lating the molecular electric polarizability, a, from vaporphase measurements of n_D at STP :

$$R_M = \frac{n_D^2 - 1}{n_D^2 + 2}, V_m = \frac{2V_m}{3}(n-1) = \frac{4}{3}\pi N_0 a \quad (6)$$

from which

$$a = \frac{V_m(n-1)}{2\pi N_0} = 5 \cdot 90 \times 10^{-21}(n-1)\,\text{cm}^3. \quad (7)$$

The a values calculated from eq. (7) are shown in the last column of Table I.

In summary it should be reiterated that the principal advantages of using the new equations given here [eqs. (5) and (7)], aside from their great simplicity, is that work at varying T's need not be performed, densities of the sample need not be experimentally determined, and, of most importance, the values so obtained can be regarded as *intrinsic* moments and polarizabilities, free from intermolecular distortions and therefore comparable to the results obtained from the Stark effect.

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November 27, 1979.

† For example $V_m = 22 \cdot 41$ for O_2, $22 \cdot 41$ for CO_2, $22 \cdot 42$ for NH_3, and $22 \cdot 39$ for H_2O [6].

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ON THE OCCURRENCE OF SYNTECTONICALLY FILLED VEINS IN THE ROCKS EAST OF BARWAHA CITY, WEST NIMAR DISTRICT, MADHYA PRADESH

DURING the course of structural investigations in a part of the West Nimar District of Madhya Pradesh, the authors have come across the occurrence of syntectonically filled veins containing sigmoidal crystals. Such occurrence is perhaps reported for the first time from the deformed rocks along the Narmada valley.

Both syntaxial and antitaxial veins[1,2] have been found, the former in predominantly calcareous rocks invaded by felsite porphyry sills near Koteswar temple (22° 15′ : 76° 06′) on both the banks of the river, and the latter about 400 m north of the Sortipura tank (22° 16′ : 76° 04′). about 5 kms east of the Barwaha city.

Both syntaxial and antitaxial veins have been shown to contain[2] sigmoidal crystals of various mineral species, the commonest being quartz, calcite, chlorite, albite clinozoisite etc. While the growth of crystals is from the walls toward the centre in syntaxial veins, it is reverse in the antitaxial type. In syntaxial veins the crystals grow by diffusion of material from the wall rock while in the antitaxial type, the vein material is foreign to the host rock. The crystals are sigmoidal but bear no signs of fracturing or internal strain and therefore it can be deduced that they were born with a curved form[2]. The crystals have acicular form, unlike their normal crystal habit. This suggests that there were no actual cavities for vuglike growth but the growth initiates in microscopic cracks and continues in the directions of incremental dilations in veins. Durney[1] first recognised such structures in the Helvetic nappes of the External Swiss Alps. By a careful analysis of such structures he was able to show that the Morcles nappe and the Wildhron nappe, the lowest two nappes in the Helvetic pile were forced into the Winstrubel depression.

The syntaxial veins found in the area contain sigmoidal crystals of quartz, calcite and plagioclase, the host rocks being predominantly calcareous ones. (Fig. 1). The antitaxial veins contain crystals of calcite in finegrained sandstone (Fig. 2).

The crystals in veins always grow in the direction of principal incremental extension (Fig. 3) and as the latter changes, the path of crystal growth also changes and eventually a sigmoidal geometry results. The degree of sigmoidality depends upon the stage at which the cracks open during the deformation process and the amount of rotational component of strain during a non-coaxial[3] deformation. These crystals enable the deformation paths to be computed[4] and incremental and finite strains to be measured[2]. Further work on these veins is in progress.

FIG. 1

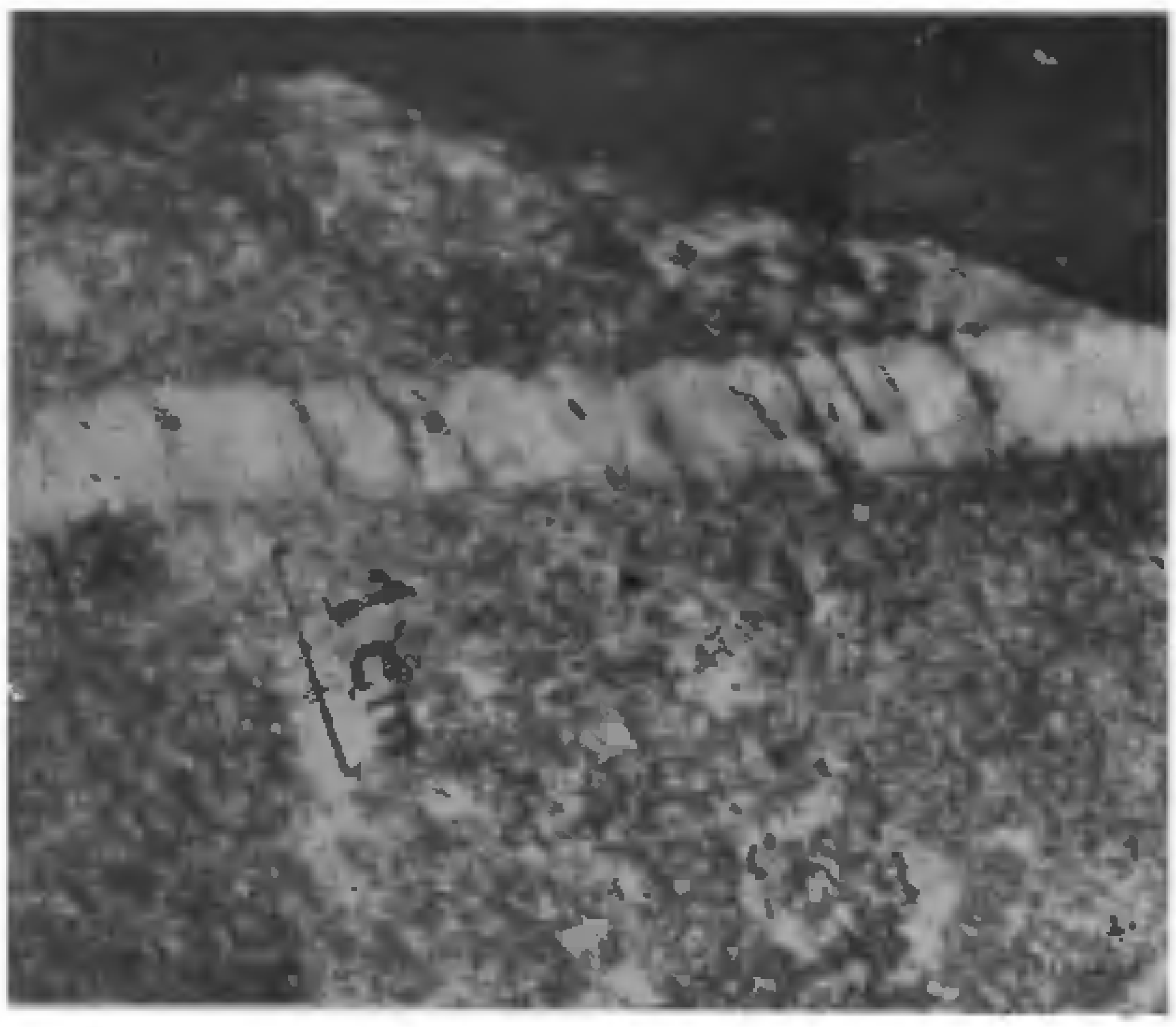

FIG. 2

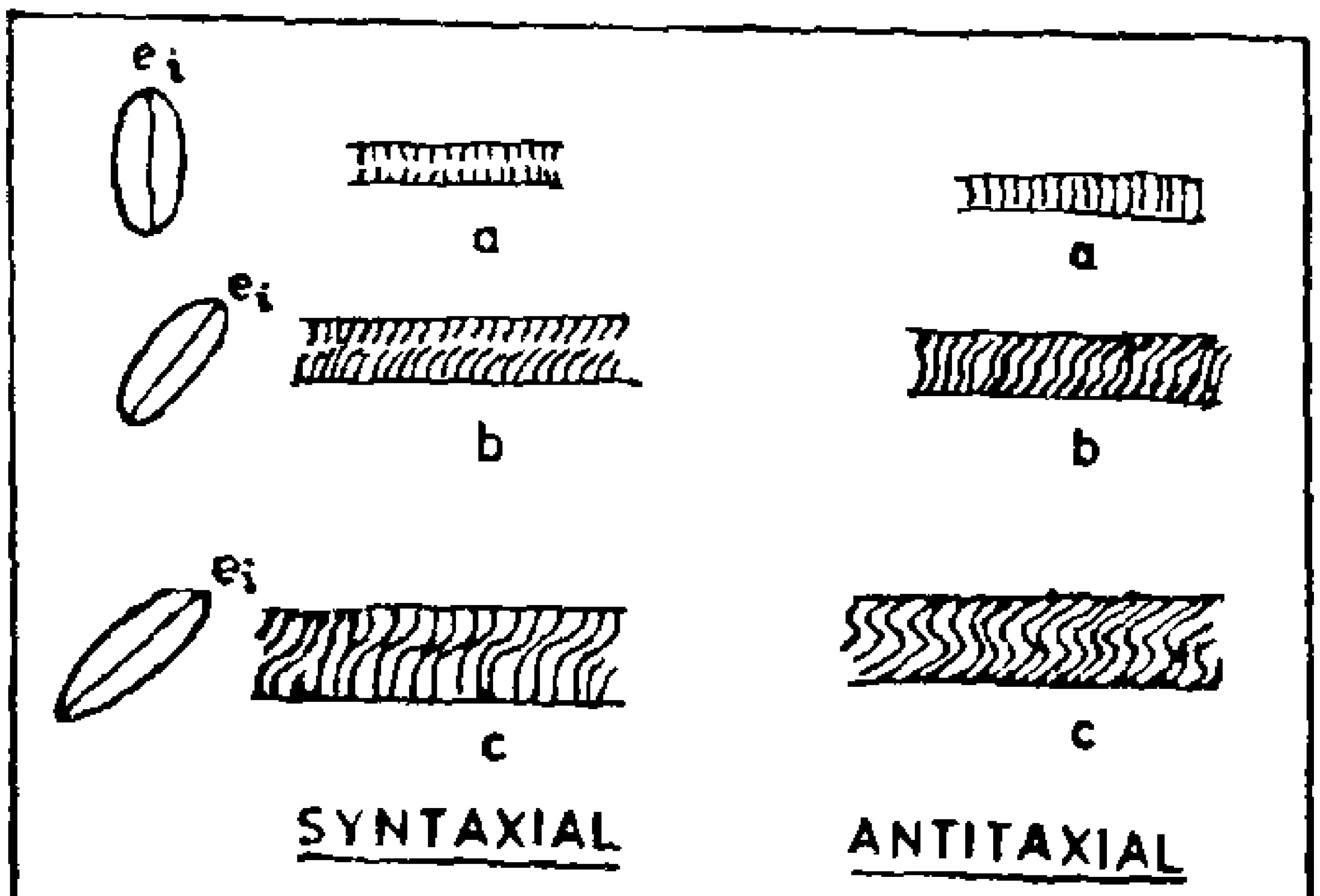

FIG. 3

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NODAL ORGANIZATION IN THE FAMILY SCROPHULARIACEAE

VARGHESE[1] reported unilacunar node in several species of the family Scrophulariaceae. In the present study, a large number of representatives of the family were selected to study the variations, if any.

For obtaining the complete perspective of the nodal organization, information has been obtained both by clearing the twigs as well as by obtaining sections through the nodal regions of the following species:

Sub-family—Scrophularioideae; Tribe Gratioleae—*Dopatrium junceum*, *Glossostigma spathulatum*, *Lindenbergia muraria*, *Majus japonicus*, *Mimulus* sp., *Scoparia dulcis*, *Stemodia viscosa* and *Torenia cordifolia*.
Tribe Verbasceae—*Verbascum celsioides*.
Tribe Aptosmeae—*Anticharis senegalensis*.

Tribe Scrophularieae—*Russelia sarmentosa*, *Scrophularia himalensis*.

Tribe Calceolaricae—*Calceolaria mexicana*.

Tribe Antirrhineae—*Antirrhinum majus*, *Linaria maroccana*.

Sub-family—Rhinanthoideae; Tribe Buchnereae—*Rhamphicarpa longiflora*, *Striga angustifolia*.

Tribe Veroniceae - *Veronica arvensis*.

In *Dopatrium junceum*, *Glossostigma spathulatum* (Fig. 1 A) and *Lindenbergia muraria* (Fig. 2 A) the unilacunar node is accompanied by a single-stranded condition of the leaf. In *M. japonicus* (Fig. 2 B), however, it is unilacunar to begin with, but later by repeated splitting of the single trace, it becomes six-stranded at the base of the lamina. In *Mimulus* sp. also the leaf ultimately shows as many as seven strands at the laminar base (Fig. 1 B). In fact at the node it exhibit a unilacunar condition with a single trace which subsequently divides into three and finally at