

those compounds that are metabolically transformed in the liver.

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ORIGIN AND GEOLOGIC SIGNIFICANCE OF THE CHAVARA PLACER DEPOSIT, KERALA.

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THE origin of the beach placer minerals like ilmenite rutile-zircon-monzite-garnet and sillimanite of the famous Chavara deposit in Kerala is still a controversy. Krishnan¹ suggested that the placer minerals originated from the pegmatites and gneisses of the interior of south Kerala, while Subrahmanyam and Rao² opined that monazite-bearing granites gave rise to the placer deposit. Based on a comparison of mineral ages of monazite and zircon from the placer deposit and granites from south-western India, as also the rare-earth content of a pegmatite from south Kerala, Soman and Nair³ concluded that the placer deposit originated from monazite-bearing granites or granitic pegmatites of late Precambrian-early Paleozoic age. However, wide disparity in ages of the gneisses (around 3000 m.y.)⁴ and pegmatites (445-474

m.y.)⁵ as well as the absence of similar placer occurrences in the vicinity of Archaean gneisses and granites of late Precambrian age in other parts of Kerala are arguments against the above mentioned sources.

Recent investigations on rocks of the khondalite-migmatite complex in areas south of the Achankovil shear zone (figure 1) provide evidence of their prograde metamorphism with the formation of sillimanite, one of the key minerals of the granulite facies khondalite suite of rocks from biotite (figure 2a, b). *Disintegration of Ti-rich biotite into sillimanite and ilmenite* under the influence of alumina-rich solutions is a process suggested to have been related to the migmatization, associated with granulite-facies metamorphism, involving mostly the metasediments of the south Kerala aulacogen and culminating in the emplacement of S-type granite of quartz-garnet-feldspar composition. This can be schematically expressed as: Biotite + Al-rich solutions → sillimanite + ilmenite + K⁺. Presence of garnet in the granite is indicative of the 'dry' nature of the granite-forming fluids, caused by the pervasive influence of CO₂ as evidenced from fluid inclusion studies⁶. S-type granites are generally rich in monazite⁷ and zircon⁸.

Thus, ilmenite, sillimanite, monazite and zircon formation is linked to the migmatization phase associated with metamorphism. Garnet is a constituent part of the khondalite as well as of the granite, and rutile is an alteration product of ilmenite. These evidences would suggest that the placer minerals (ilmenite-rutile-monzite-zircon-garnet and silli-

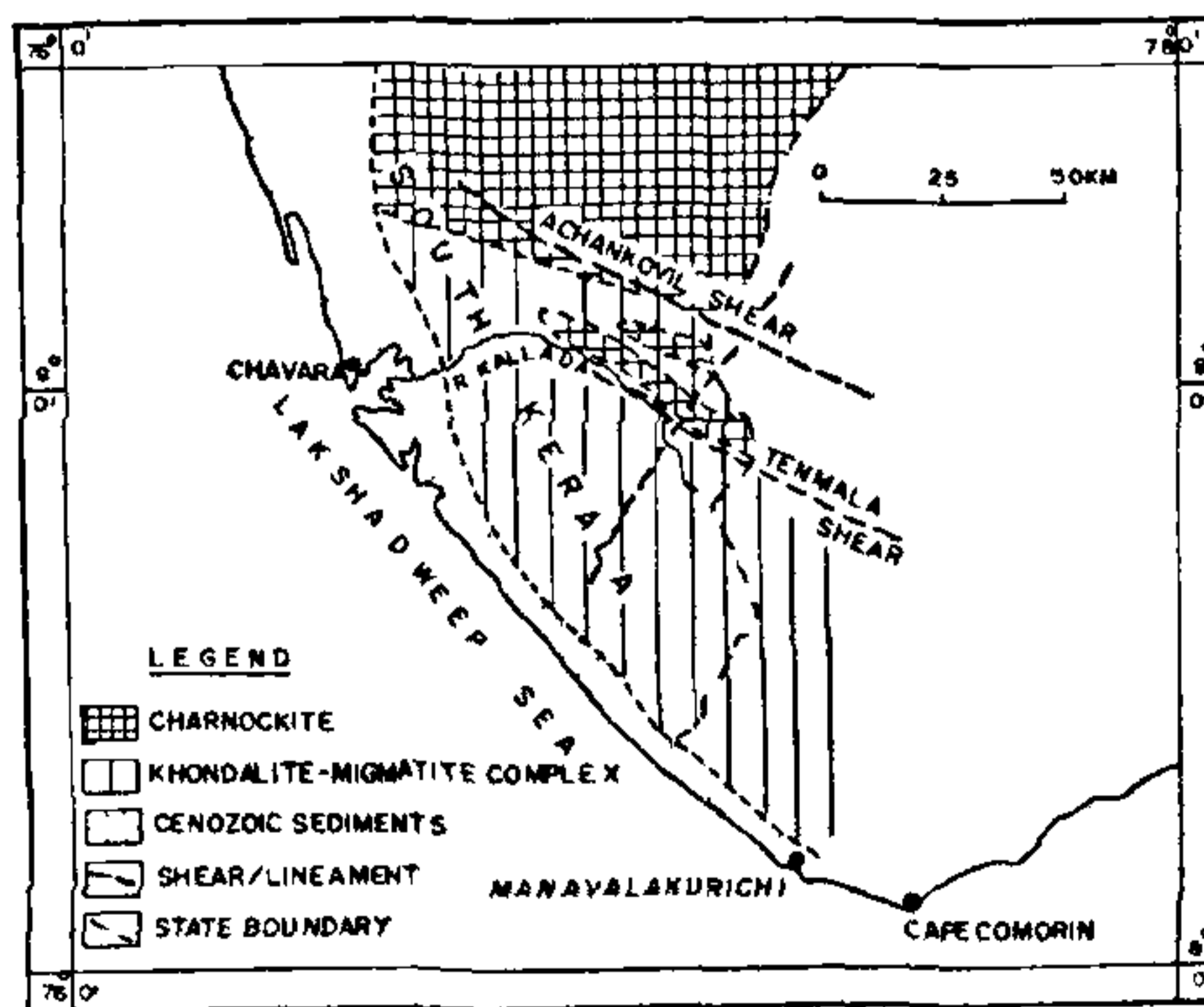
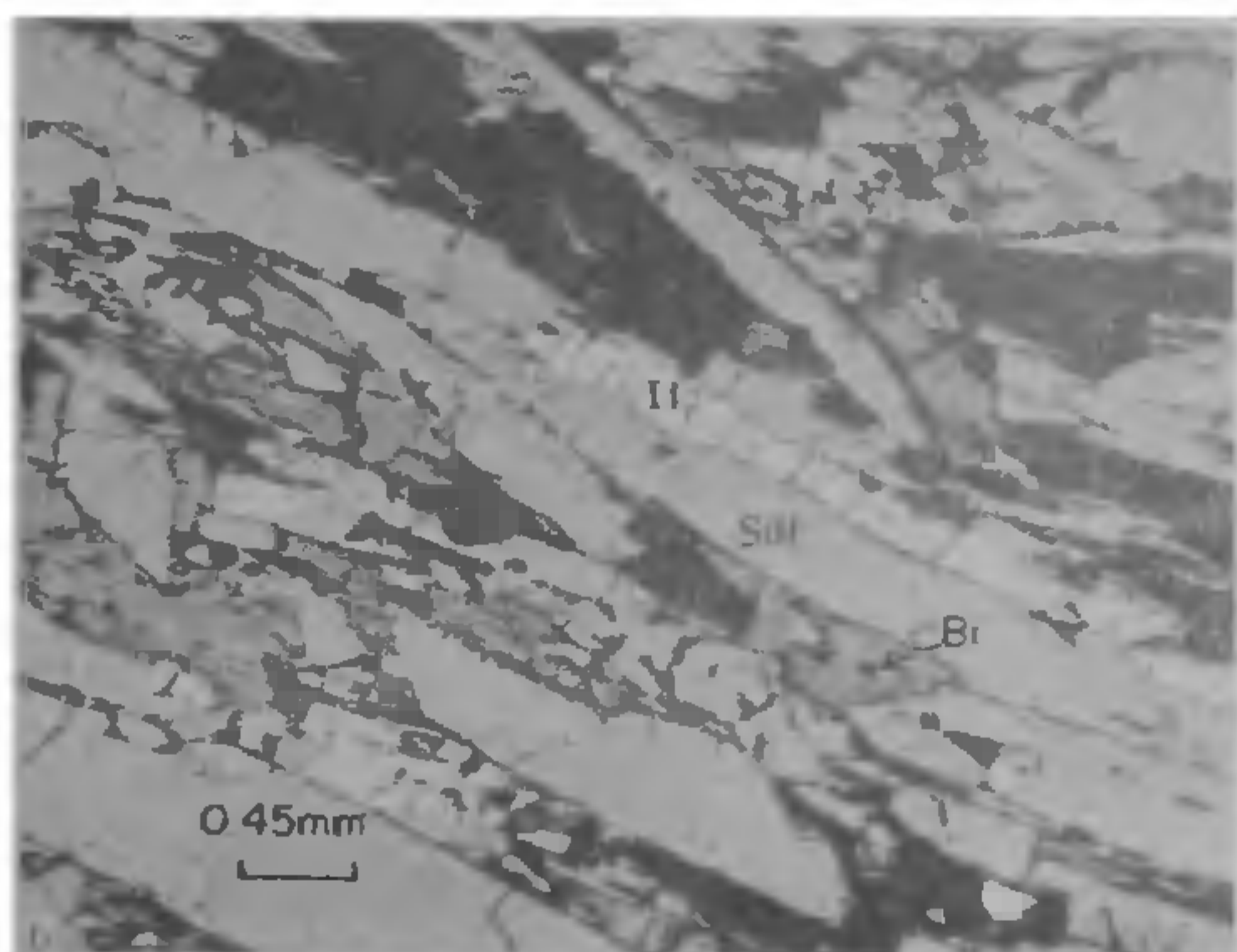
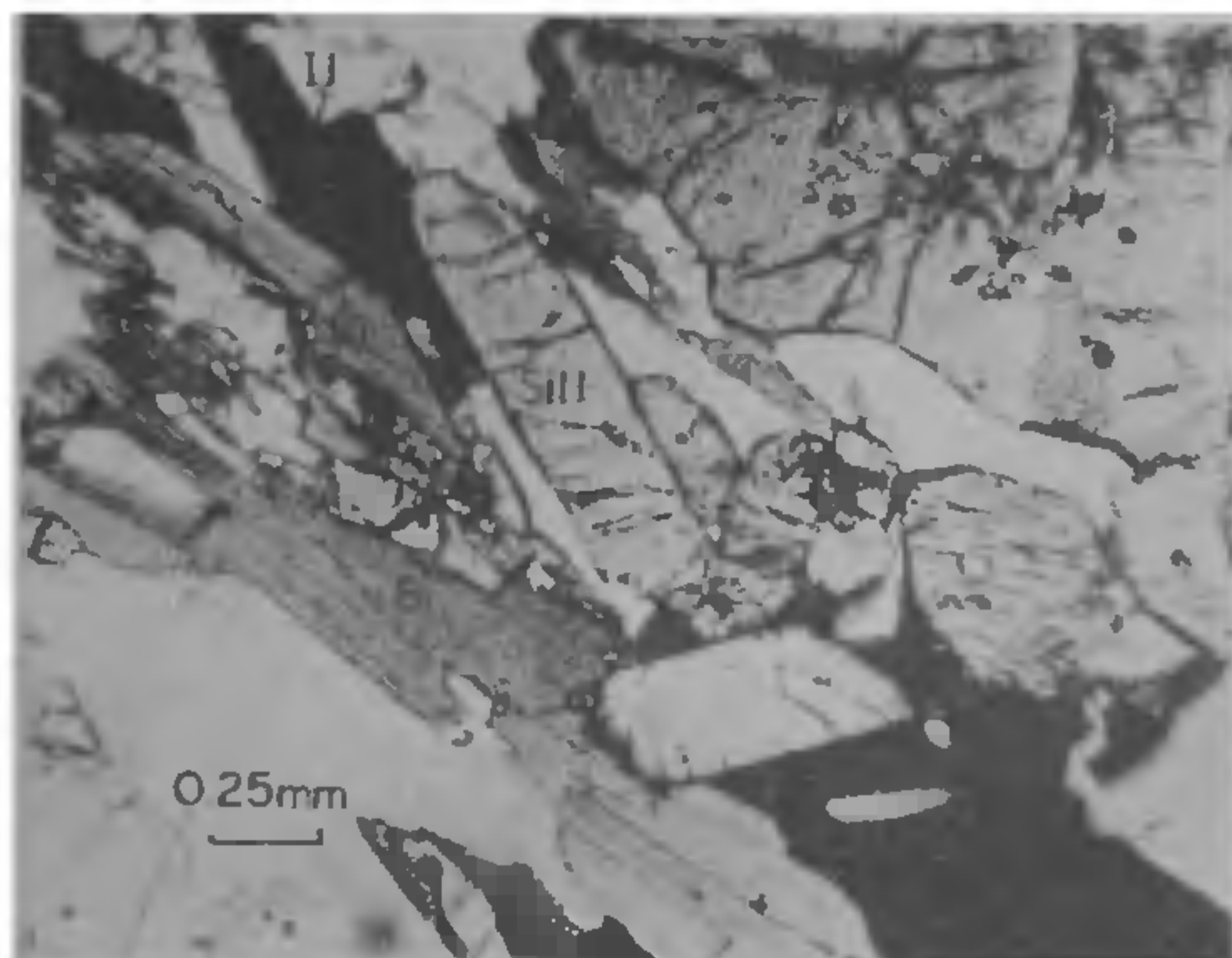


Figure 1. Location map of the Chavara Placer deposit (modified after Rao¹²)



Figures 2a, b. Photomicrographs. Formation of sillimanite and ilmenite from biotite. Sill—Sillimanite, Il—Ilmenite, Bi—Biotite, (a) Plane—Polarized light, (b) Reflected light. Scales shown on the photographs.

manite) of the Chavara deposit originated from the khondalite-migmatite complex of southern Kerala.

The available age data on monazite and zircon from Chavara deposit, ranging from 600 to 775 m.y.⁹⁻¹¹ would, therefore, signify the interval of migmatization and associated prograde (granulite-facies) metamorphism of the sediments of the south Kerala aulacogen. The exclusive localization of similar placer deposits in comparable geological environments, as in Manavalakurichi and in Orissa, would also testify to the origin of these minerals from khondalite-migmatite complexes of late-Precambrian age.

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A NEW FIND OF CARBONATITE FROM MEGHALAYA

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THIS note records a new find of carbonatite from West Khasi Hills district, Meghalaya. The carbonatite occurs in the form of small dykes (figure 1) with lengths upto 50 m and widths of 20 cm or more, traversing the gneisses and granites in Riangdo river bed, near Swangkre (25°30'45" : 90° 48'00") village, in toposheet no. 78K/14. The country rock gneisses have foliation striking WNW-ESE. The dykes trend in general N-S and are either vertical or have steep dips towards west. They are irregular in form and show branching at places. Because of their high susceptibility to erosion, they have a low relief compared to the host gneisses and granites. Platy calcite occurs as thin veins in the carbonate rock and possibly represents a pegmatitic phase.