crease with duration of the heating, the radioactive yield into purified *p*-nitro benzoic acid is likely to be much less than 44 per cent in the second case.

After purification, and removal of the activity from the carboxyl group, the overall yield was about 70 per cent by weight (17 per cent by activity), the specific activity being 230 mc./gm.

Further studies on the use of this material are in progress. A detailed account of the method will be published elsewhere.

J. E. S. BRADLEY

Physics Department,
Middlesex Hospital Medical School,
London, W.1.
Sept. 7.

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A Surface Contact Microscope for the study of Cell Movements

THE importance of the contacts formed by moving cells in controlling their behaviour has been clearly shown in the phenomenon of contact guidance described by Weiss[1] and in contact inhibition described by Abercrombie and Heaysman[2].

In order to study the contacts formed between cells and solid surfaces, it is possible to make use of the slight penetration of light waves into the less dense medium when totally internally reflected at a glass/water interface. The apparatus used for these studies is illustrated in Fig. 1. Light from an intense source *S* (compact-source mercury arc) passes through the slit *T* and strikes the upper surface *A* of the 60°-prism. A cell suspension in water is mounted between an ordinary microscope slide and a coverslip and is sealed with immersion oil on the upper face of the prism (Fig. 2). The incident light now strikes the upper surface of the glass slide at an angle greater than the critical angle and is totally internally reflected at the glass/water interface. In reality the beam penetrates the less dense medium slightly, as shown diagrammatically in Fig. 3(*a*). If a cell of refractive index greater than water is moving on

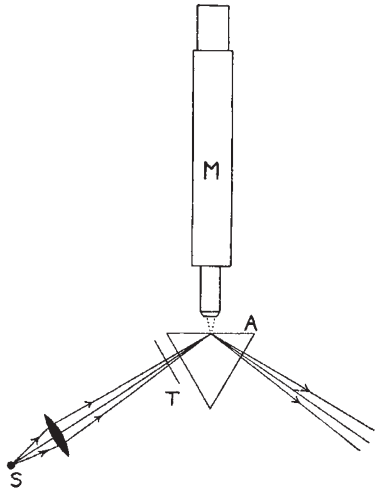

Fig. 1

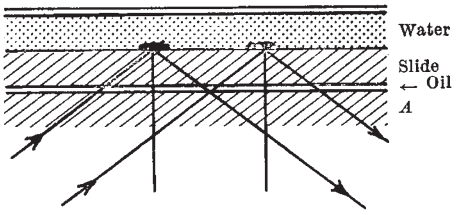

Fig. 2

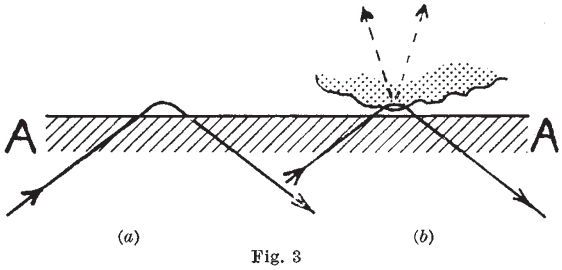

Fig. 3

the surface (Fig. 3(*b*)), those portions which make close contact with the surface of the glass will enter the penetrating beam and will scatter the light, owing to the presence of minute inhomogeneities in their structure.

When seen from above, through the microscope *M*, the field appears completely dark, provided that the incident light beam has been carefully shielded and the prism faces are clean. But those regions of the moving cells which are in close contact with the glass are brightly illuminated. In addition, the actual contours of the cell surface can be explored by changing the angle of the incident beam. With increasing angle, the degree of penetration of the incident beam is decreased so that the areas of the cell which are illuminated are reduced, eventually to those regions which are almost in molecular contact with the glass surface.

The effect is particularly well illustrated in the case of a filamentous mould kindly provided by Dr. R. J. Goldacre. As the mould moves forward along the glass, bright waves of light can be seen to move rapidly along its length, which are due to continuous changes in the points of adhesion between the lower surface of the mould and the glass surface. Apart from its biological application, the microscope may prove to be generally useful for the study of a number of phenomena, particularly those connected with the forces of cohesion between surfaces.

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E. J. AMBROSE

Chester Beatty Research Institute,
Institute of Cancer Research:
Royal Cancer Hospital,
London, S.W.3.
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