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

as the formula of anthophyllite, we can perform this substitution twice, thus $Na_2(Al_2, Fe_2''')$ for Mg_4 and we get the formula $Na_2Mg_3(Al_2, Fe''')_2Si_8O_{22}(OH)_2$ as in glaucophane. If more alkali were to be introduced it would have to enter the vacant spaces in the structure and the substitution would be of another kind, Na(Al, Fe''') for Si. Therefore the glaucophane formula can be regarded that of an end member.

The same substitution in anthophyllite is also possible in the case of holmquistite, except that we are here concerned with LiAl instead of NaAl. Logically it seems most correct to designate holmquisite as a lithium gedrite.

Geologically the determination of the rhombic character of holmquistite is of interest, because the glaucophane is a typical stress-mineral, occurring in folded schists and crystallizing during metamorphism, whereas holmquistite has long been regarded as an exception because it is formed through contact influence from pegmatite without notable influence from stress.

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AN INEQUILIBRIUM MODIFICATION OF THE CORUNDUM STRUCTURE

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During the investigation of Devonian K-bentonite and associated Marcellus Shale from Bixler, Perry County, Pennsylvania, it was noted that samples of the shale yielded a 1050° C. endotherm and a post DTA *x*-ray pattern. The *x*-ray spacings resemble corundum but are distinct from it and other published alumina polymorph patterns.

Samples of 1) the Devonian K-bentonite containing illite, mixed layer montmorillonite-illite, chlorite, kaolinite, and gibbsite, 2) Marcellus Shale, 3) $2M$ pegmatitic muscovite, and 4) a mixture of $2M$ muscovite and hydrated alumina were subjected to DTA and *x*-ray diffraction analyses to determine the nature of the material which yielded the observed 1050° C. endotherm and the alumina type *x*-ray pattern.

Post DTA *x*-ray diffraction patterns are compared in Table 1 with a corundum reference pattern by Swanson and Fuyat (1953). The pattern designated as μ_1 was taken from the top two-thirds of the DTA sample well, and μ_2 from the bottom third. The patterns represent a gradual approach toward the corundum structure with increasing time during