

1. INTRODUCTION.

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H.B. Medlicott in (1872) first used the term Gondwana for deposits of lacustrine and fluviatile origin found in India. However, it was officially published by Feistmantel in (1876). The name is derived from the brave Medieval Kingdom which was spread in Central India, ruled by Gond Kings. Fox in (1931) used the term Gondwana system for the rock deposits found in Peninsular and extra-peninsular India. These rocks show characteristic features and preserved a typical flora and fauna. Similar rocks are found in countries like Australia, New Zealand, South Africa, South America, Antartica and Madagaskar island. This huge southern land mass is called as the Gondwana land.

The Gondwana period starts from Upper Carboniferous to Lower Cretaceous covering the period of 120 million years. The Gondwana system in the peninsular India is mostly deposited in the river valleys. While the extra-peninsular deposits are mostly of marine origin. The peninsular Gondwana includes the Godavari basin, Mahanadi basin and Damodar basin. They are also found in Krishna-Godavari basin, Cauveri basin and Palar basin along the East-Coast of India. Further, they are also located in Cutch, Rajasthan and Kathewad. The extra-peninsular Gondwana deposits are located near Punjab Salt range, Kashmir, Assam etc. Regarding the classification of Gondwana system there are two major views among the

Geologist and Palaeobotanists. The differences are mostly regarding the divisions and the age of several parts of Gondwana system.

Following authors have supported the bi-partite division of the Gondwana system. Medlicott and Blanford (1879, 1887), Oldham (1893), Cotter (1917) and Fox (1931) the Gondwana system is divided into two parts such as Lower Gondwana and Upper Gondwana. Against this system the Tri-partite division is suggested by following workers. Feistmantel (1882), Vredenburg (1910) and Wadia (1957) divided into three divisions viz. Lower Gondwana, Middle Gondwana, Upper Gondwana. Recently lot of work has been carried out on the fossil flora of South Rewa basin by Feistmantel (1882), Lele (1955, 1962) and found that a distinct floral composition is found in these areas. The fossil flora of Parsora bed is quiet noteworthy in this regard. It shows a mixture of flora representing the Lower and Upper Gondwana elements. Hence the idea of Middle Gondwana rapidly flourished into the tri-partite system. Saksena (1974), Mahabale (1964) and others have contributed to the fossil flora of Middle Gondwana from varies localities.

According to Surange and Lele (1968) only two distinct floras emerged in the Gondwana period. The Glassoptris flora which represents the Lower Gondwana period and called as the

Lower Gondwana flora. While the Ptilophyllum flora is developed in the Upper Gondwana period and therefore called as the Upper Gondwana flora.

However, in the light of recent works by Lele and others. Now it is clearly established that there developed a distinct flora between the Lower Gondwana and Upper Gondwana. This flora is termed as the Middle Gondwana flora. Which represents a mixture of Lower and Upper Gondwana elements, as well as a characteristic element, Dicroidium. Hence, it is called as Dicroidium flora. The Palaeobotanist supports mostly the three fold system, while Geological Survey of India officially supports the two fold system.

The Gondwana geology represents a distinct branch of earth science due to its special sedimentary, biotic, tectonic and magnetic features. Similarly the Gondwana deposits are a large store house for the history of plant evolution, representing rich fossil floras. The Gondwana deposits offer a vast scope for the rich fossil floristic composition possessed by them. They are helpful in the biological as well as Palaeo-environmental informations. Therefore, Palaeobotanist have always given first choice for the studies of different Gondwana floral assemblage.

Following tables give the different systems of Gondwana classification. According to Fox (1931) the Gondwana system is divided into Lower Gondwana and Upper Gondwana, which

represents the following divisions :

Classification of Fox (1931)

Upper Gondwana	Jabalpur Series	Umia Stage	Lower Cretaceous
		Jabalpur Stage	
		Chaugaan Stage	
	Parsora Series	Kota Stage	Jurassic
		Rajmahal Stage	
		Parsora Stage	
	Mahadeva Series	Maleri Stage	Triassic
		Pachmarhi Stage	

Break

Lower Gondwana	Panchet Series	Hirapur Stage		
		Maitur Stage		
		(Mangli beds)		
	Raniganj Series	Kamthi Stage		
		Raniganj Stage		
	Barren Measures	Mahadeva Stage		Damuda
		Ironstone shales		
		Kulti Stage		
	Barakar Series	Barakar Stage		Permian
		Karharbari Stage		
		Umaria Marine beds		
	Talchir Series	Rikba Plant Stage		Upper Carboniferous
		Talchir needle shales		
		Glacial Boulder beds		

Cotter (1917) also supported the bi-partite classification of Gondwana system and put-forth the following table :

Cotter's Classification :

Upper Gondwana	Jabalpur, Tripetty beds,		Lower Cretaceous
	Raghavapuram,		
	Sriperamatur,		
	Vemavaram, Budwada,		
	Umia		
	Kota	....	Jurassic
	Maleri	....	U.Triassic to Rhaetic
Middle Triassic			
Lower Gondwana	Parsora	....	Lower Triassic
	Panchet	....	Upper Permian
	Raniganj	....	Middle Permian
	Barakar	....	Lower Permian
	Karharbari	....	Upper Carboniferous
	Talchirs	....

Above two tables represent two ideas of two Geologists viz. Fox and Cotter. On the other hand the three-fold system is supported by different workers and presented three patterns of division. The first attempt of three fold division was made by Feistmantel (1882), who studied the fossil flora of Parsora beds and termed them as 'Transitional beds'. It is observed that due to distinct lithological and Palaeobotanical features of the flora. The suggestion of Middle Gondwana was a new division in this system. The classification is represented as -

Feistmantel's Classification :

Upper Gondwana	Jabalpur	|	Jurassic
	Kota		
	Rajmahal		
Middle Gondwana	Parsora	|	Triassic
	Panchet		
	Damuda		
Lower Gondwana	Karharbari	|	Permo- Carboniferous
	Talchir		
	Talchir Boulder beds		

On the basis of further studies of South Gondwana rewa-basin, Lele (1964) put-forth the following three fold classification of Gondwana System.

Lele's Classification :

Upper Gondwana	Umia	|	Jurassic to Lower Cretaceous
	Jabalpur		
	Kota		
	Rajmahal		
Middle Gondwana	Mahadeva	|	Triassic, Rhaetic
	Parsora		
	Maleri		
	Panchet		
Lower Gondwana	Raniganj	|	Permo-Carboni- ferous and Permian
	Barren Measures		
	Barakar		
	Karharbari		
	Talchir and		
	Glacials		

Considering the two distinct views about Gondwana classification, many workers think that there should be a common solution for this problem. Hence Bose (1966 a) suggested that the Gondwana period should be further divided into series and stages. These divisions should correspond to the smaller sub-division of the standard Geological time scale. Further improvements can be made by the combine efforts of Geologist and Botanist. For this purpose the mapping should be first made by the Geologist and then Palaeobotanist. It can correlate the floras according to various sequences. These programmes can be undertaken by Gondwana Committee, having the main object to find the solution to various problems.

The present work is a part of efforts made by floristic studies of East-Coast Gondwana. Along the East-Coast the Mesozoic floras are found in a series of detached out-crops. They are found along the coastal parts of Orissa, Andhra Pradesh and Tamil Nadu.

Recently Venkatachala and Rajnikanth (1987) have made brief survey of Gondwana floras of East-Coast. They also consider stratigraphic implications of these floras. Accordingly the East-Coast Gondwana are distributed in Krishna-Godavari, Palar, Cauveri and Mahanadi basins. The authors have also given the Palynological as well as megafossil composition of these basins. These floras indicate distinct geological and Palaeoclimatic features. The contribution to

the Mesozoic floras includes the major part of studies of Rajmahal flora in Bihar, Jabalpur flora in Madhya Pradesh and Cutch flora on Western side of the country. The data available on this flora is quite abundant.

Rajmahal flora is the richest and studied by several workers like Sahni (1928), Srivastav (1945), Bose (1953), Rao (1943), V.Mittre (1953-59), while the Jabalpur flora is studied by Feistmantel (1877 c, 1877 d), Sahni (1928), Bose (1960), Sukh-Dev (1972) and others. Cutch flora is studied by Feistmantel, Bose and Banerji (1981, 1984) and others. Comparatively the East-Coast floras have been studied by few workers. Among the East-Coast; the flora of Vemavaram is somewhat studied in detail. But other floras like, flora of Raghavapuram in Andhra Pradesh, Flora of Sripermatour beds in Palar basin of Tamil Nadu, flora of Sivaganga formation in Cauveri basin are studied meagerly.

The present study embodies the localities found in the Sripermatour beds of Palar-basin. These beds are characterised by argillaceous rocks consisting green shales, clays and sandstones. They are overlying either the Permian boulder beds or Pre-cambrian rocks. According to Murthy and Sastri (1961) the beds show marine intercalations and their lithological characters. The beds are deposited under shallow and brackish water bodies, near the shoreline. The earlier Megafloreal studies were made by Feistmantel (1879), Seward and Sahni (1920), Sahni (1928, 1931), Suryanarayana (1954-1955).

The flora is dominated by Conifers, Cycadophytes, Ferns, Pteridosperms, while Ginkgoales are rare. Foote (1868) suggested that fossil flora of Sripermatpur beds can be correlated with the fossil flora of Rajmahal hills.

Feistmantel (1879) considered the age of Sripermatpur as Jurassic. East-Coast shales are usually devoid of carbonaceous material and hence microfossil studies are quietless. Recently Palynoflora of Sripermatpur beds is studied by Ramanujan and Srisailam (1974), Ramanujan and Verma (1977, 1981), Venkatachala (1977), Verma and Ramanujan (1984), the Palynoflora of these beds suggests Early Cretaceous age.

When the above facts are studied, it is found that there are different opinions about the age of Sripermatpur flora. Hence it was decided to study the fossil plants found at different places around the Sripermatpur towns. Poonamali, a new locality present between Madras and Sripermatpur, and Vellum, a little known locality about 10 Km. from Sripermatpur and a small exposure found near a village Venkatachari.

Therefore, the collection of plant impressions found on the fossiliferous shales and the petrified woods were made in two different series viz. Winter and Summer. The plant impressions are studied for their morphological features and woods are studied for their anatomical characters. Based on the combine data from these studies an attempt is made to correlate the fossil flora of Polar basin, with other East-Coast floras as well as other Upper Gondwana floras.

It will throw some light on floral composition and the past climate of this area. Further it will also assist in ascertaining the proper age of the flora. Since the flora is showing Jurassic or Cretaceous age based on earlier works.

Recently, it is suggested that the various basins in East-Coast are having rich potential of fossil fuel due to presence of phytoplankton and other elements, responsible for the formation of this important energy resource.