

Letters to the Editor.

Fixation in Vacuo.

FOR rapid and successful fixation it is necessary that the materials should sink in the fixing fluid very quickly. For this it often becomes necessary to exhaust the air with an air-pump after placing the material

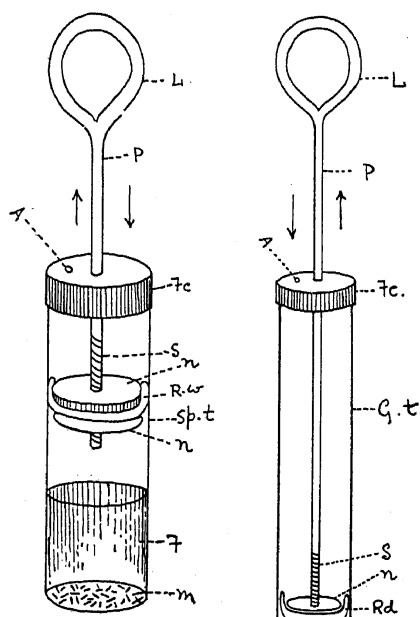


Fig. 1.

- F*—Fixing fluid.
m—Materials.
n—Brass nuts.
Sp.t—Specimen tube (3"×1")
Fc—Fibre cap.
R.w—Rubber washer held in position by two brass nuts.
A—Air hole.
P—Piston.
L—Loop.
S—Screw (cut on the brass rod).
 ↓ ↑—Arrow heads show the working.

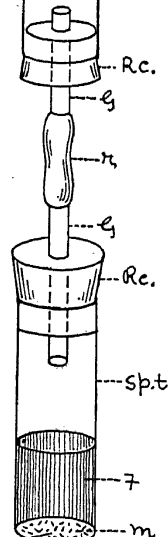


Fig. 2.

- m*—Materials. *F*—Fixing fluid. *Sp.t*—Specimen tube. *Rc*—Rubber cork. *G.t*—Glass tubing. *r*—Rubber tubing. *n*—Brass nuts. *R.w*—Rubber washer held in position by two brass nuts. *S*—Screw (cut on the brass rod). *Fc*—Fibre cap. *A*—Air hole. *P*—Piston. *L*—Loop. *G.t*—Stout glass tubing (8"× $\frac{3}{4}$ ").

in the fixing fluid. But in majority of cases the fixation must be done in the field and the ordinary air-pump is an inconvenient piece of apparatus to carry. To obviate this difficulty Osterhout¹ recommends a simpler form of air-pump, but the one we are using in the Presidency College Laboratory is not only very convenient to carry (total length being 5½", Fig. 1) but is giving uniformly satisfactory results and can be made very easily at a nominal cost. As cytological investigations have been taken up by a large number of investigators all over India, we give below a description of the apparatus.

Figure 1 shows the construction of the pump in detail. The tube is an ordinary 3"×1" specimen tube. The piston consists of a brass rod ($\frac{1}{8}$ " in diameter), one end of which is made into a loop and the other end is provided with a screw thread; the rubber washer, cut to size, is kept in position by two brass nuts, the lower one of which is slightly smaller than the inside diameter of the tube. The fibre cap contains two holes; the central one for holding the piston in position and the other one for the air to come out while the piston works.

The working of the apparatus is very simple. Take out the piston with the cap; pour the fixing fluid in the tube, then the material. Replace the cap with the piston and work it. The advantage is that the same apparatus can be used over and over again, for the fixing fluid with the sunk materials can be removed to smaller specimen tubes.

We have also devised an universal pump which can be used with any specimen tube. In this case the piston arrangement is the same as in the first case, but a piece of stout glass tubing about 8" long and $\frac{3}{4}$ " in diameter is taken instead of the specimen tube. At one end of this tube the piston with the cap is fixed and at the other is fixed a rubber cork with a piece of glass tubing as shown in Figure 2. During fixation a series of specimen tubes of the same diameter is taken in all of which a single rubber cork with a piece of glass tubing of the same bore as the one used in the piston fits. When in use the ordinary cork of the specimen tube is replaced by this rubber cork and a short piece of

¹ Osterhout, W. J. V., "Contributions to Cytological technique", *University of California Publications (Botany)*, 2, No. 2, July 15, 1904, pp 78-80.

stout rubber tubing makes the connection between the air-pump and the specimen tube.

As to the efficiency of the apparatus the vacuum produced in the smaller pump (Fig. 1) after a few strokes, is of the order of about 10 to 12 cm. ; in the universal one (Fig. 2) it is of a higher order. The vacuum produced helps the sinking of the material in two ways:—(1) by expelling the air between the surface of the fixing fluid and the uneven surface of the material, and thus helping it to “get wet” soon; and (2) by extracting the enclosed air within the material itself, thus making it “heavier” and readier to sink in the fixing fluid. It is our common experience that materials sink in the fixing fluid within a minute of the working of the pump.

Figure 3 shows a photomicrograph of a stage in meiotic mitosis in the microsporangogenesis of *Hibiscus mutabilis*—all the buds of

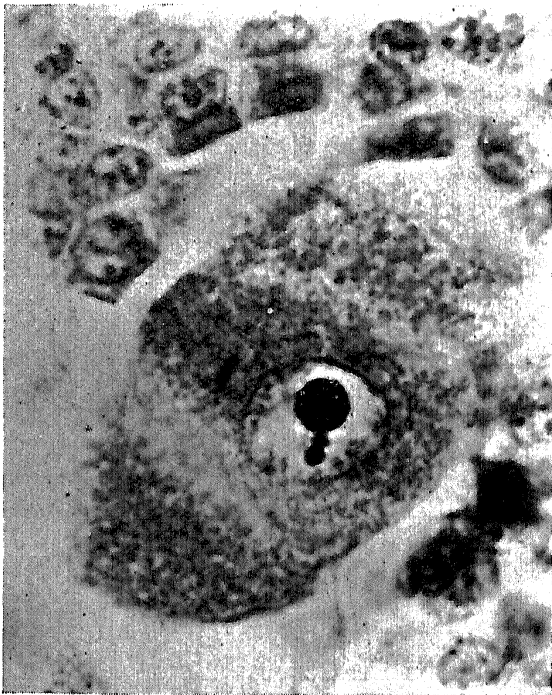


Fig. 3.

Photomicrograph of a pollen mother cell showing the fragmentation of the nucleolar bud in the nucleus.

which were fixed in the field with the help of these pumps. The detailed investigation of this material will form a separate paper.

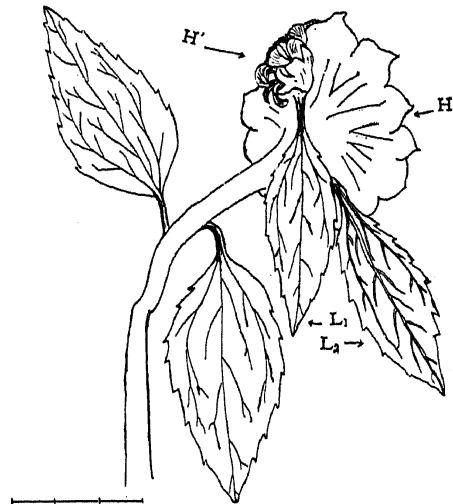
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An Interesting Case of the Insertion of the
“Leaves and Head” in *Helianthus annus*,
Linn.

It is a point of every-day observation that cauline leaves arise at the nodes of a stem and the radicle leaves appear to grow directly from the root or the roots, but are borne by the reduced stem. A slight deviation from this usual mode of insertion has been observed recently in *Helianthus annus* under cultivation.

The plant is about two feet in height and bears at the top a small head-inflorescence (see text-fig. H). The plants of this species usually grow to six feet and



Helianthus annus, Linn.

bear a few axillary and terminal heads. In the case under consideration, the growth is stunted. The head mentioned above is drooping towards one side as it is sufficiently old. The lower part of the involucre, therefore, is exposed towards the sky and bears two foliage leaves (L_1 & L_2) opposite to one another. In the axil of one of these, is another smaller inflorescence (H') just opening. The point of insertion is fairly above the peduncle, which usually bears the leaves. Seeing that the flattened portion of the peduncle on which the leaves and the inflorescences are growing is a modification of the stem, there is certainly no point of wonder in the above phenomenon; but the fact that it is of unusual occurrence is a point of interest.

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