A Technique for Sectioning Microfossils

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In recent years the sectioning of microfossils (Bryozoa and Foraminifera, especially fusulinids) has been a technique useful to the taxonomist, as well as the general worker in the field of invertebrate micropaleontology. Following the war, several plastics have appeared on the market to compete with Canada Balsam as a mounting medium in sectioning. After experimenting with a number of these plastics, the writer has found that a thermoplastic manufactured by The Lakeside Chemical Corporation[1] gives excellent results with calcareous forms. This type of thermoplastic has a distinct advantage over other media in that it has the same resistance to the grinding agent as does the calcite of the fossil, thus leaving a smooth, unpitted surface.

The present sectioning technique was developed while the writer was studying the shell structure of fossil Ostracoda (a report is now in manuscript). Because of their minute size, average 0.8 mm–1.5 mm, sectioning these bivalved crustaceans has been difficult and time-consuming; in most instances, however, only 15 min is needed to obtain excellent sections with the technique outlined here.

A slide is prepared by heating a very small quantity of the thermoplastic just above the temperature at which it becomes fluid. As quickly as possible the slide is placed on a piece of asbestos under a binocular microscope (magnification 30×) and a double-valved specimen (of an ostracode) is introduced into the plastic. The thermoplastic usually remains fluid for a sufficient time for the specimen to be oriented in any desired position. A fine needle is a satisfactory tool for changing the position of the specimen, the dorsal margin of which may be painted red to aid in orientation. This is accomplished by applying pigment from a colored pencil with a fine brush. The slide is ground by hand in a water mixture of 400-mesh carborundum on a glass plate. The specimen can be examined periodically from the reverse side of the slide, and just before the section is ground to include the desired features the slide is buffed lightly on a power-wheel felt buffer, using a liquid rouge. Suction cups (from toy arrows) with the same diameter as the slide afford an easy method for holding the slide against the buffer. The specimen then is washed thoroughly to remove the rouge and dried. In some instances, if the specimen is first moistened, the results of this part of the process offer sufficient detail to photograph well, using reflected light, although more intricate detail is usually shown if a thin section is made. If a thin section is desired the slide is reheated gently to the melting point of the plastic and the specimen oriented under the microscope so that its flat surface is flush against the slide. It is reground and buffed, as before, until clear structures are obtained.

It is possible to section both single and double valves of fossil ostracodes by this method, but double valves are preferred, since they are easier to orient. Excellent sections of single and double valves of micropelecypods and microbrachiopods were also made by this process.

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The Fate of Plasma Cells

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Plasma cells are generally believed to be specifically differentiated elements which are apparently unable to change into another cell type and finally degenerate. Only a few authors (*1, 2*) have admitted the possibility of the transformation of these elements into connective tissue cells.

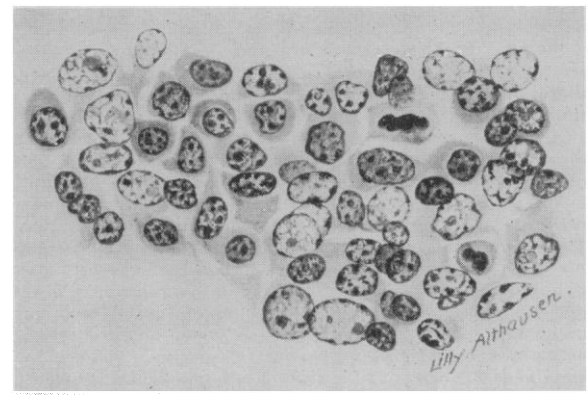

FIG. 1. Medulla of a lymph node: a group of cells is shown in which several intermediate phases from plasma cells to reticular elements are seen; upper right, a mitosis. Magnification × 900.

Recent observations which I made in the course of a study on the histopathology of experimental C-avitaminosis in guinea pigs support the theory of transformation. In fact, histological examination of the lymph nodes, especially from animals submitted to a prolonged hypovitaminotic diet, revealed very clearly that plasma cells undergo a transformation into reticular elements. The plasma cells, initially accumulated in great numbers in the medulla of the lymph nodes, showed a series of transitional phases with numerous mitoses before assuming the aspect of reticular cells. In animals which were kept in hypovitaminosis for longer periods, the plasma cellular infiltrate was sometimes replaced by dense reticular tissue. Similar observations were made in chronic inflammatory tissues from man and animals.

The findings here described confirm the assumption that plasma cells are not doomed to degeneration and suggest that they are cells in a phase of resistance, still maintaining an evident capacity for proliferation and differentiation.

References

1. FERRATA, A. *Le Emopatie,* Milano, 1933, **1**, 428.
2. MAXIMOW, A. *Handb. Mikroskopischen Anatomie Menschen,* Berlin, 1927, **2** (1), 268.