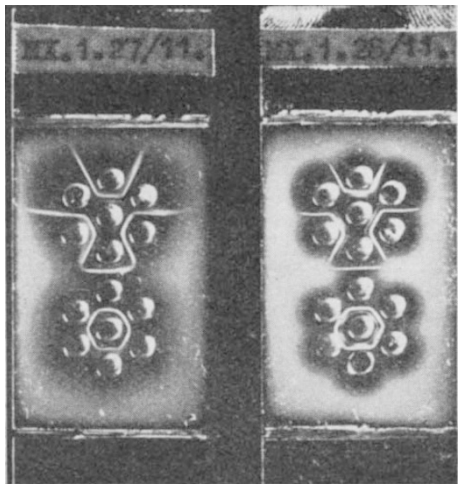

Fig. 1

the arrangement of the reagents in all four units were: convalescent myxoma serum in the centre basin, and myxoma exudate antigen in basins 1, 3 and 5. In the upper two units myxoma convalescent serum was added to basins 2, 4 and 6 and in the lower two units myxoma exudate antigen was placed in basins 2, 4 and 6.

The advantages of this technique are rapidity and economy of reagents, making it possible to proceed when the specimen submitted is insufficient for a plate test.

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Feb. 7.

[1] Mansi, W. *J. Comp. Path.*, **67**, 297 (1957).

## Use of Electronic Flash in Photomicrography

Other workers (Wilson[1] and Doncaster[2]) have discussed methods of incorporating electronic flash in microscopy; but both of them exposed the tube and no attempt was made to limit and concentrate the light from the flash tube on to the microscope mirror. A large amount of light is lost in this way, and Doncaster[2] noted that with high powers (4-mm. objective) of the microscope, high-speed film had to be used with the consequent disadvantage of large grain. In the method to be described, the electronic flash as illuminant is incorporated in an optical bench and an attempt has been made to concentrate the flash on to the microscope mirror so that fairly critical illumination is attained.

The flash unit used is the Courtenay 'Magna II *E*' with a rating of 220 Joules and a flash duration of approximately 1/4,000 sec. The flash tube, with its reflector removed, is inserted into a special reflector unit (Fig. 1) placed on a horizontal optical bench between microscope and microscope lamp. The tube rests on a *T*-piece, the vertical arm of which is attached to the side of the box *A*. Dimensions must be modified to suit individual arrangements. The actual reflecting surface of the unit consists of a

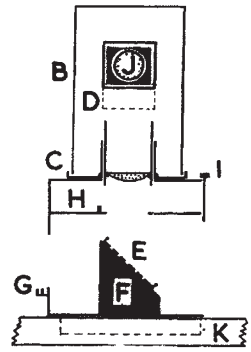


Fig. 1

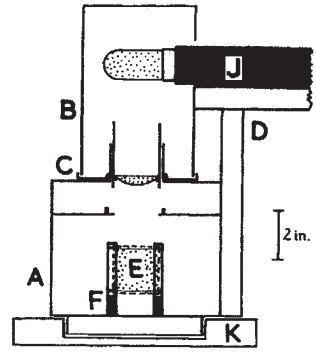


Fig. 2

Fig. 1. Reflector unit, side elevation: *A*, wooden box; *B*, metal cylinder; *C*, flange bearing tubular focusing unit with 2-in. plano-convex condenser; *D*, arm holding flash; *E*, coverslip; *F*, coverslip support; *G*, filter holder for microscope; *H*, shelf holding illumination control filters; *I*, front panel sliding in groove; *J*, flash tube; *K*, optical bench

Fig. 2. Reflector unit, front elevation

No. 2 ($2\frac{1}{2}$ in. × $1\frac{3}{4}$ in.) coverslip mounted on two wooden supports and inclined at an angle of 45°. This coverslip lies between four pins and is held in position by elastic bands stretched across the top and bottom pairs of pins so that the coverslip is easily removed for cleaning or replacement. The transparent reflector allows the greater portion of the microscope-lamp beam to pass through and will also, in conjunction with the black background, deflect the flash beam on to the microscope mirror. The interior of the unit is painted matt black.

The optical bench, *K*, is first arranged so that the image of the microscope lamp filament comes to lie in the plane of the object on the microscope stage. The reflector unit is then introduced on to the bench and the flash tube replaced by a 240-V. lamp of the same dimensions. The microscope lamp is switched off and the condenser and the distance between reflector unit and microscope is adjusted until this second lamp image is also in focus in the same plane as the image of the microscope lamp. The unit is fastened to the optical bench and the flash tube replaced in tube *B*. The flash is synchronized at 1/50 sec. to a single-lens 35-mm. reflex camera. The camera extension is approximately 3 in. and with the medium ($\frac{2}{3}$ in.) and high ($\frac{1}{6}$ in.) powers of microscope objective the illumination is too intense and has to be reduced with normal monochromatic and/or neutral density filters placed on shelf *H*. Filters for normal visual work with the microscope are placed in rack *G*. With fresh material and, using the $\frac{2}{3}$ in. × 10 combination, Ilford filters 303 plus 404 were required; with $\frac{1}{6}$ in. × 10, filter 104 was used. No filter was required with $\frac{1}{12}$ in. × 10 combination. The film was rated at *A.S.A.* 25 and developed in *I.D.* 2 for 6–7 min. at 20° C. For low-power work it was found necessary to switch the microscope lamp off before releasing the flash to avoid double exposures. The lamp was wired to a foot switch, thus freeing the hands for focusing and shutter release.

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March 3.

[1] Wilson, D. P., *Discovery*, **14**, 347 (1953)
[2] Doncaster, C. C., *Nematologica*, **1**, 51 (1956).