Electron Microscopes

Medical Laboratory Instruments

1st Stage, Laboratory 3

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What is an Electron Microscope?

- A microscope that uses a beam of accelerated electrons as a source of illumination.
- High resolution to magnify objects at the nanometer scale.
- Invented by Ernst Ruska in 1931.

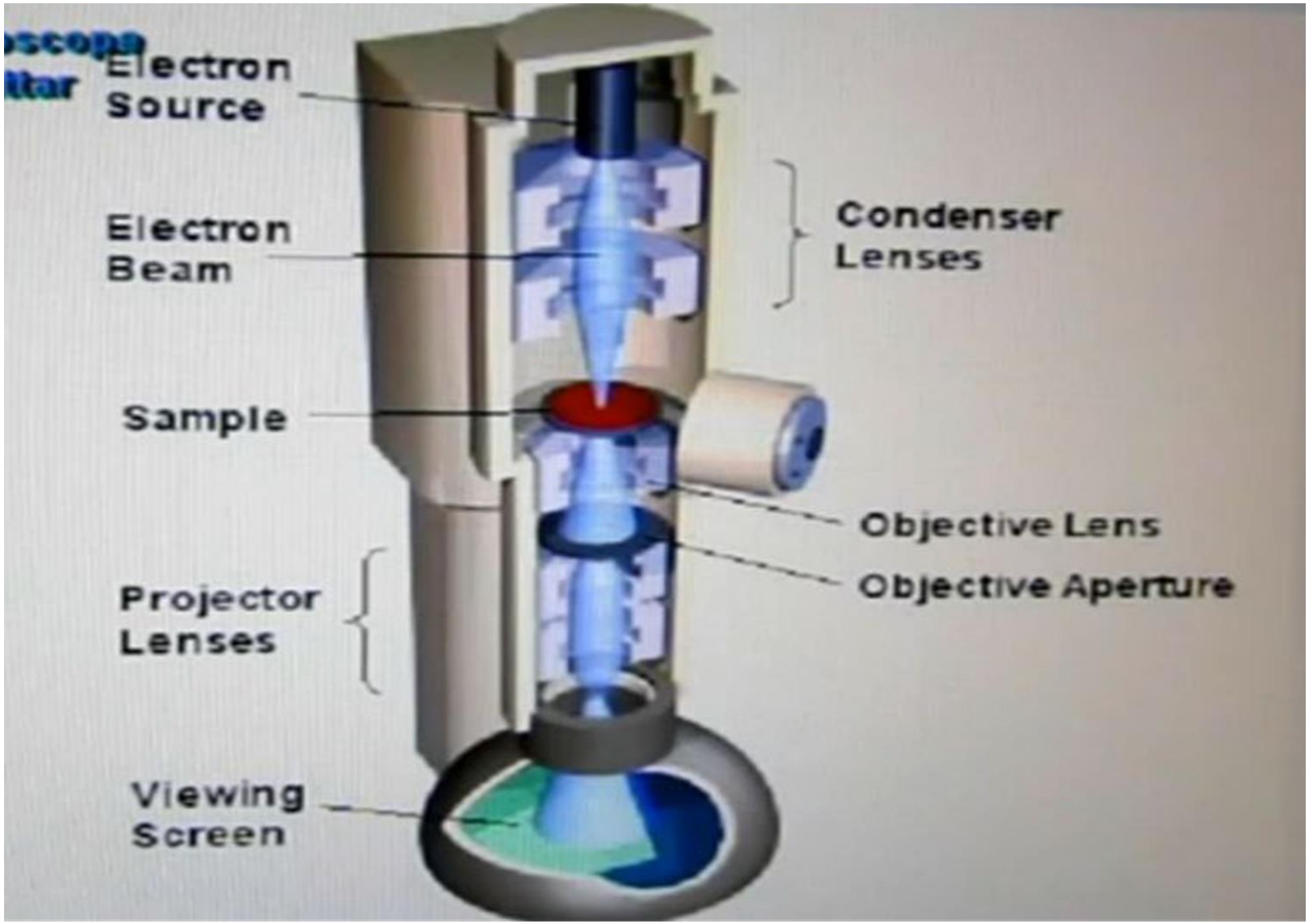
Types of Electron Microscopes

1. Transmission Electron Microscope (TEM):
   - Used for viewing internal features.

2. Scanning Electron Microscope (SEM):
   - Used for examining surface details.

Transmission Electron Microscope

Scanning Electron Microscope Laboratory



The parts of electron microscope

How Electron Microscopes Work

1. Generate electrons using an electron gun.
2. Focus the beam using condenser lenses.
3. Apply voltage to move electrons through the vacuum.
4. Observe interactions between the beam and specimen.
5. Capture images on a fluorescent screen.

Components of an Electron Microscope

1. Electron Gun: Generates electrons.
2. Electromagnetic Lenses: Focus the beam and magnify images.
3. Specimen Holder: Holds the sample.
4. Image Viewing System: Fluorescent screen or camera.

Applications

1. Studying microorganisms, cells, and large molecules.
2. Investigating metals and crystals.
3. Quality control in industries.
4. Advancing microbiology.

Advantages of Electron Microscope

- High magnification and resolution.
- Useful for studying cellular structures and pathogens.
- Ideal for analyzing fine structures.

Disadvantages of Electron Microscope

- Cannot observe live specimens.
- Requires ultra-thin, dried samples.
- Expensive and complex.
- Sensitive to vibrations and magnetic fields.


THE KEY TO SUCCESS IS
TO FOCUS ON GOALS, NOT
OBSTACLES.
مفتاح النجاح هو التركيز على
الأهداف لا العقبات.