CHAPTER IX

PHYLLITE AND SLATE AS DIMENSION STONE

Extensive deposits of phyllite and slate belonging to Aravalli system, occur in Panchmahals and Sabarkantha districts (Fig. 9.1). They include microgranular, metamorphosed argillaceous rocks and are characterized by prominent cleavage. In old times the massive slate and phyllite were used in carving large size statues of Mahavir and other Jain saints in Arthuna (Rajasthan).

GEOLOGICAL SETTING

Quartzite, slate, phyllite, schist, limestone etc.	Aravalli system
- - - - - - - - - - - - - - - Unconformity - - - - - - - - - - - - - - -	
Banded gneissic complex	Archean

DISTRIBUTION

In Panchmahals district phyllite and slate belong to Champaner series of Aravalli system. In Champaner series phyllites are exposed between quartzite ridges around Narukot, Ranjitpura and Bhabar. The lower parts of the phyllites near Shivrajpur, Bamankuva and Pani mines are manganiferous. These phyllites are not much useful as dimension stone. Phyllites and slate occupy the broad valley between the long ridges of quartzite and also occur as thin intercalated bands in the quartzite ridges. Phyllite is generally dark grey and occupy wide area near Dohad, Jhalod, Santrampur and Lunawada. It extends into the state of Rajasthan. At present quarrying of phyllite and slate is being done at Zalod. This stone is popularly known as 'Jhalod Stone'.

Extension of Aravalli system of Panchmahals district occupies part of Sabarkantha district. At present phyllite is quarried at Vasai and Nal tank near Waidy irrigation scheme.

In Banaskantha district phyllite belongs to Ajabgarh series of Delhi system. This phyllite is not of much use as dimension stone.

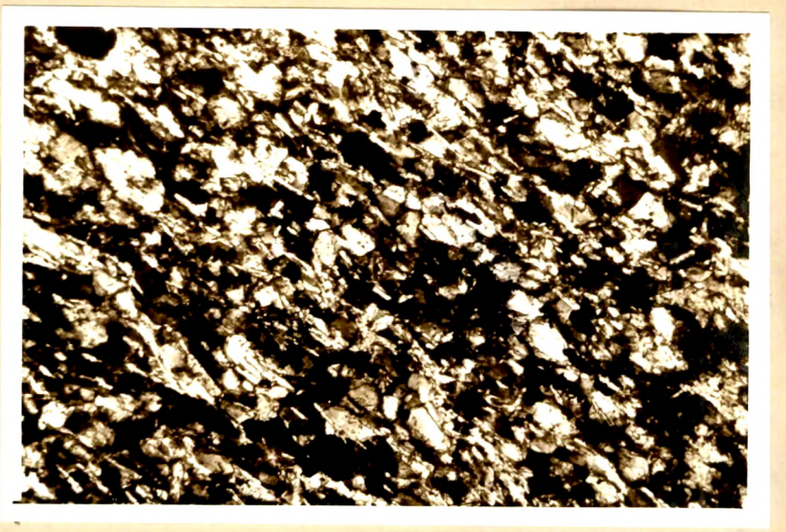

Plate 9.1: Photomicrograph showing texture of Phyllite (Crossed Nicols, X50).

PROPERTIES

The slate is grey to brown with less pronounced cleavage. It mainly consists of mica and quartz. Slaty forms of metamorphosed argillaceous rocks occur in close association with the phyllite and schist of the area. These are generally soft and their cleavage or lamination are usually too close to render them of any use as building stones.

Phyllite is generally dark grey. The rock varies in hardness and fissility. In its typical form the phyllite formation is characterised by pronounced foliation (Plate 9.1) and by its softness. Generally the phyllite crumbles readily under the attack of weathering agencies and is very prone to lie burried under the debris derived from their own disintegration. Quartz and mica are the chief minerals present in this rock (Plate 9.1).

However at Zalod (Panchmahals district) slates are associated with phyllites and cleavage is less pronounced. The rock is siliceous and often faintly micaceous at the parting. Master joints are present which give slaby character to the rock. Tiles are cut by taking advantage of slaby character. During excavation of Panam canal in Panchmahals district such slaty rocks were available.

Phyllite is excavated even at Waidy irrigation scheme.

Engineering proportion of phyllite and slate are given in Table 9.1. However, phyllite and slate are not of much use as building stone because they contain mica which alters to clay mineral on weathering. Mica is soft and easily attacked by water. Even slaty character which allows water to percolate is not desirable.

QUARRY METHOD

All the existing quarries of phyllite and slate are shown in Fig. 9.1 and list of quarries is given in Table 9.2. All quarries of phyllite and slate are approachable by rough motorable road except monsoon. During monsoon these rocks become very sleepy and it is very difficult to work on them. Normally quarries are closed during monsoon (Fig. 1.2).

Phyllite and slate are quarried by Wedge method in which advantage of joint planes is taken to cut rocks from the quarry. The wedge is driven by hammer along the cut made in the rock by chiselling so that the rock splits along the joint planes.

Because of better cleavage quarry at Jhalod yields slabs measuring upto 35 x 1.5 m.

USES

Phyllite and slate are mainly used as roofing and flooring tiles because of their slaty character. Some phyllites are used in the canal lining in Panam canal. Some arenaceous phyllites or quartzose phyllites which can be easily dressed are used as guardstone with less thickness (Chapter II).

Quarry waste can be pulverized for its use as a filler in paint, linoleum, road asphalt and other products.

Table 9.1 : Engineering Properties of Phyllite and Slate.

Sr. No.	Name of Quarry	Compressive strength Kg/cm^2	Water Absorption %	Specific Gravity
		IS 1121 (Part I)-1974	IS 1124-1974	IS 1124-1974
1.	Jhalod (233)	107	0.01-0.6	2.72-2.57
2.	Nal Tank (234)	87-463	0.51-2.65	2.61-2.95
3.	Vasai (235)	130	1.42	2.68

Table 9.2 : List of Phyllite and Slate Quarries (Fig.1.2 and 9.1)

DISTRICT	LOCATION
Panchmahals District	(233) Jhalod
Sabarkantha District	(234) Nal Tank
	(235) Vasai