SHORT COMMUNICATIONS

PETROLOGY OF THE BRICK-RED ROCK AND ALBITITE FROM THE SOUTHERN CLOSEPET GRANITE REGION

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THE Archaean Closepet granite (~2500 Ma) is a polyphase body intruding into the peninsular gneiss complex and the associated supracrustal rocks. The granite outcrop runs at least 350 km (lat 12° 15′ N to 14° 15′ N) with an approximate width of 20–25 km and cuts across the regional metamorphic structure. Earlier workers[1–4] who have studied the Closepet granite suggested a metasomatic origin. However, field observations in the southern end of the granite suggest that anatexis of Peninsular gneisses has led to the formation of granite melt[5,6]. Within the southern Closepet granite there are components with distinct mode of occurrence, colour and mineral composition. One of these lithologies is named brick-red rocks[2]. However, there is no information about their petrological and geochemical characteristics and genesis. The present paper records for the first time the occurrence of plagioclase–epidote–calcite-rich rock named albitite. The aim of this paper is to discuss the petrogenetic aspects of brick-red rocks as well as the albitite and their relationship with the associated Closepet granite.

Brick-red rock and albitites are generally found within the granite and occasionally at the margins of the granite outcrop. They predominantly occur at dolerite dyke margins.

Brick-red rock commonly occurs as sheet-like bodies forming ridges and are strongly weathered. They are deep red and have a porphyritic texture and contain large K-feldspar megacrysts which constitute up to 80% of the rock. The K-feldspar megacrysts are red and their abundance generally increases from the margin to the centre. Grass-green chlorite is abundant in the matrix. A number of epidote veins cut across the brick-red rocks. A gradational transition from the porphyritic granite (most voluminous phase of the Closepet granite) to the brick-red rocks can be observed. Occasionally hydrothermal quartz veins are found close to the brick-red rock outcrops in which the quartz crystals contain inclusions of opaque minerals.

The albitite is found in the vicinity of Ramanagaram close to the brick-red rock outcrops. The albitite is light-green and exhibits porphyritic texture with large alkali feldspar megacrysts. The megacrysts are white to cream-coloured and constitute up to 70% of the rock. Green epidote is abundant in the matrix. A gradational transition from the porphyritic granite can be recognized from the margin to the centre of the albitite outcrop.

Brick-red rocks

Brick-red rocks are megacrystic, and both the megacrysts and the ground mass are red. The presence of iron oxide provides red colouration to the rock. Modal composition of the brick-red rock is given in table 1.

In thin section the brick-red rock exhibits an inequigranular porphyritic texture and has the mineral assemblage quartz–plagioclase–K-feldspar–chlorite–calcite–grunerite.

Quartz is a minor phase occurring as anhedral grains. Plagioclase (An_{10-12}) occurs as subhedral grains with moderately developed albite twinning. In some instances plagioclase is moderately sericitized with abundant associated calcite. K-feldspar occurs as large anhedral grains and occasionally contains oriented euhedral inclusions of plagioclase. Grass-green chlorite occurs as anhedral grains. Calcite occurs as anhedral plates and has a rim of iron oxide. Brownish grunerite is found as radiating needles in association with calcite and iron oxide. Accessories such as zircon and apatite occur as inclusions in feldspars.

Albitite

Modal composition of the albitite is also given in

Table 1 *Modal composition of brick-red rock and albitite from the southern Closepet region*

Brick-red rock		Albitite	
K-feldspar	76.40	Albite	72.88
Plagioclase	6.10	Epidote	17.83
Chlorite	6.20	Clinozoisite	3.53
Calcite	4.5	Calcite	2.40
Quartz	2.2	Accessories	3.33
Accessories	1.4		
	100.00		99.97

table 1. In thin section the albitite exhibits an inequigranular porphyritic texture. The mineral assemblage consists of plagioclase–epidote–clinozoisite–calcite.

Plagioclase (An_{10-12}) is the most abundant phase and occurs as subhedral grains with moderately developed albite twinning and exhibits undulose extinction. Plagioclase is weakly sericitized and contains inclusions of epidote. K-feldspar is a minor phase and is found as anhedral plates. Epidote occurs as subhedral to anhedral plates and frequently shows lamellar twinning. Clinozoisite is anhedral and found as radiating needles. Anhedral plates of calcite are associated with plagioclase. The accessory phases such as zircon and apatite occur as inclusions in plagioclase and epidote.

Major and trace element analyses of the brick-red rock and the albitite were performed by XRF[7]. Samples of the Closepet granite close to the brick-red rock and albitite were also analysed for comparison. The analytical data are given in table 2.

The brick-red rock contains low SiO_2 (58.99%) and Na_2O (2.41%), high Al_2O_3 (16.21%) and very high K_2O (9.54%) compared to the Closepet granite. In trace elements the brick-red rock is depleted in Sr (248 ppm) and enriched in Rb (208 ppm). The brick-red rock shows similarity with the Closepet granite in the abundance of high field strength elements (HFS) such as Ti, Zr and Y and LREE.

The albitite has low SiO_2 (60.93%) and K_2O (0.19%). MgO is totally absent and Al_2O_3 (18.85%), CaO (5.16%) and Na_2O (11.06%) are very high compared to the Closepet granite. Among trace elements Rb is totally absent and enrichment of Ba (1936 ppm) is observed. The albitite also has high concentration of HFS elements and LREE, which is similar to the Closepet granite.

The mesonormative compositions of the brick-red rock, albitite and the associated Closepet granite were plotted on a Qz–Ab–An–Or tetrahedron (the granite system) for the condition $P_{H_2O} = 5$ k bar[8]. The brick-red rock and albitite fall, respectively, in the K-feldspar and plagioclase solidus volume, while the Closepet granite samples fall in the plagioclase + quartz + K-feldspar liquidus volume. The mesonormative compositions were also plotted on the two projections from the fourth face apex of the granite system. The Closepet granite samples fall close to the cotectic curve while the brick-red rock and the albitite fall outside the field.

The gradational transition from the Closepet granite to the brick-red rocks and albitite suggests a metasomatic origin for the latter. The hydrothermal quartz veins found very close to the brick-red rock and albitite may represent the SiO_2 removed during metasomatism. From petrographic observations it remains difficult to fix the origin of brick-red rock and albitite. However, the presence of low-temperature hydrothermal minerals favours a metasomatic origin. The major element data, particularly the very high K_2O (9.54%) in brick-red rock and Na_2O (11.06%) in albitite, strongly support a metasomatic origin. Composition plots for the granite system[8] envisage a magmatic origin for the Closepet granite and metasomatic origin for the brick-red rock and albitite. The HFS elements and LREE, which are considered to be immobile during secondary processes, are highly significant. The similarity in the abundance of HFS elements and LREE in the Closepet granite, brick-red rock and albitite indicate derivation of the brick-red rock and albitite from the Closepet granite by extensive metasomatism.

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Table 2 *Major and trace element composition of the brick-red rock and albitite, and Closepet granite close to these samples*

	Albitite	Brick-red rock	Closepet granite	
Major elements (%):				
SiO_2	60.93	58.99	66.47	71.17
TiO_2	0.71	0.62	0.65	0.59
Al_2O_3	18.85	16.21	15.54	14.01
Fe_2O_3	0.64	0.26	0.86	0.45
FeO	2.56	3.02	3.46	1.79
MnO	0.02	0.05	0.08	0.05
MgO	—	0.79	1.30	0.04
CaO	5.16	3.00	3.20	2.20
Na_2O	11.06	2.41	4.36	3.64
K_2O	0.19	9.54	3.26	4.24
P_2O_5	0.41	0.28	0.22	0.13
Total	100.53	95.17	99.40	98.31
Trace elements (ppm):				
Ba	1936	764	797	949
Rb	—	208	79	55
Sr	501	248	598	576
Zr	325	310	305	332
Y	33	29	30	26
La	106	120	104	123
Ce	169	175	159	181

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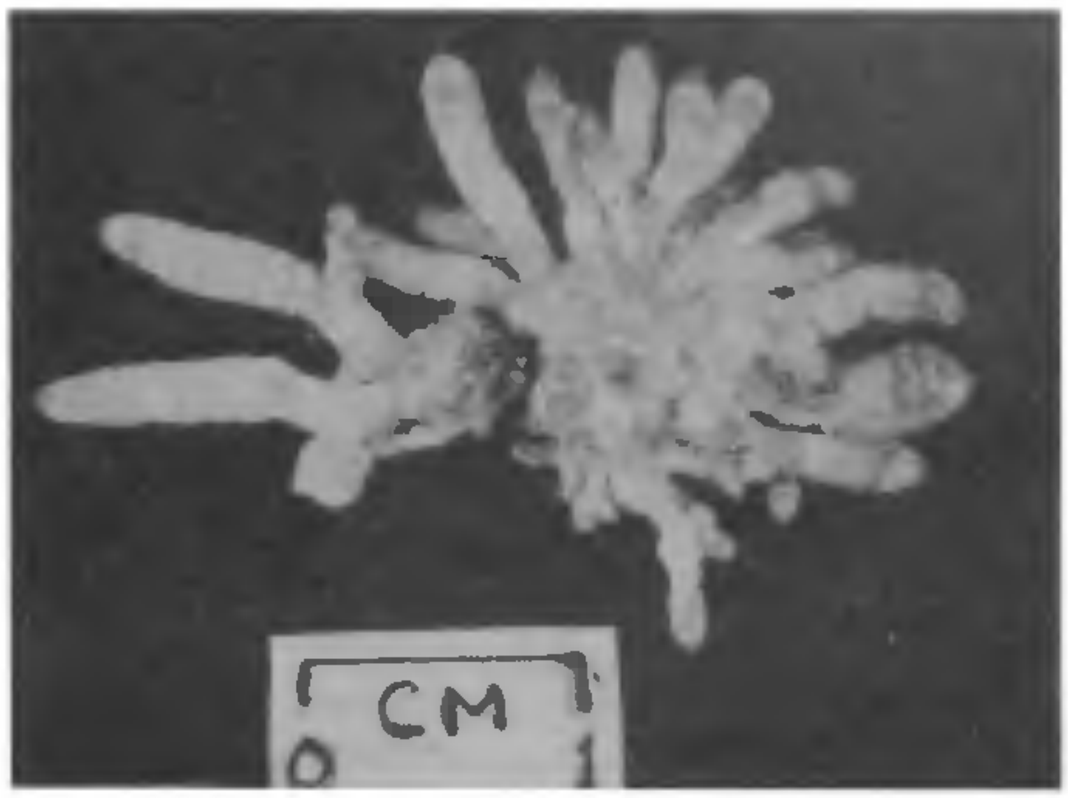

Figure 1. *Neomeris van-Bosseae*—Habit.

NEOMERIS VAN-BOSSEAE HOWE—A NEW RECORD ALONG THE INDIAN COAST

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TWO species of *Neomeris* have so far been reported from the Indian coast, viz. *N. annulata* Dickie and *N. dumetosa* Lamoun. *N. annulata* has been reported from various localities of India by various authors, while *N. dumetosa* has been listed by Chacko[1] from the Krusadai Island. During a survey in the Lakshadweep islands *N. van-Bosseae* was found growing in the lower mid-littoral zone in December. Details of habit and habitat, morphology and reproduction are given below.

Habit and habitat

Thalli were found growing on calcareous rocks and on dead corals. Thalli are light-green and strongly calcified in the lower region and weakly in apical region.

Morphology

Plants are in clusters and attain a height of 1.5–2.5 cm (figure 1). The main axis gives rise to 28–40 whorls of laterals along the entire length. These primary branches are 460–580 μm long. Secondary branches arise in pairs 340–400 μm long (figure 2a). The inflated apex of secondary branches is broad and conical, 180–220 μm (figure 2b). Secondary

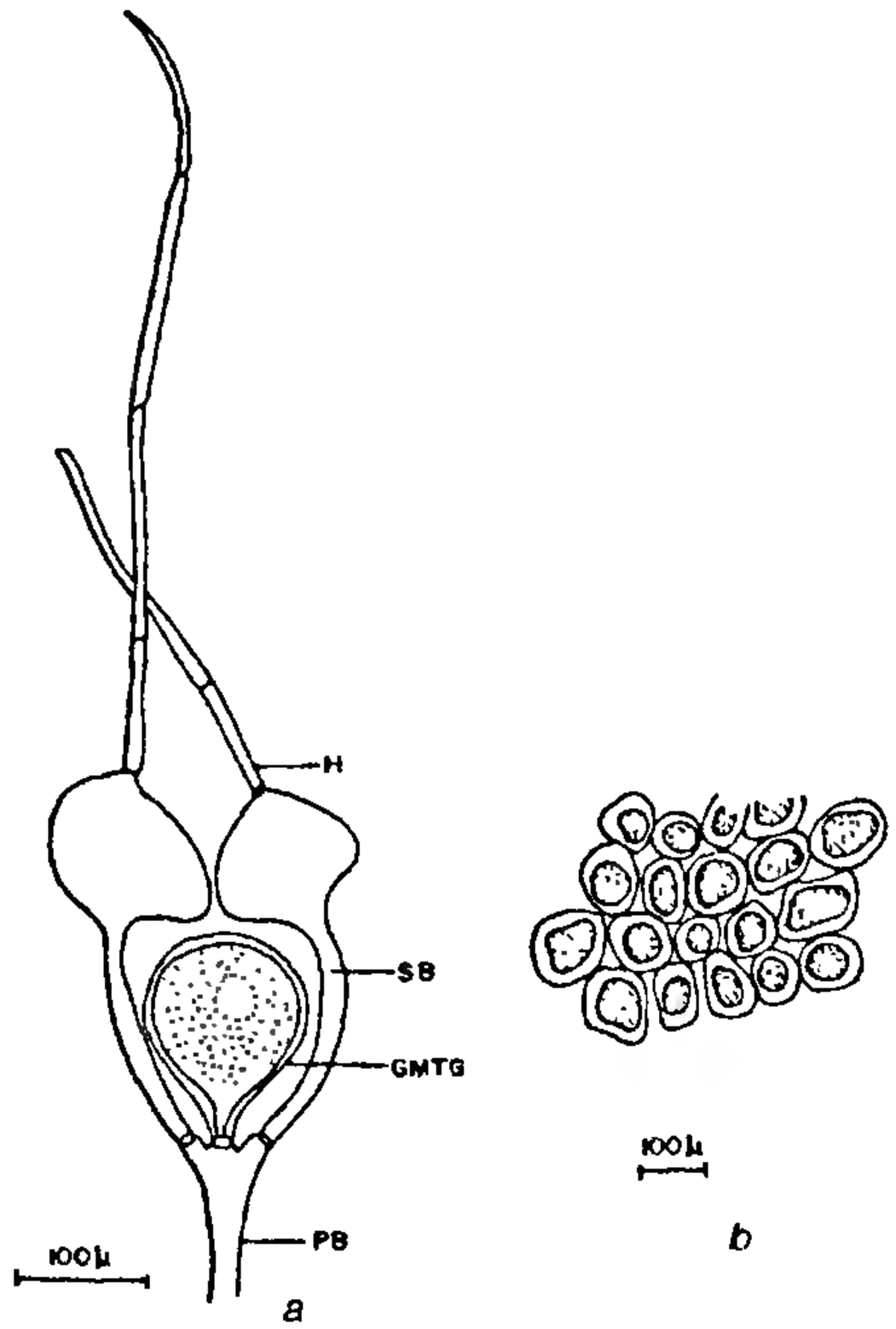

Figure 2. *N. van-Bosseae*: **a**, branching of primary (PB) and secondary (SB) order enclosing globular gametangium (GMTG), secondary branches bearing hairs (H); **b**, surface view of secondary branches.