A NOTE ON THE COLOUR OF VINDHYAN ORTHOQUARTZITE OF RAHATGARH NEAR SAGAR, M. P.

An attempt has been made to study the orthoquartzites of Vindhyan age, exposed around Rahatgarh, a village located in the district of Sagar, with regard to its colour. The Vindhyans are exposed over an area of 5-6 square miles and eleven sections have been studied to compute the thickness of the quartzites and to decipher its petrography. The Vindhyans around Rahatgarh chiefly comprise massive orthoquartzites, flagstones of various colours. The colours described in this note are after DE FORD (1946). The Vindhyan orthoquartzites display a wide array of colours ranging from olive green, greenish yellow, pink and violet. The predominating colour of these rocks is pink and red which is attributed to the presence of iron in the ferric state during the time of deposition. But these Vindhyan rocks at one time during the geological episode, were covered by a thick pile of lava flows. These lava flows inundated these rocks at temperatures ranging from 1100°C 1300° C. Presuming the colour tone was uniform and same during the period of deposition of 400′ thick Vindhyans, it is interesting to note the changes during the flooding of these Vindhyan rocks by the inundating lava flows. To ascertain whether the lava flows have brought in any changes in colour of these Vindhyan rocks, preliminary thermal studies were carried out on these Vindhyan orthoquartzites which constitute the subject matter of this petrographic note.

Method of Study: Various coloured Vindhyan orthoquartzites namely, olive-green, greenish-yellow, gray, pink and violet were chosen for the thermal studies. $\frac{1}{4}$″ size fragments of these rocks were taken in a graphite crucible and heated at various temperatures in a thermostatically controlled muffle furnace, keeping the time constant ($\frac{1}{2}$ hour). The specimen chosen everytime for the experiment at various temperatures was fresh. The fresh specimen was taken each time to enable to see the original changes distinctly. The experimental observations of the changes in colour at various temperatures, for six coloured orthoquartzites are presented in Table-1.

Results: The grey coloured variety do not show any colour variation with temperature. This may be attributed to their being at a higher elevation of the Vindhyan section and hence in close approximity with hot lavas at the time of the lava erruption. Hence, they have suffered baking effects whereby the original colour got decolourised and hence not affected by thermal effects.

The pink and violet coloured orthoquartzites suggest that they were originally green or yellow in colour and suffered mild effects of the lava temperatures ranging from 100°-800°C, as they were not in close proximity with the lava flows and were confined to intermediate depths. Hence, the ferrous state of the iron got oxidized and imparted red colour to the rock.

The olive-green and greenish-yellow coloured rocks found at much lower elevations of the thick section of the Vindhyan rocks, show a variety of changes in colour, even at low temperatures of 200°C. But, this mode of occurrence (lying at greater depths) and the

Table 1—Variation in Colour of Vindhyan Quartzites with Increase in Temperatures

S. No.	ORIGINAL COLOUR	200°C	300°C	400°C	500°C	600°C	700°C	800°C	900°C	1000°C
1	OLIVE-GREEN	Same	Greenish with brown tinge	More Brownish	Yellowish brown	Same	Lighter	Same	Dirty-Green	Bluish Green
2	GREENISH-YELLOW	Same	Light Pink	Same	Same	Same	Same	Same	Bluish-Green	Same
3	LIGHT-GREY	Same	Same	Pinkish-White	Light Grey	Same	Same	Same	Bluish-Grey	Same
4	YELLOWISH-WHITE	Same	Light-Pink	Same	Same	Same	Same	Pinkish-Grey	Bluish-Green	Same
5	LIGHT-PINK	Same	Same	Same	Same	Same	Same	Pinkish-Red	Greenish-Grey	Same
6	PINK	Same	Light-Pink	Same	Same	Same	Same	Same	Pinksih-Grey	Bluish-Grey
7	VIOLET	Same	Same	Dark-Pink	Colour gradually fades			Bluish-Pink	Bluish-Green	Same

preservation of their colour leads to think, that they are least affected by the temperatures of the hot lavas.

It is hypothetically, suggested that these colour changes are attributed to changes in lattice parameters of the elements in various co-ordinations, the ionic state in which iron is present, FeO/Fe_2O_3+FeO ratio and to some extent, the content of manganese and titanium. Much work can be done in this field and the present note is an humble endeavour in this field. Detail work on the colour of Vindhyan orthoquartzites from different areas is in progress.

REFERENCES

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