modification of a piece of equipment already available. It is felt, however, that the principle of a central high-resistance portion, achieved by use of the cold-weld technique, could be advantageously applied in the design of similar devices incorporated into hot-stage microscopes.

The authors have also recently used the heaters for rapid vitrification of plagioclase feldspars for refractive index determinations.

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The use of epoxy resins in the preparation of petrographic thin sections

THE current methods for the preparation of petrographic thin sections have been described by Weatherhead (1947), by Reed and Mergner (1953), who give a bibliography of 14 references, and by Lewis (1959). The sectioning of friable materials has been described by Catt and Robinson (1961) in a paper giving a bibliography of 29 references on this speciality; they suggest the use of epoxy resins as impregnating media. More recently Langford (1962), following Vincent (1957), has advocated the use of epoxy resins for mounting detached grains of minerals for optical study but suggested that such resins were not suitable for the preparation of standard petrographic thin sections. The writer's experience indicates that in some cases epoxy resins may be used advantageously as a mountant for thin sections.

During the examination of a series of dolerite dykes in the Scottish West Highlands it was found that the professionally prepared thin sections were of a consistently poor quality: a large number of sections were left with their feldspars showing a first order yellow and most sections were small, ragged, and full of holes. As large numbers of sections of higher quality were required it was necessary for some sectioning to be undertaken personally. It became apparent that the presence of a swelling mineral in the rock caused the section to lift from the Canada Balsam or Lakeside 70C mounting medium and break up during the final grinding. Paraffin rather than water was used in the

final grinding with slight improvement. Attempts to waterproof the swelling mineral by impregnation of the rock slice with Lakeside 70C or Canada Balsam were unsuccessful but a modification of the Bakelite impregnation technique of Exley (1956) enabled a few high-quality sections to be made. As this technique was slow another method of tackling the problem was investigated.

A mounting medium was sought that would stick the section so securely to the glass slide that it could not lift by expansion. Messrs. CIBA (A.R.L.) Ltd. assisted by providing a series of artificial resins, one of which eventually proved satisfactory. It was found that the swelling mineral was a material pseudomorphous after olivine that has not yet been positively identified but is probably a mixture containing a montmorillonite constituent. Rocks that had previously appeared to be olivine-free dolerites were thus found to be olivine-containing and sections of sufficient quality to enable reliable modes to be point-counted could be made.

Characteristics of Araldite AY 105 mounts. The bond between the section and the slide is permanent and the section cannot be moved or transferred to another slide: cover-glasses can be removed and replaced and covering cements changed with little risk of damage to the section. The resin is insoluble in normal organic and inorganic solvents and is chemically inert so that the section may be chemically treated on the slide without fear of detachment. The refractive index of the cured resin is about 1·54 but may vary between 1·535 and 1·550 depending on the care taken in preparation.

Large numbers of slices can be mounted at the one time and the strength of the mount permits the coarse and medium grinding to be performed with considerable violence using water as a lubricant: the method is thus rapid, but unless the directions that follow are carefully observed the mount will have a frosted appearance due to the inclusion of minute air bubbles or will show strain birefringence.

Method. A slice of rock $\frac{1}{16}$ in. to $\frac{1}{8}$ in. thick is cut with a diamond saw and is polished on one surface using carborundum powders on metal laps and metal and glass plates in the normal manner. After polishing the slice it is washed, wiped dry, and allowed to stand for one or two minutes, after which the surface is examined. If the surface is pitted or covered with small bulges the slice must be repolished on a dry plate and wiped clean with a dry cloth or rinsed in benzene.

The process of mounting should be carried out on a hot plate at slightly under 100° C: a metal plate covering a water-bath is satisfactory.

Equal portions of Araldite resin AY 105 and hardener HY 953F are thoroughly mixed on a glass slip standing on the hot plate. The mixture may become opaque due to the inclusion of air bubbles but will quickly clear; the slip is then removed from the hot-plate. The glass microscope slides on which the mounting is to take place are wiped clean using either methylated spirit or benzene (detergents must not be used) and are stood to warm on the hot-plate. The rock slices are also set to warm resting on a piece of paper, polished side uppermost.

Some of the resin mixture is transferred onto the polished surface of the rock slice and spread evenly over the surface. The clean, warm glass slide is then lowered onto the slice, care being taken to trap no air under the glass. There will then elapse a period of about three minutes during which it will be possible to manipulate the slide into the correct position over the slice or remove previously unnoticed air bubbles. After this time no further movement between the glass and the slice will be possible. The assembled rock and glass slide is allowed to sit on top of the hot-plate for half an hour.

The final grinding of the slice down to the correct thickness is carried out in the normal manner and the slide may be subjected to considerable rough treatment during the coarse grinding. If the slice showed much pitting or swelling during the first polishing, the final grinding may be done on a dry plate: this is very rarely necessary.

The cover-glass is mounted on the cleaned slide with Canada Balsam or Lakeside 70C. As the rock slice is stuck securely to the glass, little care requires to be taken other than the usual avoidance of bubbles.

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