The Main Malakand Granite

A PRELIMINARY STUDY

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General

In April 1962, The Geology Department, University of Peshawar decided to send its B.Sc. (Hons) Part II students to the above area for field studies. The party was lead by the author, but useful guidance was also provided by Professor Odell who visited us in the field.

The following account is based on field observations only. No maps or thin section studies of the rocks mentioned are available.

General Geology

The best exposures of this beautiful rock are seen along the main road from Malakand to Bat Khela. It is a dazzling white, coarse grained rock, mainly composed of quartz, biotite, and alkali feldspars, but there are local variations in colour, texture, and composition.

It is without foliation in the main part, but where traced to the surrounding rocks, gneissic structures come in.

The country rocks surrounding it are mainly slates and gneisses, but various kinds of schists may also be seen.

Quartz, aplite, and pegmatite veins are common, especially where the adjacent rocks are slates.

Rafts and xenoliths of slates are common in the granite.

Petrology

The minerals making the rock are anhedral. They may suggest crystallization from a magma. The greater part of the granite in the south looks like a genuine sodic granite but pink colouration may also come in east of the village Piran in the V-shaped valley. Further north the granite merges into gneisses.

The pegmatite veins carry big crystals of microcline and other feldspars along with quartz. These can be seen at various points along the contact with the slates. The biggest crystals seen were just 20 feet below the 4469 feet peak north east of the Castle rock. Here a pegmatite

vein nearly 4 feet wide follows along the granite-slate contact, and from this a crystal of microcline 8 inches long was recovered by the party after a great deal of skillful hammering.

The surrounding gneisses have pinkish colour and seem to be of the same composition as the granite. At least they are granitic and much more abundant on the northern side of the granite proper. Veins of pegmatite and quartz are also present in them at various places, and they may follow various directions. The longest pegmatite vein was traced by the party just north of the village Piran patto. It is a north-east trending vein variable in thickness from 2-5 feet as the party saw it. It crosses the road at the point where the non-metalled road to Khar branches off. It is continuous on both sides of the road for a considerable distance.

Contact

Contact of the granite with slates is very sharp. The cleavage in the slate ends abruptly against it. At some points some shattering of slate has happened. Muscovite flakes lying at right angles to the cleavage can be seen near the contact.

Greisenization has also happened, especially along the southern contact. In the south the slates are inter-leaved with the granite, and contact is not continuous. Some peculiar type of folding on a small scale is present in the slates along the western slopes of the Castle rock. This may be due to the force of intrusion. Along the fractures in the crests of these folds, quartz has recrystallized.

In the Jabban valley head, east of the Castle rock, small development of the gneissic granite can be seen. Although pegmatitic blocks separate the slates from the granite at this point, the main cliffs include this gneissic type of the rock. This zone may be 10-15 feet wide and a quarter mile long. It grades into the granite and slates on both sides, but the junction with slates is a bit sharper.

On the northern side granitic gneisses form the hills right up to Bat Khella and Chakdara. They may extend even beyond that; the contact with granite south of them is difficult to draw. They merge into each other, but the change happens somewhere between Rang Mahla and Piran. Here the pink granite with localized layering separates the two. The colour of this intermediate zone is like that of the gneisses, but the texture is that of the granite.

The eastern cantact with slate is also sharp, and the party was able to trace it to the 4469 feet peak, which is nearly 2 miles east of the

main road. Along this contact, quartz and pegmatite veins parallel to and at various angles to the contact are present. Slates have been deformed and shattered locally. Very localized foliations are also present. Xenoliths of varying sizes are present in the granite. Reaction rims can also be seen in these xenoliths. In some places only the outlines of these foreign bodies are seen. A small dry stream follows the contact down to the main Jabban valley.

The western contact is along the main Malakand valley. Slates are in contact with the granite. At Rang Mahla and the village to the north of the valley it turns to the west. The big hill to the south, on which the Malakand fort is built, is also in slates. A small raft of slate is surrounded by the granite where the road makes the closest loop. Here quartz and aplite veins cross the slate in various directions.

Possible Origin and Age

The main granite is definitely younger than the slates. This is supported by (1) sharp contact with and contortion of slates, (2) veins originating in the granite and ending in the slates, (3) abrupt ending of the cleavage against the granite, (4) enclosure of blocks of slates by the granite and their digestion in varying degree.

The granite-gneiss contact is not defined, and in fact these types merge into each other. The gneisses in turn grade into various kinds of schists and slates and may even alternate with them, as for instance east of Marano Banda and at Gumbat Banda. The strike is everywhere NE.

1. The gneissic material and the sediments may have been there, and during earth movements cleavage was developed in them. This cleavage is uniform throughout the region, even in Bunir and Swat to the east and Chakdara to the north. The granite came later. As the gneisses had a composition similar to the granite, a sharp contact did not develop. A sharp contact with slate developed because of differences in composition.

2. All the three types were there, and during earth movements different parts were affected differently. The granite, which may have been the same as the gneisses in the beginning, was remobilized and intruded during a later phase.

The presence of fluorite half a mile north of the village of Piran, along the main road, suggests emanations from a granitic magma.

Further careful mapping and thin section studies will give more information about the rocks mentioned.