THE GENUS *CONTIGNISPORITES* FROM THE LOWER CRETACEOUS BEDS OF ADILABAD DISTRICT, A. P.*

P. V. RAJESHWAR RAO[1] AND C. G. K. RAMANUJAM[2]

1. *Department of Botany, New Science College, Hyderabad*
2. *Department of Botany, Science College, Saifabad, Osmania University, Hyderabad*

ABSTRACT

The genus *Contignisporites* Dettmann (1963) is one of the important and commonly encountered spore types of the Middle Jurassic to Lower Cretaceous deposits of India. It constitutes the most predominant taxon of the cryptogamic spores recovered from the Lower Cretaceous (Neocomian) Gangapur beds of the Adilabad District of Andhra Pradesh. In view of its highly characteristic spore morphology, the authors stress the need for maintaining the generic circumscription of this spore type as provided originally by DETTMANN (1963). The species in the Gangapur beds are *Contignisporites glebulentus, C. cooksonii, C. fornicatus, C. dorsostriatus, C. multimuratus* and *C. crassicingulatus* sp. nov. The paper provides a brief account of the occurrence of this spore type in the diverse Jurassic-Cretaceous deposits of India. Lastly, the authors highlight the stratigraphic potential of certain species of *Contignisporites*.

INTRODUCTION

Contignisporites represents one of the important constituents of the microfloral assemblages of the Middle Jurassic to Lower Cretaceous deposits of India. From the Gangapur Formation RAMANUJAM AND RAJESHWAR RAO (1976a, 1976b) recorded recently a rich and well preserved Lower Cretaceous (Neocomian) palynoassemblage. *Contignisporites* constitutes the most predominant element among the cryptogamic spores and is represented by a number of species. The present contribution deals with all the species of *Contignisporites* recovered from the Gangapur beds, followed by a brief account of the record of this genus from diverse Jurassic-Cretaceous horizons of India. Further, it is also intended to highlight the significance of some species of this taxon as stratigraphic markers.

The palynological samples investigated comprise carbonaceous shales and clays from the Gangapur beds near Rallapet and Anksapur situated within a few kilometers around Naogaon (19°20′ : 79°24′) in the Asifabad taluk of the Adilabad District of Andhra Pradesh.

SYSTEMATIC DESCRIPTION

Anteturma	SPORITES H. Potonie′ 1893
Turma	TRILETES (Reinsch) Dettmann 1963
Suprasubturma	ACATITRILETES Dettmann 1963
Subturma	ZONOTRILETES Waltz 1935
Infraturma	CINGULATI (Potonié & Klaus) Dettmann 1963
Genus	**Contignisporites** Dettmann 1963

Type species *C. glebulentus* Dettmann 1963

*Paper presented at Second Indian Geophytological Conference, Lucknow, March 11-12, 1978.

Contignisporites glebulentus Dettmann 1963
Pl. 1, Figs. 1-3

Remarks—This species is easily distinguishable by the presence of elongated and irregular, often coalescing verrucae in the proximal polar area. *C. glebulentus* has been commonly encountered in the Gangapur beds.

Contignisporites cooksonii Dettmann 1963
Pl. 1, Figs. 4, 6

Remarks—The important features of *C. cooksonii* are the presence of 6 to 8 parallel, low, roundly crested muri on the distal facet and the smooth proximal polar area. Among the various species of *Contignisporites* encountered in the Gangapur beds *C. cooksonii* constitutes the most predominant member.

Contignisporites fornicatus Dettmann 1963
Pl. 1, Figs. 7, 8

Remarks—The presence of 5 to 7 parallel, low, broad crested muri on the distal facet and a few hemispherical verrucae in the proximal polar area are the diagnostic features of this species. *C. fornicatus* has been encountered commonly in the Gangapur beds.

Contignisporites dorsostriatus Dettmann 1963
Pl. 1, Figs. 9, 10

Remarks—The fairly large size of the amb (55-70 μm) and the presence of 7 to 10 low, broad crested muri much wider than the intervening lumina on the distal side and the smooth proximal polar area are the characteristic features of this species.

Contignisporites multimuratus Dettmann 1963
Pl. 1, Figs. 11-13

Remarks—This taxon is recognizable in the possession of a higher number of distal muri (10-15 or more) which are as broad as the intervening lumina and the irregularly lobed verrucae in the proixmal polar area. *C. multimuratus* is an occasional element of the Gangapur microflora.

Contignisporites crassicingulatus sp. nov.
Pl. 1, Figs. 14, 15

Diagnosis—Amb triangular, 50—70 μm in diam., including cingulum, cingulum of unequal width, laterally 7-10 μm broad, and at radial apices 12-15 μm broad. Distal facet with 7 to 10 parallel muri, contact area around laesurae on proximal side with many hemispherical, locally coalescing verrucae.

Description—Spores trilete, cingulate, amb triangular, Y-mark distinct, laesurae straight reaching inner margin of cingulum, commissures bordered by thin lips, exine 1.5 μm thick, cingulum of unequal width, broader at radial apices than at sides to form hump-like elevations along the three radial apices. Distal facet bilaterally symmetrical, cicatricose, with 7 to 10 parallel muri, muri (5-7 μm) broader than intervening lumina (2-3 μm); proximal facet radially symmetrical, with many hemispherical locally coalescing verrucae in contact area ; each interradial area on proximal side traversed by a single tangential murus up to 4 μm thick and 20-25 μm long.

Remarks—The conspicuous cingulum of unequal width resulting in hump-like elevations at its radial apices constitutes the diagnostic feature of this species. Further, the

new species is also characterized by the prominently sculptured proximal polar area. *C. crassicingulatus* resembles to some extent *C. glebulentus* in its proximal sculpture but the latter has a narrower cingulum of uniform width. *C. crassicingulatus* has been encountered occasionally in the Gangapur beds.

Type locality : Anksapur.

Geological horizon : Gangapur Formation (Neocomian).

Holotype : Pl. 1, Figs. 14, 15 ; A IV, S. No. 2, 42.1×102.3 (58 μm).

In addition to the above species, the authors have also encountered some rare specimens, in which the proximal or the distal muri are either faintly preserved or apparently lacking (Pl. 1, Figs. 16-19). Such specimens probably represent aberrant types.

DISCUSSION

Dettmann (1963) instituted the genus *Contignisporites* to include trilete, cicatricose and cingulate spores with bilaterally symmetrical distal facet consisting of parallel, locally bifurcating muri and radially symmetrical proximal facet with a single tangential murus along the equatorial region of each contact face. The proximal polar area of these spores is either psilate or sculptured. The demarcation of various species of this genus are based upon the size and shape of the spore, the number and thickness of muri, the nature of the proximal polar sculpture and the width of the cingulum.

Singh and Kumar (1966), however, recently emended and enlarged the diagnosis of *Contignisporites* to accommodate even those forms lacking tangential interradial muri on the proximal side. Based exclusively upon this criterion, they described two new species, viz., *Contignisporites dettmannii* and *C. psilatus*, from the Jabalpur beds. We are of the opinion that because of its characteristic and easily distinguishable spore morphology the original circumscription of *Contignisporites* needs no alteration. The absence of the proximal interradial muri in *C. dettmannii* and *C. psilatus* could be due to inadequate preservation or it may as well constitute a rare instance of aberration. We too have come across in the present study some specimens either apparently lacking or with only a faint indication of poorly preserved proximal tangential muri (Pl. 1, Figs. 16, 17). It may be noted significantly that Singh and Kumar (1966) themselves recorded some specimens of *C. dettmannii* with faintly preserved proximal muri-like elevations. Further, it may be noted pertinently that spores with well preserved proximal tangential muri and poorly preserved distal muri were also encountered *al beit* rarely in the present study (Pl. 1, Figs. 18, 19). It would thus, perhaps be advisable to consider all these instances as by-products of either poor preservation or sporadic abnormalities. In the light of this interpretation the possibility that *Contignisporites dettmannii* and *C. psilatus* may constitute poorly preserved or aberrant apecimens of *C. cooksonii* with which they otherwise agree mostly, merits serious consideration.

The occurrence of Contignisporites in the Mesozoic deposits of India

The spores of *Contignisporites* are now known from most of the Upper Gondwana strata of India, viz., the Jabalpur and Bansa beds of Madhya Pradesh, the Kutch and Saurashtra basins of the west coast, the Jaisalmer basin of Rajasthan, and the Godavari-Krishna, Pranhita-Godavari, Cauvery and Palar basins of South India. These spores, however, have not been recorded to date from the Rajmahal beds of Bihar (Sah & Jain, 1965).

From the Jabalpur beds (Lower Cretaceous) *Contignisporites glebulentus*, *C. cooksonii*, *C. fornicatus*, *C. detmannii* and *C. psilatus* have been recorded so far (Singh, 1966 ; Singh &

KUMAR, 1966). MAHESHWARI (1974) recorded *Contignisporites* sp. from the Lower Cretaceous Bansa beds.

From the Katrol (Upper Jurassic) and Bhuj (Lower Cretaceous) beds of the Kutch region, *Contignisporites cooksonii*, *C. glebulentus*, *C. fornicatus*, *C. multimuratus*, *C. kutchensis* and *C. triletus* were recorded (SINGH, SRIVASTAVA & ROY,1964 ; VENKATACHALA, 1969a, 1969b ; VENKATACHALA & KAR, 1970, 1972 ; VENKATACHALA, KAR & RAZA, 1969). From the Lower Cretaceous outcrops of the Chawad River section in the west-central part of Kutch, RAWAT (1977) recently described *C. glebulentus*.

From the sub-surface of the Godavari-Krishna basin of Andhra Pradesh, RAO AND VENKATACHALA (1971), and SHARMA, JAIN AND VENKATACHALA (1977) described a rich Lower Cretaceous palynoassemblage which includes *Contignisporites glebulentus*, *C. cooksonii* and *C. multimuratus*.

From the Lower Cretaceous *Microcachryidites antarcticus* zone of the Cauvery basin, VENKATACHALA, SHARMA AND JAIN (1972) recorded *Contignisporites glebulentus*, *C. multimuratus* and *C. cooksonii*. RAMANUJAM AND SRISAILAM (1974) described *C. glebulentus*, *C. dorsostriatus* and *C. cooksonii* from a bore hole near Kattavakkam in Palar basin of Tamil Nadu. More recently RAMANUJAM AND VERMA (1977) recorded excellently preserved spores of *C. glebulentus*, *C. fornicatus* and *C. multimuratus* from the Lower Cretaceous Sriperumbudur beds of Palar basin.

From the above brief survey, it becomes clear that the Lower Cretaceous palynoassemblages of India are characterized by the fairly consistant occurrence of *Contignisporites glebulentus*, *C. multimuratus* and *C. fornicatus*. These species are generally associated with *Aequitriradites* (*A. spinulosus*, *A. verrucosus*), *Cooksonites*, *Coptosportes*, *Impardecispora*, *Foraminisporis*, *Cicatricosisporites* (*C. hughesi*, *C. ludbrooki*, and *C. australiensis*), *Microcachryidites* (*M. antarcticus*), *Polycingulatisporites*, *Staplinisporites* and *Cybelosporites* (see RAO & VENKATACHALA, 1971 ; RAMANUJAM & RAJESHWARA RAO, 1976a, 1976b ; RAMANUJAM & VERMA, 1977). While as a genus *Contignisporites* is known to span from the Middle Jurassic to Lower Cretaceous, species like *C. glebulentus*, *C. multimuratus* and *C. fornicatus* appear to be characteristic of the Neocomian-Aptian deposits. From outside India too, these species represent consistent elements of the various Lower Cretaceous deposits (see DETTMANN, 1963 ; SINGH, C. 1964, 1971) and may be considered as reliable stratigraphic markers for the Neocomian-Aptian age.

ACKNOWLEDGEMENTS

The authors are grateful to Shri C. Sudarshan, Principal of the New Science College, and Shri D. Hanumantha Rao, Principal of the Science College, Saifabad, for their keen interest and encouragement all through the progress of this work.

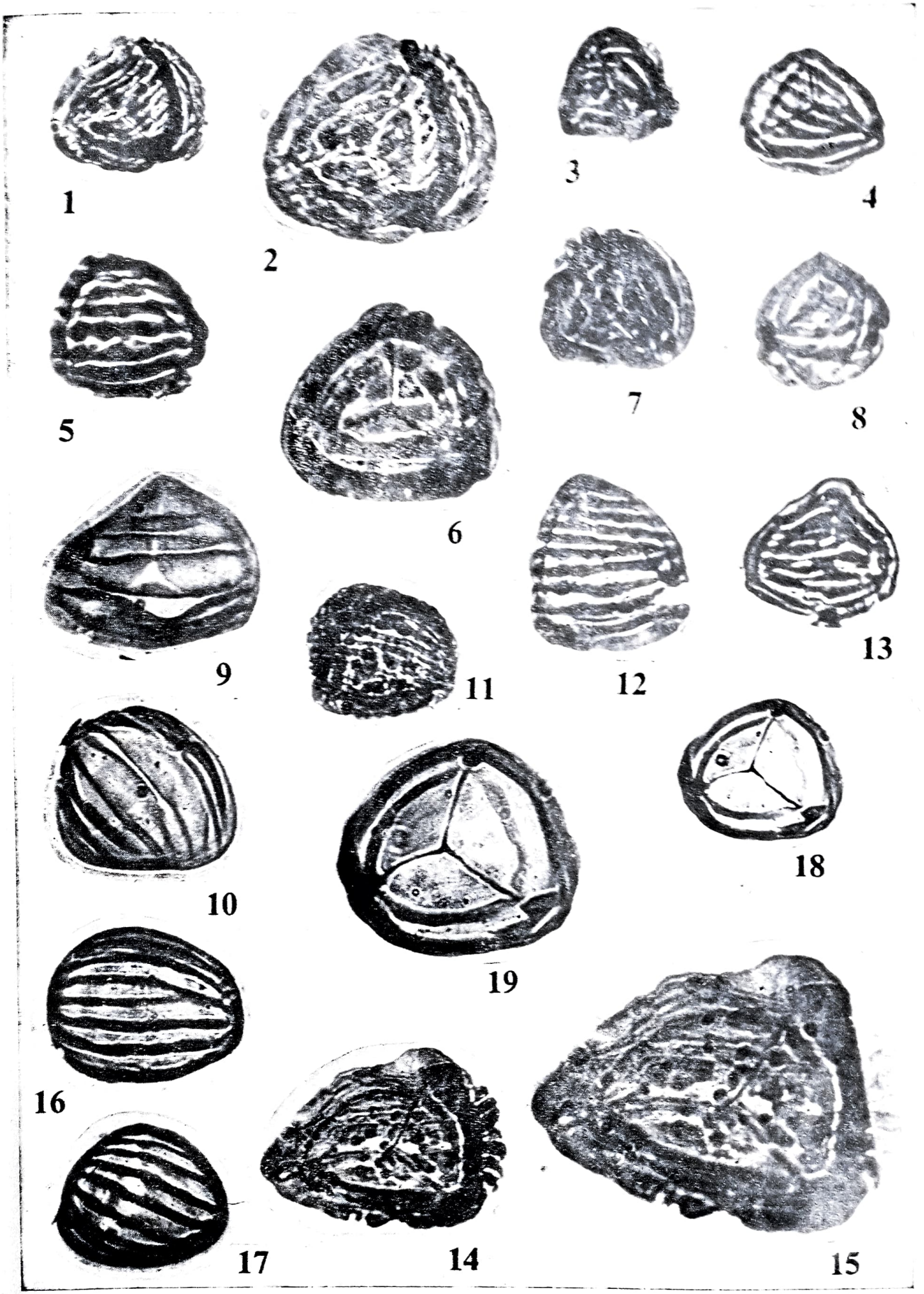
REFERENCES

DETTMANN, M. E. (1963). Upper Mesozoic microflora from South-eastern Australia. *Proc. Roy. Soc. Vict.*, **77** : 1-148.

MAHESHWARI, H. K. (1974). Lower Cretaceous palynomorphs from the Bansa Formation, South Rewa Gondwana basin, India. *Palaeontographica*, **146B** : 21-55.

RAMANUJAM, C. G. K. & RAJESHWAR RAO, P. V. (1976a). Palynological approach to the study of some Upper Gondwana clays at Rallapet near Asifabad in Adilabad district of Andhra Pradesh. *Colloquium* on *Palaeontological studies in southern region. Abstracts*, pp. 10-11.

RAMANUJAM, C. G. K. & RAJESHWAR RAO, P. V. (1976b). Palynological evidence for the age of some U. Gondwana deposits in Adilabad district of Andhra Pradesh. *IV. Intern. Palynol. Conf. Lucknow, Abstracts*, pp. 140-141.


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19

RAMANUJAM, C. G. K. & SRISAILAM, K. (1974). Palynology of the carbonaceous shales from a bore hole at Kattavakkam near Conjeevaram, Tamil Nadu, India. *Pollen Spores*, **16** : 67-102.

RAMANUJAM, C. G. K. & VERMA, Y. N. R. (1977). Palynological evidence for the age of Sriperumbudur beds encountered in a bore hole at Orikkai near Conjeevaram, Tamil Nadu. *J. geol. Soc. India*, **18**: 429-435.

RAO, V. R. & VENKATACHALA, B. S. (1971). Upper Gondwana marine intercalations in Peninsular India. *Ann. Geol. Dept., Aligarh Muslim University*, **5** & **6** : 353-389.

RAWAT, M. S. (1977). Palynology of the Mesozoic sediments of Kutch, W. India : Plant microflossils from Chawad River Traverse, District Kutch, Gujarat. *J. Palynol.* **12** : 19-42.

SAH, S. C. D. & JAIN, K. P. (1965). Jurassic spores and pollen from the Rajmahal Hills, Bihar with a discussion on the age of the Intertrappean beds. *Palaeobotanist*, **13** : 264-290.

SHARMA, K. D., JAIN, A. K. & VENKATACHALA, B. S. (1977). Palynology of the Early Cretaceous sediments from the subsurface of Godavari-Krishna basin, Andhra Pradesh, South India. *Proc. 4th Colloq. Indian Micropalaeontol. Stratigr.* 109-121.

SINGH, C. (1964). Microflora of the Lower Cretaceous Manville Group, East-central Alberta. *Res. Council Alberta, Bull.* **15** : 1-237.

SINGH, C. (1971). Lower Cretaceous Microflora of the Peace River area, Northwestern Alberta. *Res. Council Alberta, Bull.* 28 ; **1** : 1-299.

SINGH, H. P. (1966). Reappraisal of the mioflora from the Jabalpur Series of India with remarks on the age of the beds. *Palaeobotanist*, **15** : 87-92.

SINGH, H. P. & KUMAR, P. (1966). Some observations on the genus *Contignisporites* Dettmann 1963. *Palaeobotanist*, **15** : 80-92.

SINGH, H. P., SRIVASTAVA, S. K. & ROY, S. K. (1974). Studies on the Upper Gondwana of Cutch, 1. Mio- and Macrospores. *Palaeobotanist*, **12** : 282-306.

VENKATACHALA, B. S. (1969a). Palynology of the Umia plant beds of Kutch, west India. 2. Bhuj exposures near Walkamata, Gujarat State—systematic palynology. *Palaeobotanist*, **17** : 1-8.

VENKATACHALA, B. S. (1969b). Palynology of the Mesozoic sediments of Kutch—4. Spores and pollen from the Bhuj exposures near Bhuj, Gujarat District. *Palaeobotanist*, **17** : 208-219.

VENKATACHALA, B. S. & KAR, R. K. (1970). Palynology of the Mesozoic sediments of Kutch, W. India. 10. Palynological zonation of Katrol (Upper Jurassic) and Bhuj (Lower Cretaceous) sediments in Kutch, Gujarat. *Palaeobotanist*, **18** : 75-86.

VENKATACHALA, B. S. & KAR, R. K. (1972). Palynology of the Mezozoic sediments of Kutch, W. India. 9. Palynological fossils from the Bhuj exposures near Dayapur, Kutch District, Gujarat State. *Proc. Seminar Palenopalynol. & Indian Stratigr.*: 166-171.

VENKATACHALA, B. S., KAR, R. K. & RAZA, S. (1969). Palynology of the Mesozoic sediments of Kutch, W. India. 5. spores and pollen from Katrol exposures near Bhuj, Kutch District, Gujarat State. *Palaeobotanist*, **17** : 184-207.

VENKATACHALA, B. S., SHARMA ,K. D. & JAIN, A. K. (1972). Palynological zonation of Jurassic-Lower Cretaceous sediments in the sub-surface of Cauvery basin. *Proc. Seminar Paleopalynol. & Indian Stratigr.* : 172-184.

EXPLANATION OF PLATE

(Unless otherwise mentioned all figures × 500)

PLATE 1

Figs.

1-3. *Contignisporites glebulentus* fig.1 × 1000.
4-6. *C. cooksonii*, fig. 6 × 1000.
7,8. *C. fornicatus*.
9, 10. *C. dorsostriatus*.
11- 13. *C. multimuratus*.
14, 15. *C. crassicingulatus* sp. nov. Holotype, fig. 15 × 850.
16, 17. Abnormal specimens of *Contignisporites* with proximal muri either lacking or faintly seen.
18, 19. Abnormal spceimens of *Contignisporites* with distal muri poorly preserved. fig. 19 × 1000