

CHAPTER - II

PREVIOUS WORK ON THE
UPPER GONDWANAS OF INDIA

Indian Upper Gondwanas have been divided into Rajmahal and Jabalpur series. They are further divided into Rajmahal, Kota, Jabalpur and Umia stages. Contribution on the Upper Gondwana plants were made by various workers. Their work is recently reviewed by Sahni (1921, 1938), Sitholey (1954, 1963) and A.R. Rao (1972) detailed groupwise reviews have been made by different workers at the Palaeobotanical Symposium held at Kodai-canal in 1974. Since the work is vast one, a brief account is included in this chapter.

The Upper Gondwana flora includes Bannettiales, Coniferales, Pteridosperms, Ginkgoales, Filicales and a new group of Gymnosperms - Pentaxylales.

(1) Rajmahal Hills - Extensive work on this series was carried out by Oldham and Morris (1863), Feistmantel (1877a,b, 1879), Seward and Sahni (1920), Sahni (1921, 1928, 1931b,c, 1935, 1936, 1940), Sahni and A.R. Rao (1933, 1934), Jacob (1938), Sitholey (1954, 1963), Sitholey and Bose (1953, 1971, 1974), A.R. Rao (1947, 1959, 1964, 1972, 1974), A.R. Rao and Vimala Achutan (1968), A.R. Rao and Bose (1971), Sah (1958), Sah and SukhDev (1957), Sah and Jain (1964, 1965), Sharma (1967, 1968, 1969a,b, 1971), Vishnu-Mittre (1953, 1956, 1957, 1959), etc. main findings of them are summerised below.

(1) In the Rajmahal Hills fossil ferns are found quite commonly but the other groups of the Pteridophytes occur rarely. Oldham and Morris (1863) have reported Thinnfeldia like leaves for the first time from Rajmahal Hills. They also have described Pachypteris. Later a number of reports of the genus Thinnfeldia were given by workers like Feistmantel (1877a, 1879), Jacob (1938), Gopal et al. (1957) Sah and Sukh Dev (1957), C.N. Rao (1959), Adyalkar and Rao (1960), Bakshi (1969b), Gururaja and S.C. Pant (1970), and Sharma et al. (1973). Retinosporites has been reported by Sahni (1928) and by Adyalkar and Rao (1960). Four species of Cladophlebis have been described by Gopal et al. (1957), Bose and Sah (1968). Suryanarayana (1954) has reported Sphenopteris from East-Coast Gondwana localities. Bose and Sah (1968) have also reported Lycopodites gracilis, Equisetites rajmahalense, Marattiopsis macrocarpa, Todites indicus, Gleichenites gleichenoides, Phlebopteris sp., Hausmania indica and Gleichinites sp.

Maximum number of reports from Rajmahal series belong to the Bennettitales. A considerable number of impressions are with epidermal remains and petrifications also are there.

Oldham and Morris (1863) reported nine species of Pterophyllum which were later referred to the genus Nilssonia by Seward (1917) and the same has been followed by Seward and Sahni (1920), Sahni and A.R. Rao (1933) and Sharma (1969b),

Feistmantel (1877, 1879) had described various species of the genus Pterophyllum, Zamites, Otozamites and Ptilophyllum. Many of these species were transferred to the genus Ptilophyllum by Bose and Kasat (1972). A species of Pterophyllum from East-coast was reported by Suryanarayana (1954). Different species of the genus Dictyozamites were reported by Oldham and Morris (1863), Feistmantel (1877 a), Sahni and Rao (1933), Jacob (1951) and Gupta and Sharma (1968 a,b). Bose and Kasat (1972) have given the anatomical details of this genus.

Several species of Ptilophyllum from these series have been reported by Feistmantel (1877a), Gupta (1943), Ganju (1946), Bose (1953c), Jacob and Jacob (1954), Sah (1958), Adyalkar and Rao (1960), Roy (1963, 1967), Sharma (1967) and Gupta and Sharma (1968a,b).

A few species of Anomozamites have been described by Oldham and Morris (1863) and Sharma et al. (1973) which were referred by Bose (1974) as the species of Pterophyllum on the basis of the diagnostic characters given by Harirs (1969). Zamites proximus described by Feistmantel (1877a) is now considered to be Ptilophyllum acutifolium by Bose and Kasat (1972). Similarly Palaeozamites bravifolius described by Oldham and Morris (1863) is transferred to Otozamites bravifolia. The same again is referred to Ptilophyllum acutifolium by Bose and Kasat (1972) while reviewing the species of Ptilophyllum in India, anatomy of Ptilophyllum

leaf has been given for the first time by A.R.Rao and Vimala Achutan (1968).

Taeniopteris species from these series have been described by Feistmantel (1877a), Sahni and A.R.Rao (1933), Gopal et al. (1957), A.R.Rao (1943 b), C.N.Rao (1959), etc. Sitholey and Bose (1971) described Bennettitalean male flower as Weltrichia. Bose (1968) reviewed Williamsonia species along with a new species W. harrisiana. Sitholey and Bose (1953) reported W. santalensis. Bisexual flowers of Bennettitales have been described by Bose (1974) as Cycadeoidea. Species of Cycadopteris and detached scale leaves have been described by Bose and Jain (1963), and Gupta (1954).

Stem genus of the Bennettitales has been described as Bucklandia species by Seward (1917), Bose (1953 a,b), Vishnu Mittre (1957), and Sharma (1967, 1969 a).

A new group of gymnospermous plants Pentoxyleae was instituted by Sahni in 1948 on the basis of the findings by A.R.Rao (1943) and Srivastava (1945). Later our knowledge of this group of plants was enhanced by the workers like Shukla (1957), Vishnu-Mittre (1953, 1957) and Sharma (1969a,b). A.R.Rao (1974) reviewed the entire work done on the member of this group, making remarks on the affinities of the group.

Very few reports of Ginkgoales are known so far and most of them have been on leaf impressions. Feistmantel (1876, 1877a), Seward (1917), Seward and Sahni (1920), Gunju (1947),

Gopal et al. (1957), Adyalkar and Rao (1960,1963), Sah and Jain (1964), Srivastava and Sah (1966) and Bakshi (1969b) are the main contributors. Recently Sitholey and Bose (1974) have reviewed the previous work on it.

Coniferales is well represented in all the localities of Upper Gondwanas in India, but very poorly in Lower Gondwanas. Leaves, stems, cones, pollen and scale leaves are the main form genera.

In the Rajmahal series, the Taxodiaceae is represented by Athrotaxites feistmanteli, a cone-bearing shoot from Naogoan (Kota) Sahni (1928). Similarly Cupressinoxylon is the only genus from these beds belonging to the family Cupressaceae Sahni (1931 b). Members of the Podocarpaceae are quite many. Among them Elatocladus species have been reported by Sahni (1928), Vishnu-Mittre (1957) and Gopal et al. (1957). Retinosporites was described by Feistmantel (1877a), and Oldham and Morris (1863). The genus Nipanioruha was founded for petrified coniferous shoots by A.R.Rao (1947). Vishnu-Mittre (1957) also has reported it from this series. A.R. Rao (1943) has reported a new genus of megastrobilus as Nipaniostrobus sahnii from Nipania. Mehtaia is another new genus found by A.R.Rao (1943). Vishnu Mittre (1957) has instituted a new genus for the fertile shoot of it Sitholeya and described as S. rajmahalensis. Another fertile shoot was described by A.R.Rao (1950) as Stachyotaxus sp. A male strobilus Masculostrobus rajmahalensis and another

cone - Podostrobus were described by A.R.Rao (1964) while describing a sterile shoot Vishnu-Mittre (1959) instituted a new genus Indophyllum.

Members of the family Araucariaceae are known from Rajmahal series as petrified woods, cone scales and some sterile shoots. Species of Araucarites have been reported by Feistmantel (1877 a), Sahni (1928), Vishnu-Mittre (1954 b), Singh (1957) and Ramanujam (1957).

Other coniferous remains like Brachyphyllum sp. have been reported by Sahni (1928), Bose (1952), Bose and Maheswari (1974). Cones of this genus are known as Conites (Sahni 1928, Bose and Hsu, 1953). Coniferocaulon has also been reported from these beds by Gupta (1954), and Sharma (1967) and Pagiophyllum by Vishnu-Mittre (1959).

Isolated pollen grains from Rajmahal series have been reported by A.R.Rao (1943), Vishnu-Mittre (1954a), Sah and Jain (1965).

Among the petrified woods, species of Mesembrioxylon, Dadoxylon, Taxaceoxylon and Fascisvarioxylon are known (Seward and Sahni (1920, Sahni 1931 b, Bharadwaj 1954, Suryanarayana 1953, Sah and Jain 1964, Krausel and Jain 1964, and Jain 1964).

b) Jabalpur Series :

Several genera of different groups have been reported

from various localities of Jabalpur series in India ever since Feistmantel (1876).

A considerable number of genera belonging to Pteridosperms and Pteridophytes have been known, mostly from Jabalpur area Feistmantel (1876) and Bose and Roy (1968) have recorded Pachypteris indica. Species of Cycadopteris were described by Bose and Sukh-Dev (1958) Onychiopsis, Cladophlebis and Coniopteris have been recorded by Bose (1960). Thinnfeldia and Cladophlebis are also known from these beds (Sahni 1936, C.N.Rao and S.C. Sah 1960), Alethopteris has been reported by Agarwal (1963). Rao, C.N. and Sah, S.C. (1960) have reported Dicroidium sp. Bose and Sukh-Dev (1961) have described Weichselia and Onychiopsis. Isoetites sp. has been reported by Bose and Roy (1963).

Plant remains of Cycadophyta have been reported mainly from the localities in the East-Coast and Cutch. Many of them were only impressions.

Species of Taeniopteris have been described by Rao, C.N. and Sah, S.C. (1960), and Agarwal (1963). Ptilophyllum species were reported by Jacob and Jacob (1954), Bose and Sukh-Dev (1958), Bose (1959 b) and Agarwal (1963). A species of Bucklandia has been reported by Bose (1959a) and of Nilssonia and Nilssoniopteris by Agarwal (1963) and Bose (1974) respectively. Otozamites species was first described by Feistmantel (1876) and later by Rao, C.N. and Sah S.C.

(1960). Rao C.N. and Sah, S.C. (1960) have also reported Dictyozamites from the same series. Bose (1958) has described Cycadopteris.

Nipaniophyllum is the only representative of Pentoxyleae group from Jabalpur series (Bose and Sukh-Dev, 1958).

Ginkgoales are represented here by Baiera (Lele, 1962) and Ginkgoites (Bose and Sukh-Dev, 1958).

Important genera of Coniferales are Elatocladus (Feistmantel, 1879; Agarwal, 1963), Pagiophyllum (Bose and Sukh-Dev, 1972), Araucarites Feistmentel, 1876; Pant and Srivastava, 1968), and Coniferocaulon (Bose, 1959 a).