Palynology of the Mesozoic sediments exposed near Ellichpur, Maharashtra

Pramod Kumar

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The paper records palynofossils from the dark grey shales/clays (inliers) exposed at Belkher Village, north of Ellichpur town in Maharashtra. The assemblage contains 41 species assigned to 22 genera and is characterised by pteridophytic and bryophytic components, viz., *Callispora potoniei, Contignisporites glebulentus, Murospora, Triporoletes reticulatus, Coptospora kutchensis, Cooksonites* cf. *C. rajmahalensis,* etc. The prominence of *Callialasporites* followed by *Podocarpidites, Alisporites* and *Araucariacites* is noteworthy. The assemblage is comparable to the palynozone-D of Rajmahal Hills, the assemblage recovered from Sivaganga area of Cauvery Basin, and Dharesi nala section of Bhuj Formation, Kutch Basin, which are assigned a Neocomian-Aptian age. The presence of spore-pollen, algal or fungal entities suggests fresh water conditions during deposition.

Key-words—Palynology, Palaeoclimate, Early Cretaceous (India).

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सारांश

महाराष्ट्र में एलिचपुर के समीपस्थ अनावरित मध्यजीवी अवसादों का परागाणविक अध्ययन

प्रमोद कुमार

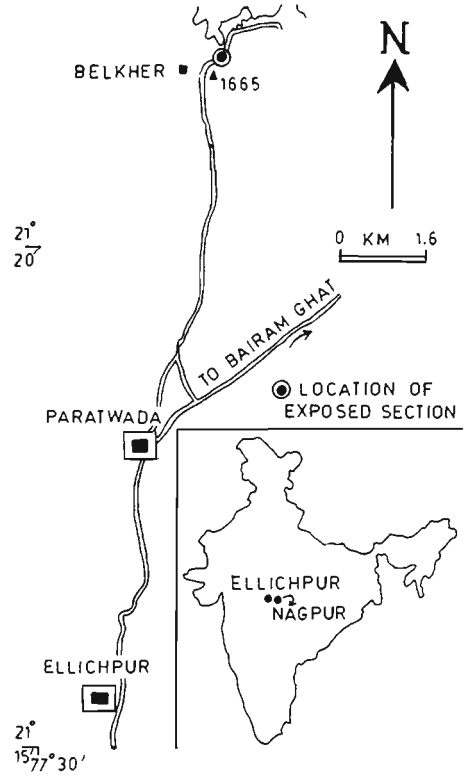
प्रस्तुत शोध-पत्र में महाराष्ट्र में एलिचपुर के उत्तर में बेलखेर गाँव के पास अनावरित गहरी भूरी शैलों/मृत्तिका से प्राप्त परागाणुओं की विवेचना की गई है। इस समुच्चय में 22 प्रजातियों की 43 जातियाँ विद्यमान हैं तथा यह **केलिस्पोरा पोतोनियाई, कॉन्टिग्नीस्पोराइटिस ग्लीबुलेन्टस, मुरोस्पोरा, ट्राइपोरोलिटीस रेटिकुलेटस, कोप्टोस्पोरा कच्छेन्सिस, कुक्सोनाइटिस** सजातीय **कु० राजमहलेन्सिस** आदि टेरीडोफ़ाइटी एवं ब्रायोफ़ाइटी बीजाणुओं से लक्षणित है। **केलियालास्पोराइटिस** के पश्चात् **पोडोकार्पिडाइटिस, एलिस्पोराइटिस** एवं **अराकेरियासाइटिस** की बाहुल्यता उल्लेखनीय है। यह समुच्चय राजमहल पहाड़ियों के परागाणुमंडल-डी०, कावेरी द्रोणी के शिवागंगा क्षेत्र एवं भुज शैल-समूह के धरेसी नाला खंड से तुलनीय है। इन सभी की निओकोमियन-एप्शियन आयु प्रस्तावित की गई है। बीजाणु-परागकण तथा शैवालीय अथवा कवकीय अवशेषों की उपस्थिति से निक्षेपण के समय स्वच्छ जल वाली परिस्थितियों का होना इंगित होता है।

BLANFORD (1869) recorded 139.25 m thick strata of feldspathic sandstone, conglomerate and shale from near Ellichpur, Maharashtra and designated them as Mahadeva and Bagh beds (Map 1, 2). Pascoe (1959) described these beds as the inliers and equated them to Kamthi (?Mahadeva). So far, there are no palynological as well as megafloral records from these beds.

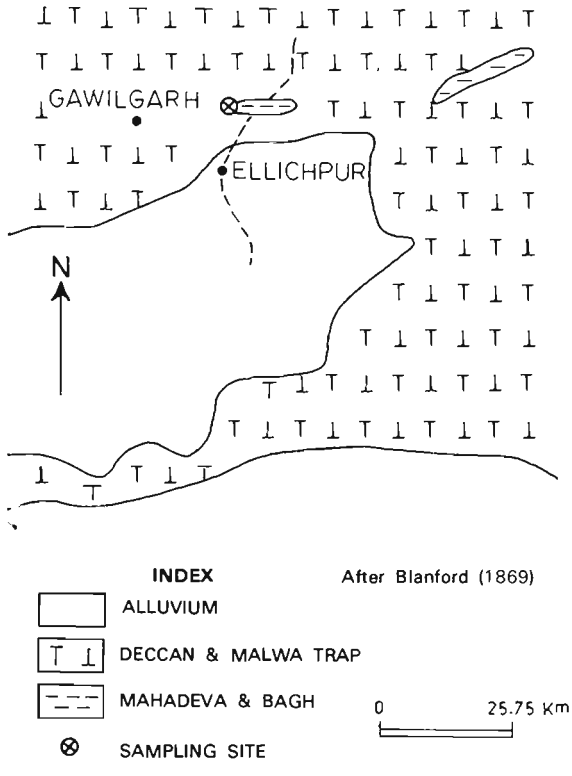
The Ellichpur sediments are exposed near Belkher, Pandhari, Khareli and Bairam Gadh villages and can be traced laterally up to 10-12 km trending east-west between Belkher and Bairam Gadh villages. The beds dip gently (10°-15°) towards north. At places these sediments are covered with alluvium.

The stratigraphic sequence of the beds exposed north of Ellichpur is as follows:

Thickness in m	Lithology
02.00	Deccan trap, lavas
10.50	Lameta beds (Sandstone shales and limestone)
.....	Unconformity .....
25.15	Sandstones, conglomerates, shales, grey shales and clay (exposed around Ellichpur)
.....	Unconformity .....
	Metamorphic rocks



Map 1



Map 2

Material—A sequence of light to dark grey shales is exposed at north-east of Belkher Village (21°22′ : 77°32′) which is situated at about 16 km north of Ellichpur. The details of samples are given in Histogram 1 which shows a lithological sequence in the section. Palynofossils have only been recovered from one sample (no. 8).

PALYNOLOGICAL COMPOSITION

The characteristic palynotaxa, some figured in Plate 1, are represented by *Cyathidites australis* Couper 1953, *C. punctatus* (Delcourt & Sprumont) Delcourt *et al.* 1963, *C. cutchensis* Singh, Srivastava & Roy 1964, *C. densus* Kumar 1973, *Callispora potoniei*

PLATE 1 →

(All photomicrographs from unretouched negative magnified ca. × 500;

1. *Lygodiumsporites* sp., Slide no. BSIP 10260, Coordinates : 11 × 111.5
2. *Callispora potoniei*, Slide no. BSIP 10257, Coordinates : 15 × 108.
3. *Matonisporites discoidalis*, Slide no. BSIP 10255, Coordinates : 23 × 96.
4. *Murospora* sp., Slide no. BSIP 10257, Coordinates : 12 × 112.5.

5, 6. *Triporoletes reticulatus*, Slide no. BSIP 10255, Coordinates : 24.5 × 101; 5, proximal and 6, distal surfaces showing reticulate pattern of exine.

7. *Cooksonites* cf. *C. rajmahalensis*, Slide no. BSIP 10261, Coordinates : 20 × 95.5.
8. *Coptospora kutchensis*, Slide no. BSIP 10256, Coordinates : 31 × 104.
9. *Triporoletes densus*, Slide no. BSIP 10257, Coordinates : 11 × 106.4.
10. *Contignisporites glebulentus*, Slide no. BSIP 10254, Coordinates : 20 × 102.5.
11. *Cooksonites* cf. *C. rajmahalensis*, Slide no. BSIP 10260, Coordinates : 20 × 106.
12. *Callialasporites dampieri*, Slide no. BSIP 10259, Coordinates : 19 × 112.
13. *Callialasporites segmentatus*, Slide no. BSIP 10255, Coordinates : 19 × 96.
14. *Alisporites haradensis*, Slide no. BSIP 10262, Coordinates : 37.5 × 97.
15. *Podosporites tripakshi*, Slide no. BSIP 10263, Coordinates : 4 × 110.
16. *Araucariacites australis*, Slide no. BSIP 10255, Coordinates : 31 × 97.5.
17. *Cycadopites couperi*, Slide no. BSIP 10254, Coordinates : 19 × 102.
18. *Monolites indicus*, Slide no. BSIP 10258, Coordinates : 25 × 97.
19. *Microcachryidites* sp., Slide no. BSIP 10257, Coordinates : 41 × 94.5.

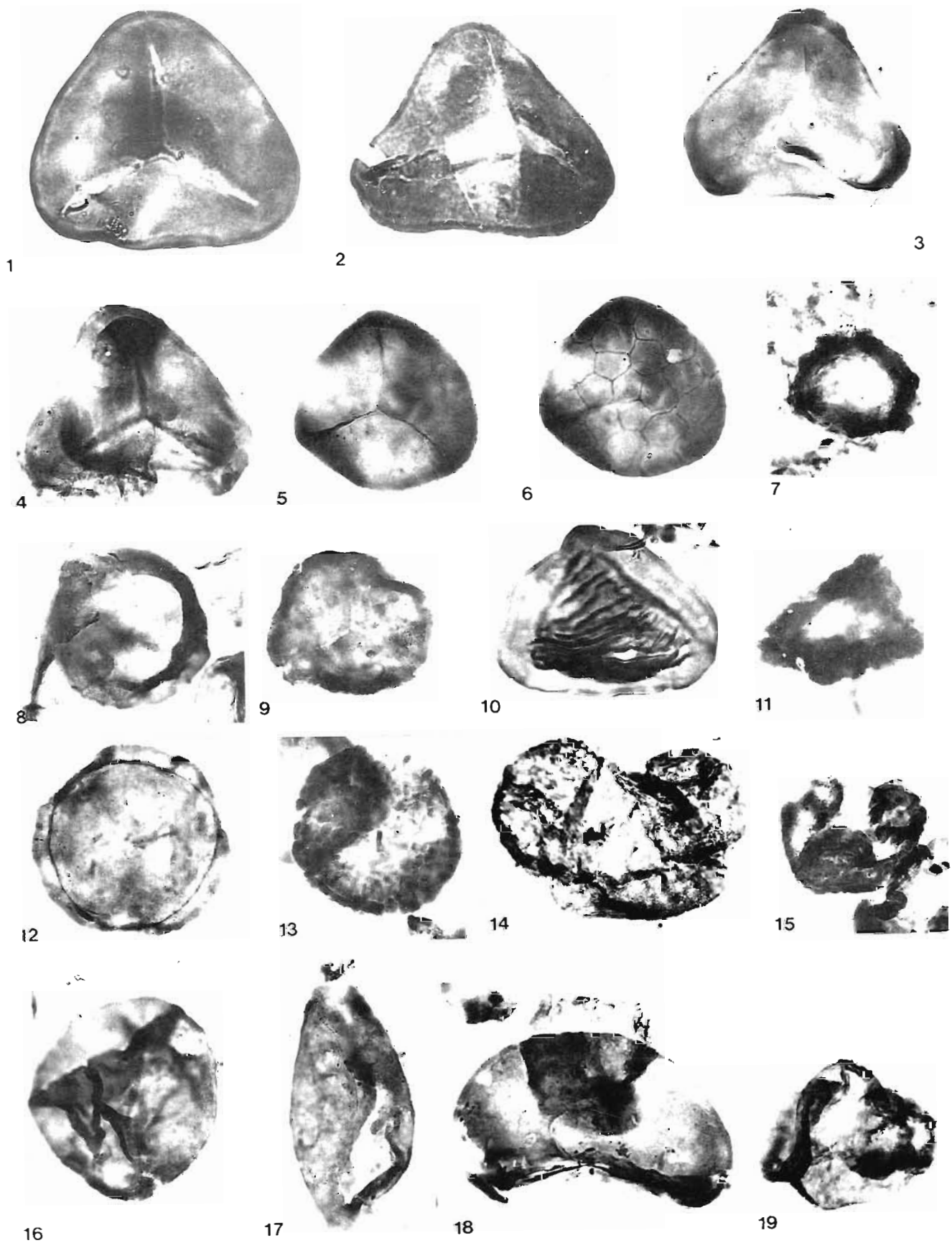
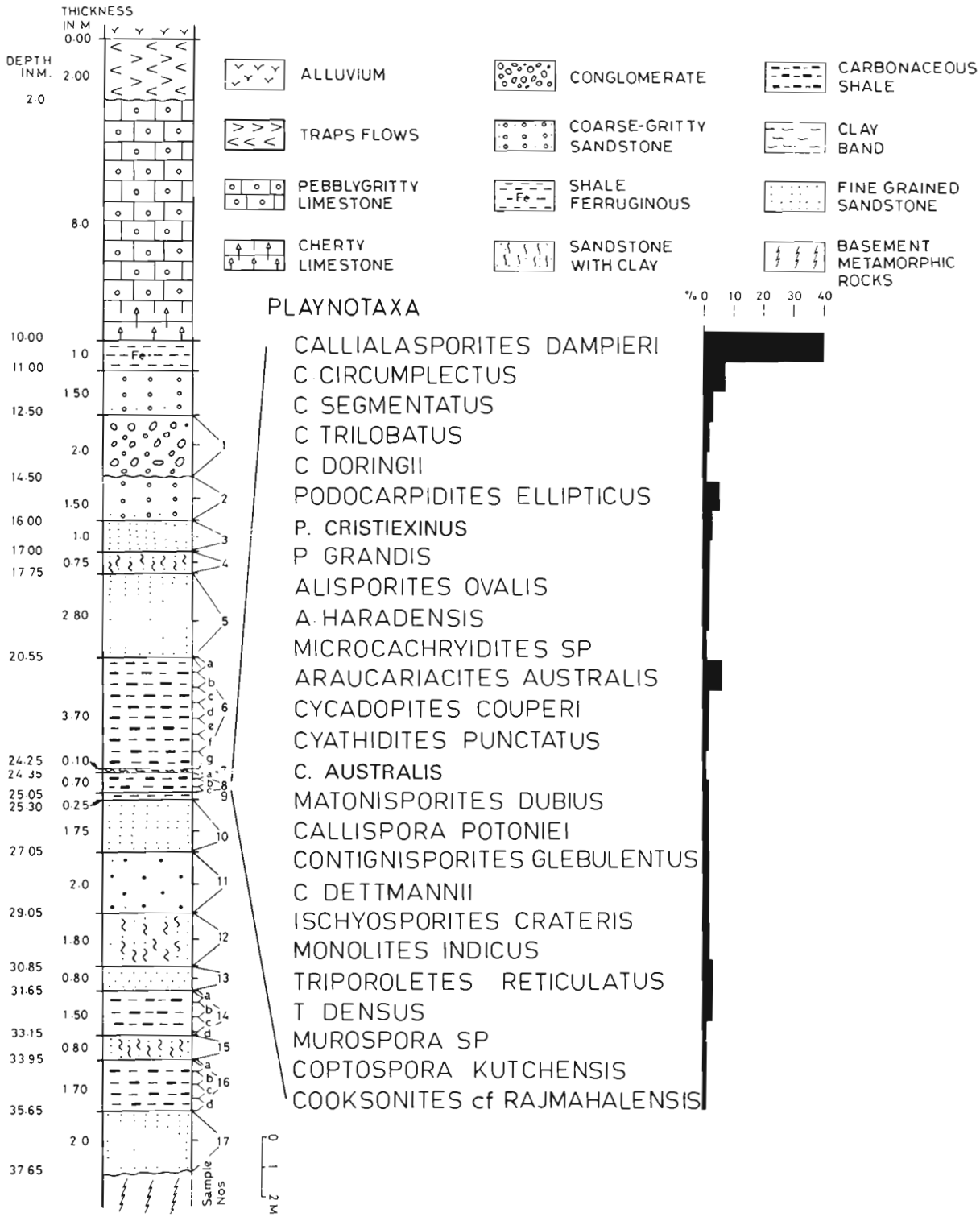


PLATE 1



Histogram 1—Showing percentage frequency of spore-pollen species in Belkher Section, Ellichpur, Maharashtra.

(Dev) Bharadwaj & Kumar 1972, *Matonisporites discoidalis* Kumar 1973, *M. dubius* Kumar 1973, *Ischyosporites crateris* Balme 1957, *Lygodiumsporites* sp., *Contignisporites glebulentus* Dettmann 1963, *C. dettmannii* Singh & Kumar 1972, *C. cooksonii* (Balme) Dettmann 1963, *Monolites indicus* Kumar 1973, *Murospora* sp., *Triporoletes (Rouseisporites) densus* Kumar 1973, *T. reticulatus* (Pocock) Playford 1971, *Coptospora kutchensis* Venkatachala 1969, *Cooksonites* cf. *C. rajmahalensis* Tripathi, Tiwari &

Kumar 1990, *Cycadopites couperi* (Dev) Kumar 1973, *C. sakrigaliensis* Sah & Jain 1965, *Monosulcites ellipticus* Kumar 1973, *Araucariacites australis* Cookson 1947, *A. limbatus* Kumar 1973, *Callialasporites trilobatus* (Balme) Bharadwaj & Kumar 1972, *C. segmentatus* (Balme) Bharadwaj & Kumar 1972, *C. circumplectus* Kumar 1973, *C. doringii* Kumar 1973, *C. rudisaccus* Maheshwari 1974, *Podocarpidites ellipticus* Cookson 1947, *P. multesimus* (Bolkhovitina) Pocock 1962, *P. cristiexinus* Sah & Jain 1965, *P. grandis* Sah & Jain 1965, *Alisporites ovalis* Kumar 1973, *A. haradensis* Kumar 1973, *A. sehoraensis* Kumar 1973, *A. mesozoicus* Kumar 1973, *Baculopollenites haradensis* Kumar 1973, *Cedripites cretaceus* Pocock 1962, *Chordasporites australiensis* de Jersey 1968, *Podosporites tripakshi* (Rao) Kumar 1984, and *Microcachryidites* sp.

The percentage frequency of spore-pollen species occuring in the Belkher section is given in Histogram 1.

COMPARISON

The palynoflora has the following significant spore-pollen taxa: *Cyathidites punctatus, Callispora potoniei, Ischyosporites crateris, Contignisporites glebulentus, Murospora* sp., *Triporoletes reticulatus, Cooksonites, Coptospora kutchensis*, etc. Spores and pollen of Osmundaceae, Gleicheneaceae, Lycopodiaceae, Selaginellaceae and Cheirolepidaceae are absent. However, it has the bulk of coniferalean pollen grains, whereas the pteridophytic and bryophytic spore taxa are poor.

The comparable palynoassemblages are known from Rajmahal Basin, Bihar, Sivaganga beds—Dalmiapuram Formation in Cauvery Basin, and Dharesi nala section, Bhuj Formation in Kutch Basin. Out of six assemblages, the Palynozone-D from infratrappean beds of Rajmahal Basin described by Tiwari *et al* (1984) has been found comparable with the present assemblage. The former assemblage also contains the characteristic taxa, viz., *Matonisporites dubius, Callispora potoniei, Murospora, Monolites indicus, Coptospora kutchensis, Cooksonites* cf. *C. rajmahalensis* and *Triporoletes reticulatus*. Prominence of *Callialasporites* and *Podocarpidites* is also recorded. Tiwari *et al.* (1984) assigned a late Late Jurassic age, whereas Singh and Venkatachala (1987, p. 172) have proposed an Early Cretaceous age to the Palynozone-D on the basis of the presence of certain supposedly marker of Early Cretaceous age, viz., *Aequitriradites, Cooksonites, Coptospora* and *Triporoletes*, etc.

The palynoflora of Ellichpur section is comparable with the *Triporoletes reticulatus* zone of Dalmiapuram Formation in Cauvery Basin (Venkatachala *et al.*, 1980). It also contains *Contignisporites* spp., *Podosporites tripakshi, Coptospora* spp. and *Triporoletes reticulatus*, etc. which are common to both the assemblages. Besides these elements, the Cauvery Basin assemblage contains angiospermic pollen which have not been found in the Ellichpur section. Venkatachala *et al.* (1980) dated the Cauvery palynoassemblage as Late Albian-Early Cenomanian. Because of the lack of angiospermic pollen in the Ellichpur section, the author is of the opinion that this assemblage could be older than that of Cauvery Basin.

Maheshwari and Jana (1987) have recorded a palynoflora, comparable to the presently studied one, from the Upper Member of Bhuj Formation from Dharesi nala section (Aptian) in Kutch Basin. The taxa, which are common to both are: *Cyathidites, Callispora (Foveotriletes), Matonisporites, Ischyosporites, Monolites, *Aequitriradites, *Cooksonites, *Coptospora*, and **Triporoletes*. Dharesi assemblage differs from that of Ellichpur in having *Dictyophyllidites, Concavissimisporites, Todisporites, Impardecispora, Densoisporites, Osmundacidites, Boseisporites, Lametatriletes, Trilites, Gleicheniidites, Crybelosporites, Microfoveolatosporis, Schizosporis, Psiloshizosporis*, etc. These are not represented in the latter assemblage. Due to the occurrence of hilate taxa (asterisk) in both the assemblages and the high frequency of *Callialasporites* (19.7%) in Dharesi section a close comparability can be suggested.

Thus, on the basis of the above palynofloral comparison it appears that the Ellichpur beds had deposited during Neocomian-Aptian time and cannot be equated with Kamthis (Permian) and Mahadeva (Triassic or Bagh beds; Late Cretaceous) as were suggested by the earlier workers (Blanford, 1869; Pascoe, 1959). The presence of terrestrial components suggests them to be of fresh water origin.

PALAEOCLIMATE

The palynoassemblage from Ellichpur section contains conifer pollen, viz., *Callialasporites, Araucariacites, Podocarpidites, Podosporites, Alisporites, Microcachryidites* as well as cycadalean elements which are dispersed by wind from distant places of upland areas. It also comprises fern spores belonging to Cyatheaceae, Matoniaceae, Schizaeaceae (dispersed by water), which could have grown under warm, humid and swampy

conditions prevailing in the nearby areas. The presence of bryophytic hilate forms (mainly dispersed by water)—*Aequitriradites, Coptospora, Triporoletes* and *Cooksonites*, etc. indicates a sufficient amount of rainfall with swampy conditions. Absence of phytoplanktons suggests that the fresh water conditions were prevailing in the basin at the time of deposition. The palynoassemblage was preserved under warm climate with sufficient rainfall and fresh water swampy environment.

ACKNOWLEDGEMENTS

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