LETTERS TO THE EDITOR

AN IMPROVED SYNTHESIS OF ISOFLAVANONES USING PHASE TRANSFER CATALYST

PHASE transfer catalysts have assumed importance in recent times by virtue of their property in increasing the efficiency of base catalysed organic reactions[1]. Yanovskaya *et al.*[2] have reported their successful use in Michael reactions.

A one step synthesis[3] of isoflavanones from *o*-hydroxyphenyl benzyl ketones and diiodomethane has been developed in our laboratories. However, this method suffers from a serious limitation which requires refluxing the contents in acetone medium in the presence of ignited potassium carbonate for 150–200 hrs.

The present communication deals with the use of phase transfer catalyst for the one step synthesis of isoflavanones.

2-Hydroxy-4,6-dimethoxyphenyl benzyl ketone (500 mg) was dissolved in benzene (20 ml) and vigorously stirred with aqueous potassium carbonate (20%; 25 ml) and diiodomethane (0·5 ml) under reflux at 90° using varying amounts of tetrabutylammonium hydrogen sulphate as phase transfer catalyst. The progress of the reaction was found to depend upon the amount of the catalyst used. Best results were obtained in the presence of 150 mg of the catalyst and the reaction was found to go to completion in 20 hrs. The benzene layer on working up afforded 5, 7-dimethoxyisoflavanone m.p. 150–51°, identical with an authentic sample[3]. A new isoflavanone, 5,7,4'-trimethoxy-8-methyl isoflavanone, m.p. 160–61°, NMR ($CDCl_3$): δ 2·0 (*s*, 3H, CH_3 at position 8), 3·70–3·90 (*m*, 10 H, 3 × OCH_3 and C<u>H</u> at position 3), 4·57 (*d*, 2H, $C\underline{H}_2$ at position 2), 6·1 (*s*, 1H, H–6) and 6·85–7·23 (A_2 B_2 pattern, 4H, H–2', H–3', H–5', H–6') has now been synthesised by this method starting from 2-hydroxy-3-methyl-4,6-dimethoxyphenyl 4-methoxybenzyl ketone. Use of aqueous sodium or potassium hydroxide in place of aqueous potassium carbonate in the above case yielded complex mixtures.

Phenyl benzyl ketones possessing resorcinol unit in ring A reacted rather sluggishly under the above conditions. In these cases, the use of aqueous potassium hydroxide gave better yields of the desired products. Thus 2-hydroxy-4-methoxyphenyl benzyl ketone and 2-hydroxy-4-methoxyphenyl 4-methoxybenzyl ketone gave respectively 7-methoxy- and 7,4'-dimethoxyisoflavanones, identical with authentic sample[3].

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Department of Chemistry, University of Delhi, Delhi 110 007, India, and Institute of Organic Chemistry, Technical University, Budapest, Hungary,
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P. K. JAIN
J. K. MAKRANDI.
S. K. GROVER.*
M. NOGRADI.

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REMANENT MAGNETISATION AND MAGNETIC ANOMALIES OF CHARNOCKITES NEAR VISAKHAPATNAM

NEAR Visakhapatnam, a lone charnockite outcrop is located at Mudasaralova between two hill ranges. The area in the vicinity of the outcrop is surveyed with a magnetometer. NRM measurements are made on collected samples of charnockite. The geology in the vicinity of Visakhapatnam is closely connected with the general geology of Eastern Ghats, which constitute mostly khondalites and intervening charnockites. The banding in the charnockites is parallel to that of the surrounding khondalites.

Magnetometric observations are made along 12 radial lines, diverging from the quarry of the outcrop at an interval of 15 metres with a vertical Torsion Magnetometer. Observations are also made in between traverse lines, and beyond, as they diverge wide apart. The observations are corrected for diurnal variation. The vertical magnetic anomalies range from −1000 γs to 700 γs. They are shown contoured in Fig. 1. The resulting anomaly pattern is a rather simple one with a large negative closure and a southward positive centre.

The direction and intensity of NRM of twenty specimens are measured with an astatic magnetometer having a sensitivity of 1×10^{-6} oe/mm. The directions, thus measured, range from 320° E to 345° E in declination (D) and −8° to −36° in dip (I). The intensities range between $0{\cdot}4 \times 10^{-3}$ e.m.u. and $0{\cdot}7 \times 10^{-3}$ e.m.u, with an average value of $0{\cdot}6 \times 10^{-3}$

e.m.u. The mean direction for all the specimens is D = 330° E, I = −22°.

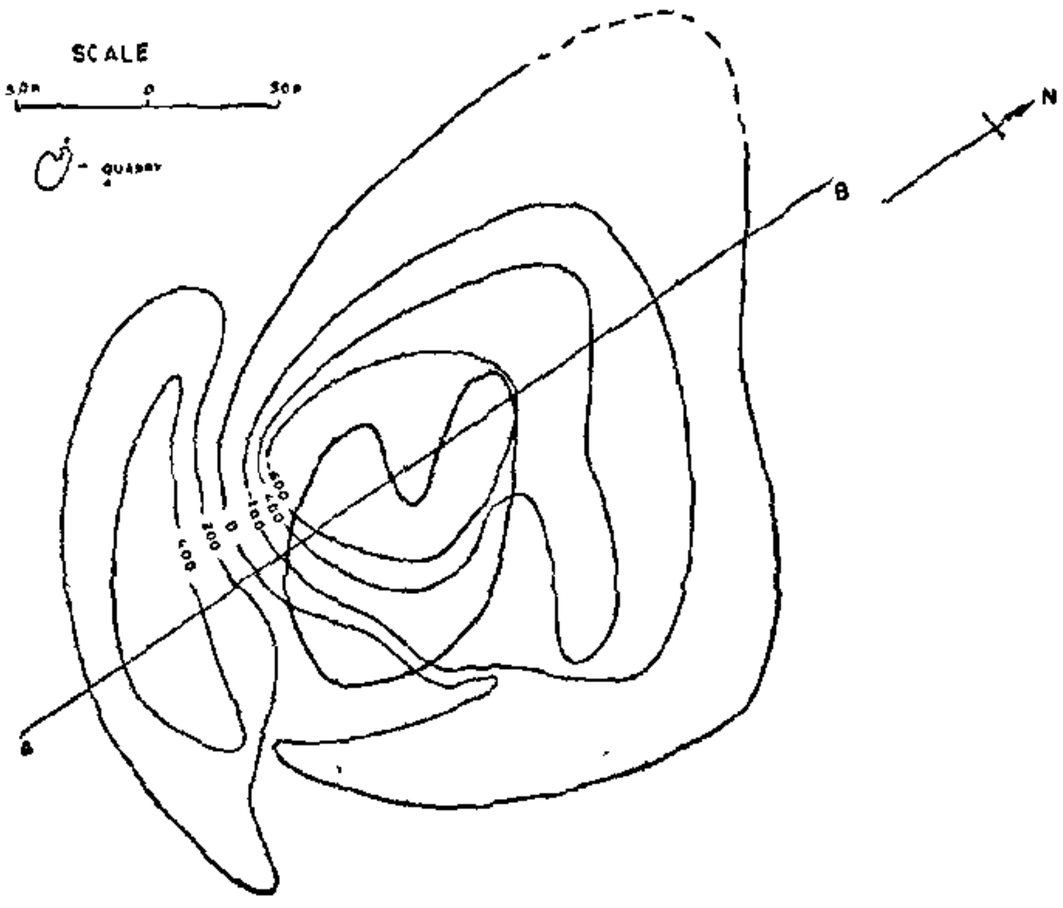

FIG. 1. Vertical magnetic anomaly map.

From the almost circular anomaly pattern in Fig. 1 it appears that the causative body is a localised mass with very limited lateral extent and it may be approximated by a spherical mass. The profile AB (Fig. 2)

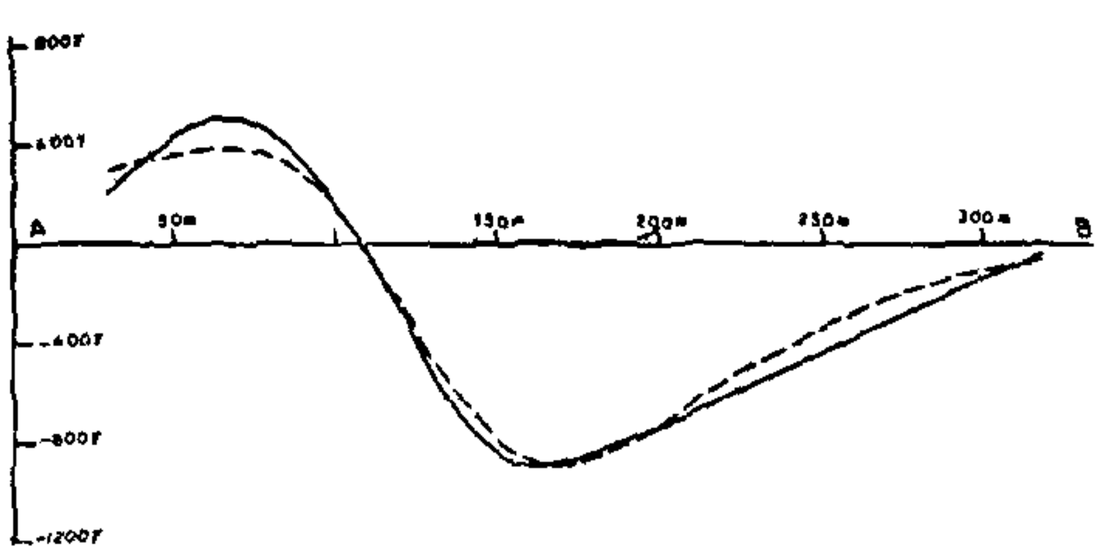

FIG. 2. *Profile AB.*

is interpreted for the quantitative parameters of the assumed sphere model. Approximate depth to the centre of the mass is obtained from the width of the profile. The depth thus deduced and the magnetic dip (−22°), from measurements on specimens, are used in calculating a theoretical vertical magnetic anomaly profile with the usual expression (Telford *et al.*)[1]. The depth is slightly changed until the theoretical curve agrees with the observed anomaly curve and the one shown by a discontinuous line in Fig. 2 is for a depth of 103 metres to the centre and a magnetic dip of −22°. If the average intensity of measured NRM, $0{\cdot}6 \times 10^{-3}$ e.m.u., is used for deducing the radius, it comes to 106 metres exceeding the depth by only 3 metres. A slightly stronger intensity, $0{\cdot}65 \times 10^{-3}$ e.m.u., will remove this discrepancy.

The northward dominant negative closure and the close match between the observed anomaly curve and the theoretical curve indicate that the magnetic anomalies are predominantly controlled by the NRM. Thus, the results suggest the charnockite mass to be having limited lateral extent, possibly a stock type intrusive, whose magnetisation is dominantly remanent.

Department of
Geophysics,
Andhra University,
Visakhapatnam 530 003,
April 19, 1980.

V. BHASKARA RAO.
A. LAKSHMIPATI RAJU.

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FOSSIL WOOD OF *ANISOPTERA* FROM THE MIOCENE BEDS OF BIRBHUM DISTRICT, WEST BENGAL INDIA

IN the present note, a new fossil wood resembling the modern genus *Anisoptera* korth is described from the Miocene beds of Santincketan (23·42′ N, 87·42′ E) near Bolpur, Birbhum District, West Bengal. The present fossil wood is represented by a single specimen of secondary wood about 6 cm in length and 3 cm in diameter. The preservation is quite satisfactory. It shows the following characters.

Wood diffuse—porous (Fig. 1). *Growth rings* absent. *Vessels* small to large sized, t.d. 166–266 μ, r.d. 133–499 μ, exclusively solitary (Fig. 1); 6–12 per sq. mm.; heavily occluded with tyloses; vessel members usually long; perforation plate simple with truncate ends; pits to vessel not seen. *Tracheids* vasicentric. *Parenchyma* paratracheal and apotracheal; *Paratracheal* parenchyma scanty to vasicentric, apotracheal parenchyma diffuse. *Xylem rays* fine to moderately broad (Fig. 2), 1–5 (mostly 4–5) cells and 15 to 80 μ broad; 6–12 per mm, uniseriate rays 3–12 cells and 159–333 μ high, multiseriate rays 12 to 52 cells and 166 to 999 μ high; rays heterocellular (Kribs type 11A) consisting of procumbent cells in the middle thickened portion with 1–6 marginal upright cells at one or both the ends (Fig. 3), sheath cells present on the flanks of the rays. *Fibres* irregularly arranged in between two consecutive xylem rays, thick-walled, libriform, non-septate, 15–30 μ in diameter. *Gum canals* diffuse, normal, vertical, exclusively solitary, scanty and small in size, 66–133 μ in diameter.

Holotype No. — P_{13}, of the Palaeobotanical collection, Department of Botany, Burdwan University, Burdwan.

Locality — Santineketan, Birbhum District, West Bengal, India.

Age — Miocene.