METHOD FOR ELEVATING LOW UNIVERSAL STAGE FLOOR-PLATE

JOHN C. HAFF,
Colorado School of Mines, Golden, Colorado.

Efficient universal stage operation requires that the central plane of the thin-slice itself must lie, or be brought to lie, in the plane defined by the horizontal axes of the instrument. The thickness of object-glasses and cover-glasses used by different thin-section preparators, both here and abroad, often varies considerably. To allow for this lack of uniformity most stages are equipped with some device for adjusting the height of the glass floor-plate carrying the thin section; thus providing accommodation for use with sections of widely different types.

In the 5-circle Bausch and Lomb universal stage (Emmon's model), vertical adjustment of the section is accomplished by rotation of a finely threaded ring on the under side of the stage. In the particular instrument used by the writer this ring cannot be raised sufficiently high to elevate adequately the thin sections obtained, despite the fact that the latter are procured from an experienced manufacturer (object-glass thickness circa 1.0 mm., coverglass thickness circa 0.13 mm.). In consequence of this deficiency the image of even a most accurately centered grain plunged rapidly away (northward) from the cross-hair intersection when the instrument was rotated about the E-W control axis away from the observer. This indicated that the section was still too low although the floor-plate was adjusted to its maximum height. Such behavior creates visual confusion, uncertainty in precise determination of extinction position, and soon induces oppressive eyestrain if the instrument is used continuously for any appreciable time.

Whether such a defect is a peculiarity of this instrument alone, merely inadvertent, or typical of all stages of such type, is not known. In any case, with continued absence of thin-section standardization it may be anticipated that similar difficulties will be encountered by others. Hence, a brief description of a simple means of correction of stages with insufficient vertical adjustment seems pertinent.

If the section cannot be elevated sufficiently to bring it precisely into the plane of the horizontal axes there are, in general, two possibilities, short of actual modification of the stage, for correcting this condition. Either (1) a means must be found to increase the thickness of the thin section object-glass, or (2) an exceedingly low platform may be erected on the working face of the glass floor-plate itself. No matter which method is adopted application of one or more large cover-glasses cemented firmly

with Canada balsam very probably will suffice to obtain the necessary elevation.

If the thickness of a thin section be increased by cementing a cover-glass directly to its under side, care must be taken to prevent overheating of the preparation when the balsam is applied. Such precautions as are necessary to prevent slipping or fragmentation of the rock-slice are especially important when oriented sections are used as in petrofabric studies. Also, when the section itself is modified the cover-glass applied to the lower surface must be sufficiently large so that there will be no tendency for the slide to tilt when moved about into positions remote from the center of the stage.

For a more permanent correction it is recommended that a single large (30×50 mm.) cover-glass, or two smaller ones (22×30 mm.) placed side by side, be cemented directly to the glass floor-plate supporting the thin section. This arrangement is more generally satisfactory since correction need only be made once provided the same type of thin sections are used subsequently. Moreover, the above-mentioned danger of injury from overheating of sections is obviated.

To prevent development of air bubbles beneath the cover-glasses balsam in xylene may be used. The floor-plate and cover-glass assembly should be heated very slowly at low temperatures, until sufficient volatile matter is driven off so that the balsam becomes hard on cooling. With this procedure care must be taken not to apply so much heat that strains develop in the floor-plate glass or its metal mount, and the whole unit must be slowly cooled. As a precaution the assembly may be tested for strain with a Berek compensator after cementing is complete.

Interposition of thin plates like cover-glasses between the thin section and glass floor-plate does not, in the usual case of routine measurements, cause sufficient deviation in the direction of measured optical vectors as to necessitate their angular correction before plotting.