

MICROSCOPIC NOTES.

BY GEORGE M. HOPKINS.

QUICK METHOD OF MOUNTING DRY OBJECTS.

There is a certain class of microscopic objects that need little or no preparation for mounting, and require no protection beyond a well secured glass cover. Many of these objects are interesting and in some degree valuable; but the microscopist considers them hardly worth



Fig. 1.—QUICK METHOD OF MOUNTING MICROSCOPIC OBJECTS.

the trouble of mounting. For such objects the method shown in the annexed engravings is of great utility, as it permits of inclosing the object quickly, completely, permanently and in presentable form, and while it seems especially adapted to such objects as are common, and

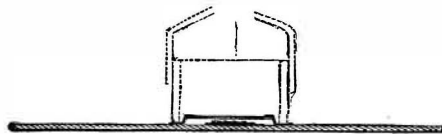


Fig. 2.—SECTIONAL VIEW OF THE SLIDE AND HEATING TOOL.

liable to remain unmounted, it is, of course, applicable to almost any dry object.

To carry out this method, only two articles, in addition to those usually possessed by microscopists, are required; one being the ring, with an internal flange at the top and an external flange at the bottom, the other a heating tool, consisting of a ring of brass attached to a suitable handle.

The rings of which the walls of the cells are formed are spun or stamped from disks of Britannia metal, sheet brass, or other sheet metal, with a narrow internal flange or fillet at the top for receiving the cover glass, and a wider external flange at the bottom, for attachment to the slide. The rings vary in depth according to the depth of cell required. The under surface of each ring is coated with thick shellac varnish and allowed to dry thoroughly. When the varnish is dry and hard a clean cover glass is dropped into each ring, and the ring is placed bottom upward on the warming stand and heated until the shellac melts and thoroughly covers the edge of the cover glass. The ring is now allowed to cool, when the cover will be ready for use. It will, of course, be understood that a quantity of rings and covers are thus prepared and held in reserve. In fact, it is to be hoped that the manufacturers of microscopists' supplies will furnish the rings and covers thus prepared, ready for instant use.

The object to be protected is attached to the slide by means of cement, in the usual way. A ring containing a

glass cover is arranged over the object, and the heating tool is warmed and placed upon the outer flange of the ring, as shown in the sectional view, Fig. 2. By this means sufficient heat is imparted to the ring to melt the shellac upon that portion touched by the heating tool, and cause it to attach itself to the glass slide. It is the work of an instant to cover an object in this way, and the slide needs no further finish; but the operator may, if he choose, lacquer the rings to prevent them from tarnishing.

A thin ring provided with the coating of shellac may be applied to an ordinary balsam mount to increase its security.

By applying to the ring a suitable cement, a liquid cell may be made. The object to be mounted in the liquid cell is wet with the liquid and placed on the slide. The ring is then secured in the manner above described, and the liquid is afterward introduced into the cell through an aperture previously made in the side of the ring. This aperture is stopped with cement, applied with a hot wire or needle.

DIMINISHING THE POWER OF AN OBJECTIVE.

It is often desirable to diminish the magnifying power of an objective and at the same time increase its penetration. For example, if one possesses a $1\frac{1}{2}$ inch or 2 inch objective, and desires to examine objects like minerals in the natural state, crystals, seeds, etc., he will find it necessary to focus up and down upon the object to see it in all its parts. A 3 inch or 4 inch objective would furnish the desired power, but it is not at hand.

To increase the focal length, and, at the same time, enlarge the field and deepen the focus, it is only necessary to place a double convex lens of, say, 5 inch focus about half way down the draw tube. The action of such a lens is the reverse of that of an amplifier.

SALICINE WITH HALF OF THE FIELD BACKED WITH MICA.

Fig. 3 of the engravings shows the beautiful circular crystals of salicine in a field partly covered by mica, to exhibit the phenomenon of the reversal of the rotation of the radial color bands by the action of a thin film of mica on the polarized beam. It is difficult to convey the idea fully by means of an illustration in black and white. The crystals are formed on a cover glass and protected by another cover glass, either with or without balsam. A thin film of mica is placed upon the stage of the microscope, so as to occupy one-half of the field. The mount of salicine is then laid on the stage, over the mica, so as to fill the entire field. If the crystals above the mica and those unbacked by mica seem to revolve in opposite directions as the polarizer is turned, no further experiment is necessary, and the salicine, with its mica backing, may be permanently mounted. But if this effect is not secured at first, mica films of different thicknesses should be tried.

Gardening under Difficulties.

The Chinese are a very industrious people, and nothing is allowed to go to waste that can possibly be utilized. As the empire of China is the largest on the

globe, and contains nearly half of the entire number of the human race, the necessity of economy is very apparent. They not only cultivate the land, but all of the lakes, ponds, and marshes are gardens in which aquatic plants, suitable for food, are largely raised. Among these the water chestnut is pre-eminent, and is said to be of a very palatable and wholesome nature. In a narrative of Lord McCartney's embassy to China, it is related that his lordship's attendants, in passing through a part of that empire, saw a man cultivating the side of a precipice, and on examination they found he had a rope fastened around his waist, which was secured at the top of the mountain, and by which he let himself down to any part of the precipice where a few yards of available ground gave him encourage-

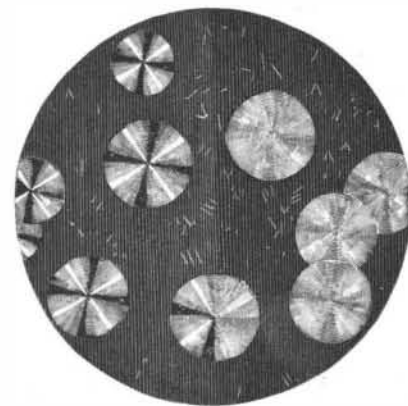


Fig. 3.—CRYSTALS OF SALICINE UNDER POLARIZED LIGHT—HALF OF THE FIELD BACKED BY MICA.

ment to plant his vegetables and his corn. The whole of the cultivated spots, which were at some distance from each other, appeared to be not more than half an acre, and near the bottom of the precipice, on a hillock, he had a little hut.—*American Agriculturist*.

A NOVEL ELECTRICAL EXPERIMENT.

An interesting example of the mutual repulsion of similarly electrified bodies is shown in the annexed engraving.

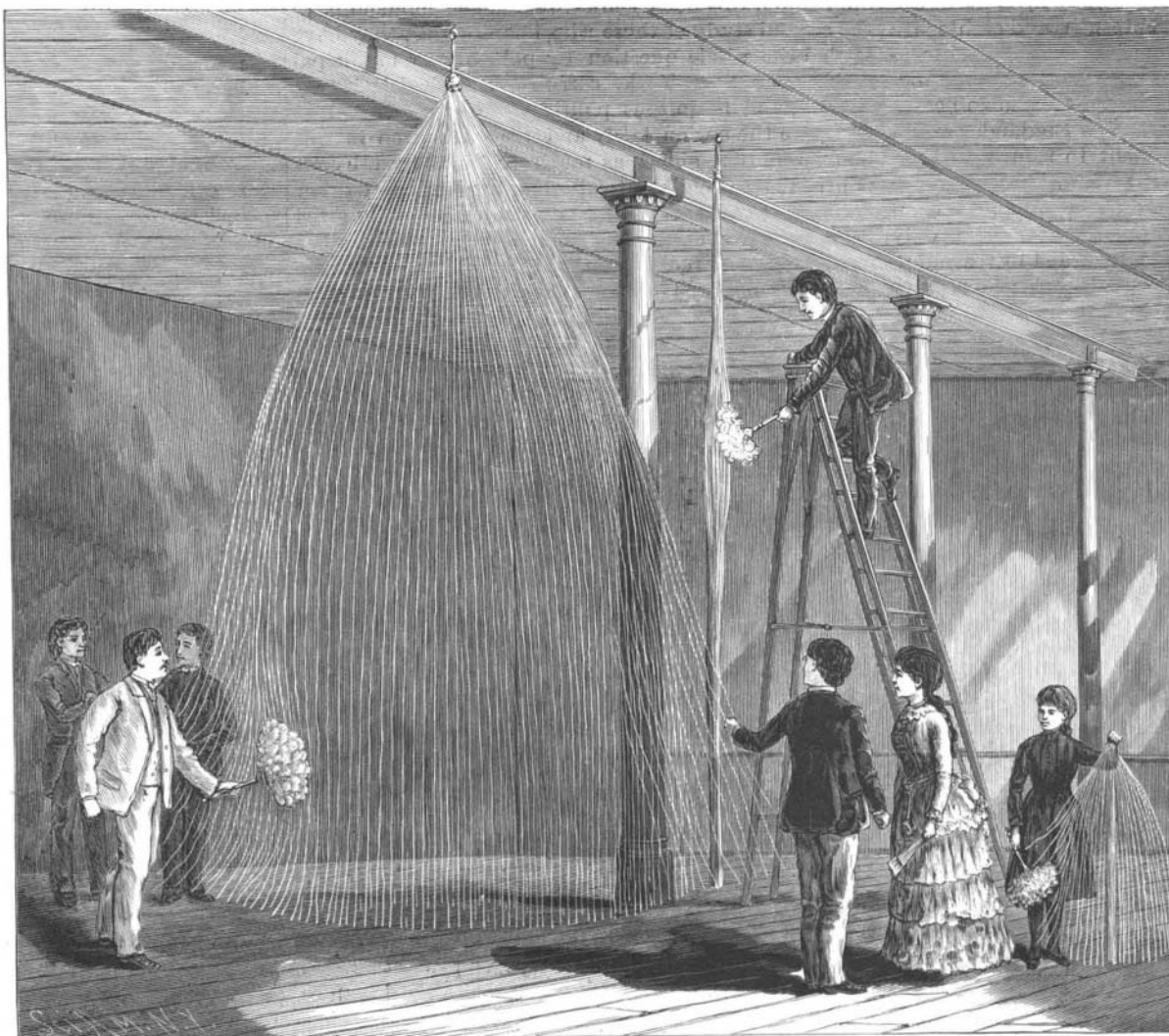
The divergence of the leaves of the electroscope, the repulsion of electrified pith balls, straws, and silk threads, and the electrification of human hair while being combed, are all familiar examples of the same electric action; but the rubber strips employed in this experiment have the advantage of being readily electrified and of retaining the charge for a long time.

For this beautiful experiment we are indebted to Mr. C. Voorhis, of the National Suspender Company, of the city, who, in handling some of the rubber threads used in the manufacture of suspenders and other elastic webs, noticed that the threads at times repelled each other. The repulsion was naturally attributed to electrification, and the experiment illustrated was at once suggested. The elastic rubber strips

used in the experiment (which were seventeen feet long and about one-sixteenth inch square) were suspended from the ceiling in one of the apartments of the SCIENTIFIC AMERICAN office, and were electrified by simply brushing them with a feather duster. The threads became more and more divergent as the electrification proceeded, until it finally became impossible to approach the threads without becoming enveloped in them.

Upon gathering all of the free ends of the threads together, the repulsion of the threads at their mid length caused them to separate widely. When once electrified, in a dry day the threads retain the charge for hours. They can be discharged by connecting them with the ground through the body, by drawing them through the hand.

This curious experiment is one which anybody may easily try at small expense. It illustrates the phenomenon of electrical repulsion in the most striking manner.



REPULSION OF ELECTRIFIED THREADS.