NOTES AND NEWS

MEASUREMENT OF COMPONENTS OF THIN SECTIONS WITH THE PLANIMETER

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The following method was employed in the determination of the relative proportions of two alkaloids in a mixture, and has much to recommend its use in fields other than that of forensic chemistry. The proportions of the different minerals in a thin section of a rock, or in a granular mixture of discrete particles as in the case of sediments, may be easily and precisely determined.

In the case in question, the microscope was mounted on the base of the stand supporting a camera placed in a vertical position. The ground-glass of the latter was removed and replaced by a piece of plywood, about $12'' \times 15''$, with a central opening $4'' \times 5''$ (the size of the ground-glass of the camera), and with four cleats attached to the underside making a frame of the same size as that of the ground-glass. This construction holds the plywood in place. A sheet of plate glass was suitably fastened to the upper surface of the wood. A piece of celluloid roughened with fine sandpaper on one side, or oiled bond typewriter paper, etc, is cemented to the glass so that it will lie perfectly smooth and function in the same manner as the ground-glass of the camera, thereby enabling the image of the object to be sharply focussed on it.

The procedure consists in measuring the areal extent of the components by means of a planimeter passing over the paper. The surface should be sufficiently rough so that the wheel of the planimeter will move without sliding, a condition easy of attainment. The fixed point of the planimeter is so chosen that the tracing point can sweep over the whole area to be covered, and is held in position by pressing it into an elongated piece of cardboard, near one end, the other being suitably weighted to keep it firmly in position.

On moving the tracing point around the periphery of the image of a crystal or grain the planimeter gives the area. This area is the difference between the reading taken at the beginning and that at the end of the circumscribing movement. The sum of all of the areas so measured gives the areal extent of all of the particles. Moving the point around the periphery of the field gives the total area and this value divided into the sum of the grain areas gives the relative proportion of the latter to the area of the field, taken as unity; or the relationship can be expressed in per cent.

If the problem is the determination of the relative amounts of two or

more substances in a mixture, the area of the grains of each type is measured and the sum of all of these areas, divided into the total area of one of the components, gives the contribution to the whole by the component considered. To illustrate we may give the following actual example. The field contained three components; the total areas of the *A*, *B*, and *C* grains were respectively 0.73, 0.19 and 1.03, each in square inches. The total area of all of the grains is the sum of these, 1.95. The three ratios of the components to the total area are *A*, 0.3745; *B*, 0.0975; *C*, 0.5280; and the percentages are *A* 37.45, *B* 9.75, *C* 52.80. In this case the field had a diameter of 4.5″ (area 15.90 square inches), and the three components constituted *A* 4.58%, *B* 1.19%, and *C* 6.48% of the entire field.

The accuracy of the method is free from any dependence on the regularity or uniformity of outline or distribution of the components. The planimeter readings can be speedily taken and a slide rule enables results to be found quickly. For these reasons the method recommends itself highly for mineralogical and petrographic analysis.