Geology
CHAPTER III
GEOLoGY OF ATTUR VALLEY

3.1 INTRODUCTION:

The stratigraphic sequence established by the present investigation is as follows:

<table>
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<th>Stratigraphic position</th>
<th>Rock types</th>
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<tr>
<td>Recent</td>
<td>Alluvium and soil.</td>
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<tr>
<td>Dykes</td>
<td>Dolerites</td>
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<tr>
<td>Arcotgranite</td>
<td>Pink granite, Pegmatite and Quartz veins.</td>
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<tr>
<td>Peninsular gneiss</td>
<td>Granodiorite and granite gneisses.</td>
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<tr>
<td>Charnockite</td>
<td>Basic granulite and Enderbite</td>
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<tr>
<td>Khondalite group</td>
<td>Pelitic and Psammitic members.</td>
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<td>(Quartz magnetite rock, Garnetiferous sillimanite gneiss.).</td>
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</table>

3.2 DESCRIPTION OF THE ROCK UNITS:

3.2.1 KHONDALITE GROUP OF ROCKS:

The Khondalite group of rocks occurring in and around Attur Valley is represented by sillimanite gneiss, garnetiferous biotite sillimanite gneiss and ferruginous quartzite. The distribution of Khondalite group in the area under investigation is shown in Fig.18.
The rocks belonging to Khondalite group are encountered in Palaniapuri basin and Paithur hills. The pelites are comprised of sillimanite and granetiferous biotite sillimanite gneiss. Sillimanite gneiss is finely foliated and pale yellow in colour. It is essentially comprised of fine granular quartz and feldspar and pale-grey needles of sillimanite. It displays variation in trend from N 45°E to N-S and exhibits folding. It is characterised by two sets of joints, one set of joint is parallel to the foliation, and the other inclined at 70° to the trend of the foliation.

Garnetiferous sillimanite gneiss occur associated with sillimanite gneiss and displays crude banding due to the presence of pimples of dark brown garnet and leaves of pale grey quartz. (Plate III Fig.1).

The psammitic members are characterised by ferruginous quartzite. They are essentially comprised of quartz and magnetite.

Magnetite quartzite occurs as narrow bands along the flanks of Paithur hills and Palaniapuri hill. (Fig.13). On fresh surfaces it is steel gray in colour and finely granular, but on weathered surfaces it is
yellowish brown in colour. It displays one set of joint parallel to the trend of the bands and joint planes are smooth and reddish brown in colour.

3.2.2 CHARNOCKITE:

In the area under investigation the charnockite is represented by Enderbite and basic granulite with ultrabasic schlieren.

The distribution of charnockite in the area under investigation is shown in Figure 18.

In the field the basic members of charnockite displays faint foliation (Plate III Fig.2) on weathered surfaces. They are fine to medium grained dark grey granular rocks. Pale yellow plagioclase feldspar and dark glistening hypersthene and augite are present.

In places fragments of basic members of charnockite occur as xenoliths in peninsular gneiss and pink granite and are mostly converted to plagioclase amphibolite (Plate III, Fig.3).

Along the contact with ultrabasic schlieren they display coarseness in grain size; disturbed foliation and
Fig.1. Ripples of dark brown garnet and leaves of pale grey quartz arranged along the foliation of garnetiferous sillimanite gneiss at Anaivari, North of Attur town.

Fig.2. Charnockite displays faint foliation on weathered surfaces, at Kolladachannelai South of Attur Town.

Fig.3. Charnockite occur as xenoliths in Peninsular gneiss and are mostly converted to plagioclase amphibolite at Paithur.
enrichment in hornblende. Some times the basic granulite carry small lenses of pyroxenite. The pyroxenite are medium grained dark green granular rock characterised by hypersthene and augite.

The acid member of charnockite is enderbite. Enderbite is a pale bluish grey, medium to fine grained granular rock and the weathered surface show faint foliation.

In thin section it is essentially comprised of antiperthite, bluish grey quartz with subordinate amount of hypersthene and augite. In contact with ultrabasic schlieren, they show formation of biotite and garnet.

3.2.3 Peninsular Gneiss:

Peninsular gneiss is a pale greyish white, fine to medium grained rock displaying coarse to fine banding due to the directional orientation of prisms of hornblende and flakes of biotite. (Plate I, Fig.2). It is mostly comprised of granodiorite gneiss. The granodiorite gneiss carries oligoclase and quartz with minor amounts of hornblende and biotite. Near Kadampur, Pungavadi and Valayamadevi peninsular gneiss is highly sheared.
3.2.4 PINK GRANITE:

Pink granite is rare in the area under investigation. It occurs near the village Kadambur and Ceylon colony (Fig. 18). Pink granite displays both concordant and discordant relation to the charnockite and peninsular gneiss. Pegmatite and aplite intrusions are encountered with the pink granite.

3.2.5 DYKE ROCK:

Dyke rocks are the youngest rock type that occur in the area under investigation. They are comprised of dolerite. The distribution in the area under investigation is shown in Figure 18. Most of the dolerite dykes are encountered in the western and central zone of the study area.

The dolerite dyke trending in the NW-SE direction is dissected by number of faults parallel to roughly NE-SW direction. Around Palaniapuri basin, the dolerite dykes display branching. Near Ethapur dolerite dyke occur in the NE-SW direction and is dissected by E-W fault.

In the central zone of the area under investigation NS trending dyke occur between Attur and Manjani. They swing towards Northeast at Soolamalai (1928'). In general the dolerite dykes trend mostly in NW-SE, NE-SW and N-S directions. They cut across metasediments, charnockite,
EXPLANATION OF PLATE IV.

Fig. 1. Sharp contact by dolerite dyke with peninsular gneiss developed at Poyamalai.

Fig. 2. Development of concentric layers of spheroidal weathering shown in dolerite dyke at Paithur Village.

Fig. 3. Crushed at syenonatised rock shows shear zone at Chennimalai.
peninsular gneiss and granite and display sharp contact. (Plate IV Fig.1). At Pungavadi and Punavasal boundary run of dolerite were observed. The dolerite of this area clearly exhibit spheroidal weathering. (Plate IV Fig.2).

Fine grained dolerite occur at Kurukkumalai and near Malliakarai. They are economically highly valuable as they fetch a price of nearly Rupees 14000 per cubic metre. Tamil Nadu Minerals Ltd., a State Government enterprise have opened up quarries at the following places, 1. Paithur Reserve forest at Kurukkumalai, 2. Near Malliakarai, 3. Ethapur, 4. Near Manjani.

3.2.6 ALLUVIUM:

Along the Vasista river, the alluvial deposits in the E-W direction, are deposited at the central portion of the study area.

They are classified into the following groups. (Soil Survey and landuse organisation. 1983). 1. Red Soil, 2. Black soil, 3. Mixed soil.

By the distribution of Soil as mentioned above, it is inferred that the area might have undergone some denudational processes.