composition of the phenocrysts and the groundmass are approximately An_{65} and An_{58} respectively. This difference of 7 per cent anorthite is perhaps too small to explain by itself the conspicuous contrast in their twinning. It is now recognized by many that the lamellar width is also dependent on external environmental conditions of crystallization (Gorai, 1951; Smith, 1958; Gay, 1956; Vance, 1961). Some of these workers have expressed the extreme view that lamellar width is governed almost entirely by external factors such as velocity of crystallization and euhedral growth habit and is little influenced by structural or compositional controls.

This work was carried out in the Department of Geology, Presidency College, Calcutta. Most of the rock specimens supporting this study were collected by the writer, the others were obtained from the museum of this Department.

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THE AMERICAN MINERALOGIST, VOL. 50, SEPTEMBER, 1965

DEFORMATION BANDS IN ALBITE

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Introduction

An albite crystal collected from a pegmatite near Bethel, Maine shows long narrow deformation bands oriented approximately normal to (010). In thin section, between crossed nicols, these bands become readily visible due to the difference in extinction position and the bending of intersecting twin lamellae and are associated with small boundary fractures and irregular, but progressive, extinction changes from band to undeformed host (Fig. 1). The only twinning present is abundant fine regular albite lamellae regarded as secondary in origin (Vance, 1961; Seifert, 1964). Both optics, by the 5-axis feldspar method with $2V_z = 79°$, and *x*-rays, average $2\theta\ (1\bar{3}1) - 2\theta\ (131) = 1.20$, indicate the albite crystal is in the low temperature ordered structural state and roughly agree with a chemical analysis indicating the crystal has a composition of An_7.

Discussion

Deformation bands are lamellae within which the crystal lattice is progressively rotated away from that of the host crystal during deforma-

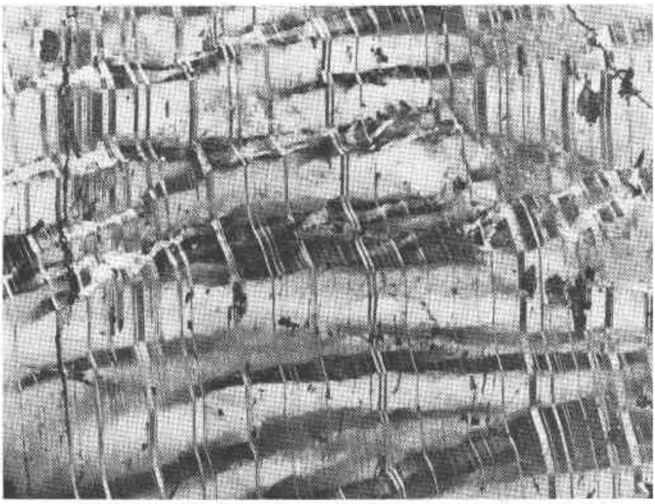

Fig. 1. Deformation bands (EW) and bent intersecting twin lamellae observed between crossed nicols in a section essentially normal to the *a* crystallographic axis. Magnification 8×.

tion and are generally inclined at high angles to the active glide planes (Turner *et al.*, 1954). Deformation banding in the Maine albite consists of both individual bands and multiple combinations of bands inclined from 76° to 90° to (010). The bands vary considerably in width with length, averaging about 1 mm, while traversing up to 70 mm across the crystal and imparting a distinctive wavy appearance to (010) cleavage faces. Although band boundaries may be sharply defined, they commonly associate with distributed cataclasis as evidenced by progressive, but distinct, changes in extinction position traversing from band to host. Commonly, where boundaries are sharp, they appear to be defined by (001) cleavages. The bands are rendered readily visible in thin sections normal to the *a* crystallographic axis by the difference in extinction position and smoothly bent albite twin lamellae between crossed nicols and by curved cleavages and localized alteration in plane polarized light. The density of twinning remains constant in deformation bands relative to the host crystal. Rotation of the crystal lattice within deformation bands varies from very slight up to approximately 45° with all bands showing rotation in the same direction.

The position of (010) and (001) cleavages in the deformation bands corresponds only roughly to that which would be obtained by rotation of (010) and (001) in the host about an axis perpendicular to the *c* crystallo-

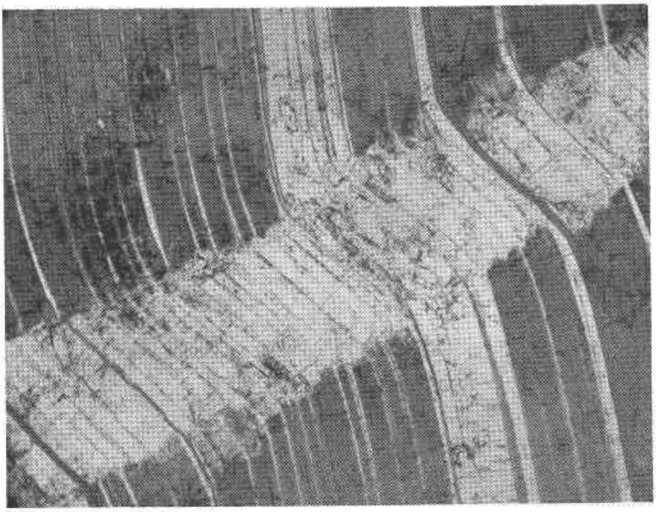

FIG. 2. An individual deformation band (NE) showing constancy of the relative positions of (010) and (001) cleavages in band and host. Crossed nicols in a section essentially normal to the *a* crystallographic axis. Magnification 112×.

graphic axis lying in the (010) plane. Consequently deformation can not be strictly defined by rotation of the host crystal about an axis of external rotation, *i.e.* rotation about an axis coinciding with the line of intersection of the kink boundary and the slip plane at right angles to the slip direction. Furthermore the relative positions of (010) and (001) within the deformation band are essentially the same as in the host (Fig. 2) yielding no suggestion of significant internal rotation, *i.e.* rotation about an axis coinciding with the line of intersection of the actively moving plane and the planar feature being rotated. The absence of well defined axes of external and internal rotation precludes the classification of the bands as kink bands since by definition kink bands represent simple deformation bands where deformation can be described by axes of external and internal rotation.

The constant density of twinning through band and host indicates that

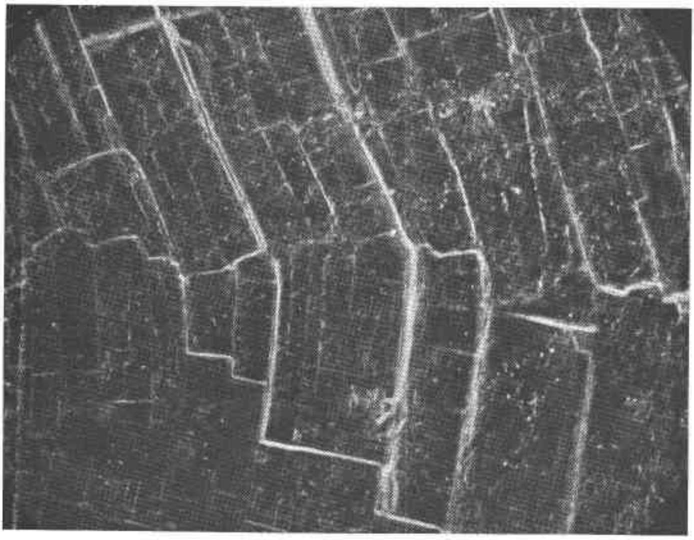

FIG. 3. A continuous series of small connected cracks (irregular white EW line) along a deformation band boundary as observed in phase contrast illumination. Magnification 438×.

twinning predates the formation of deformation bands and consequently that twin gliding has not been involved in the formation of the deformation bands. However, the consistent position of the bands at high angles to (010) and the position of (010) and optics within the bands suggests that movement has occurred along (010) planes as they bent during formation of the deformation bands, possibly along composition planes of the earlier formed albite twins. The presence of small cracks, especially near band boundaries (Fig. 3), indicates that deformation was not entirely plastic and accounts, at least in part, for the lack of well defined rotation axes.

The author is indebted to Drs. N. Carter, I. Borg and H. Heard for their many valuable comments and suggestions and to Dr. T. P. Rooney for *x*-raying the crystal.

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