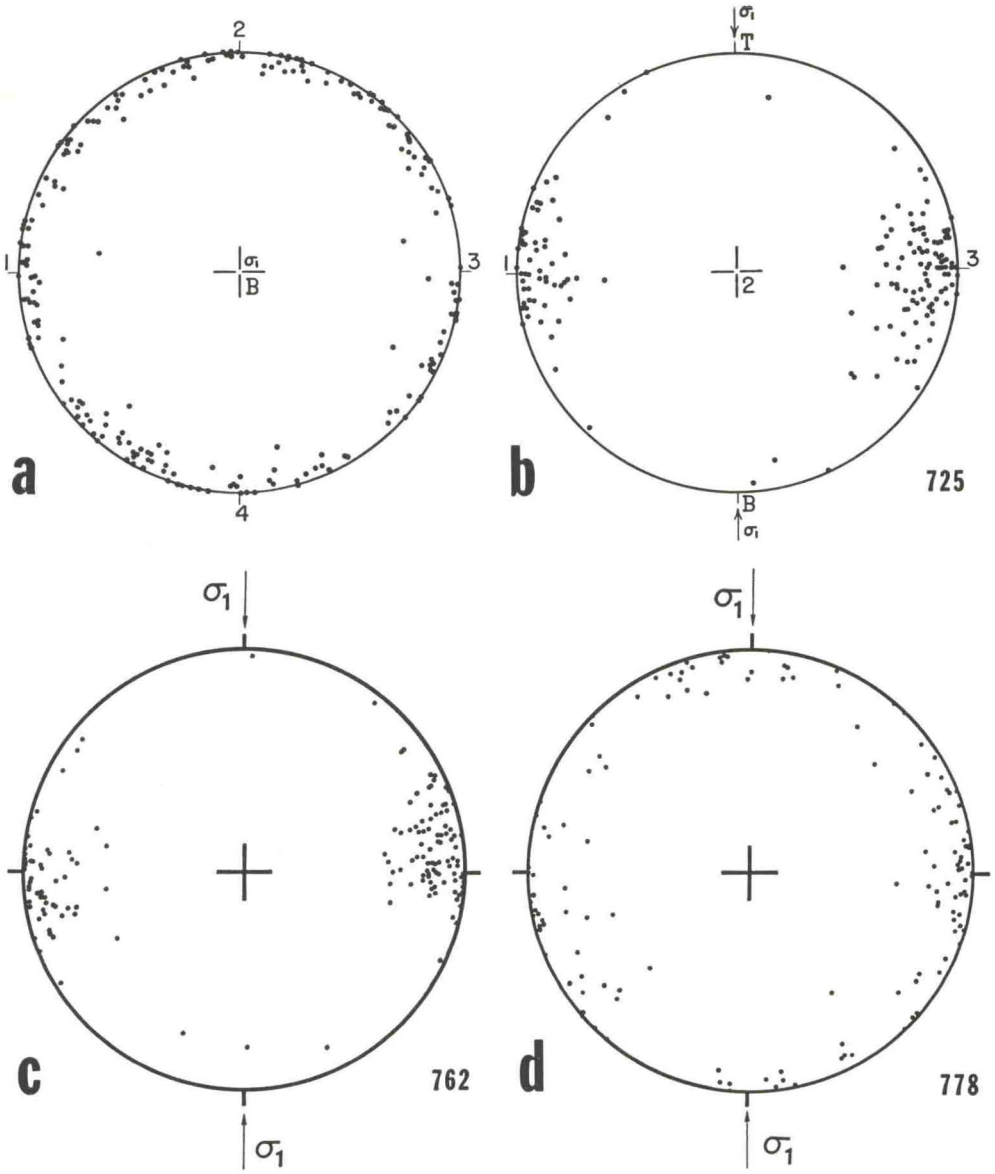

FIG. 14.—*a*, specimen 725. Normals to 198 sets of microfractures in 100 detrital grains. Diagram oriented perpendicular to long axis of deformed cylinder with σ_1 at the center, at *B*. *b*, specimen 725. Normals to 153 sets of microfractures in 100 detrital grains. Diagram oriented parallel to long axis of deformed cylinder with σ_1 oriented N.-S. *c*, specimen 762. Normals to 138 sets of microfractures in 100 detrital grains. Diagram is oriented same as in *b*. *d*, specimen 778. Normals to 125 sets of microfractures in 100 detrital grains. Diagram is oriented same as in *b*.

[*Fig. 14 continued on p. 30.*

rotation of the fracture planes away from their initial positions.

There appears to be a slight tendency for the microfractures to form parallel to r and z, as shown in figure 6, *c*, which illustrates the relations between the normals to the microfractures and the c_v in the host quartz grains for specimen 725. This possible crystallographic control of fractures is, however, greatly overshadowed by the marked relationships between the microfractures and the calcite grains exhibit undulatory extinction. This indicates that the grains have been externally rotated during deformation. In the four specimens, twin lamellae are preferentially oriented in contrast to random c_v orientations; normals to the lamellae are clustered within $\pm 45°$ of σ_1, as illustrated in figure 15, *A* and *B*, for specimens 725 and 780. This indicates that twin gliding takes place only on those sets of twin planes that are favorably oriented with respect to σ_1.

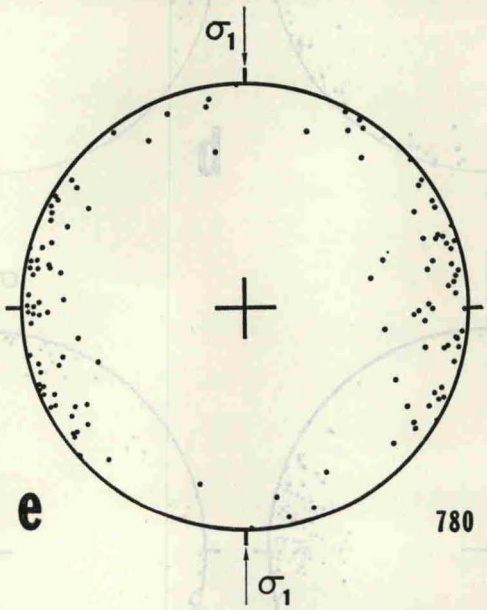

FIG. 14.—*Continued.*—*e*, specimen 780. Normals to 119 sets of microfractures in 100 detrital grains. Diagram is oriented as in *b*. In all diagrams the majority of the microfractures are oriented parallel to σ_1 and normal to σ_3; i.e., they are extension fractures.

the principal stresses across the boundaries of each specimen.

3. Twin lamellae are profusely developed in the calcite cement (pl. 3*B*, *b* and *c*). Approximately 85 per cent of the grains exhibit at least one set of twin lamellae, and the average spacing indexes are generally high—212, 152, 238, and 302 for specimens 762, 725, 778, and 780, respectively. Moreover, it is significant that the spacing index generally increases with increased strain, although one reversal was noted in comparing specimens 762 and 725. The twin lamellae in specimen 780 are commonly bent, and

DISCUSSION OF RESULTS

RELATIONSHIP OF PRINCIPAL STRESS ORIENTATIONS AND OBSERVED TWIN LAMELLAE

The preferential arrangement of twin lamellae relative to σ_1 in specimens 762, 725, 778, and 780 is significant. Handin and Griggs (1951) assumed that each calcite grain in a monomineralic aggregate would reflect the loads applied to the specimen as a whole rather than the effects of stress concentrations at grain contacts. This was confirmed for marble by Turner and Ch'ih (1951), who showed statistically that for