Mineralogical and Textural Studies on Basalts in Parts of Malwa Plateau

D. R. S. MEHTA, S. N. BHATTACHARJEE and R. L. MUNSHI
Geological Survey of India

Abstract

Malwa plateau is composed mainly of basalt traps. The basalt flows are of uniform character and the total thickness varies from 50 m to 135 m. A number of flows have been identified, indicating breaks in the continuity of the eruptions. The breaks were of shorter nature as evidenced by the presence of thin discontinuous bands of intertrappean sediments. The trap maintains a uniform horizontal attitude with well developed joints and is sometimes scoriaceous. Petrographically, these basalts are divisible into porphyritic, massive and vesicular types. The rock types are composed essentially of plagioclase, pyroxene, iron ore and glass. Stray occurrences of olivine have been noted from the lower section of the flows. The plagioclase ranges in composition between An 59 and An 68 and the pyroxene is diopsidic augite. The rocks are fine grained, aphanitic showing porphyritic, glomeroporphyritic, intergranular, micro-ophitic and flow textures.

It is concluded that the lava flowed out quietly, in some cases through fissures, and that the area is away from the main centres of differentiation.

General Features

Basalt traps within the Malwa plateau between the latitudes 22°00' to 25°30' and longitudes 74°00' to 79°00', are separated from the typical Deccan Traps by the Narmada and the Tapti valleys to south. To the SE, E and N of this plateau, Vindhyan rocks are in contact with basalt. To the SW and W, the Aravalli rock types demarcate the limit of the basalt flows. The whole area lies to the east of the Panvel flexure of the peninsular India.

Basalt flows of uniform character and thickness can be traced for long distances and cover almost the whole area. Inliers of older
rock types are confined generally to the marginal parts. Total thickness of the basalt flows varies approximately from 135 m in Sehore district (ATRAM, 1965) to about 50 m in Mandsaur district (BHATTACHARJEE and MUNSHI, 1968). The plateau has a general trend of NE-SW which also roughly coincides with the regional strike of the Satpura Range.

Nature of the Basement Rocks

From inliers exposed at several places the general succession of the older rock formations in contact with basalt is derived as follows:

- Upper Cretaceous
- Infra-trappeans
- Sandstone associated with limestone
- Unconformity
- Vindhyans
- Sandstone and limestone
- Unconformity
- Delhis
- Conglomerate (Quartzitic)
- Sandstone (Quartzitic)
- Shale

Of the older rock formations the Infra-trappeans are exposed in Dhar district to the south and Delhis in Mandsaur district to the north of the plateau.

Traps and Inter-trappeans

High fluidity and uniform temperature conditions of the basalt from flood eruptions are indicated by:

1) Uniform thickness of the individual flows occurring in the identical contour levels at different parts of the area.

2) Spreading of flows over great distances away from the source. Even in the marginal parts of the plateau, earlier flows are seen to continue for 20 to 40 km.

3) Uniform lateral composition is indicated by the general tholeiitic type of basalt throughout the area.