A METHOD FOR THE RECOVERY OF MOUNTED PALYNOLOGICAL RESIDUES

by

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Summary

A simple method is given for the extraction and remounting of palynomorphs contained in glycerine jelly slide mounts.

Introduction

There are many occasions when the palynologist requires remounts of mounted material, particularly when little or no additional residue is available. This is often the case with valuable core samples and rocks containing very low concentrations of palynomorphs, such as the purer limestones. Some of the reasons that the writer has recovered the residues from slides are:

1. Salvaging the material from broken or damaged slides (mainly as a result of the serious Nottingham University Geology Building fire of March 1970).
2. Altering the palynomorph concentration.
3. Changing the degree of staining.
4. Altering the size of coverslip used (the original coverslips used by the writer were too large for the mounts to be fully traversed with a mechanical stage).
5. Additional chemical and mechanical processing.

The method described below would also be suitable for the rejuvenation of slides in which the glycerine jelly had deteriorated. On occasions when the strew mounts are required for single-grain picking, the writer uses a slightly different method, involving the treatment of one slide at a time (Wilson, 1971, p.32).

It is important to stress that remounts of residues can be prepared only when glycerine jelly and certain other non-permanent substances are used as mounting media. This means that it is not possible (by readily available methods) to remount residues contained in Canada balsam mounts. Furthermore there is little point in attempting to remount over-macerated residues in the hope of improving them, since nothing can be done to repair palynomorphs once they have been split, expanded or broken due to excessive oxidation, acetylation or ultrasonic irradiation. The writer tends to slightly under-macerate his samples, since the mounted residues can always be given additional treatment, if necessary, by use of the method which follows.

Method

Slides for remounting are cleaned with cotton wool moistened with alcohol, avoiding any areas containing obvious residue (particularly in the case of damaged or broken slides). If the coverslips have been sealed with nail lacquer, this must be carefully removed with cotton wool soaked in acetone. The coverslip margin should then be washed thoroughly in acetone and wiped clean with a tissue.

The cleaned slides, all from the same sample, are placed vertically with the labels uppermost in a 100ml. beaker. The beaker is filled with distilled water to a level just

covering the coverslips. No more than ten slides should be placed in any one beaker. The beaker is then placed on a hotplate kept at about 100°C. Eventually the coverslips and residues will sink to the bottom of the beaker as the glycerine jelly melts.

The slides must then be removed individually and washed carefully, with a small amount of hot distilled water, into the beaker to ensure that all traces of residue are removed. They should preferably be handled only with a pair of tweezers during this process. Damaged or broken slides are then discarded, while those in sound condition may be cleaned with alcohol and conserved ready for reuse. The old coverslips, together with any labels which may have soaked off, are discarded; care must be exercised to ensure that no important information, given on the old labels, is lost.

The residue should then be transferred to one 15 ml. centrifuge tube and washed thoroughly with hot distilled water. If the original slides were sealed with nail lacquer, then the residue must be washed thoroughly with acetone in order to remove all traces of the sealant. The residue is then ready for either remounting or additional processing.

Treatment of residues

The investigator, after having examined the original slide preparations, should have an idea of the amount and nature of any subsequent treatment required by the residue.

Very small residues should be treated with a heavy liquid solution (Wilson, 1971) and washed several times with water.

Larger residues should either be filtered through a sintered glass plate (Wilson, 1971) or screened through one or more sieves if these are available (Kidson & Williams, 1969). Acetylation may be used for residues containing an abundance of cellulosic matter. The residues should then be treated with a heavy liquid solution, short-centrifuged (Lennie, 1968) and washed several times with water.

Increase in Stain

Residues requiring a deep stain should be mixed thoroughly with a few drops of alcoholic safranin solution, then centrifuged and washed several times with water. This process should be repeated at least once. The residue must then be mounted in stained glycerine jelly.

Decrease in Stain

Safranin-stained residues requiring partial or complete removal of stain should be washed with 20% HCl until the blue colour disappears from the supernatant liquid. The destained residue should be mounted in unstained glycerine jelly if unstained palynomorphs are required or in lightly stained glycerine jelly if a mild stain is required.

Mounting

A semi-micro pipette is used to transfer 1-3 drops (depending on the required palynomorph concentration) of carefully mixed aqueous residue to the slide (Lennie, 1968). The slide is warmed on a 100°C hotplate until the water has nearly evaporated. A drop of melted glycerine jelly is added and mixed thoroughly with the residue, using a flat-tipped plastic toothpick, and is spread out with the toothpick into a square of approximately 18 x 18 mm.

The slide is then removed from the hotplate and allowed to cool. Before the jelly has completely cooled, a clean 22 x 22 mm. "O" gauge coverslip is placed on the surface and the slide returned briefly to the hotplate, enabling the jelly to migrate to the edges of the coverslip. Sufficient glycerine jelly must be under the coverslip to ensure that the larger palynomorphs, especially certain hystrichospheres, are not crushed by the weight of the coverslip; on the other hand, if too much mountant is used the mount will be too thick, the palynomorphs

in different planes, and the slide difficult to examine microscopically.

The slide is left for three hours on a cool horizontal surface, to facilitate hardening of the mountant and to achieve an even spread of the residue. After this period, any residue which may have exuded around the margin of the coverslip is carefully removed with the tip of a clean scalpel and transferred to another slide. The writer has found that, by removing the excess jelly in this manner from 7-10 slides, sufficient residue can be obtained to make another rich slide mount; this is very useful when relatively little residue is available. Finally the margin of the coverslip is cleaned with ethanol, then with acetone, sealed with two coats of nail lacquer, and labelled.

Further details on palynological slide mounting are given by Andersen (1965) and Brown (1960). Methods for the preparation of single-specimen mounts are described by Wilson (1971).

Acknowledgements

The writer completed this work under the tenure of a New Zealand Public Service Overseas Study Award. Dr. William A.S. Sarjeant kindly read and criticized the manuscript.

References

ANDERSEN, S.T. 1965. Techniques in Palynology: Mounting Media and Mounting Techniques. In KUMMEL, B. & RAUP, D. (eds.) "Handbook of Paleontological Techniques." San Francisco, Freeman (pp. 587-98).

BROWN, C.A. 1960. Palynological Techniques. Baton Rouge, La.; privately published, 188 pp.

KIDSON, E.J. & WILLIAMS, G.L. 1969. Concentration of palynomorphs by use of sieves. Okla. Geol. Notes, vol. 29, no.5, pp. 117-9.

LENNIE, C.R. 1968. Palynological techniques used in New Zealand. N.Z. Jl. Geol. Geophys., vol. 11, no.5, pp. 1211-21.

WILSON, G.J. 1971. A chemical method for the palynological processing of chalk. Mercian Geologist, vol.4, pp. 29-36.

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Manuscript received 15th September 1971.