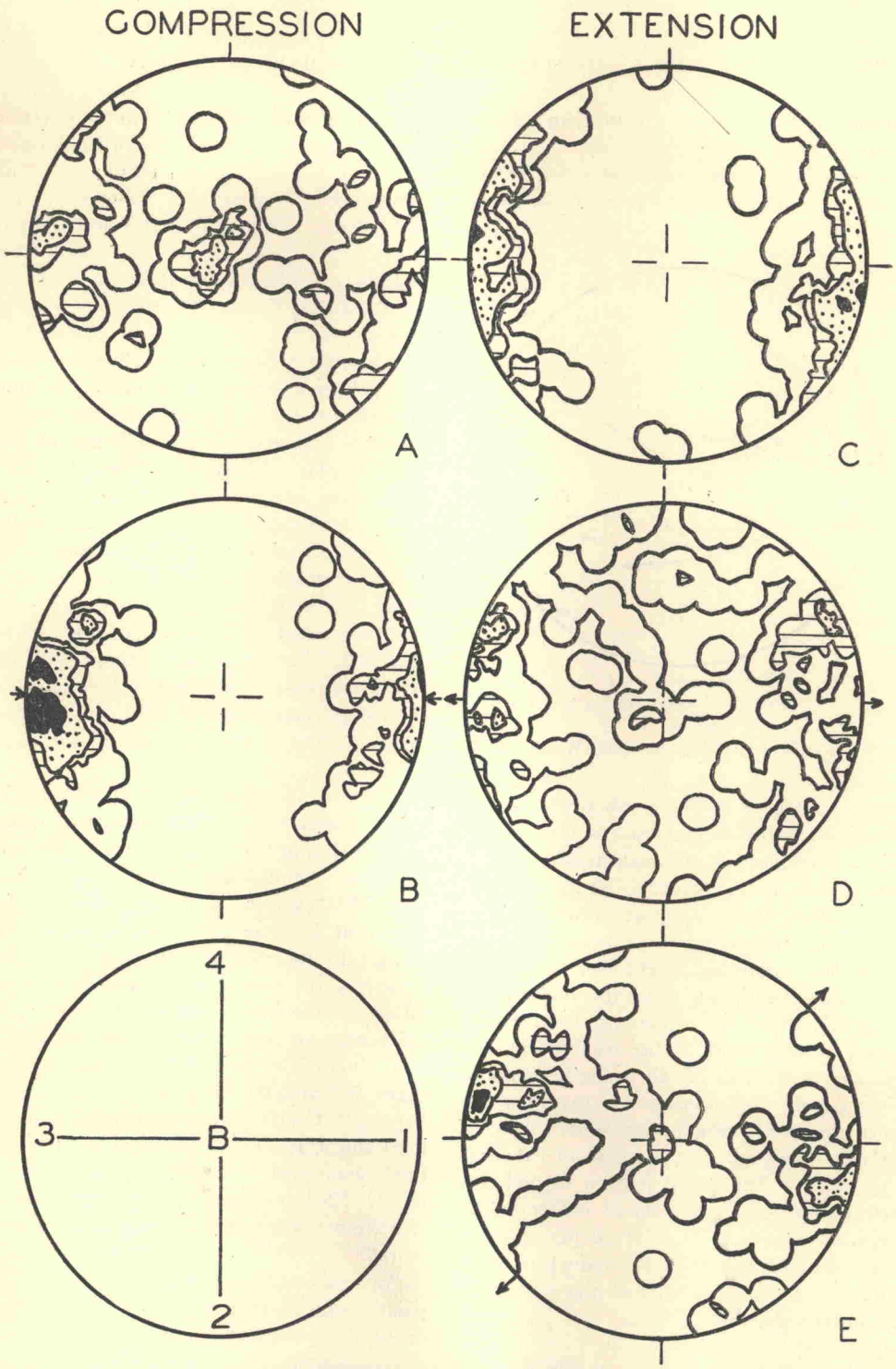

FIGURE 7.—ORIENTATION DIAGRAMS FOR *c* AXES OF CALCITE IN DEFORMED YULE MARBLE
100 grains per diagram. Contours, 1, 3, 5, 10%, per 1% area. Diagrams oriented (*cf.* bottom left) with trace of foliation plane (1 and 3) parallel to N-S diameters.

A. 321, *T* cylinder, shortened (normal to plane of diagram) by 20%.
B. 255, *3* cylinder, shortened (E-W) by 19%.
C. 176, *T* cylinder, elongated (normal to plane of diagram) by 12%.
D. 252, *3* cylinder, elongated (E-W) by 20%; 111 *c* axes in 100 grains.
E. 287, *d* cylinder, elongated (NE-SW) by 20%.

lattices have been twinned more than halfway to completion.

Poles of alternative *c* axes for grains of this type are shown, connected in each case by an arrow, in Figure 8. The *c* axis of the better-developed lattice in each case is plotted as a black dot; that of the less-extensive lattice, interpreted as the original lattice prior to deformation, is shown by an open circle.

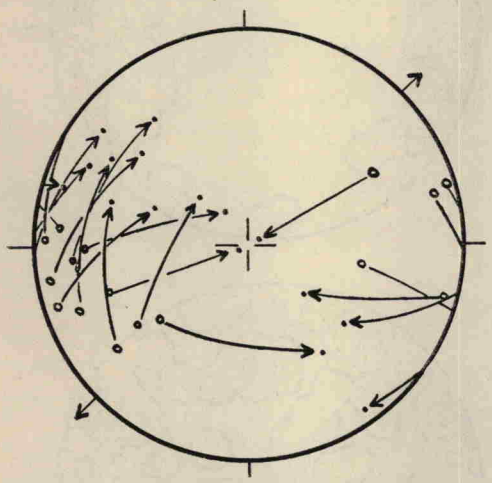

FIGURE 8.—PAIRS OF *c* AXES FOR TWINNED GRAINS OF CALCITE
287, *d* cylinder, elongated (NE-SW) by 20%.

Some general conclusions, independent of any hypothesis regarding mechanism of orientation, may be drawn from the diagrams of Figure 7: Under the conditions of our experiments, *c* axes tend to become concentrated parallel to the axis of shortening in compression experiments. Conversely, they tend to align themselves within a girdle normal to the axis of elongation in the course of extension experiments. The initial pattern of preferred orientation is not completely obliterated in experiments where strain of 20 per cent has been achieved. It is least affected where orientation of the test cylinder in the stress field is unfavorable for twinning of grains on $\{01\bar{1}2\}$ (Fig. 7, B, C).

Preferred orientation of best-developed $\{01\bar{1}2\}$ lamellae.—Orientation diagrams for strongly developed $\{01\bar{1}2\}$ lamellae—one set per grain in most cases—show consistently reproducible patterns illustrated in Figure 9. These are symmetrical with respect both to the direction of applied stress and to the original *c*-axis pattern of the undeformed fabric; for in all grains, even those strongly twinned on the $\{01\bar{1}2\}$ lamellae in question, the most conspicuous set of lamellae is parallel to one of the $\{01\bar{1}2\}$ planes of a crystal lattice that has been rotated at most through 20°–30° from its initial position.

In lamellae patterns resulting from compression, poles are strongly concentrated as near as possible to the axis of applied stress, within the limits imposed by the *initial* state of preferred orientation of *c* axes. In Figure 9, B (255, compression normal to foliation) this maximum coincides approximately with that of the *c*-axis diagram of the initial fabric, and so too with its intensified equivalent in the deformed fabric (Fig. 7, B). In Figure 9, A (321, compression parallel to foliation) poles of prominent $\{01\bar{1}2\}$ lamellae occupy a ring around the axis of compression; and within this are areas of strong concentration about halfway between the axis of compression and the *c*-axis maximum.

The three diagrams (Fig. 9, C, D, E) for $\{01\bar{1}2\}$ lamellae in fabrics deformed by extension are alike in that poles of lamellae are concentrated in girdles around the axis of extension. This expresses a strong tendency for prominent lamellae to be aligned as nearly parallel to the axis of extension as is permitted by the *initial* state of preferred orientation of *c* axes. The cleft girdle of Figure 9, D (252, extension normal to foliation) occupies a zone situated at an angular distance of between 30° and 60° from the extension axis. Figures 9, C (176, extension parallel to foliation) and 9, E (287, extension at 45° to foliation) show great-circle girdles whose incompletely filled condition reflects the influence of preferred orientation of *c* axes in the *initial* fabric.

Preferred orientation of edges [e:e].—As pointed out in Part III (p. 901), the *c*-axis orientation pattern of the initial fabric imposes this restriction on the pattern of edges [*e*:*e*]: such edges, lying at 76 degrees to the *c* axis of the grain in question, must be concentrated within a broad belt along the N-S diameter of the orientation diagram (trace of foliation).