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Himalayas and the Continental Drift

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The characteristic feature of the Himalayas is the unfossiliferous nature of of the pre-Tertiary sediments lying on the southern side of the crystalline axis, whereas on its northern side a complete sequence of marine fossiliferous rocks, ranging in age from Cambrian to Eocene exists (BURRARD & HAYDEN, 1907 to 1908). In order to explain this feature, two separate basins of sedimentation, separated by the crystalline axis, have been visualised by WADIA (1934), FUCHS (1968) and PANDE & SAXENA (1968). In the western part of the Himalayas (Kashmir Valley) the situation is a bit different. In the Kashmir Valley too, which lies in between the two bifurcated branches of the so called crystalline axis, the fossiliferous marine sediments ranging in age from Cambrian to Jurassic, are found. To PANDE & SAXENA (op. cit.) the outer range i. e. Pir Panjal is the real crystalline axis but according to WADIA (1934) the whole of the Kashmir valley is a nappe and hence it is not autochthonous. It is also worth pointing out that the outer bifurcated range has very small geographical extent as compared to the inner one. Other notable occurrences of the fossiliferous rocks on the southern side of the crystalline axis are Tal Formation (Jurassic?) in Kumaon Himalaya (PASCOE, 1959), Pulchauki Series (Ordovician-Silurian) in Nepal Himalayas and Tang-Chu Series Silurian-Devonian) in Sikkim-Bhutan Himalays (GANSSER, 1964). This hypothetical barrier, according to PANDE & SAXENA (op. cit.), Chandighar 1968, was formed after the Caledonian orogeny. According to JAIN & KANWAR (1970), it is difficult to believe that this ridge has been and is still rising in spite of the fact that it is subjected to the continued denudational processes since its birth, to become the highest mountain chain of the world. Moreover there is no major unconformity present in rocks lying to the southern side of the ridge, which could be equated with the Hercynian orogeny.

HOLMES (1965) on the basis of palaeomagnetic studies on the Deccan Plateau Basalt of the Indian Peninsula, concluded that the Indian Peninsula has drifted about 5000 km. in a northerly direction since the end of Cretaceous at a rate about 7 cm. a year. Peninsular India naturally lay to the south in the pre-Cretaceous times and before the breaking up of the "Pangea" it was a part of

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the African continent. Hence to visualise two basins separated by a ridge between the Indian Peninsula and the Tibetan landmass and to account for the fossiliferous sediments lying on the southern side of the ridge with help of marine transgression seems to be out of context. And to prepare palaeogeographical maps of the Himalayas in the Mesozoic and Palaeozoic times is meaningless as both the parts were thousands of kilometers apart, whereas the total width of the Himalayas (400 km. width, 500 km. crustal shortening, GANSSER, 1964) is only 900 km. What, then, happened to the remaining tens of thousands of kilometers land or sea or both. As also suggested by JAIN & KANWAR (op. cit.), these factors obviate the necessity of having a ridge in the pre-Tertiary times, a conclusion arrived at by PETRUSHEVSKY (1971). According to him it was during Neogene-Quaternary period that the mountain ridge of the Himalayas was formed. The central crystalline axis seems to have been formed as the result of the colliding of the drifting Indian Peninsula with the stable Tibetan mass in the early Tertiary times, which established the orogenic belt.

Approximately along the contact line of both the lands, a tension zone got developed along which the reactivated Archaean basement got mobilized and formed the so called crystalline axis. In the western part, the tension zone got developed rather away from the contact line underneath the Tethyan basin. With the anticlock wise movement of the Peninsular India (AHMAD, 1966), the shear planes got opened up along which new mobilized granitic material intruded, which is now seen as the bifurcating ranges from the main central crystalline axis. It was during this period that the present Kashmir moved over the mobilized material and came to its present position. The transport does not seem to be much as its configuration almost coincides with that of Spiti, being separated by the Zanskar range. The faunal affinities between the two areas, suggest the Zanskar range to be younger rather than two separate basins. It is interesting to know that the bifurcations from the Central crystalline axis are only on the southern side, a fact which suggests that Tibetan land was stable. With the continued orogeny, lot of thrusting took place, at places some of the fossiliferous rocks of the Spiti basin travelled towards this side of the main crystalline axis.

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