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MACRO POINT COUNTING

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Macro point counting, and a stage to facilitate its application to hand specimens, has recently been discussed by Emerson (1958, p. 1000). In 1953 the author exhibited a method of macro point counting before the Mineralogical Society of London. Five years experience confirms the value of this method, which is considered to be both simpler and superior to that described by Emerson.

The method is based on a graticule prepared by the author and his senior colleague, Dr. A. T. J. Dollar, for a variety of petrological uses. The graticule (Fig. 1) has 676 equally spaced points, and a co-ordinate reference system. It can be reproduced photographically on any scale to suit the requirements of the task. When used for modal analysis the scale is varied to suit the grain-size and porphyritic character of the rock to be analysed. For routine hand specimen analysis the graticule is printed on high resolution photographic plates, but for field use it can be prepared on plastic film. Point counting requires the identification of the mineral grains that occur at each of the equally spaced points. For this purpose the graticule is superior to the use of Zip-E-Tone, suggested by Jackson and Ross (1956), which obscures the mineral to be identified. In most cases there is no difficulty in deciding which mineral occurs at the exact centre of the circle, but when doubt arises, this is resolved by the use of a cross-wire (or transparent protractor in the field) aligned on the graticule.

It has been found by experience that porphyritic and coarse-grained rocks are not adequately sampled by micro analysis alone. Often a combination of macro and micro point count analysis is found to produce the most satisfactory results. If the object of the point count is to

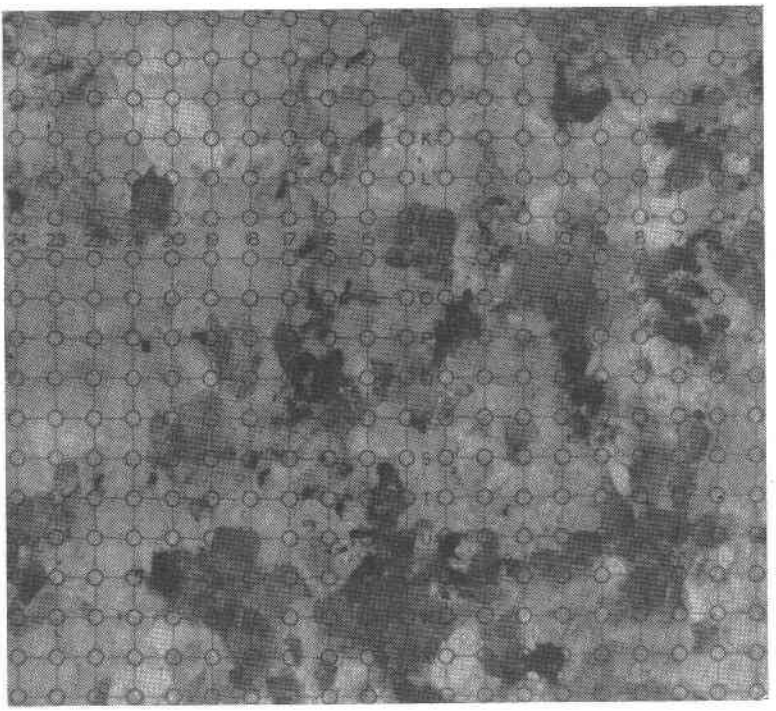

FIG. 1. Graticule on photographic plate, for use in macro point counting.

produce a true bulk modal analysis, the author agrees with Emerson that the stratified-random sampling method described by Chayes (1956, p. 29), is the most suitable. The value of point count analysis in petrofabric studies, however, is based on carefully oriented specimens. Macro point count analysis of three mutually perpendicular surfaces can confirm or deny a suspected grain- or particle-shape fabric. For example, this method has been found particularly useful in confirming poorly developed primary flow structure in porphyritic granites.

Very coarse-grained rocks, and rocks with extremely large phenocrysts require large macro-grids, but it is found that a grid prepared on a glass slip $2\frac{1}{2}$ to 3 inches square is suitable for the average rock. The specimen to be analysed is cut into a parallel-sided slab and one surface smooth ground by the usual methods. Staining of some minerals at this stage may assist in their identification. The macro-grid is cemented to the smooth ground surface with glycerin jelly. To do this the specimen is placed face-downwards on a hot-plate for about a minute. This warms the surface sufficiently to melt a small lump of the jelly now placed on it. Once the glycerin is melted, the macro-grid, which has

also been warmed on the hot-plate is firmly mounted and the air bubbles pressed out as in thin section making. When cold the glycerin sets firm. The advantage of using glycerin jelly for this purpose is that, when the analysis is completed, the grid can be removed, and the specimen washed clean, simply by immersing in hot water. The author uses a binocular microscope fitted with one cross-wire ocular for routine macro analysis, but a standard petrological microscope can be used if a binocular is not available. A tabulator can be used to collate the results as in micro analysis. Each circle of the graticule is viewed in turn, the rock slab being moved by hand on the microscope stage. The circles are not accurately centred on the microscope cross-wires unless there is doubt as to which mineral grain lies at the exact centre. With a little practice the 676 points can be counted in fifteen to twenty minutes. Moving the macro-grid to another position on the cut surface, or to further cut surfaces, enables any number of points to be counted, as may be required.

The principal advantage of this method is that it does not require any special apparatus other than a cheaply prepared photographic plate. Its simplicity enables it to be used by students as a routine. The use of a binocular microscope is superior to the use of a magnifying lens. Strong illumination is required if the high power objectives are to be used, but the use of a microscope enables the majority of minerals to be identified.

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THE RHOMBIC AMPHIBOLE HOLMQUISTITE

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In a recent note, Vogt, Bastiansen and Skancke (1), as a result of x-ray studies, made the statement that the amphibole holmquistite is rhombic, and not monoclinic, as earlier supposed. Thus the amphibole species glaucophane is dimorphic.

The formula of glaucophane can be derived from that of anthophyllite. As is well known the latter often contains essential amounts of trivalent atoms Al and Fe, and at the same time alkalies, chiefly Na. The corresponding varieties have been named gedrites. The relevant substitution may be Na(Al, Fe‴) for MgMg. If $Mg_7Si_8O_{22}(OH)_2$ is accepted