Ethy-N-α-naphthyl malonamate used in the above experiment was prepared in the following manner :

A mixture of α-naphthylamine (7 g) and diethylmalonate (16 g) was gently refluxed for 2 h. The malondi-α-naphthylamide formed was filtered and the filtrate after evaporation to dryness was extracted with petroleum ether (b.p. 80–100° C). On evaporation of the solvent, a pink mass was obtained and this after recrystallisation from the same solvent yielded a white crystalline product, m.p. 83° C (Found: C, 70·21%, H, 5·76%, N, 5·61%; $C_{15}H_{15}NO_3$ requires C, 70·03%, H, 5·83%, N, 5·45%).

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A NOTE ON THE RARE MINERALS BEARING GRANITE OF KANIGIRI IN PRAKASAM DISTRICT OF ANDHRA PRADESH

THE granite of Kanigiri-Podile tract of Nellore and Prakasam districts (Andhra Pradesh) has been under investigation[1], not only for their abnormal fluorine content and its environmental aspects (widespread fluorosis in the human population of the area) but also because of their interesting mineralogy. This note reports the occurrence of columbite-tantalite in the granite and its economic significance. To the best of our knowledge, this is the first time that such an economically viable occurrence of columbite-tantalite in granite is reported from India.

Kanigiri town (Lat. 15° 24′ 30″ N, Long. 70° 30′ 00″ E in toposheet No. 57 M/11) after which the granite is named is suituated approximately 180 km NNW of Nellore (Nellore district) and 86 km WSW of Ongole (Prakasam district) of Andhra Pradesh. The granite forms the main hill mass just NE of the town and is extensively quarried. Results of airborne gamma-ray spectrometric data acquired in the flights conducted over these parts by the Atomic Minerals Division (AMD) in 1977 indicated high radioactivity, largely confined to the peripheries of the granitic body and prompted a detailed study by AMD.

The leuco-granite occurs as an intrusive in the meta-basic rocks, comprising sericite-chlorite-schists, exposed on the western flanks of the granite body and hornblende schists and gneisses on its eastern limits. The schists forming part of the Nellore schist belt (Dharwars) are considered equivalents of the Holenarsipur schists of the same age in Karnataka.

In thin sections the granite is seen to have typical holocrystalline-hypidiomorphic texture and composed mainly of orthoclase, microcline, perthite, albite and chloritised biotite. Zircon is the chief accessory mineral. Fluorite, topaz, arseno-pyrite and apatite are the other accessories observed in the rock. A few black and/or brown coloured, opaque mineral grains occur at the edges of the chloritised biotite clusters. The potash felspars have been converted to perthite and at places also replaced by albite. The rock can be termed as essentially an albitised granite (apogranite).

A sample of the granite from the fresh quarry at the northern edge of Kanigiri town was pulverised to −35″ size (Tylor screen) and deslimed. Heavy minerals were isolated by tabling, magnetic and heavy media separations yielding a crop mainly of zircon and other opaque mineral grains.

The above poly-mineral concentrate analysing radiometrically 0·5% equivalent U_3O_8, revealed the presence of samarskite, fergusonite, monazite and zircon in decreasing order of abundance. The concentrates were found by X-ray fluorescence analysis to contain 14·9% Nb_2O_5 and 2·2% Ta_2O_5[2]. The presence of columbite-tantalite, samarskite, fergusonite with lesser amounts of zircon and monazite in the same fraction was confirmed by X-ray diffraction studies[3].

The columbite-tantalite and samarskite bearing granite of Kanigiri is the first reported occurrence of non-pegmatitic source of these rare elements in the country. In mineralogy and mode of occurrence, this granite closely resembles the well-known Jos Bukuru granite of Nigeria[4] and similar granites in USSR[5]. The soil resulting from the weathering of this granite may prove to be a major source of niobium and tantalum. The soil contains 100 to 200 gm of columbite-tantalite per tonne and may yield sizable reserve of columbite-tantalite[6].

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STRUCTURAL CONTROL OF MAGNESITE MINERALISATION AT ATTAPADI, PALGHAT DISTRICT, KERALA

MAGNESITE veins occur in the northeastern part of a NE–SW trending hillock at Kalkandi village (11° 9′ 5″ : 76° 41′ 20″) on the south bank of Bhavani river. Mineralisation is confined to an area of about 1·5 sq km in a peridotite lens, composed mostly of olivine and subordinate clinopyroxene, enclosed in amphibolite and hornblende gneiss. The highly weathered lenticular peridotite, exposed over a strike length of 500 m, follows the NE–SW trend of the country rocks (hornblende gneiss with patches of hornblende-actinolite schist, quartz-biotite schist and amphibolite). The magnesite occurrence is located on the ENE–WSW trending Attapadi shear zone[1,2].

A penetrative axial surface foliation has developed in all the rocks except peridotite. Steep to vertical foliation has a general NE–SW trend. All the rocks, especially the peridotite, are fractured.

Pitting and drilling have shown mineralisation to extend to a maximum depth of 35 m (B. J. Anthraper, pers. comm.). It is not known whether the peridotite body itself extends beyond this depth. Magnesite veins with thickness varying from less than a cm to 20 cm criss-cross the host rock (Fig. 1), where veins intersect an increase in thickness is noticed. Veins extending more than a metre along the strike are found to be more than a cm thick while those extending less than a metre are less than a cm in thickness. Accordingly the former group is termed major veins and the latter—minor veins. Poles of both major and minor magnesite veins when plotted on a lower hemisphere stereographic projection form a number of concentrations giving the impression of poor preferred orientation (Fig. 2). But when the strike of major and minor veins are plotted separately a different picture emerges (Fig. 3 *a*, *b*). It can be seen that the major veins show strong preferred orientation with the great majority of them concentrated between NW–SE and N–S, the mean strike being N30W–S30E. A subordinate concentration along N30E–S30W is also significant. The strike of the minor veins, on the other hand, is more dispersed, most of them trending between NW–SE and NE–SW. However, two mean trends—N45W–S45E and N20E–S20W are discernible. Of these, the former coincides with the dominant trend of the major veins.

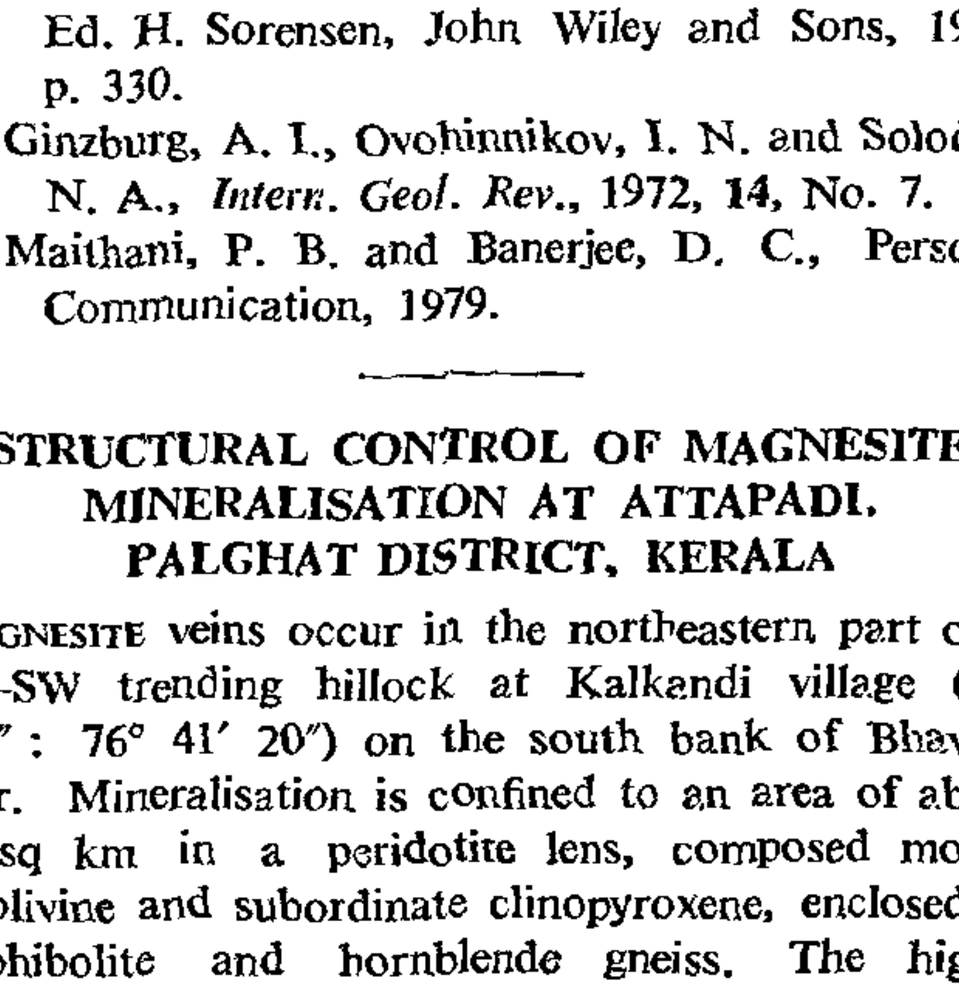

FIG. 1. Magnesite veins in peridotite.

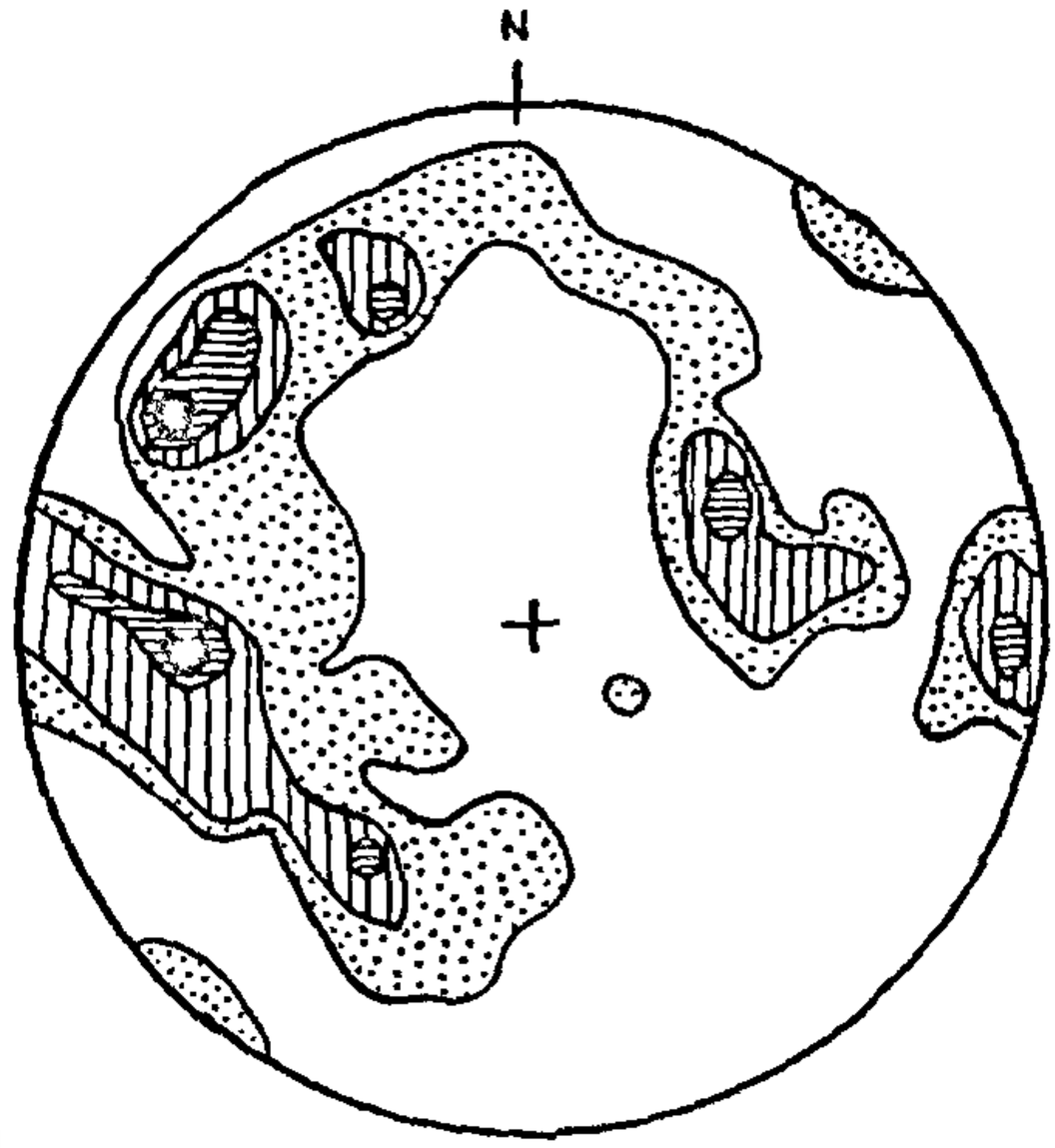

FIG. 2. Lower hemisphere stereographic projection of poles of 145 magnesite veins. Contours—8–6–4–2%.

The veins must have developed along available openings in the host rock at the time of mineralisation. Since the most important openings available in the rocks apart from foliation which has failed to develop in the host rock are joints, possible relation between the trend of joints and veins has to be examined. The strike of joints over an area of