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# *Handapaphyllum*—a new leaf type from the Upper Permian of Orissa, India

Shaila Chandra & Kamal Jeet Singh

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A new genus *Handapaphyllum* is established for fan-shaped, petiolar leaves having symmetrically lobed and dissected lamina with 6-8 dichotomous parallel running veins from the Kamthi Formation of Handapa, Orissa.

**Key-words**—*Handapaphyllum*, Ginkgoalean leaf, Kamthi Formation, Upper Permian (India).

Shaila Chandra & Kamal Jeet Singh, Birbal Sahni Institute of Palaeobotany, 53 University Road, Lucknow 226 007, India.

## सारांश

उड़ीसा (भारत) के उपरि परमी कल्प से एक नई प्रकार की पत्ती—हंडपाफिल्लम्

शैला चन्द्रा एवं कमलजीत सिंह

उड़ीसा में हंडपा के कामथी शैल-समूह से प्राप्त सममित पालियों एवं विच्छेदित पत्रफलक से युक्त पंखाकार एवं पर्णवृन्तीय पत्तियों के लिए हंडपाफिल्लम् नामक एक नई प्रजाति स्थापित की गई है। इन पत्रफलकों में 6 से 8 तक द्विभाजी समानांतर शिरायें विद्यमान हैं।

GINKGOALEAN type of leaves, although not very common, are known from the Gondwana formations of India as well as from other Gondwana countries. The Permian Gondwana forms are referred to the genus *Ginkgophyllum*. Earlier these forms were placed under the genus *Psygmodiphyllum* and were recorded from the extra-peninsular region. The ginkgoalean leaves known from the Permian Indian peninsular region are placed under the genera *Platyphyllum* and *Gondwanophyton*.

The order Ginkgoales is represented in the Mesozoic formations of India by leaves assigned to the genera *Ginkgoites* and *Sidbiphyllites*.

## MATERIAL AND LOCALITY

The solitary specimen with its counterpart comes from fossiliferous beds of Kamthi Formation exposed in the Hinjrida Ghati Section (20° 58' : 84° 43') near Handapa, Dhenkanal District, Orissa and occurs on a compact buff-coloured clayey shale.

## SYSTEMATIC DESCRIPTION

### *Handapaphyllum* gen. nov.

*Diagnosis*—Fan-shaped, variously lobed, petiolate leaves; oppositely attached to the axis, apex broad, lobed, base cuneate, petiole narrow; veins erect, dichotomous, fanning out in the lamina without interconnections.

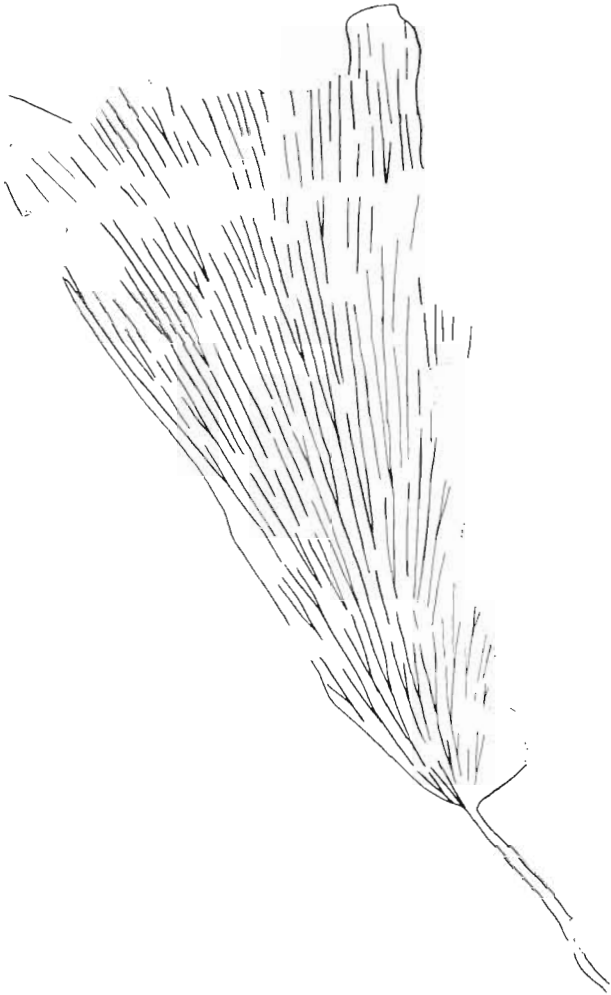
Type species—*Handapaphyllum indicum* sp. nov.

*Handapaphyllum indicum* sp. nov.

Pl. 1, fig. 1; Text-figs 1, 2

*Diagnosis*—Fan-shaped lobed petiolate leaves, lobes even, petiole long, slender, veins sparsely placed, erect and dichotomous.

*Description*—The specimen is 12.1 cm long. Four pairs of petiolate leaves are attached to a slender axis in an opposite manner at the nodes. It is difficult to say whether the leaves are superimposed



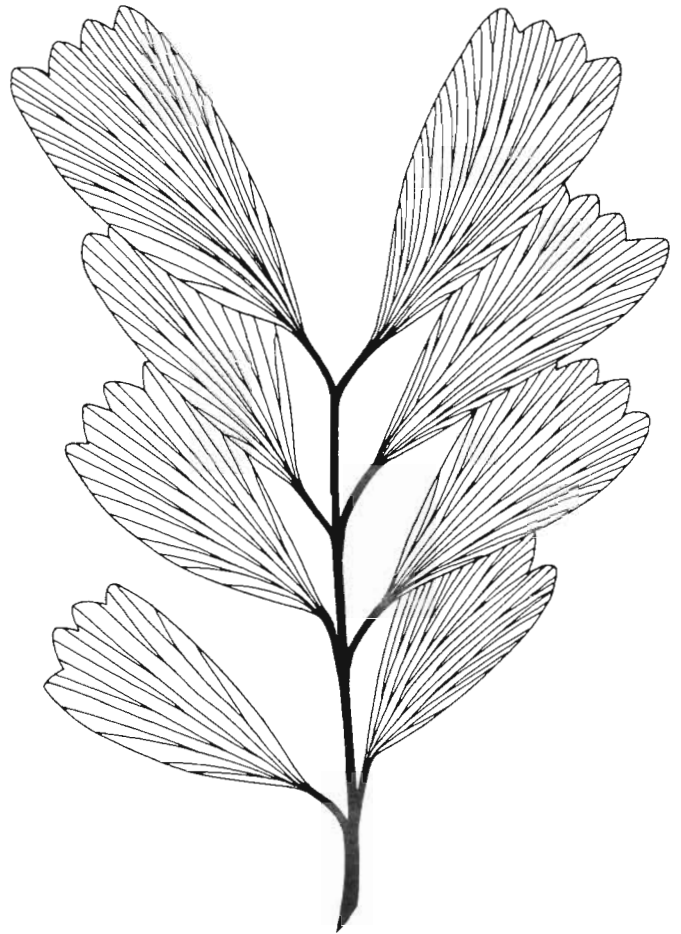
**Text-figure 1**—*Handapaphyllum indicium* gen. et sp. nov.: Single leaf drawn to show dichotomously divided erect veins, fanning out in the lamina without interconnections.  $\times 4$ .

or not, as the exact attachment point is not seen. The leaf is 2.5 cm at the broadest, petiole narrow and 1.2 cm long, apex broad and lobed and the base is cuneate. Nearly 6-8 veins fan out into the lamina of the leaf. Each vein dichotomises several times but never anastomose

*Holotype*—Specimen no. BSIP 35932.

#### COMPARISON

Of the three genera of ginkgoalean leaves known from Permian of India, *Ginkgophyllum* is characterised by leaves having lamina gradually passing into a narrow basal portion which is not



**Text-figure 2**—Reconstruction of *Handapaphyllum indicium*.

sharply marked off as a petiole. Moreover, the lamina may have an entire or irregularly cuneate margin or it may be divided by deep sinuses into wedge shaped segments, the divisions between the lobes do not extend to the base of the lamina (Maithy, 1974).

*Handapaphyllum* is essentially a petiolate leaf and there is no equal lobing of the lamina. Moreover, the leaves in *Ginkgophyllum* are spirally arranged on the axis while in *Handapaphyllum* the leaves are oppositely arranged.

Feistmantel (1881, 1886) reported *Rhipidopsis densinervis* Feistmantel and *R. ginkgoides* Schmalhausen from the Permian Gondwana of India. The type specimen of *R. ginkgoides* is misplaced or lost from the collection of the G.S.I. According to Maithy (1974) the type specimen of *R. densinervis* is

#### PLATE 1

1 *Handapaphyllum indicium* gen. et sp. nov.: Specimen showing axis with oppositely attached petiolate leaves having lobed

lamina.  $\times 2$ : Specimen no. BSIP 35932.



PLATE 1

without any small petiole as reported by Feistmantel (1881) and therefore he transferred this species to the genus *Platyphyllum*. *Handapaphyllum* is a petiolate genus and therefore, distinctly different from *Platyphyllum*. Maithy (1974) instituted the genus *Gondwanophyton* for certain fan-shaped, entire leaves with broadly rounded apex and truncate base. The leaves are nonpetiolate and alternately attached to the axis. We examined all the specimens kept at BSIP and found that our specimens are quite different from *Gondwanophyton*. Although the description on the basis of which the genus *Gondwanophyton* is instituted is quite different than what is actually seen. The apex is certainly not rounded and the lamina is not continuous, on the contrary one can easily see the definite lobing of the lamina. The Mesozoic ginkgoalean leaves from India are referred to the genera *Ginkgoites* or *Ginkgo* (Sitholey & Bose, 1974). The *Handapaphyllum* leaf differs from these in overall morphology and in the manner of attachment.

The genus *Sidbiphyllites* Srivastava 1984 has a fan-shaped leaf with lamina deeply segmented,

almost reaching up to the base. It has obtuse apex and entire margin. Cuticular structures of this genus are also known.

It is evident from the above comparison with the known Gondwana ginkgoalean type of forms that the newly instituted genus *Handapaphyllum* is a distinct and characteristic leaf form.

#### REFERENCES

- Feistmantel, O. 1881. The fossil flora of the Gondwana System. The flora of the Damuda and Panchet divisions. *Mem. geol. Surv. India Palaeont. indica* 3(3) : 77-149.
- Feistmantel, O. 1886. The fossil flora of the Gondwana System-2. The fossil flora of some of the coalfields in western Bengal. *Mem. geol. Surv. India Palaeont. indica*, ser. 12, 4(2) : 1-71.
- Maithy, P. K. 1974. Studies in the Glossopteris Flora of India-41. *Gondwanophyton* gen. nov. with a revision of allied plant fossils from the Lower Gondwana of India. *Palaeobotanist* 21(3) : 298-304.
- Sitholey, R. V. & Bose, M. N. 1974. Mesozoic Ginkgoales, pp. 210-211 in Surange, K. R. et al. (eds)—*Aspects & Appraisal of Indian Palaeobotany*. Birbal Sahni Institute of Palaeobotany, Lucknow.
- Srivastava, S. C. 1984. *Sidbiphyllites*: A new ginkgophytic leaf genus from the Triassic of Nidpur, India. *Palaeobotanist* 32(1) : 20-25.