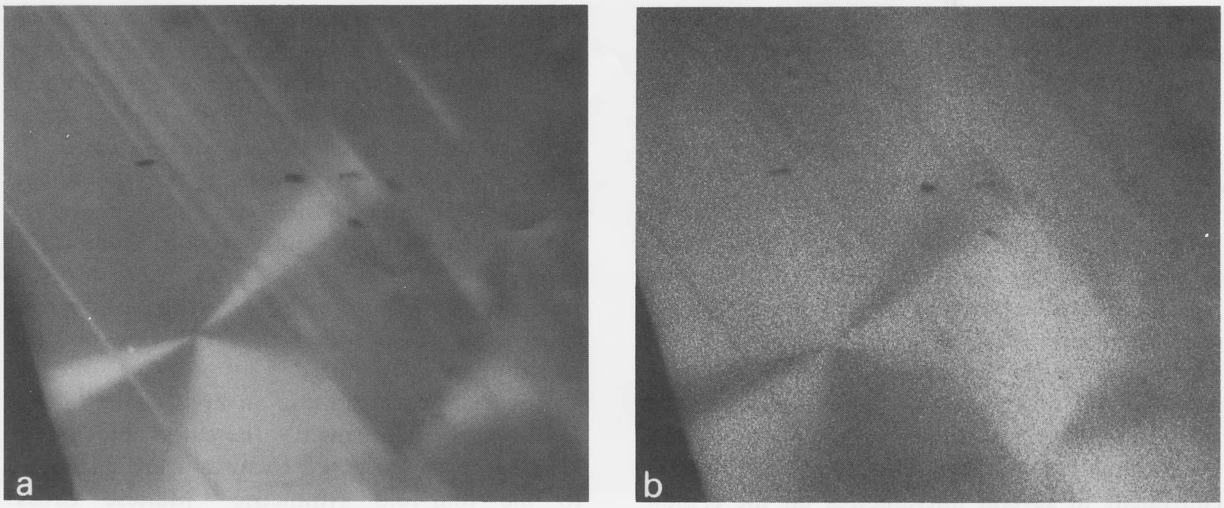

Fig. 6. Detail of cathodoluminescence pattern within the inner zones of the ($\bar{1}11$) growth sector outcrop. Width of field 0.5 mm. Experimental conditions as in fig. 5. (a) Emission by the 2.56 eV centre. (b) Emission by the 1.40 eV centre.

acteristics, must repeat under operation of the triad symmetry axes parallel to ⟨111⟩ in the diamond structure. In fig. 5, ($\bar{1}\bar{1}1$) growth surfaces dip at 35° into the polished surface, rising towards the top of the figure. Since the growth direction, [$\bar{1}\bar{1}1$], points into the surface, it follows that later growth is represented in the upper part of the image. Thus this figure combines a slightly distorted plan view of the ($\bar{1}\bar{1}1$) growth surface together with some indication of the degree of persistence of local topography on a sequence of such surfaces as growth proceeds. A direct record of persistence of a trigonal feature is afforded by the sectored pattern in fig. 6, which is generated in the following way. Consider a persistent trigonal feature on ($\bar{1}11$), i.e. a persistent low-elevation growth pyramid, whose centre, i.e. the pyramid apex, traces a locus inclined to [$\bar{1}11$] in such direction as to make a moderate angle with (110). Then the distribution of bright and dark segments along successive traces of ($\bar{1}11$) that appear in fig. 6 records the sequence of such distributions as they would appear on a line sweeping across the pyramid at any one particular ($\bar{1}11$) growth horizon, the line orientation being [$1\bar{1}2$], the intersection of ($\bar{1}11$) and (110). It follows that the centre of the sectored pattern in fig. 6 lies on that ($\bar{1}11$) growth horizon at which the locus of the pyramid apex is cut by the (110) polished specimen surface. Note that the mirror symmetry in ($\bar{1}11$) exhibited by the pattern in fig. 6 hides disclosure whether the apex was migrating away from or towards the observer as growth proceeded. This information could be acquired experimentally (at least ideally) by noting in which direction the apparent centre of the pattern in fig. 6 moved when switching the electron beam from low kilovoltage to high kilovoltage, i.e. from shallow to deeper depths of maximum cathodoluminescence generation. Regarding persistence, fig. 6 shows that both the main sectored pattern and a similar one in the lower right of the field suffer simultaneous abrupt termination at one growth horizon. The distance back from this horizon to the growth-sector boundary with the ($\bar{1}01$) sector where the image of the major sectored pattern first can be seen is 0.35 mm.

3. Discussion

The 1.40 and 2.56 eV centres appear in synthetic diamonds that contain nitrogen as dominant impurity, and it is reported that both are associated with the presence of nickel [8]. On the relation between the systems the current view,