SCIENTIFIC APPARATUS AND LABORATORY METHODS

A SAFETY RAZOR BLADE WHICH CUTS AS WELL AS THE BEST MICROTOME KNIVES

LABORATORY instruction in histologic and cytologic technique very often taxes the patience of the teacher when students abuse apparatus, especially the microtome knives. If a limited number of knives are used, students become careless and knives are soon dulled or nicked. Better results are obtained by assigning one knife to a small group. A still more satisfactory procedure is to let each student have one knife and burden him with the responsibility of keeping it in good condition. This, however, has the disadvantage that a great number of knives must be on hand, and that they have to be resharpened at the end of the course.

Recently, a new safety razor blade made its appearance, which is radically different from older types. It is curved and heavier than the ordinary blade. The curvature adds to its inherent strength, so that it is practically impossible to bend it. I tried this blade by attaching it to a piece of hard wood and was able to cut sections of four microns of Drosophila eggs without having the slightest variation in thickness. I communicated with the company which manufactures these blades, asking for the production of a holder, so as to be able to use the blades for general microtome work. After several conferences with the technical expert, I obtained a steel holder with the blade attached in the center. This curved safety razor blade with its holder gave me as good results as any knife I ever used. The blade is rigid, giving uniform sections of any thickness. It stands up under its own strength, being attached to the holder by only two screws. It is concave, approximating the best microtome knives on the market.

I requested the company to submit this product to all of us who for so many years have been looking for salvation from the troubles of microtome knives. I have been told that the holder will soon be advertised and introduced to the readers of SCIENCE.

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ANOTHER PETROGRAPHIC METHOD

THERE appeared in SCIENCE for April 5 a note by Charles Milton on microscope technique of especial interest to petrographers. It dealt with the use of the analyzer frame in determining refractive indices of powdered minerals under the microscope. That note suggests another. The Leitz Company has added to its standard petrographic microscope a special substage shader, the purpose of which is to give better results in determining refractive indices by the inclined illumination method. There are many who prefer the inclined illumination method to any other though it may not be any more accurate or convenient. The shader consists of a small plate on a swinging arm controlled by a convenient lever. It swings in below the condensing lens and above the polarizer. The intensity of the illuminated or darkened margins of grains is very satisfactory indeed both with white and diffused monochromatic light and a high degree of accuracy is afforded. It is of course much more convenient than the use of the finger or a card. The shader has been developed by W. Zieler, of the Leitz Company in New York City. It is announced by the writer at the request of Mr. Zieler.

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SPECIAL ARTICLES

A METHOD OF DETERMINING THE AXIAL RATIO OF A CRYSTAL FROM X-RAY DIFFRACTION DATA: THE AXIAL RATIO AND LATTICE CONSTANTS OF ZINC OXIDE

AN X-ray diffraction pattern taken by the powder method gives directly the interplanar spacings of the most important planes. In the case of a hexagonal or tetragonal crystal most of these spacings are dependent on both "a" and "c," which are the lattice parameters along the X (or Y) and Z axes respectively. Only a few of these spacings are dependent on either "a" or "c" alone. An accurate determination of the axial ratio could not be made by direct calculation from these few spacings.

A graphical method of finding the axial ratio from a group of interplanar spacings has been developed by Hull and Davey.[1] It is evident to any one who has used this method that it is only approximate. Since the values of "a" and "c" can not be calculated without knowing the axial ratio, it is necessary, for any accurate measurement of the lattice parameters of a crystal, to know the axial ratio accurately.

A very accurate method of finding the most probably correct value of "a" for cubic crystals, from a series of observed interplanar spacings, has been described by Davey.[2] The method consists of plotting on arithmetic probability paper[3] the values of "a," calculated from the observed interplanar spacings,

[1] A. W. Hull and W. P. Davey, *Phys. Rev.*, 17: 549, 1921.
[2] W. P. Davey, *General Electric Review*, 29: 118–128, 1926.
[3] A. Hazen, *Trans. Am. Soc. C. E.*, 77: 1539, 1914.