CHAPTER XI

BRICK-RED FELDSPATIC ROCK
The occurrence of brick-red feldspathic rocks (composed mainly of feldspar, with minor amounts of quartz) as small mounds (Fig. 89A) within the area needs some mention in view of their curious brick-red colour, porous appearance, and monomineralic character. These rocks have already been noticed by several workers, both within and outside the thesis area (Jayaram, 1912; Radhakrishna, 1958 and Suryanarayane, 1959).

An excellent occurrence of the brick-red feldspathic rock is the one seen near the 34th milestone, on the Bangalore-Mysore road. Radhakrishna (1958) has pointed out that these brick-red rocks occur in linear zones. But the present writer's investigation does not support his view. The rocks occur as isolated small hillocks scattered in the area. They are highly porous and crumble into individual feldspar grains.

The rocks are coarse-grained and are composed of large crystals of feldspar often of the size, 1 to 2 cms. in length and ½ to 1 cm. in breadth. The feldspars are coloured brick-red and deep pink. The red colour is attributed to the presence of fine haematite dust within the mineral. The yellow stain sometimes seen on the surface of the rocks is due to limonitic material altered from haematite. Haematite must have altered to limonite, which
has been removed by weathering to form cavities on the surface of the feldspar. The presence of these cavities on the surface of the feldspars, due to the removal of limonite, imparts the porous appearance to the rocks.

Radhakrishna (1958) reports the occurrence of carbonate minerals in the brick-red feldspathic rocks on the basis of the effervescence he obtained when the rock was treated with hydrochloric acid. A similar test applied on the brick-red rocks of the area produced no effervescence, but only bubbling through of the air as the acid entered the pore spaces. The bubbling caused by the escape of the air might have been mistaken by Radhakrishna for effervescence.

The individual feldspar grains are impregnated with iron ore dust (haematite) on account of which the grains appear dusty, and brick-red in colour, making the grains appear almost opaque (Fig. 89B). However, the anisotropy of the mineral grain can generally be detected in the transmitted light as the stage is rotated. The examination on the Universal Stage revealed one set of prominently developed cleavages parallel to (001). Several grains were found showing both the optic axes. The mineral is negative, with 2V varying between 64° and 68°. The poles of the cleavage when tested on the Nikitin's stereogram (Fig. 90) fall on the trace of 0(001) indicating the monoclinic symmetry of the grains. This, together with
the 2V ranging from 64° to 68°, has led the author to identify it as orthoclase feldspar.

In some sections, a few brick-red feldspars were noticed with unaltered cores exhibiting polysynthetic twin lamellae (Fig. 39.D). The cores were found to be albites. This probably indicates the growth of brick-red potash feldspar around albite. Some potash feldspars exhibit cross-hatching, with the lamellae parallel to (010) being rather distinct. This may lead us to believe the potash feldspar to be microcline. Taken as a whole, the brick-red feldspathic rocks may be considered to have been composed essentially of orthoclase feldspar, with a slight tendency towards triclinicity. This view is confirmed by the 2V value of 64° to 68° which is between that of true orthoclase, which generally has low 2V, and microcline, whose 2V is generally high, between 80° to 85°.

The red colouration of the feldspars is due to the minute particles of the haematite dust distributed within the mineral grains. The mineral is noticeably red along the borders and the colouration seems to extend gradually into the crystals (Fig. 39.D). The reddening has also gone along the (010) twin lamellae in the case of plagioclase grains.

Though there is unanimity of opinion that the red colouration is due to the presence of haematite dust, there
is no general agreement on the actual cause for such colouration. The cause for the red colouration of feldspars has been explained in different ways as follows.

Bastin (1935) states that the red colouration of aplite is due to hydrothermal alteration.

Singewald (1930) and Riley (1935) believe that the hydrothermal solutions, that pinkened the feldspar, obtained ferric oxide by the alteration of ferromagnesian minerals, which took place at the end of the intrusive cycle.

Pichamuthu (1936), while describing red feldspars from porphyry dykes of Mandhya district, Mysore State, refers to the dissemination of abundant haematite by hydrothermal metamorphism.

Nockolds (1941) records that the medium-grained granodiorite of the Garabal Hill, Glen Fyne complex, is coloured pink by being affected by later hydrothermal solution.

Conybeare and Campbell (1951) have offered three possible explanations for the presence of haematite dust in feldspars which are as follows:

1) Haematite was introduced by solution or diffusion.

2) Haematite was liberated from the pre-existing iron-bearing minerals by radioactive bombardment.

3) Haematite is an exsolution product of ferro-microcline or ferro-albite.
Leedal (1952) in his description of the Claunie igneous intrusion has recorded that the normal granodiorite which is light grey in colour has been reddened by hydrothermal alteration.

Hutchinson (1956) states that the oxygen ions at the surface of the mineral have a tendency to carry iron oxide from the solutions into the mineral.

Which of the above views holds good for the red feldspathic rocks of the area must be considered. Any view suggested must be done in the context of the geological setting of the rocks, which, perhaps, is done by most workers that have offered their views.

In the present case, the red feldspathic rocks of the area occur in a terrain consisting of rocks that have originated by regional metamorphism. In dealing with the genesis of the Peninsular gneiss, it is believed that the regional metamorphism was attended by the injection of granitic liquids into the pre-existing rocks. These granitic liquids are mainly responsible for the formation of Peninsular gneiss. During this period, hydrothermal solutions were active. These hydrothermal solutions, together with the water present in the original sediments which has been expelled during the high grade regional metamorphism from the theatre of metamorphism, must have carried with it the iron-ore leached from the ferromagnesium minerals together with the residual potash, and played a part in the genesis
of red feldspathic rocks. The red feldspathic rocks have a sporadic distribution in the area. The positions occupied by them now must be the locii through which the iron ore and potash-carrying hydrothermal solutions have oozed out with the consequent crystallization of the solutions to form the red feldspathic rocks. As these rocks do not show any linear disposition in their arrangement and as no evidences of faulting are found, the view of RadhaKrishna (1953) and others, that the hydrothermal solutions rose along the fault planes, stand refuted.