

## ON A NEW SPECIES OF *OTOZAMITES* FROM KACHCHH, WESTERN INDIA

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### ABSTRACT

The new species of *Otozamites*, viz., *O. walkamotaensis* is based on a large number of specimens collected near Walkamota, Kachchh. *O. walkamotaensis* resembles most, both in gross features as well as cuticular structure, *O. obtusus* Lindley & Hutton described by Reymanówna (1963).

*Key-words* — *Otozamites*, Bhuj Formation, ? Upper Jurassic, Kachchh (India).

### सारांश

पश्चिमी भारत में कच्छ से ओटोजेमाइटिस की एक नवीन जाति — महेन्द्र नाथ बोस एवं जेबा-बानो

ओटोजेमाइटिस की यह नवीन जाति, ओ० वल्कामोटेन्सिस, कच्छ में वल्कामोटा के समीप से एकत्रित बहुत से प्रादर्शों पर आधरित है। ओ० वल्कामोटेन्सिस, रिमानोवना (1963) द्वारा वर्णित ओ० ऑब्टयूसस लिन्डले एवं हटन से स्थूल लक्षणों एवं उपत्वचीय संरचना, दोनों के आधर पर बहुत अधिक समानता प्रदर्शित करती है।

### INTRODUCTION

**A**MONGST the species of *Otozamites*, described by Bose (1974), *O. imbricatus* Feistmantel and *Otozamites* sp. were from Kachchh. Recently a large number of specimens resembling *Otozamites* sp. were collected by us from two different localities near Walkamota Village. From one of the localities, which is about 1 km east of Walkamota, well-preserved specimens of *Otozamites* were collected from shale dumps of a recently excavated well. From the other locality, which is about 2 km east of Walkamota (the exposure is closed to the Rawapur-Panelli road), similar type of *Otozamites*, preserved in the form of impressions, were collected.

*Genus* — *Otozamites* Braun, 1842

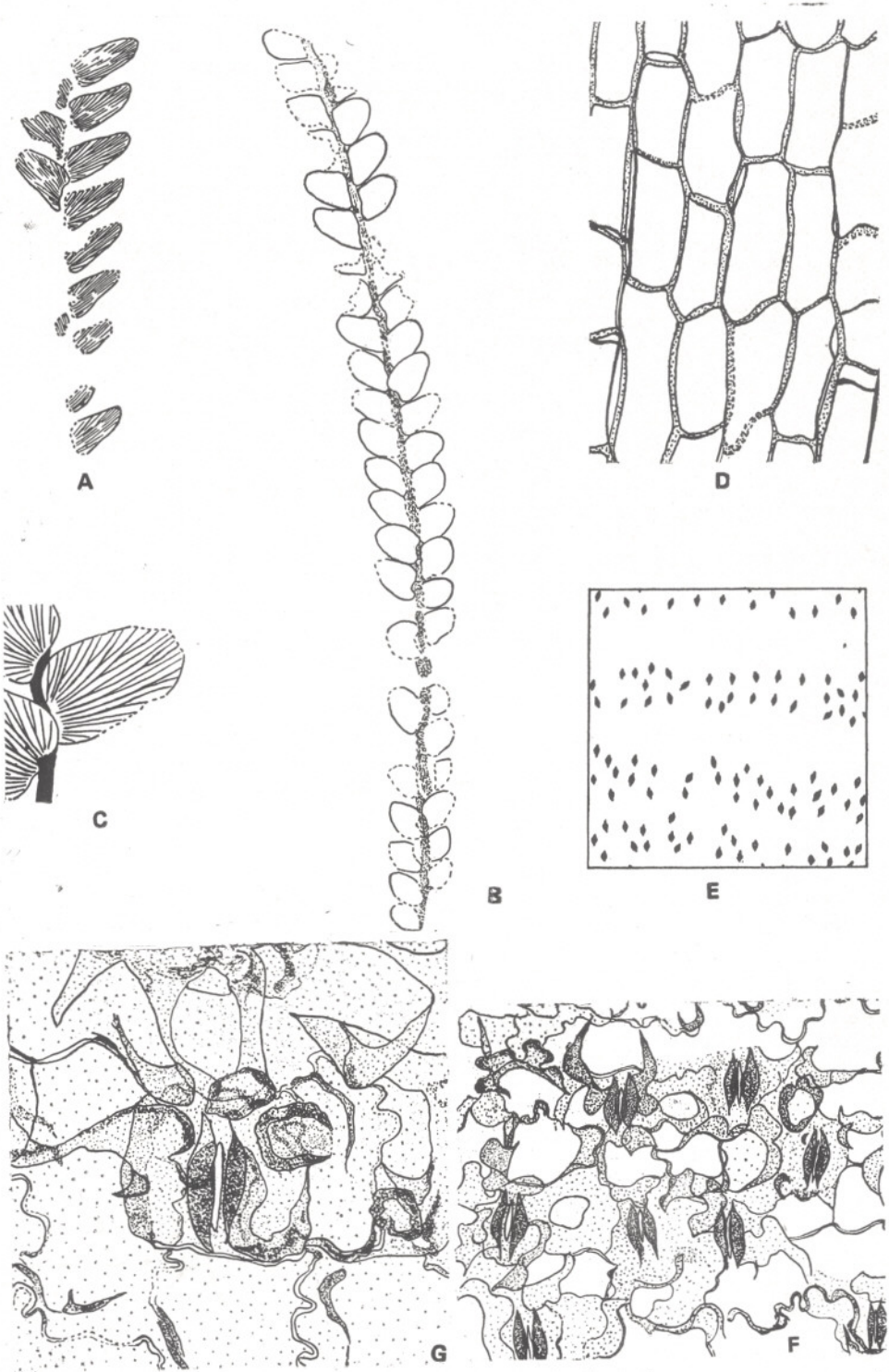
*Otozamites walkamotaensis* n. sp.

Pl. 1, figs 1-9; Text-fig. 1A-G

1974 *Otozamites* sp.: Bose, p. 102, pl. 47, figs 7-10; text-figs 1G, 2A, B.

*Diagnosis* — Leaf linear, pinnate, largest available specimen 13 cm long and 1.2 cm broad near middle region, narrower towards base and apex. Rachis slender, about 1 mm wide, mostly concealed by enlarged pinnae bases. Pinnae attached to rachis by a small basal sinus formed by asymmetrical bases at an angle of 40°-80°, closely set or contiguous, nearly circular-triangular with a rounded base, smaller towards apical and basal regions. Basal pinnae somewhat orbicular, about 3 mm in length and 2.5 mm in width, remaining pinnae mostly triangular with obtuse or subacute apex and rounded base, falcate, 0.3×0.25—1.0×0.6 cm in size, margin entire. Basiscopic margin contracted, partly covered by acroscopic margin of the pinna below; acroscopic margin somewhat expanded, auricle feebly or scarcely developed. Veins radiating from base, simple or forking at all levels, reaching up to margin, 8-14 in number across middle region of pinna, forking 1-3 times.

Cuticle moderately thick on both sides. Upper cuticle slightly thicker than lower cuticle. Rachis cells on both surfaces mostly



TEXT-FIG. 1



narrowly elongated, quadrangular, sometimes polygonal in shape, serially arranged, at places groups of small polygonal cells visible on one surface; lateral-walls thick, parallel, straight or at places slightly wavy, end-walls oblique, slightly thinner than lateral-walls; surface wall smooth. Stomata mostly present on lower side, transversely or obliquely placed; walls of subsidiary cells thinner than ordinary epidermal cells, at places slightly wavy, non-papillate. Guard cells crescent-shaped, thickening of guard cells well-defined.

Upper cuticle of lamina thicker towards extreme base, cells along this region smaller in size than remaining part of lamina, polygonal in shape, lateral- and end-walls thick, slightly wavy or sinuous, surface smooth. Cells of marginal region serially arranged, fairly longer than broad, rectangular, lateral- and end-walls sinuous with broad loops, surface wall mostly smooth, hair bases extremely rare, present over a few marginal cells. Cells of middle region of lamina broader than marginal cells, irregularly packed or at places tending to be serially arranged, mostly quadrangular in shape, sometimes polygonal; lateral- and end-walls sinuous with prominent dome-shaped loops, surface wall smooth.

Lower cuticle differentiated into three zones — outer marginal region, broad stomatiferous and narrow nonstomatiferous bands. Marginal region 2-7 cells wide, cells rectangular, serially arranged; lateral- and end-walls sinuous with broad loops, surface unevenly cutinized, slightly more thickened towards centre but non-papillate. Cells near point of attachment of lamina much smaller in size and highly papillate. Nonstomatiferous bands 2-3 cells wide, cells serially arranged, rectangular to polygonal in shape; lateral- and end-walls unevenly thickened, sinuous or wavy; surface showing papillae of various sizes and

shapes. Mostly a solid papilla present in each cell, sometimes up to 4; papillae circular, ring-shaped or crescent-shaped occasionally papillae joining to form a frill-like structure, papillae thick, slightly raised. Stomatal bands 2-5 stomata wide, cell walls wavy or sinuous, mostly obscure, covered by papillae of adjoining cells as well, like nonstomatiferous bands a number of papillae joining to form frill-like structure with hollow central region, covering epidermal cells and stomata. Stomata within stomatal bands transversely or obliquely orientated, arranged in discontinuous longitudinal files, stomatal apparatus somewhat squarish in shape, surface of subsidiary cells covered by papillae of adjacent cells, outer walls of subsidiary cells thin, wavy; guard cells sunken, having well-defined crescent-shaped thickening, aperture lens-shaped.

*Holotype* — Specimen no. 17/2085B of the Birbal Sahni Institute of Palaeobotany Museum, Lucknow.

*Locality* — Walkamota (type locality) and Kakadbhiti in Kachchh, India.

*Horizon & Age* — Bhuj Formation (Biswas, 1977); ? Upper Jurassic.

*Comparison* — Amongst the Indian species of *Otozamites*, in gross features the present species resembles most *O. vemavaramensis* Bose & Jain described by Bose (1974). In *O. vemavaramensis* the pinnae are smaller in size and they have reflexed margin and very few veins. In external features and in cuticular character, *O. walkamotaensis* comes closest to *O. obtusus* Lindley & Hutton described by Reymanówna (1963) from Grojec near Cracow in Poland. In both the species the upper cuticle is more or less similar and their lower cuticle is highly papillate. *O. obtusus* differs in having stomata inside deep stomatal pits. *O. walkamotaensis* resembles *O. pecten* Sahni & Sitholey (1943) described from the Salt Range, Pakistan, in general shape and size of pinnae. The

TEXT-FIG. 1 — *Otozamites walkamotaensis* n. sp. — A-B, specimens from about 2 km east of Walkamota Village; B.S.I.P. nos. 5/2085A and 10/2085A  $\times$  1. C, a part of a specimen from about 1 km east of Walkamota Village; B.S.I.P. no. 17/2085B  $\times$  4. D, showing rachis cells; B.S.I.P. slide no. 8/2085B-(2)  $\times$  250. E, showing distribution of stomata on lower surface; B.S.I.P. slide no. WK-(1)  $\times$  40. F, showing a few stomata; B.S.I.P. slide no. 5/2085B-(1)  $\times$  250. G, a stoma enlarged; B.S.I.P. slide no. 5/2085B-(1)  $\times$  500.

pinnae in *O. pecten* have revolute margin and on lower surface they have irregularly distributed stomata. The narrower fronds of *O. simpsoni* Harris (1969, text-fig. 16A, C) have pinnae like the present species, but the former differs in having nonpapillate cells. Moreover, in *O. simpsoni*, on lower side, the vein zones are almost unrecognizable and its stomatal apparatuses are slightly sunken and surrounded by compression folds. The smaller fronds of *O. falsus* Harris (1949, 1969, text-fig. 20A) look like *O. walkamotaensis*, but in the former species stomata do not form definite files and the

stomatal apparatuses are sunken. In overall shape the pinnae of *O. walkamotaensis* are like *O. tenuatus* (Leckenby) Harris (1969). The latter, however, differs in having larger number of veins and stomatal apparatuses which are sunken in pits. The pinnae of *O. walkamotaensis* superficially resemble the pinnae of *O. massalongianus* Zigno and *O. feistmantelii* Zigno figured by Wesley (1974), *O. cf. mandelslohi* Kurr. described by Walkom (1917) and *O. sp.* described by Edward (1934). In none of these species the cuticular structure is known.

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#### EXPLANATION OF PLATE

##### PLATE 1

- 1-3. *Otozamites walkamotaensis* n. sp., all the specimens are from about 1 km east of Walkamota Village; B.S.I.P. nos. 18/2085B, 17/2085B (holotype) and 8/2085B. × 1.
4. Showing a stoma and rachis cells; B.S.I.P. slide no. 8/2085B-(1). × 500.
5. Showing cells of upper surface; B.S.I.P. slide no. 16/2085B(1). × 250.
6. Showing a few papillae of a non-stomatal band; B.S.I.P. slide no. A1/2085B-(2). × 500.
7. Showing stomatal and non-stomatal bands; B.S.I.P. slide no. B1/2085B-(1). × 60.
8. Showing a stoma; B.S.I.P. slide no. 5/2085B-(1). × 500.
9. Showing a part of stomatal band; B.S.I.P. slide no. A1/2085B-(2). × 150.



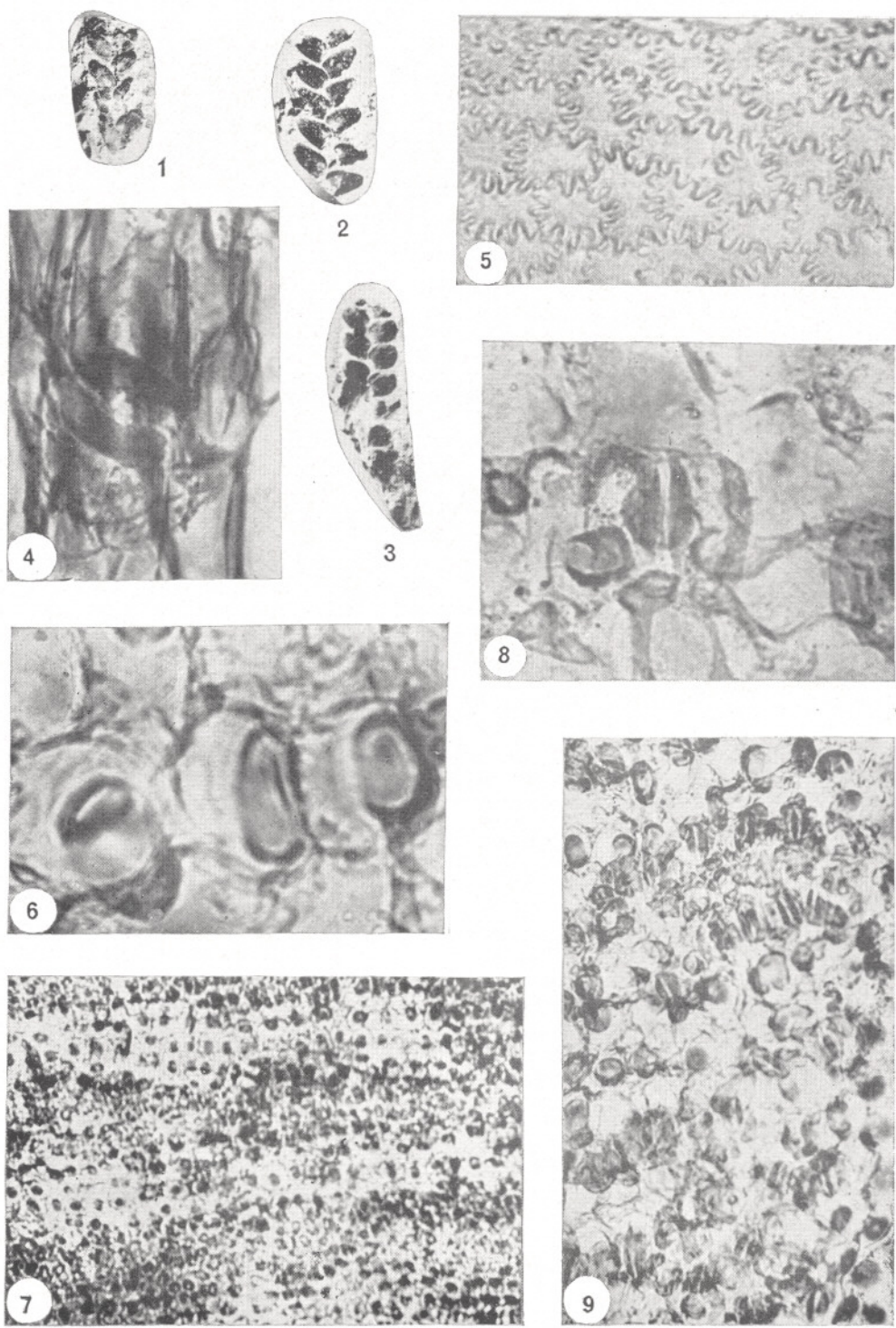


PLATE 1