

ON THE STRATIGRAPHIC POSITION OF THE RED SHALE
(JUNGEL) SERIES IN THE SON VALLEY, M.P.

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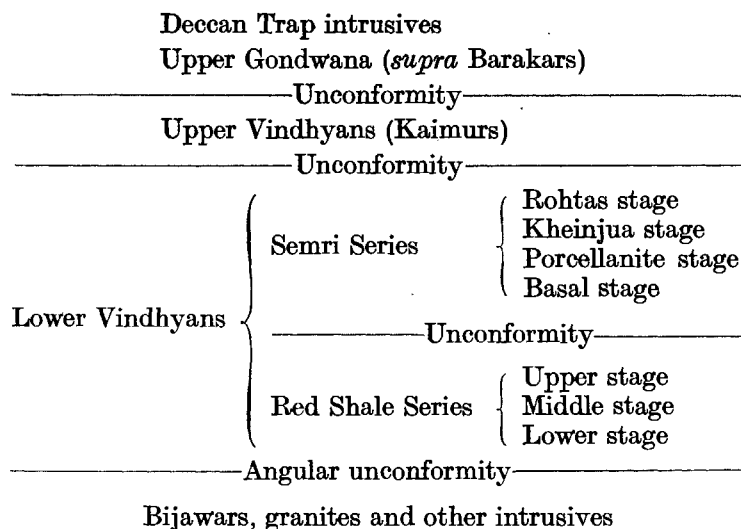
In the Son Valley a group of rocks occupying a narrow belt known as the Red Shale Series occurs in between the Bijawars and the Vindhyan, but its precise stratigraphic position is in doubt. Some group it with the Bijawars and others with the Vindhyan. The general parallelism of the beds of the Red Shale Series with the Semri Series is noteworthy. The nature of the basal beds of both the series shows many common features in their felspathic nature, in their occasionally containing boulders of big size, in their showing the same palaeocurrent direction and in their being composed largely of the Bijawar detritus. The impersistence of the beds, their degree of metamorphism and disturbance, and the absence of any intrusions in them all go to prove that the Red Shale Series have more affinity with the Vindhyan than with the Bijawars. This has led the author to propose a revised classification of the Vindhyan in the Son Valley.

INTRODUCTION

In between the Bijawars and Lower Vindhyan there occurs in the Son Valley a group of rocks known as the Red Shale Series or Jungel Series, which can be distinctly recognized and mapped as a separate stratigraphic unit. This is found to occupy a narrow belt between the basal stage of the Semri Series and the Bijawar sub-metamorphics. The precise stratigraphic position of the Red Shale Series is in doubt, some grouping it with the Bijawars and others with the Vindhyan. In this short communication the author discusses the stratigraphic position of the Red Shale Series with the observations he made while mapping the area between lat. $24^{\circ} 0'$ and $24^{\circ} 15'$ and long. $80^{\circ} 55'$ and $81^{\circ} 30'$ in the Son Valley.

The geological succession visualized as a result of this work in the area is as shown on the next page.

The Bijawars and the granites with the associated intrusives form the oldest exposed rocks in the Son Valley. To the south of the Son river these are overlain by the Red Shale Series composed as the name itself suggests of red or purple shales. These occur prominently to the east of the area under report. Except for the slaty shales, which occupy valleys, rocks of this series form low elongated ridges running an ENE direction; and dipping to



the NNW at angles ranging usually from 57° to 65° or more. The series on the whole is divisible into three indistinct stages: a lower stage composed of conglomeratic sandstone (conglomerate grading to a sandstone), a middle stage of purple slaty shale and an upper stage consisting of sandstone. The division of the stages is not well marked and rocks of both types gradationally merge into one another laterally and vertically.

VIEWS OF PREVIOUS WORKERS

Earlier workers like Oldham, Datta and Vredenburg (1901) treated the Red Shale Series as a separate one, and assigned them a position between the Bijawars and the Lower Vindhya.

Auden (1933) considers that the Red Shale Series show more resemblance to the Bijawars than to the Vindhya. To quote Auden: 'The associated red shale and phyllites of the series are not really similar to any facies in the Vindhya though they could be matched with many specimens from the Bijawars, WNW of Obra.' This, the author feels, indicates the Bijawars as the source and their proximity.

Mathur and Narain (1958) consider that the 'Jungel Series is younger than the Transition (Bijawar) sediments within which it occurs as a highly-folded syncline, and is older than the Vindhya and may perhaps be regarded as equivalent to the Kolhans of Singhbhum'.

While Pascoe (1959) has treated them under the Cuddapahs, Krishnan and Swaminath (1959) consider that they may form a part of the Bijawars or may be slightly younger.

Kedar Narain as a result of the systematic mapping carried out in parts of the Sidhi district proposed a new classification for the various rock-formations

of the Son Valley. According to him (Narain 1961) the Sidhi Series which form the oldest rock group are overlain unconformably by a younger series called the Jiawan Series. The gneisses present show distinct intrusive relationship with the Sidhi Series but their exact relationship with the Jiawan Series is not known. The Red Shale Series, considered younger than these formations, overlies them unconformably and in turn are overlain unconformably by the Lower Vindhya.

Rao (1965), however, treats the Red Shale Series with the Sidhi Series (considered equivalent to the Bijawars) with no unconformity between them, and he considers that there is a distinct unconformity separating the Sidhi Series together with the Red Shale Series from the Lower Vindhya.

The author, for reasons given below, is tempted to group the Red Shale Series with the Lower Vindhya rather than with the Bijawars.

GENERAL PARALLELISM OF THE BEDS OF THE RED SHALE SERIES AND THE SEMRI SERIES

The Red Shale Series, occurring as a narrow ENE running belt between the Sumdin *nala* in the west and the Banas river in the east (Fig. 1), everywhere displays a distinct unconformable contact with the underlying Bijawars. The Banas river, in fact, provides an excellent section for the study of the field relationship of the Red Shale Series with the underlying and overlying rocks. The Red Shale Series with the general dip to the NNW at 62° – 65° show angular unconformity relationship with the steep SSE dipping Bijawars below. The basal stage of the Semri Series overlying the Red Shale Series also dips towards the NNW but at slightly lower angles of 56° – 59° . The succession, but for the intervention of the conglomerate bed of the basal stage, appears to be quite gradual. A similar observation is made to the NW of Barhata. The general parallelism of dips of the Red Shale Series with the overlying Semri Series is quite significant.

NATURE OF THE BASAL BEDS OF THE RED SHALE SERIES AND THE SEMRI SERIES

The lowest bed of the Red Shale Series exhibits the conglomerate which is very well developed in the bed of the Banas and is composed largely of pebbles of the typical Bijawars. Pieces of greyish hematitic quartzites, pebbles of greyish quartzites, pinkish quartzites, cracked white vein quartz, red jasper, banded jasper, etc., are known to be the common constituents of the conglomerates of the Red Shale Series and the Semri Series. The conglomerate rarely contains boulders of about 1–1½ feet in size. Rounded boulders of pinkish gneiss resembling the pinkish granite-gneiss exposed in the Son bed are also occasionally met with here. The bed above the bottom conglomerate is a medium-grained, current-bedded and ripple-marked sandstone. Although

current-bedding is well developed in the Banas river section, ripple-marks are better seen in the Pasgarhi-Burwa road-cutting. The lower conglomeratic sandstone stage passes into the middle shaly stage which again becomes arenaceous on top and is overlain by the basal conglomerate of the Semri Series (as classified by previous workers).

It was observed that the conglomeratic quartzite of the Semri Series and the conglomerate seen at the base of the Red Shale Series have many characters in common. Both of them show sedimentary structures like ripple-marks and cross-lamination. They show common features in their felspathic nature, in their occasionally containing boulders of the size of about 1-1½ feet, and in their being composed predominantly of the Bijawar detritus. This suggests that both might have had almost the same mode of origin.

The palaeocurrent pattern (NNW to NW), determined from the cross-laminations and ripple-marks in the conglomeratic sandstone of the Red

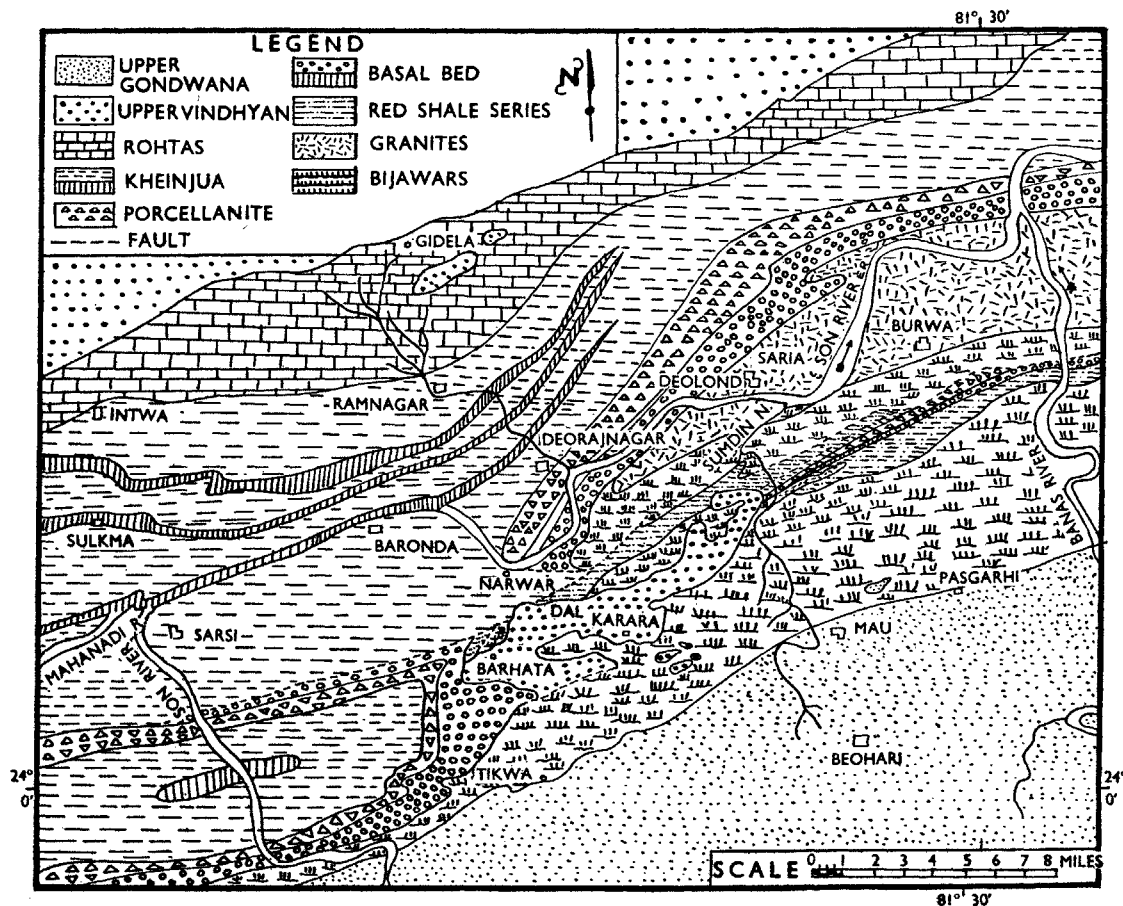


FIG. 1. Geological map of the area (after R. D. Oldham).

Shale Series, is essentially the same as that of the Semri Series, indicating the same source and the same direction of sediment transport.

In these respects the Red Shale Series, it goes without saying, show more affinities to the Lower Vindhyan than to the Bijawars.

IMPERPERSISTENCE OF THE RED SHALE SERIES

Impersistence of the beds is quite characteristic of the Semri Series and, for that matter, any basal series. This appears to be the case with the Red Shale Series also.

The variation in thickness and extension of the Red Shale Series may not be due to extensive or intensive denudation as supposed by earlier workers (Oldham *et al.* 1901), but could be explained by capricious sedimentation in an uneven or irregular floor close to the margin of the basin.

The impersistence of the beds of the Red Shale Series in general, their remarkable absence to the north of the Son river, their general parallelism in dips with the younger series and the marked unconformity with the Bijawars lead the author to suggest that the sediments constituting the Red Shale Series have been of the nature of marginal deposits filling up the irregularities and depressions of the Lower Vindhyan basin very close to the margin.

DEGREE OF METAMORPHISM, DISTURBANCE, ETC.

Analytical study of the amount and directions of the dips observed by the author has indicated that as one proceeds towards the north there is a gradual decrease in the amount of dip, in the degree of metamorphism and disturbance. Compared to the younger members of the Semri Series, the Red Shale Series are highly disturbed and in most places the red shales were found to have been converted to slaty shales and phyllites in other places. The Red Shale Series like the Semri Series show evidence of only one period of folding in the area under discussion.

The Semri Series and the Red Shale Series, unlike the Bijawars in the area, show no intrusion of any type.

It is difficult to conceive of two separate periods of diastrophism between the Red Shale Series and the Upper Vindhyan, and also that the belt of the Bijawars with the associated igneous intrusives, which formed the floor of deposition for the Red Shale Series, the Semri Series and the Upper Vindhyan, could have undergone so many vertical movements between the deposition of the Red Shale Series and the Upper Vindhyan.

The suggestion of the earlier workers that the Red Shale Series have been completely denuded away from the main area (to the north of the Son river) does not appear to be tenable. No inlier of the Red Shale Series was noticed in the main Lower Vindhyan area.

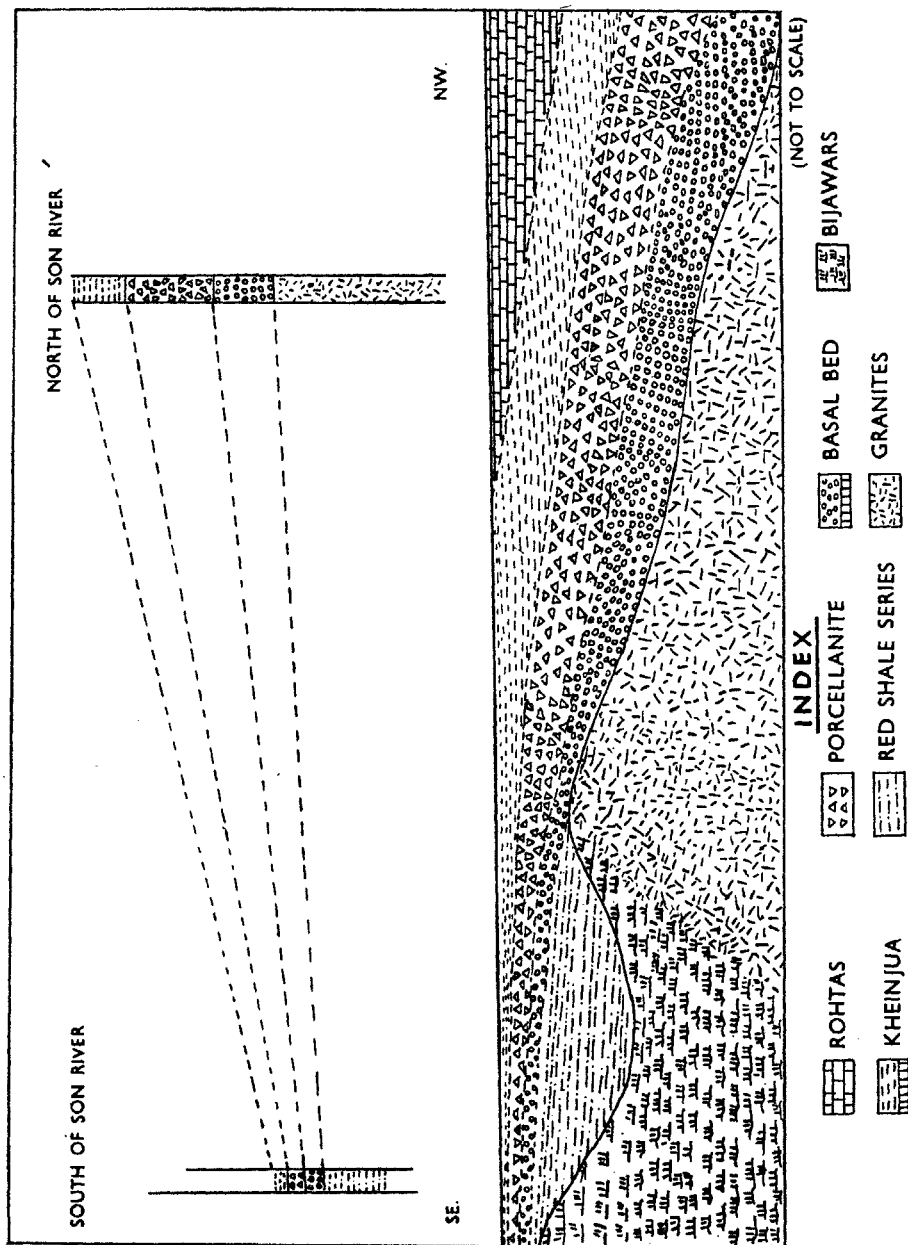


Fig. 2. Diagrammatic sketch showing the Lower Vindhyan basin in the area.

It can also be mentioned that in Bundelkhand and in the Son Valley the various stages of the Vindhyan overlap each other successively towards the north and the south respectively. The Kaimur sandstone, the lowest stage of the Upper Vindhyan, is found resting on the Bundelkhand granite to the north at Bundelkhand, and on the Bijawars to the south in the

Son Valley. If the Red Shale Series are considered as the lowest exposed Vindhyan, they would perfectly fit into this scheme of overlap, for they display an unconformity and overlap with the Semri Series, very similar to the relationship existing between the Lower and Upper Vindhyan, as in various outliers of the Upper Vindhyan like Karhara, etc.

Considering that the coarsest sediments are deposited close to and at the margin of a basin and finer grained material farther away, then the position of the Red Shale Series, together with the basal stage of the Semri Series, will suitably be grouped into the picture of the Lower Vindhyan basin, as they are largely coarse-grained, compared to the rest of the Semri Series, presumably indicating the shore-line *facies*.

In the area the sediments constituting the Semri Series show a pronounced thickening towards the north as in Fig. 2. Coarser clastics are seen in the southern exposures. These, together with the fact that no outlier of Vindhyan has so far been found or reported amidst the Gondwanas in the south, support the suggestion already made by Mallet (1869), Pascoe (1959) and West (1962) that the present limit of the Vindhyan in the Son Valley more or less marks the original limit. The nature of the basin of deposition, reconstructed as in Fig. 2, not only adequately explains the absence of the Red Shale Series in the exposures to the north of the Son river, but also explains the proximity to the margin of the Lower Vindhyan basin and the overlap of the Red Shale Series by the Semris.

CONCLUSION

In view of the data given above, the author considers that the Red Shale Series show more affinities towards the Semri Series than to the lithologically dissimilar Bijawars which are largely composed of altered tuffs and flows. They are hence assigned the rank of a series within the Lower Vindhyan itself, which so far was believed to consist of only one series. It is therefore suggested that the term, 'Semri Series', should be confined only to the upper series of the Lower Vindhyan, and not to the Lower Vindhyan as a whole.

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