

3 Chromosomes Can Be Seen

Mendel's achievement in working out the basic principles of heredity seems all the more remarkable when we realise that he had no way of knowing what the units of heredity were. It was over sixty years later (1916) before the chromosomes were discovered and their role in inheritance understood.

We have a big advantage over Mendel because we can

actually see the chromosomes ourselves. These are only visible clearly when they shorten and thicken in dividing cells, so we look for them in rapidly growing tissue. The root tips of young bean plants are particularly suitable, and if you carry out the following procedure you should be able to see chromosomes for yourself:

EQUIPMENT YOU WILL NEED:

Packet of bean seeds
Beaker
Vermiculite or Perlite in a tray
Sharp scalpel or razor blade
Microscope slide and cover slip
Meths burner
Tissues
Aceto-orcein stain (obtainable from chemical suppliers)

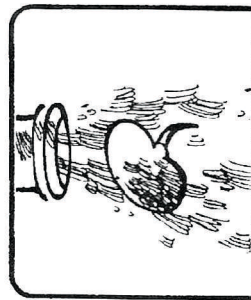


Fig. 3.3 Wash germinated seed to remove perlite.

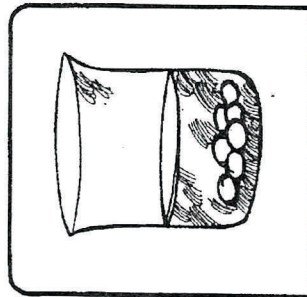


Fig. 3.4 Soak several bean seeds in water overnight.

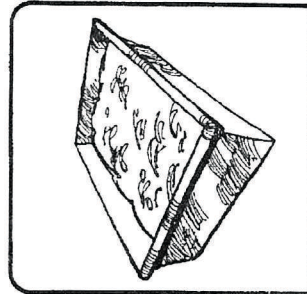


Fig. 3.2 Plant these seeds in perlite or vermiculite and keep moist for 4-5 days.

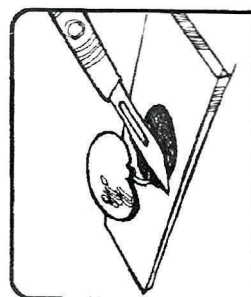


Fig. 3.4 Place a drop of aceto-orcein solution on a slide, and cut off the tip of the bean root — as close to the tip as you can get.

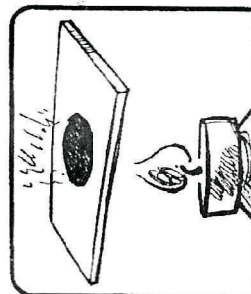


Fig. 3.5 Gently warm the slide above a low flame until the stain begins to steam. (Do not boil.)



Fig. 3.7 Place your slide on a firm surface, cover with a paper tissue (or blotting paper) and press. This should spread the root tip cells.

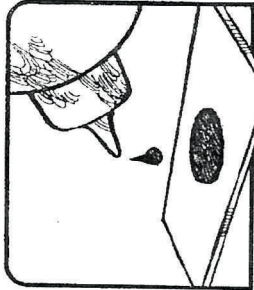
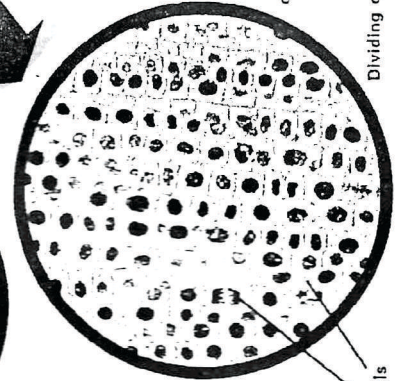
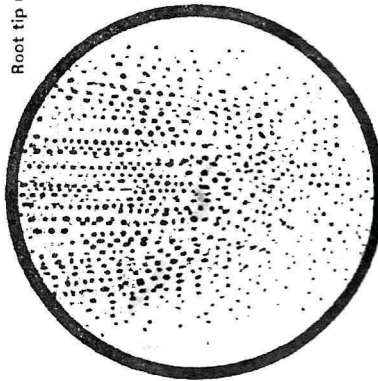
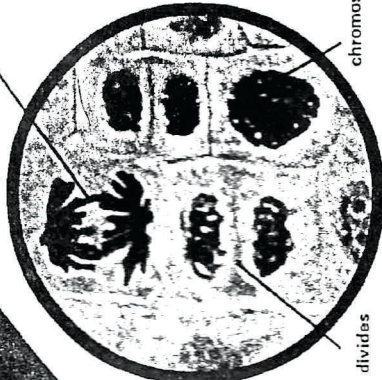


Fig. 3.6 Add another drop of stain and cover with a clean coverslip.

Root tip under low power



dividing cells

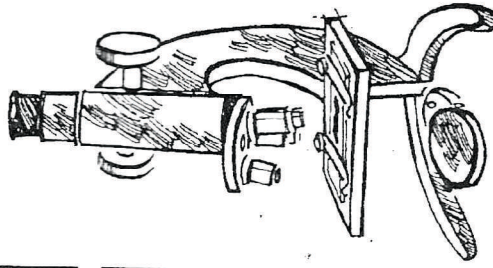


chromosomes separating

chromosomes

Dividing cells under high power

Fig. 3.8 Examine your slide using a microscope — first under low power to search for dividing cells and then under high power to look at the chromosomes in these cells in more detail.



Variation and change.
Heredity and environment.
D.H. Nelson.