The geological history of every part the globe is punctuated by several orogenic and epirogenic crustal movements that had occurred from time to time. These movements are observed in the form of regional unconformities, volcanic activity, metamorphism, tectonic deformations resulting to upheavals, transgressions and regressions, changes in the genetic component of the basins and subsequently their sedimentary regime. Since the intense orogenic movements of one continent may be found as a simple eustatic change of sea level on the other, because the velocity of tectonic force is dissipated with the distance. Various kinds of regional topographic expressions developed in this way were bound to undergo a major change in the modes of sedimentary processes, operating upon there prior to their existence. A comparison of the geological succession of Zagros with that of Western Rajasthan, brings about the following facts:

The Precambrian-Palaeozoic sequence of Southwest Iran comprises Barut, Zaigun, Lalun, Mila, Faraghan and Dalan Formations. These are interrupted by a Carboniferous unconformity, for the rocks of this age are nowhere developed in the region. This sequence is non-conformably resting over the folded Archaeans having the granite intrusions and metamorphism similar to the Arabian Shield where it is affected by Assyntic/Katangan Orogeny. The InfraCambrian to Middle Triassic time was a period of a remarkable tectonic calm as the rock sequences deposited during this interval exhibit a typical Platform Facies and represented by alternating shallow marine, lagoonal and continental deposits containing important sedimentary gaps. These gaps in the succession as well as epirogenic movements with no evidence of significant folding are synchronous to Caledonian and Hercynian Orogenies in the other parts of the Eurasia.

A regional unconformity indicating Early Devonian Epirogenic Movements is found everywhere at the base of Upper and Middle Devonian formations. They overlie Lower Devonian, Silurian, Ordovician or Cambrian strata in many sections of Iran. The contact is a disconformity indicating the evidence of the Caledonian Epirogenic Phase. Devonian and Lower Carboniferous sediments wherever developed are identifiable on the basis of fossil remains. They possess always a transitional relationship.

A more important regional and angular unconformity is observed at the base of Permian which throughout Iran marks a marine transgression after the emergence of land.
in the Late Carboniferous time. This unconformity caused by eustatic change of sea level may be related to Hercynian Orogeny severely affecting the geological succession of the neighboring areas in Caucasus and Anatolian Pontid.

Similarly, Early Proterozoic-Palaeozoic sedimentation is represented by the Birmania-Randha Formations in Barmer basin and Jodhpur-Bilara-Nagaur Formations in Bikaner-Nagaur basin in Western Rajasthan. These are also overlying folded Aravallis (Basement Complex) in the respective areas. The abovementioned formations in turn are succeeded by the deposition of shallow marine sediments of the Karampur Formation of Permo-Carboniferous age in Jaisalmer basin. Bap and Badhura sediments were simultaneously accumulated in Bikaner-Nagaur basin. They did not extend to Barmer as this area was probably highland during this time. The hiatus from Palaeozoic to Lower Mesozoic in Barmer and Jaisalmer basins and Permo-Trias to Mesozoic in Bikaner-Nagaur basin may be related to already mentioned epirogenic phases of Caledonian and Hercynian Movements.

The carbonate, argillite, marl and evaporitic Mesozoic sequence in Southwest Iran is represented by Khanehkat, Sargelu, Gotnia, Nyriz, Surmeh, Fahlian, Gadvan, Darian, Garau, Kazhdomi, Sarvak, Surgah, Ilam, Gurpi and Tarbur Formations. Tectonic events of greater consequence than any of the Palaeozoic movements took place in Late Triassic time. The Palaeozoic-Middle Triassic Platform sediments are more or less uniform throughout the Iran. A differentiation into several facies and structural provinces emerged only in the Late Triassic and younger sediments. The Kimmerian Orogeny of Late Triassic period caused the partition of the Platform Facies. Rheatic-Liassic coal bearing sandstones and shales were formed in the continental regime with marine incursions after the general withdrawal of the Permian-Triassic Tethys sea. The evidence of this epirogenic phase is represented in the form of faulting rather than the folding movements.

The Late Jurassic and Early Cretaceous Late Cimmerian Orogeny was comparatively more intense than the preceding one, resulting to regional unconformity at the base of Cretaceous sequence. True foldings occurred in East and Central Iran. A low grade metamorphism affected the Palaeozoic and Mesozoic rocks in Northwest, Central and East Iran. This metamorphism appears to be related to zones of crustal weakness between more rigid blocks which was locally accelerated by the Alpine Orogeny.
Triassic and Early Jurassic time was a major period of regression and deposition in Western Rajasthan. Fluvial to deltaic clastic sequence forming Shumarwali and Lathi Formations of Lower Jurassic age were laid down in Jaisalmer and Barmer basins. The Lathi Formation did not extend southward on the general raised surface of Bikaner-Nagaur basin. A stable shelf appeared during the Middle Jurassic Period in Jaisalmer basin which received a thick carbonate succession all over the area Jaisalmer Formation deposited at this time. The commencement of igneous activity in the axial part seems to have disrupted the stability of provenance as well as the depocentre in Upper Jurassic time. The sandstones and shales belonging to Baisakhi and Badasar Formations were accumulated owing to this disturbance in oscillating marine conditions. These sediments like their predecessors do not have any extension on the Bikaner-Nagaur basin. Like Iran the Lower Cretaceous Period in Western Rajasthan appears to have witnessed an intense Late Cimmerian Orogeny raising the floor of the basin of deposition, for Parihar Formation initially deposited in a shallow marine to brackish water condition and turned completely to continental in the upper part by enclosing huge amount of petrified forests. In Barmer basin this formation is equivalent to Fatehgarh Formation. No evidence of any sedimentation of this time is seen in the Bikaner-Nagaur basin.

Aptian-Albian time testified again a minor marine transgression in the area with deposition of Habur marl and arenaceous limestone in the marginal parts of the Jaisalmer basin and Goru Formation further dipdown. This sedimentation terminated during Coniacian time with the development of marl and limestone succession interbedded with shales and sandstones. The crustal movements synchronous to Laramie Orogeny of Europe appear to have produced a major uplift of the axial belt forming a regional unconformity of time span ranging from Upper Cretaceous-Lower Palaeocene. The abundant precipitation of carbonates in Mesozoic time in Iran as well as in India distinctly favour the palaeoposition of the both countries in a isoclimatic belt perhaps in a Tropical Zone.

The sequence of events seems to have taken a strange turn at the close of the Cretaceous Period probably under the impulses of the Himalayan Orogeny. The Old Tethys Sea receded westward from Himalayas Central part of Indian Peninsular suffered a major volcanic activity and intermittent spreading of lava flows. Eustatic change of sea
level under the Cenomanian transgression resulted inundation of east and west coasts of India as far interior as Kutch and Western Rajasthan. Similarly, an arm of the decaying Tethys Sea also extended along the southern fringes of Himalayas connecting the Arabian Sea with the Bay of Bengal. This scenario of land and sea distribution was markedly different from the Mesozoic time. Clastic sequence of sanu Formation representing a brackish to shallow marine environment was deposited in Lower Palaeocene time. Deposition of Palana Formation of Bikaner and Akli Formation in Barmer basin took place at this time. The vegetal matter forming the extensive deposits of the lignite in Barmer and Bikaner-Nagaur basin is indicative of a coastal/deltaic condition. This is evident by the abundance of dinoflagellates and land-derived spores and pollen grains including pollen grains of coastal plants in the lignites. This transgression continued through Late Palaeocene to Middle Eocene producing interbedded fossiliferous sequence of Fuller’s Earth, marl, limestone, shales and sandstones under the oscillation of the sea level. Khuaila and Bandah Formations deposited under the stable condition. Mataji Ka Dungar and Kapurdi Formations and Kolayat and Bikaner Formations are the equivalent sediments in Barmer and Bikaner basins respectively. These sediments are also abundant with foraminifers, Ostracoda and a variety of molluscs and dinoflagellates.

The final upheaval of the axial belt occurred only in post-Lutetian time resulting to the development of foldings and faultings and ultimate withdrawal of the Eocene sea. The entire Western Rajasthan Shelf now turned in to a land area contributing the detritals to fluvial basin to the west and southwest.

Since Zagros region underwent a steady subsidence during the major part of the Cenozoic Era, pelagic sedimentation continued with the deposition of marls and shales interbedded with the argillaceous limestone comprising the Pabdeh Formation. This carbonate sedimentation also remained unbroken on the Arabian Shield and towards southwest Iran where the limestone sequence is called the Jahrum Formation. In the central and north Lurestan flysch type of sediments accumulated forming the Amiran and Kashkan Formations during the Upper Cretaceous-Eocene time interval. Amiran and Kashkan Formations are separated from each other by an interbedded Talehzang Formation. The youngest Kashkan Formation in turn is capped by the Shahbazan Formation.
During the Early Oligocene time the pelagic sedimentation continued in southwest Lurestan, Khuzestan and Coastal Fars producing the upper portion of the Pabdeh Formation. In later part of the Oligocene epoch the sea covered most of the Fars, Khuzestan provinces and led to development of carbonate of Asmari Formation. The planktonic foraminifera and dinoflagellates observed in the Lower Tertiary sediments of the Western Rajasthan Shelf are profoundly present here due to their vast dispersal range in the open ocean. Hence these taxa have served the better parameters for intercontinental correlation (Text Fig. 28).

Pyrenean Orogeny causing the intense submarine volcanic activity at the close of Eocene epoch affected the rock sequences in Central, Northwestern, North and East Iran. During the Early Miocene epoch, the Lurestan was the site of the pelagic sedimentation on the top of the Pabdeh Formation that resulted to the precipitation of the carbonate comprising the upper part of the Asmari Formation. Near the end of the Early Miocene time, the evaporitic condition prevailed particularly in the area of Khuzestan and Lurestan, producing the Gachsaran Formation. The transgression of the sea accompanied by the influx of a huge quantity of argillaceous material forming the Mishan Formation in Fars and Khuzestan provinces in Late early-Middle Miocene times. The regression of the sea during Mio-Pliocene epoch created a typical estuarine-lacustrine environment in Lurestan and Khuzestan provinces. The sedimentary basin at this time received the great quantity of clastic material forming the Aghajari Formation. This was perhaps the time of the final uplift the Zagros Mountains that led to development of the individual structure, local erosion and sedimentation producing several hiatuses within the Aghajari Formation. The Bakhtyari Formation was finally formed during the Post-Zagros Plio-Pleistocene Pasadenaian Orogeny by the active erosion of the different relief of the land surface which produced a large quantity of the coarse clastics of the Molasses Facies. That this area is still unstable is evident by the tectonic activity recorded in the recent past.