these crystals, would be accounted for.

In Fig. 1 the crystal is a truncated lozenge, showing also {100} faces in addition to the {110}. In this case we expect six distinct sectors, four with folds along {110} and two along {100} planes. The existence of the first four has already been demonstrated. That of the additional two is revealed by electron micrographs like Fig. 2, where such sectors appear in Bragg contrast because they satisfy different reflexion conditions from the rest of the crystal. Sometimes a surface corrugation can also be seen bounding such sectors.

As stated earlier, the sectors bounded by {110} faces are in twin relation, that is, the lattices, also including the fold along {110} planes, are identical but in different orientation. However, the remaining two sectors with folds along {100} planes would represent a different lattice. This is strikingly brought out by the following experiment. The crystals, sedimented on a slide, were heated to about 128–130° C. When examined after cooling they appeared as in Fig. 3. It is seen that the sectors in question are now distinct; thus they must have melted (or become otherwise transformed) at a lower temperature than the rest of the crystal. This difference in thermal stability is in agreement with the postulate of a different lattice.

We conclude that the existence of distinct sectors within the same crystal is definitely established in agreement with the predictions based on the folded molecular configuration in polymer crystals.

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Deviation of Zone Lenses Produced by Polarization

Zone lenses are systems of alternate opaque or phase-retarding rings, which are usually made in one of the following ways: (*a*) by describing larger circles on cardboard and photographically reproducing them, (*b*) by photographing Newton fringes occurring between a slightly convex lens and an optical flat, or (*c*) following Wood[1], but cutting out narrow ring circles on a previously coated surface by means of a turntable or lathe. The least distance, (*d*), resolved by a zone lens is given by:

$$d = 1{\cdot}22\lambda B \qquad (1)$$

where λ is the wave-length and B the focal length/diameter. Since the focal length is proportional to the square of the radius of the innermost zone[2], small zone lenses will have higher resolving power. Thus, the originals made are usually further reduced photographically in one or two subsequent steps.

Another way of producing zone lenses is based on the birefringent properties of certain crystals, such as basal sections of calcite or sodium nitrate. The crystal is sandwiched between two Polaroid films (C in Fig. 1). A is a monochromatic light source, B is an aspherical collecting lens, D a collimator, E a photographic objective (Tessar) of 50 mm. focal length, and F is the image plane. Photographs were taken on Kodak type 649 high-resolution film; they were developed in '*D* 11' to a high gamma and some of them further cleared in Farmer's reducer. In this way, zone lenses not larger than about 1 to 2·4 mm. in diameter were produced in one single step.

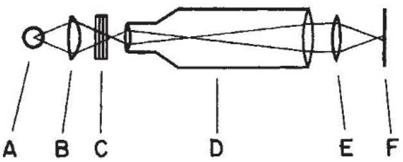

Fig. 1. Polarization arrangement for producing zone lens-like concentric fringes

Zone lenses of this type were then scanned by means of a densitometer comparator. The upper graph in Fig. 2 shows the radii of an experimental zone lens, scanned from centre to periphery in different directions. Generally, the radii, r_m, of the rings in a zone lens are proportional to the square roots of the natural numbers:

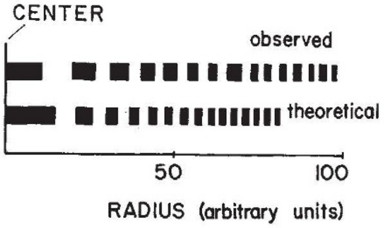

Fig. 2. Radii of an experimental zone lens, obtained by birefringence and compared with the theoretical figures.

$$r_m = r_1\sqrt{m}, \quad m = 1, 2, 3 \ldots, \qquad (2)$$

where r_1 is the radius of the central zone. This relation is shown in the lower graph in Fig. 2. Evidently, equation (2) does not rigorously describe the properties of zone lenses obtained by polarization, for the individual zones decrease slightly slower in radius, toward the periphery, than required by theory.

This work was supported by National Institutes of Health Research Grant *C*–2834.

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ELECTRONICS

Use of the Silicon Resistor in the d.c. Stabilization of Transistor Circuits

It is well known that changes in the d.c. characteristics of transistor amplifiers with temperature are particularly severe, and tend to limit the range over which these devices can operate. The d.c. parameters, the changes of which are of interest, are the collector-emitter leakage current (Ico'), the d.c. current gain (α') and the base-emitter input impedance, this last producing a change in the base-emitter voltage. Up to the present, stabilization has either been by minimizing these effects by suitable circuit design, or by the use of thermistors and non-linear elements in the base circuit. These have the disadvantage in some cases, of higher power consumption, and thus loss of the in-