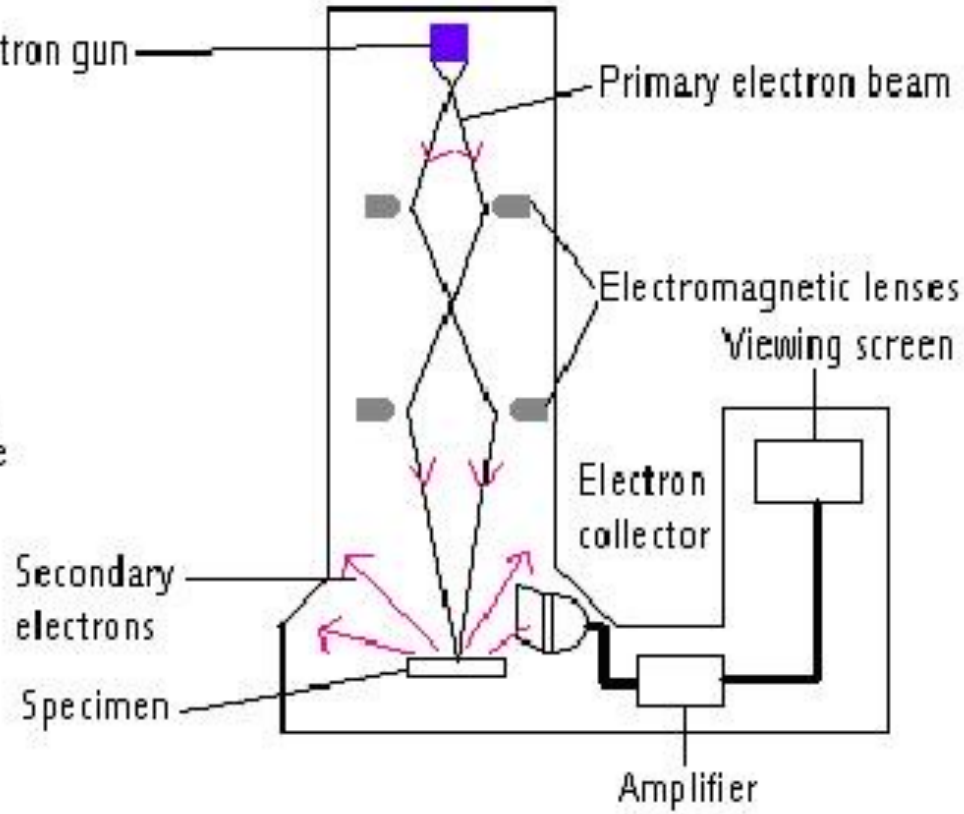
Stereoscopic Microscope

- **Gives a three dimensional view of an object.** (Examples: insects and leaves)
- Used for dissections

Electron microscopes – use a beam of electrons instead of a beam of light to magnify the image



Transmission electron microscope



Scanning electron microscope

Electron Microscopes

- **can achieve 3D images using electrons**

The Scanning Electron Microscope

- produces a 3-dimensional image of specimen's surface features

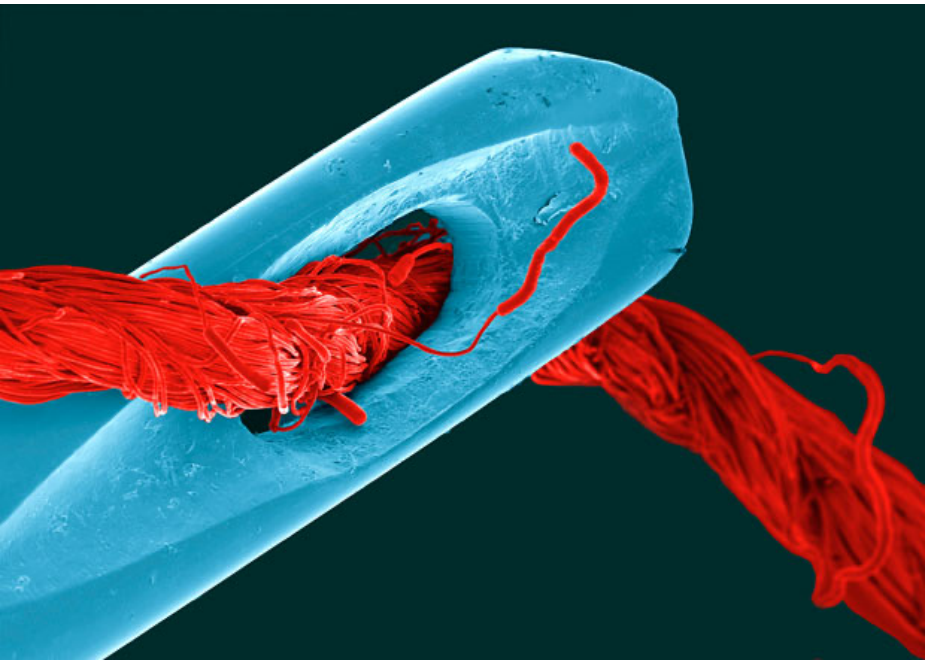
spider

head of a butterfly

Scanning electron microscopy (SEM)

Types of specimens:

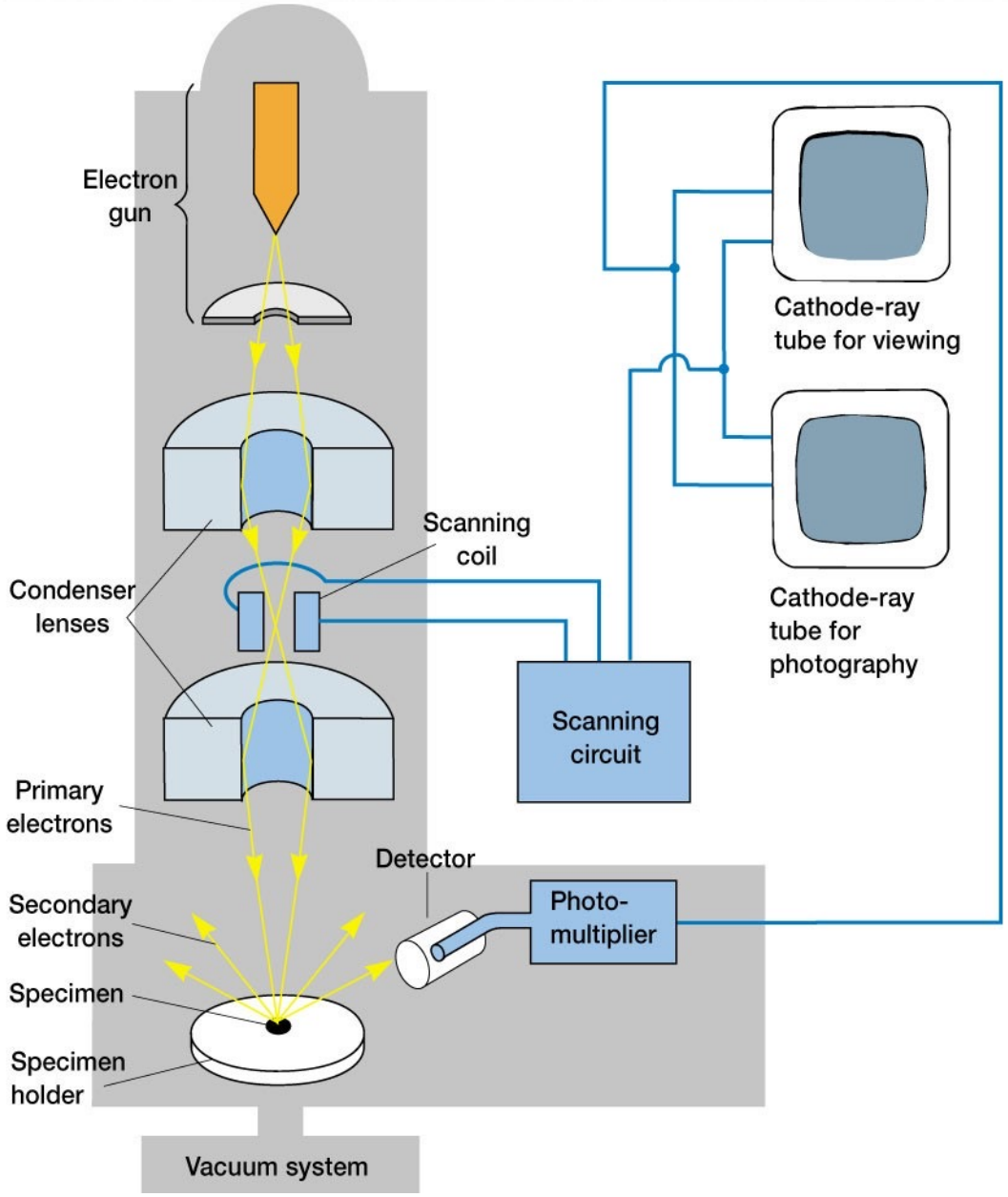
- -Whole organisms
- -Natural tissue surfaces
- -Exposed tissue structure



What is this?

A flea magnified 50 000 X

Scanning Electron Microscope



Transmission electron microscopy (TEM).

- Allows the observation of molecules within cells
- Allows the magnification of objects in the order of 100, 000's.

Transmission electron microscope (TEM)

- Provides for detailed study of the internal ultrastructure of cells
- a beam of electrons is transmitted through the specimen for a 2D view

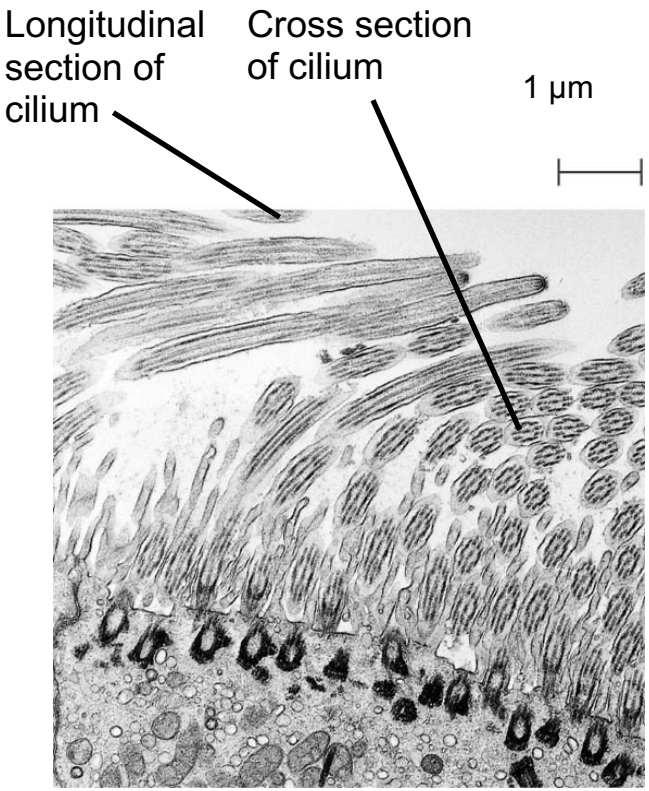
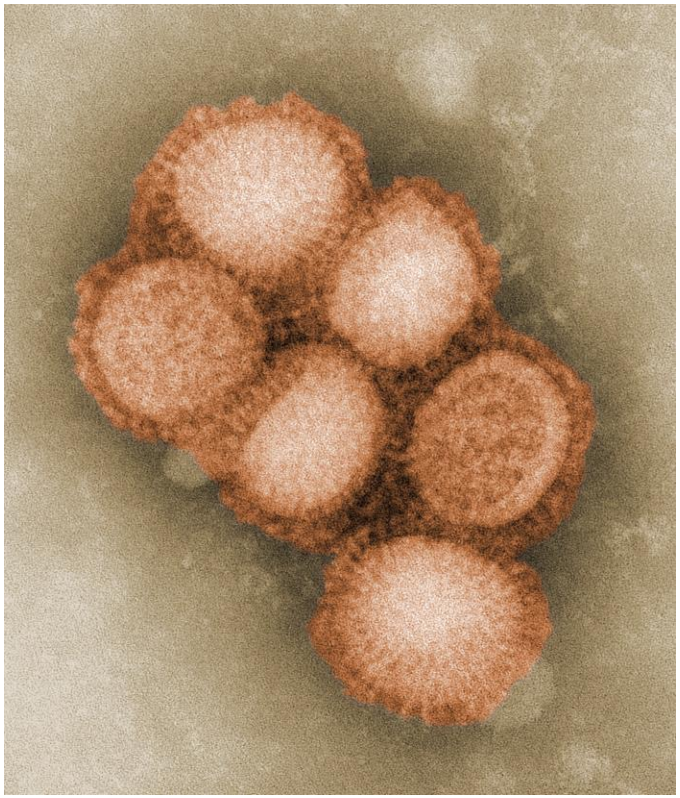


Figure 6.4 (b) cilia on rabbit lungs

Transmission electron microscope

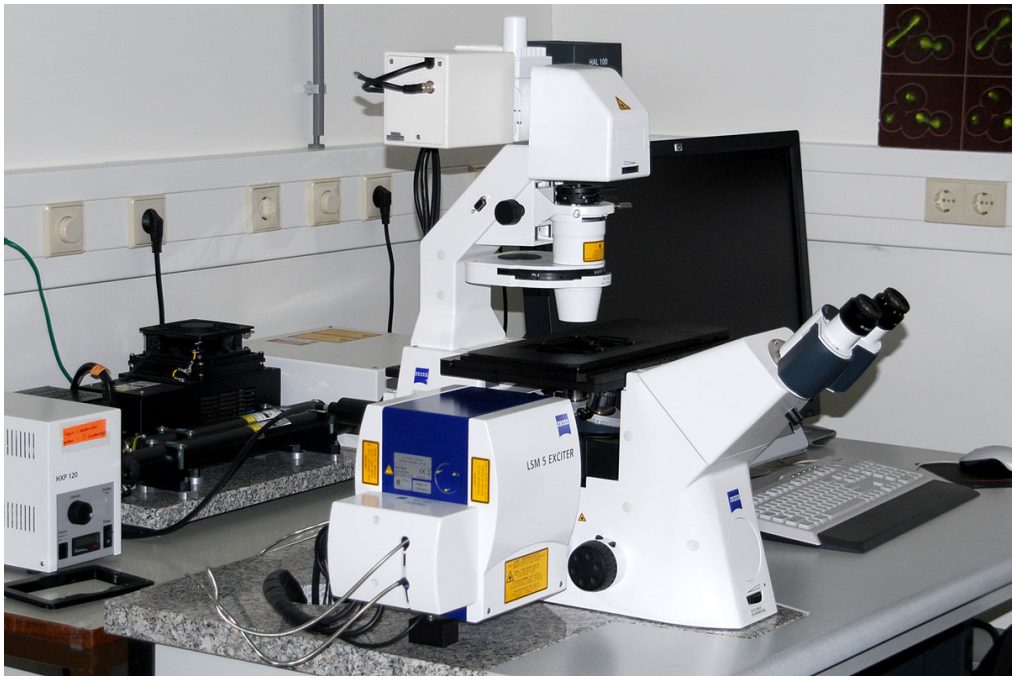
Chloroplast from a tobacco leaf



H1N1 virus

Confocal Laser Scanning Microscope (CLSM)

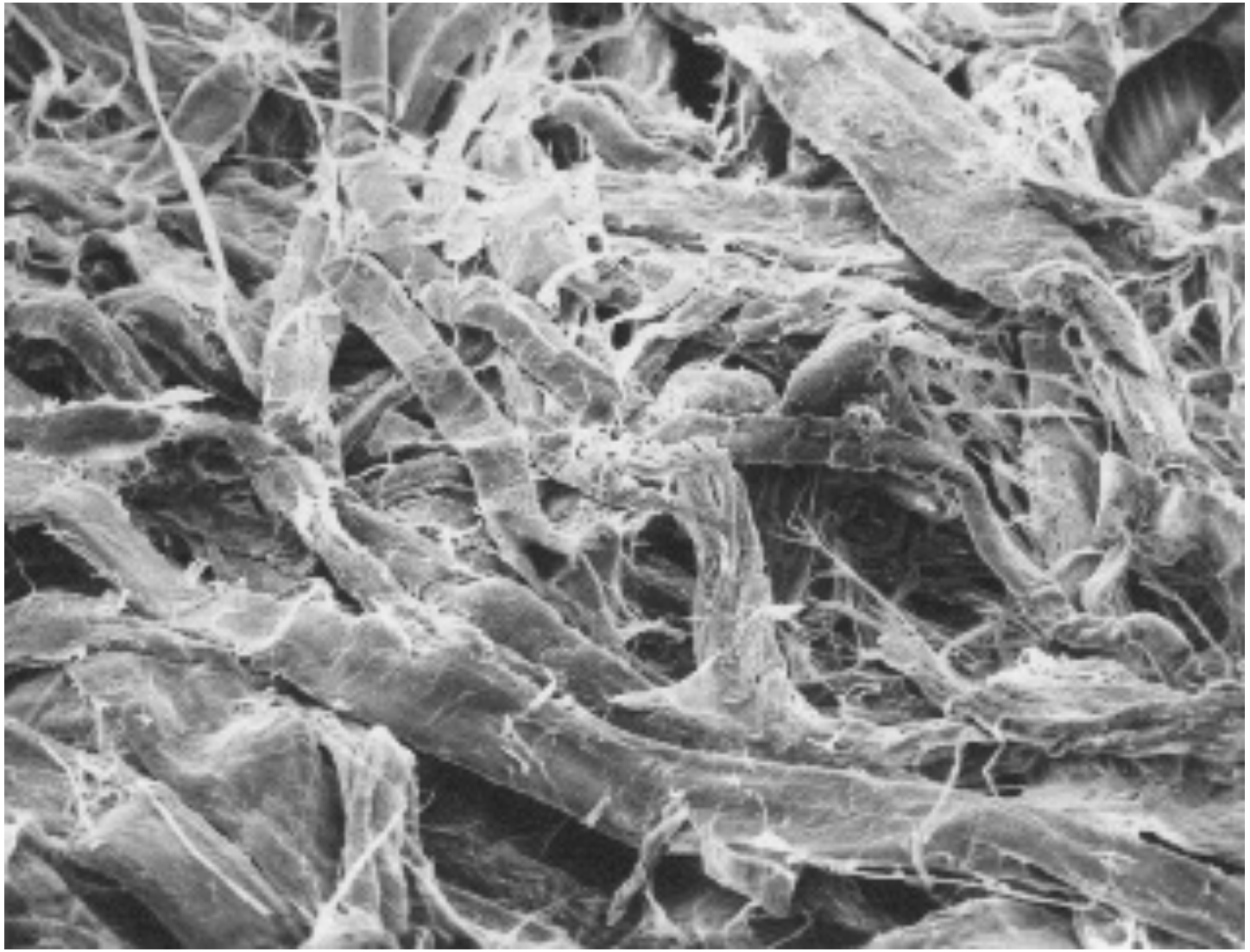
- laser beam used to illuminate spots on specimen
- computer compiles images created from each point to generate a 3-dimensional image
- used on specimens that are too thick for a light microscope



Look at the following micrographs (a picture made by a microscope) and try to determine what the object is!


This isn't a
rock collection.

TOILET PAPER

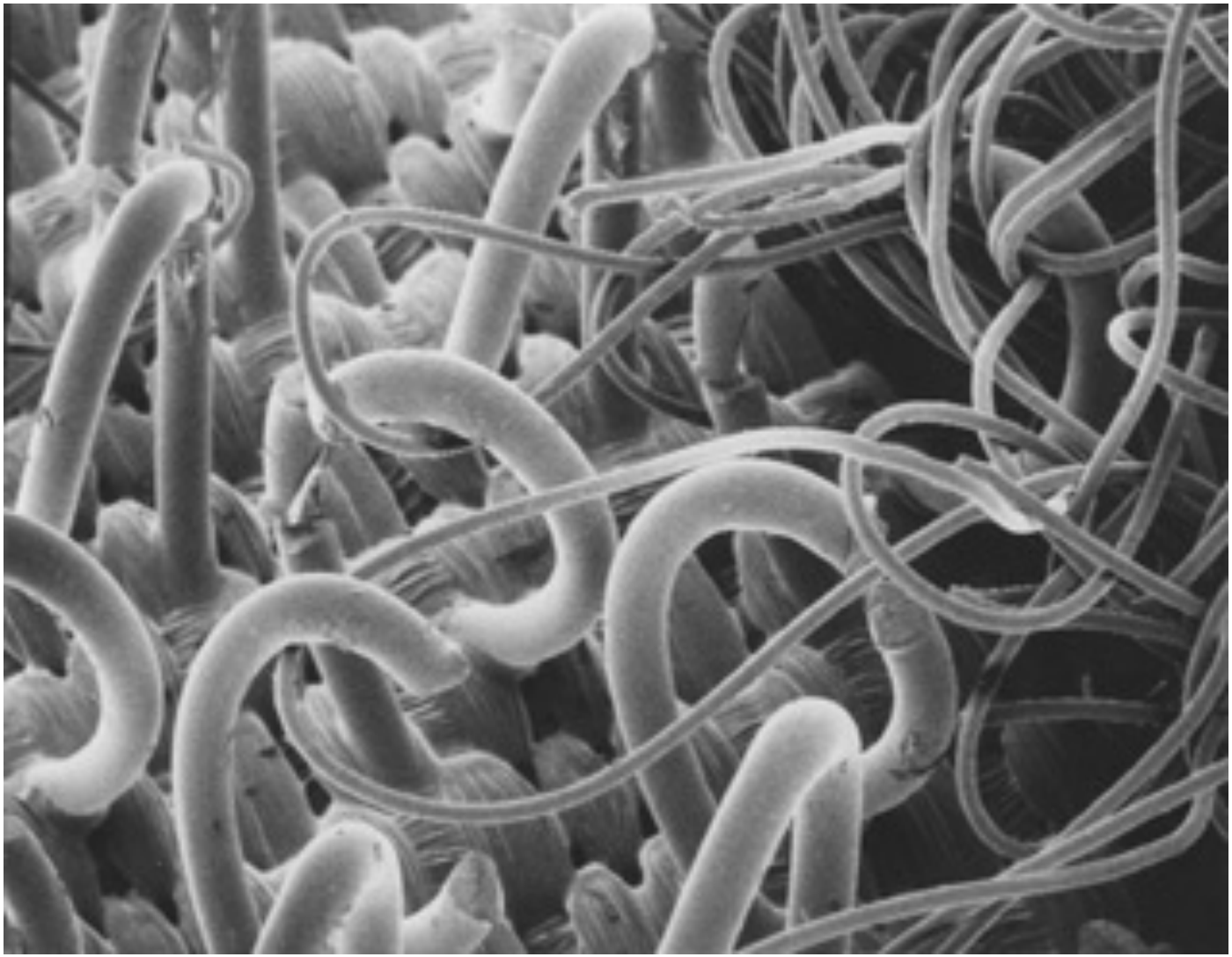



This looks like a
walrus in a sweater.

HYPODERMIC NEEDLE


This creature isn't
from outer space.

VELCRO




This isn't a bird or
anything feathered.

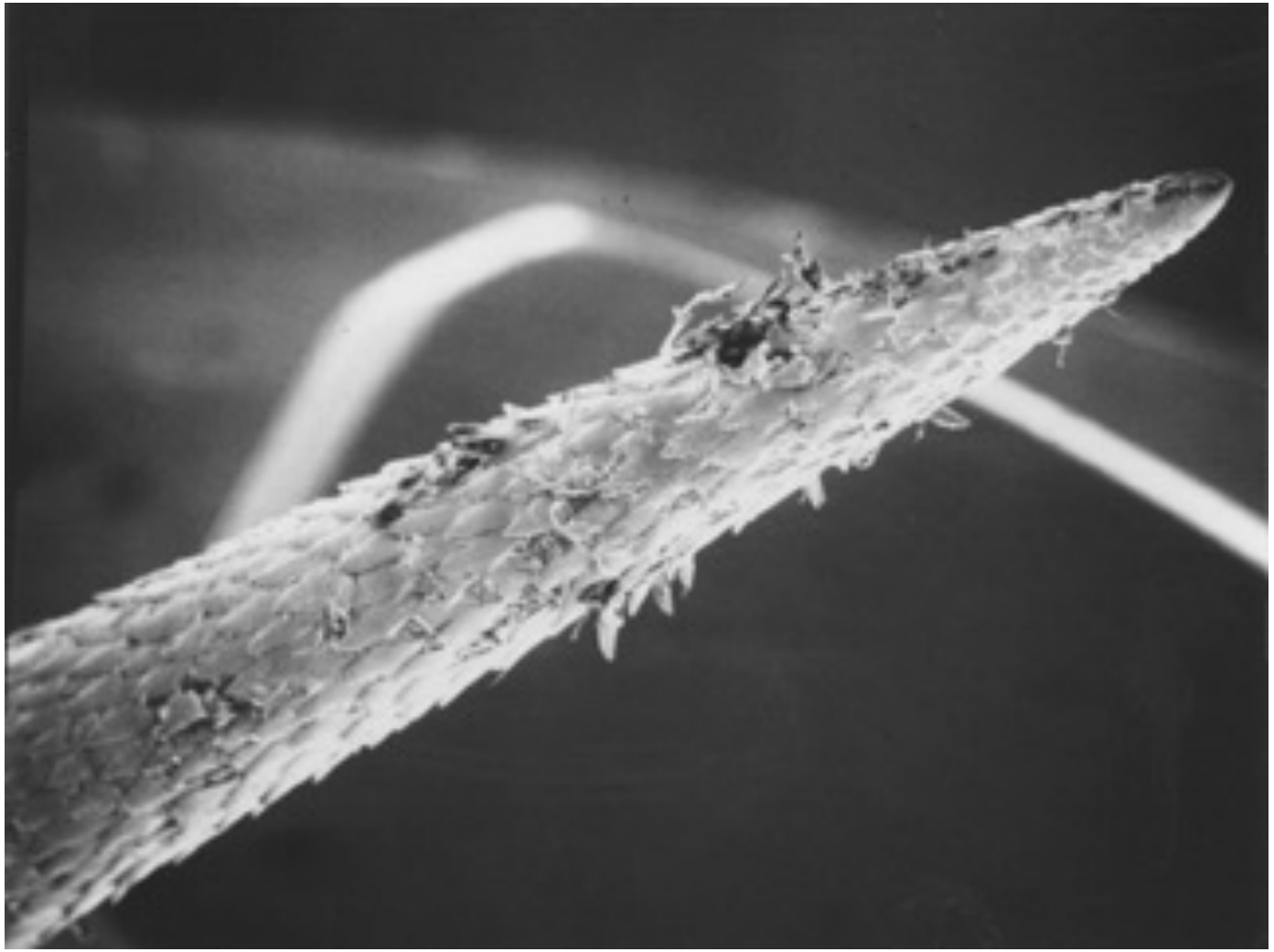
STAPLE THROUGH PAPER

It makes sense that this looks gummy.

BLACK WIDOW SPIDER CLAW

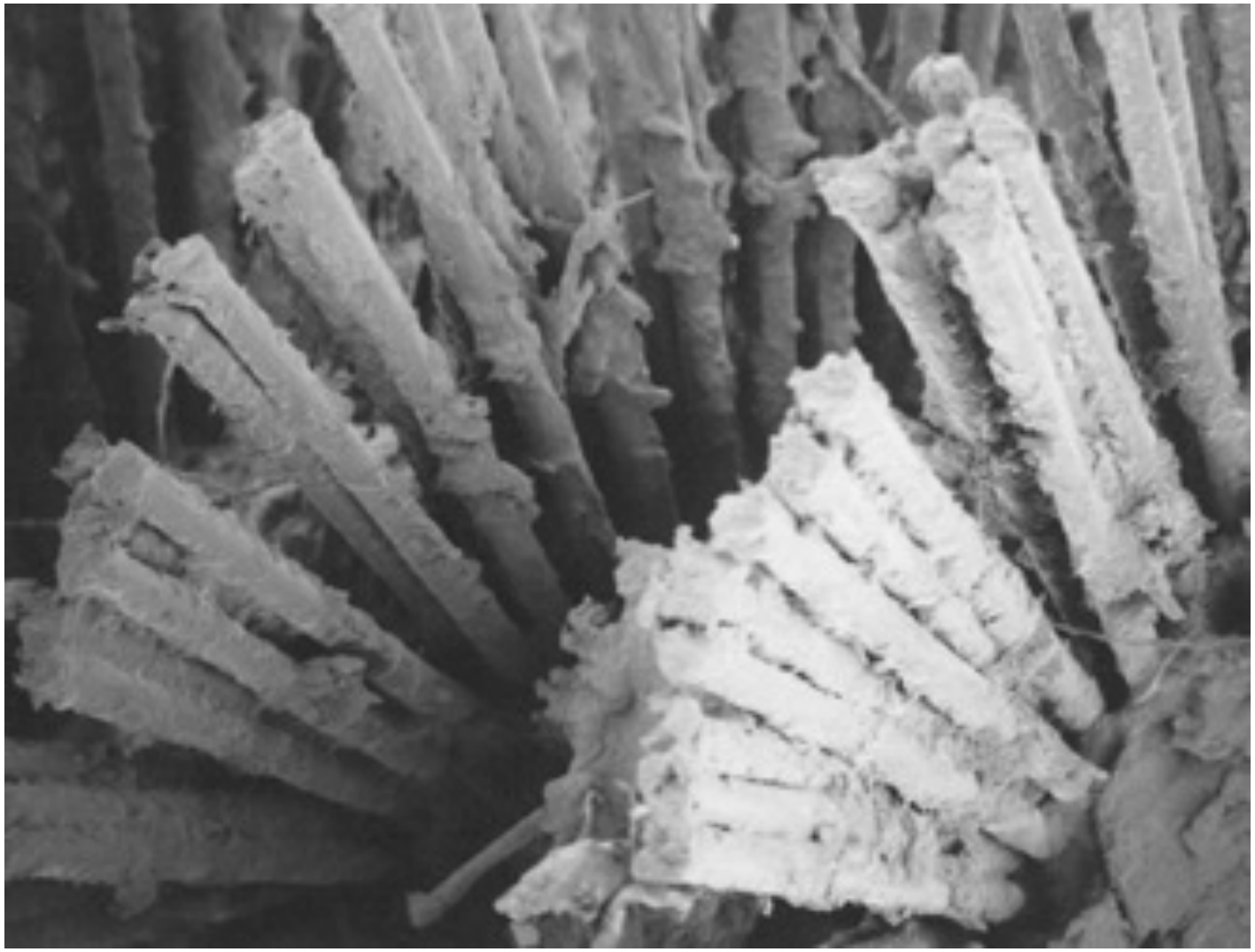

This is exactly
what it looks like.

PORCUPINE QUILL



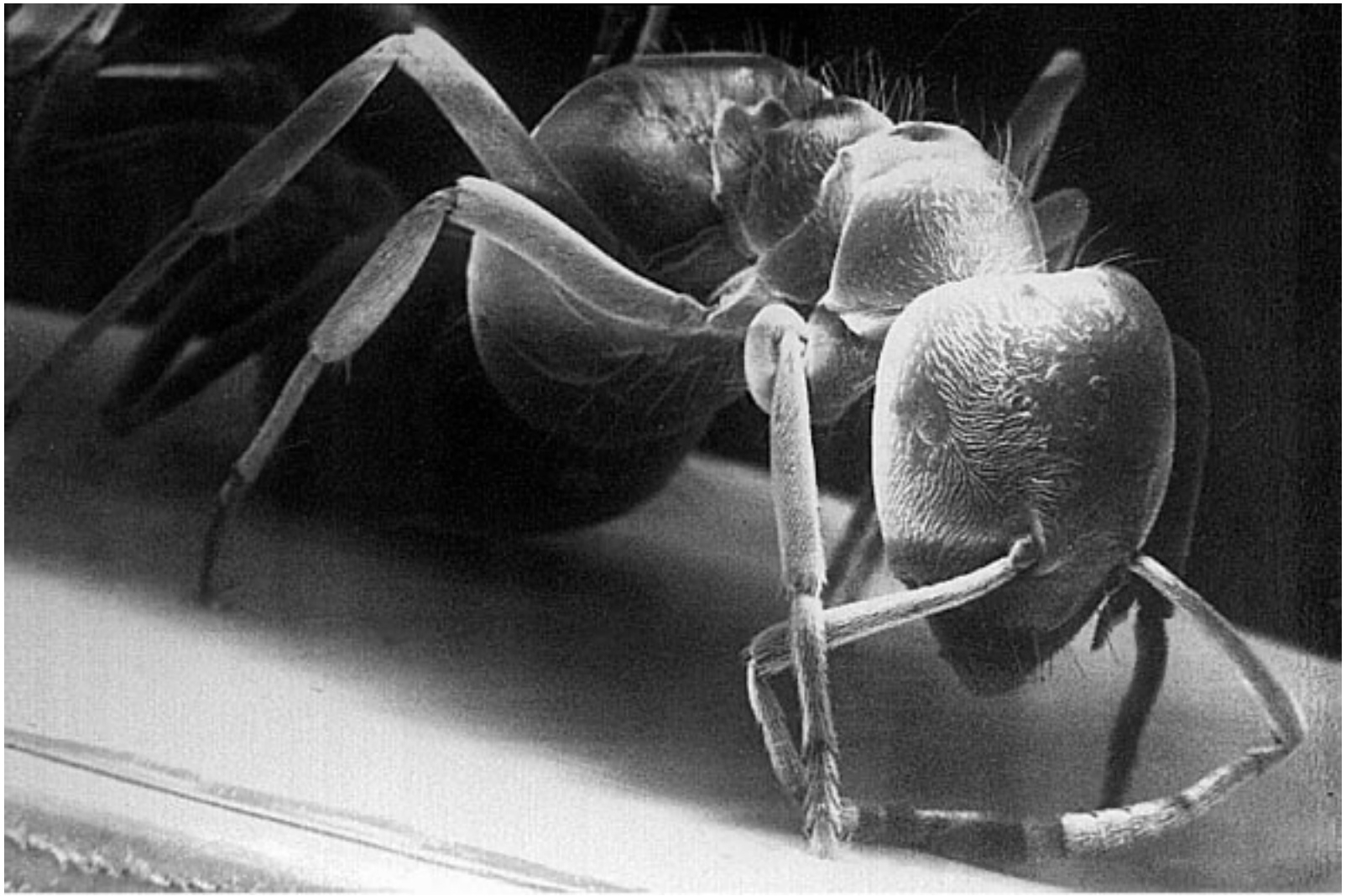

This is appropriately bitey-looking.

MASCARA BRUSH




These aren't
alien egg pods.

ANT




This is not a
fungal cancer cell.

BLACK FLY


This is not a
cave painting.

MOSQUITO

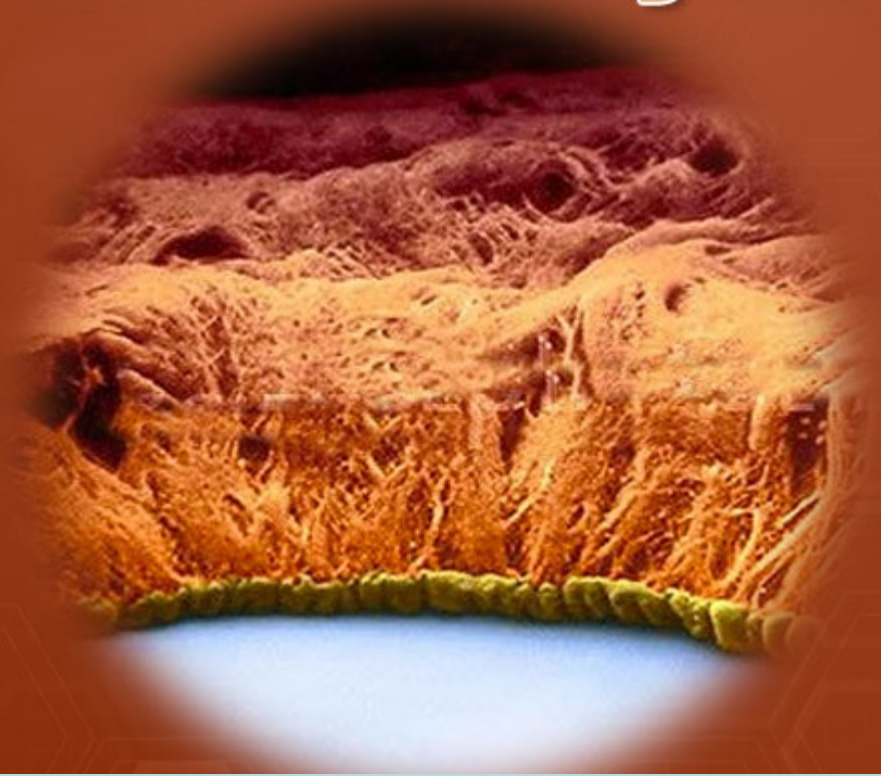
This looks like a crystalline flower.

CAT FLEA

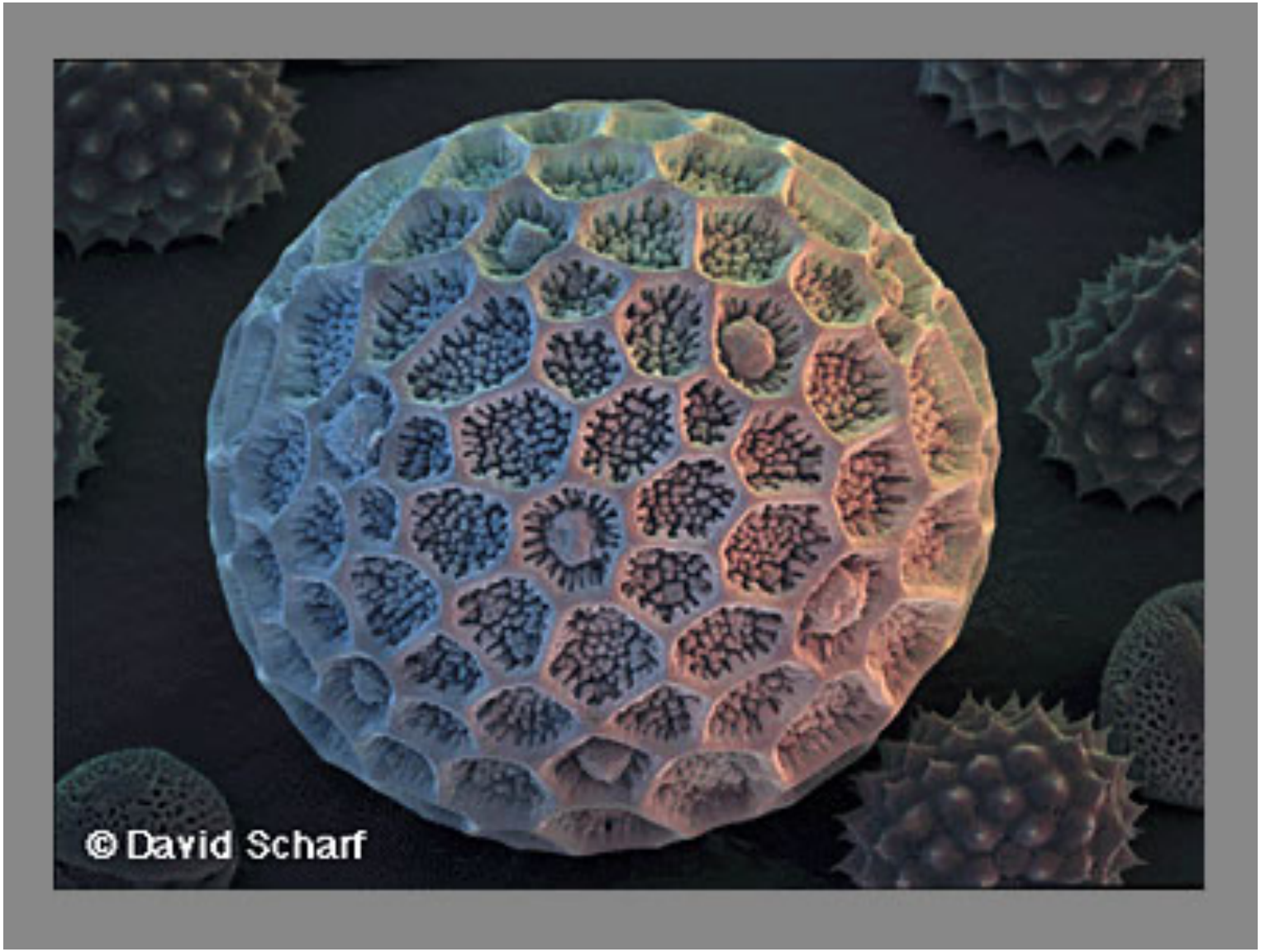

This crazy confetti is
all over your house.

MITE FEEDING

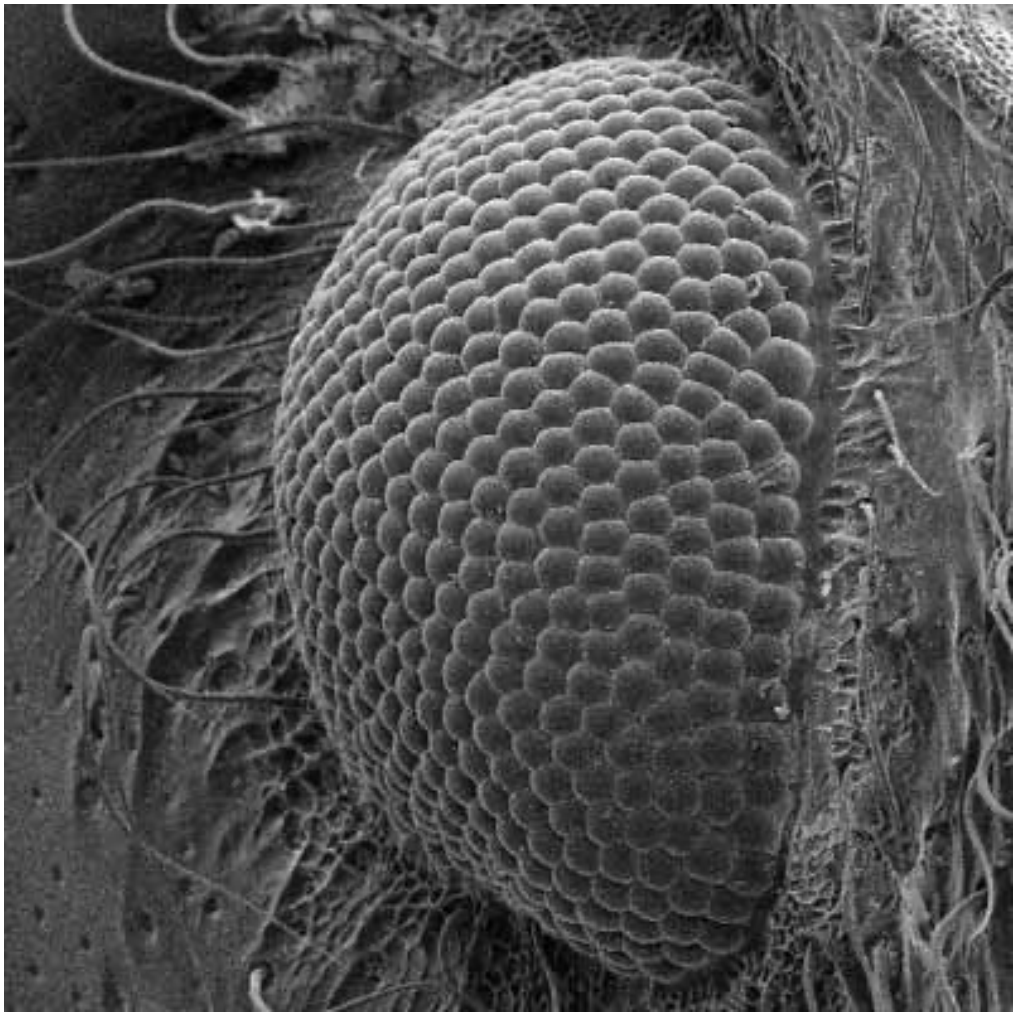
This looks like a lake in a canyon.



POLLEN GRAIN



ANT EYE



APHID ON A LEAF

EYELASHES

DOG FLEA