

PETROGRAPHY

The Loch Ailsh dolomites are more or less coarsely crystalline rocks with saccharoidal texture. The proportion of impurities is very small, calcite being virtually absent. Quartz is locally present in the form of small, isolated grains, and, associated with feldspar, as extremely thin veins; the isolated quartz grains are small and rounded and probably represent detrital fragments.

A gradation may be traced from rocks in which the grains are clear, with interlocking boundaries and few deformation lamellae, through rocks showing increasing marginal granulation of grains and greater development of deformation lamellae, to rocks consisting entirely of minute granules. In the intermediate stages the degree of marginal granulation is, in general, proportional to the frequency of the lamellae present.

More than sixty specimens, collected in traverses across the dolomite, were examined in thin section under the microscope to determine whether the comparatively fine grain of much of the dolomite is a property of the initial crystalline fabric or a result of the later granulation. In most of the rocks the degree of granulation is not great, indicating that the crystalline dolomite was initially fine-grained. The degree of granulation along grain boundaries is very variable over the mass, but increases, in general, toward the Moine thrust. Of fourteen specimens showing complete granulation, eleven were collected within 100 feet of the thrust (on the ground surface), and complete disruption of the grains seems to be general in this zone. The analyzed specimens were selected because of their comparatively coarse grain, the majority of the rocks being too fine-grained for fabric analysis.

FABRIC DATA

In all five specimens [0001] axes were measured in at least 300 grains, and a complete analysis of the lamellar structures was made in specimens M14, M15, M17, and M18. In specimen M13, twinned grains with lamellae thick enough for the twinning to be demonstrated optically are very scarce, and orientations of lamellae were not recorded. It is of particular importance in studies of dolomite fabrics that measurements be made in several sections cut with different orientation from a specimen (Christie, 1958), and in all the specimens described below, approximately 100 grains were examined in each of three mutually perpendicular sections.

The analyzed specimens are massive, with no trace of foliation or lineation. They show varying degrees of postcrystalline deformation; in all the specimens there is considerable development of {02 $\bar{2}$ 1} lamellae, and optically recognizable twinning is present in an appreciable number of grains in all specimens except M13. Tables 1 and 2 contain an analysis of the {02 $\bar{2}$ 1} lamellae present in each specimen. "Twinned" and "nontwinned" lamellae (Borg and Turner, 1953) are not distinguished in table 1, but table 2 shows the proportion of grains with twinned lamellae in each specimen. Although optically recognizable twinning is present in only a limited proportion of the grains in each specimen, the majority of the grains in all the specimens contain two or three sets of {02 $\bar{2}$ 1} lamellae.

TABLE 1
ANALYSIS OF {02 $\bar{2}$ 1} LAMELLAE IN LOCH AILSH DOLOMITE SPECIMENS^a
(In per cent)

Specimen number	Number of sets of {02 $\bar{2}$ 1} lamellae in grains			
	Three	Two	One	None
M14.....	71	25	4	0
M15.....	36	52	5	7
M17.....	48	30	18	4
M18.....	60	32	8	0

^a Data are based on grains in which all three {02 $\bar{2}$ 1} planes were accessible for measurement.

TABLE 2
ANALYSIS OF TWINNED {02 $\bar{2}$ 1} LAMELLAE IN LOCH AILSH DOLOMITE SPECIMENS^a
(In per cent)

Specimen number	Number of sets of twinned {02 $\bar{2}$ 1} lamellae in grains			
	Three	Two	One	None
M14.....	0	1	19	80
M15.....	0	25	33	32
M17.....	0	7	30	63
M18.....	0	5	31	64

^a Data are based on grains in which all three {02 $\bar{2}$ 1} planes were accessible for measurement.

TABLE 3
GRAIN SIZE, DEGREE OF GRANULATION, AND DEGREE OF PREFERRED ORIENTATION OF
DOLOMITE GRAINS IN LOCH AILSH DOLOMITE SPECIMENS

Specimen number	Mean diameter of grain section (in mm)	Degree of granulation (in per cent)	Areal analysis of preferred orientation of [0001] axes (in sq cm on net of 10-cm radius)			
			Pole-free area	Areas of maxima		
				5% per 1% area	4% per 1% area	3% per 1% area
M13.....	0.45	10	51.5	0	5.6	9.2
M14.....	0.54	27.5	60.5	1.4	7.8	21.7
M15.....	0.42	25	41.5	0	0	5
M17.....	0.37	35	46.3	0	0	2
M18.....	0.40	29	46.1	0.4	3	12

The postcrystalline strain is also evidenced by varying amounts of marginal granulation of the constituent grains of the rocks. The percentage of granulated material in each specimen, measured by means of a point counter in three sections, is shown in table 3. In addition to {02 $\bar{2}$ 1} lamellae, {10 $\bar{1}$ 1} cleavages are present in most of the grains, and a few grains in each specimen contain internally rotated {02 $\bar{2}$ 1} lamellae (L_9), which are not parallel to rational crystal planes (Turner *et al.*, 1954). Only in specimen M14 are lamellae of the latter type present