

EXPERIMENT – I

COMPOUND MICROSCOPE

Objects which are ordinarily not visible by naked eye are seen with microscope. Generally an object smaller than 0.1 mm cannot be seen by our eyes. Therefore, to observe an object smaller than this, compound microscope is very helpful. Hand lens (magnifying lens) is also a type of microscope but its magnifying capacity is very low. Dissecting microscope is also used to visualize tiny things, but it has only one lens. Compound microscope is generally used in the laboratories. Therefore, description, use and maintenance of ordinary compound microscope is mentioned here.

1.1 Parts of a Compound Microscope

Take out the microscope from the box holding the arm by one hand and supporting the base by another hand. Place carefully on the table and study the names and functions of the parts as mentioned in the figure. The parts of a compound microscope can be divided into 4 main parts:

(a) Base : This is U-shaped lower portion of the microscope on which the other parts of the microscope lie. Above the U-shaped portion, there is a perpendicular portion known as the pillar. On the top of this, another arm is fixed. This is known as inclination joint. This can be used to tilt the microscope at a desired angle.

(b) Arm : It supports the body tube and base of the microscope. This portion is used to hold or carry the microscope. On the

base of this, stage is fixed. On the top of the arm body tube of the microscope is fixed and two knobs are fitted. One is for the coarse adjustment and the other for the fine adjustment. These are used for focussing the body tube.

(c) Body Tube : This is attached to the knob of the arm. It has one lens on the upper end known as eye piece. This lens can be changed according to the required magnification. On the bottom of this tube there is a nose piece. Two to four lenses can be fitted in this nose piece. Because the lenses are fitted on the objective, these are known as objective lenses. These are fitted in the body tube, known as objective lens body. The objective lens body is fitted into the nose piece.

(d) Stage : It is a platform having a circular hole in the centre to allow the passage for light from below. It is fixed to the base by the stand. One mirror is fixed to the stand. It is known as reflecting mirror. Below the stage is a condenser through which concentrated beam of light passes. Iris diaphragm is also attached to the condenser. The reflecting mirror reflects the light upward through the iris and diaphragm. This beam of light passes through the hole in the stage and provides light to the object kept on the slide. There are two clips for holding

the slide above the hole on the stage.

Operation (Use) : Keep a clean prepared slide in the centre of the stage. Use clips to fix the slide on the stage so that it does not move. Now move the body tube by the help of coarse adjustment knobs. Bring the slide in focus under the objective lens. Focussing should be made sharp by the use of fine adjustment knobs. When the focus is sharp then study the slide. The specimen is viewed by keeping one eye on the eye piece and the second eye should be kept open. This type of compound microscope is known as monocular compound microscope.

Some compound microscopes have two body tubes. So there are 2 eye pieces and specimen can be viewed by both the eyes. Such type of compound microscope is known as binocular compound microscope. In the research work generally binocular compound microscope is used.

1.2 How to use a Compound Microscope

To use the microscope first of all rotate the nose piece until the low power objectives is in line with the body tube and clicks into position. Open the iris diaphragm. Look through the eye piece, adjust the mirror and diaphragm to set a complete field of vision. Place the slide you want to examine on the stage of the microscope and by the help of the clips fix it. Move the slide till the object comes roughly to the centre of the hole or the stage. Bring the object into focus using the coarse adjustment knob. Turn the fine adjustment knob to bring the object into sharp focus.

How much magnification the object needs will be learnt through experience. Eye lenses of 5x, 10x or 15x are available. Some way objective lenses of 4x, 10x & 40x

are also available. The multiplication of magnification of eye piece and nose piece denotes the size of the object under observation.

Maintenance of Microscopes:

Microscope is a costly equipment. Therefore, it should be handled carefully. Always keep the microscope in an upright position while taking it from one place to another. As far as possible don't tilt the arm. Clean the lenses of the microscope with the lens paper or muslin cloth, never with the filter or any other kind of paper. If you are using the high power objective lens then after the observation is over, turn the nose piece and bring low power objective lens in line with the hole in the stage. Objective lens should be kept atleast 1 cm above the stage. After using the microscope always keep it in the box. Take care to see that the stage of microscope, the eye piece, the objective lens are dry and clean. No chemical should stick to these. Adjustment knobs and joints should be protected from rusting by applying vaseline.

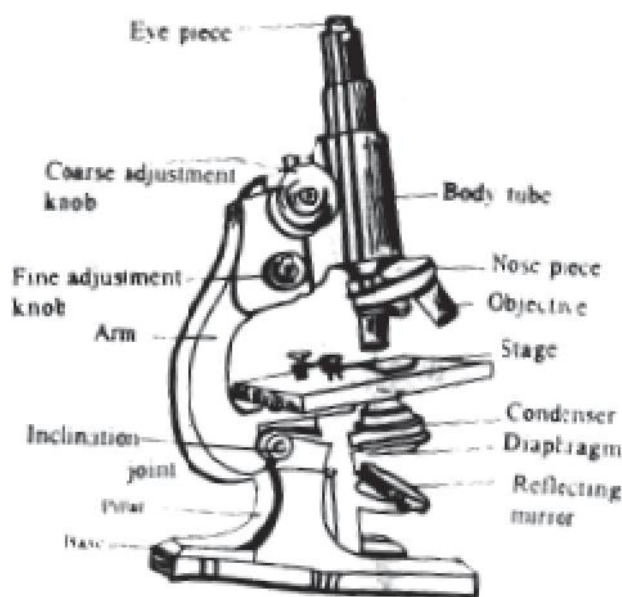


Fig. 1.1 A compound microscope

