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UTKALIA DICHOTOMA GEN. ET SP. NOV.— A FOSSIL FRUCTIFICATION FROM THE KAMTHI FORMATION OF ORISSA, INDIA

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ABSTRACT

Utkalia dichotoma gen. et sp. nov. is a possible seed bearing fossil fructification. The main axis of the fructification is dichotomously branched, each dichotomy bearing mostly alternatel atral branches. The lateral branches further dichotomize and the altimate branches bear seeds singly.

Key-words — *Utkalia*, Pteridosperm, Fructification, Kamthi Formation, Upper Permian (India).

सारांश

उत्कलिआ डाइकोटोमा नव वंश व नव जाति : उड़ीसा (भारत) के कामथी शैल-समूह से एक फलनाश्म – शैला चन्द्रा

उत्कलिआ डाइकोटोमा नव वंश व नव जाति कदाचित् एक बीज उत्पादक फलनाश्म है। इसकी मुख्य अक्ष द्विभाजी शाखित है। प्रत्येक द्विभाजी शाखा अधिकतर एकान्तर पार्श्व शाखाओं को जन्म देती है। इन पार्श्व शाखाओं का फिर एक बार द्विभाजन होता है तथा इस प्रकार बनी प्रत्येक अन्तिम शाखा एक बीज में परिवर्तित हो जाती है।

INTRODUCTION

SEVERAL sporangia and seed bearing fructifications were described from the Kamthi Formation in Handappa Village belonging to Dhenkanal District of Orissa (Surange & Maheshwari, 1970; Surange & Chandra, 1973, 1974 in a series of papers). The seed bearing genera so far reported from this locality are *Partha*, *Denkania*, *Lidgettonia*, *Indocarpus*, *Scutum* and *Cistella*. Of these fructifications, some are found attached with *Glossopteris* leaves while others in detached condition and accordingly their affinities are related.

In the present paper a new type of seed bearing fructification is described and its affinities and relationships are discussed.

Genus — *Utkalia* gen. nov.

Type Species — *Utkalia dichotoma* gen. et sp. nov.

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

Diagnosis — Main axis dichotomously branched, primary branches giving out mostly alternate branches on either side, each alternate branch repeatedly dichotomizing, each ultimate branch bearing a single terminal seed-like body without any scale or bract.

Description — There are four specimens in the collection. They are brown impressions on a buff coloured hard, fine grained, clayey shale. One of the most complete specimens with its counterpart is best preserved. The main axis is 3 cm long and 1 mm broad. Each dichotomy is about 3.5 cm in length and has 10-15 mostly alternate branches which further dichotomize once or several times (Pl. 1, fig. 1). Each ultimate branch bears a single terminal seed-like body without any scale or bract between them. The seed-like bodies are unwinged, 2.5 mm long and 1-1.5 mm broad (Pl. 1, fig. 2).

I have every reason to believe that these fruiting bodies are seeds. This is suggested by the facts that (i) these excellently preserved seed-like bodies are of the same size as the numerous scattered seeds found eleswhere on the shales in abundance, (ii) the sporangia so far known from the

TEXT-FIG. 1 — Actual specimen drawn to show the dichotomy of the main axis and the manner of seed attachment on the ultimate branchlets, × 2.

Glossopteris flora are different in shape and much smaller in size.

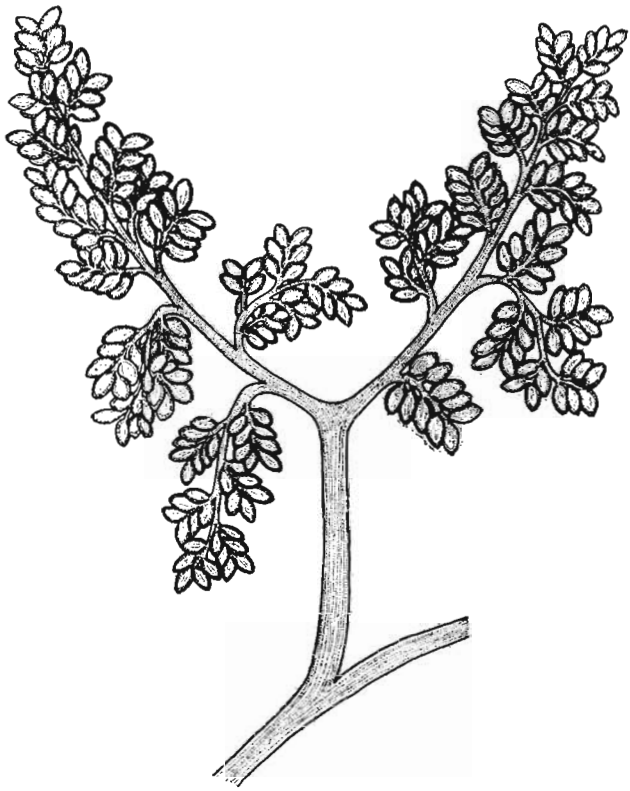
Holotype — B.S.I.P. specimen no. 35470.

Horizon — Kamthi Formation, Upper Permian.

Locality — Near Handappa Village, Hinjrida Ghati, Dhenkanal District, Orissa, India.

Comparison — *Utkalia dichotoma* gen. et sp. nov. is unlike any fructification known so far in the *Glossopteris* flora. The only comparable genus is *Wankiea*, instituted by Lacey and Huard-Moine (1966) from the Karroo flora in the Wankie District of southern Rhodesia. *Wankiea bondii* is a seed bearing fructification consisting of longitudinally striated axis bearing lateral branches of at least two orders probably pinnately arranged. The ultimate branchlet form lateral clusters where each one of the 4-6 branchlet ends in an ovate seed-like body. According to Lacey and Huard-Moine (1966) the manner of seed attachment was not clear but they thought that the seeds were possibly borne on a peltate expansion or the scale-like extensions of the branchlets. *Utkalia* is distinct and different from *Wankiea* in having a dichotomous primary branching of the axis and singly borne terminal seeds on the ultimate branches.

Delevoryas and Gould (1971) described an unusual fossil fructification from the Jurassic of Oaxaca, Mexico and named it as *Perezlaria oaxacensis*. This fructification had branches arising from all sides, some laterals once forked, bearing short appendages usually tapering distally, each with 5-8 sac-like bodies borne in a whorl at the apex. The genus *Utkalia* is distinct in having dichotomous branching system and singly borne terminal seeds. Moreover, the authors have interpreted these sac-like bodies as the sporangia showing dehiscence line. *Nystroemia pectiformis* Halle (1929) described from the Permian of China is



TEXT-FIG. 2 — Restoration of *Utkalia dichotoma* gen. et sp. nov. drawn on the basis of specimen no. 35470, × 2.

based on portions of a branch system that has the general organization of a fern frond. The ultimate subdivisions divide several times, each branchlet terminating in a small two horned body about 3 mm long that is presumed to be a seed.

Thus, apart from some similarities with the known fructifications like *Wankiea* and *Perezlaria*, the differences are pronounced enough to distinguish *Utkalia dichotoma* from any other known fructification.

Derivation of the Name — The genus is named after the ancient State Utkal which is presently known as Orissa.

Affinities — it is interesting to speculate with available evidences about the relationship of *Utkalia dichotoma*. In the same assemblage I found the vegetative forms of lycopods, Equisetales, Sphenophyllales, Filicales, cycads and glossopterids. The present fructification on the basis of its peculiar organization and possible seed bearing nature could belong to some gymnosperm. Due to the lack of any associated sporophyll it seems quite reaonable that this fructification has pteridospermous affinities. From the same assemblage we have already described a number of pteridospermous fructifications like *Partha*, *Denkania* and *Lidgettonia* and *Utkalia* is one more type added to the list. Actual connection or at least some more reliable circumstantial evidences will be required before we can be sure of its affinities with a particular leaf genus.

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EXPLANATION OF PLATE

(The specimen is deposited at the B.S.I.P. Museum)

1. *Utkalia dichotoma* gen. et sp. nov. — Specimen showing dichotomous axis, each dichotomy bearing mostly alternate branches on either side. Holotype no. 35470. × 3.
2. A portion of above specimen enlarged to show the nature and attachment of seed. × 8.

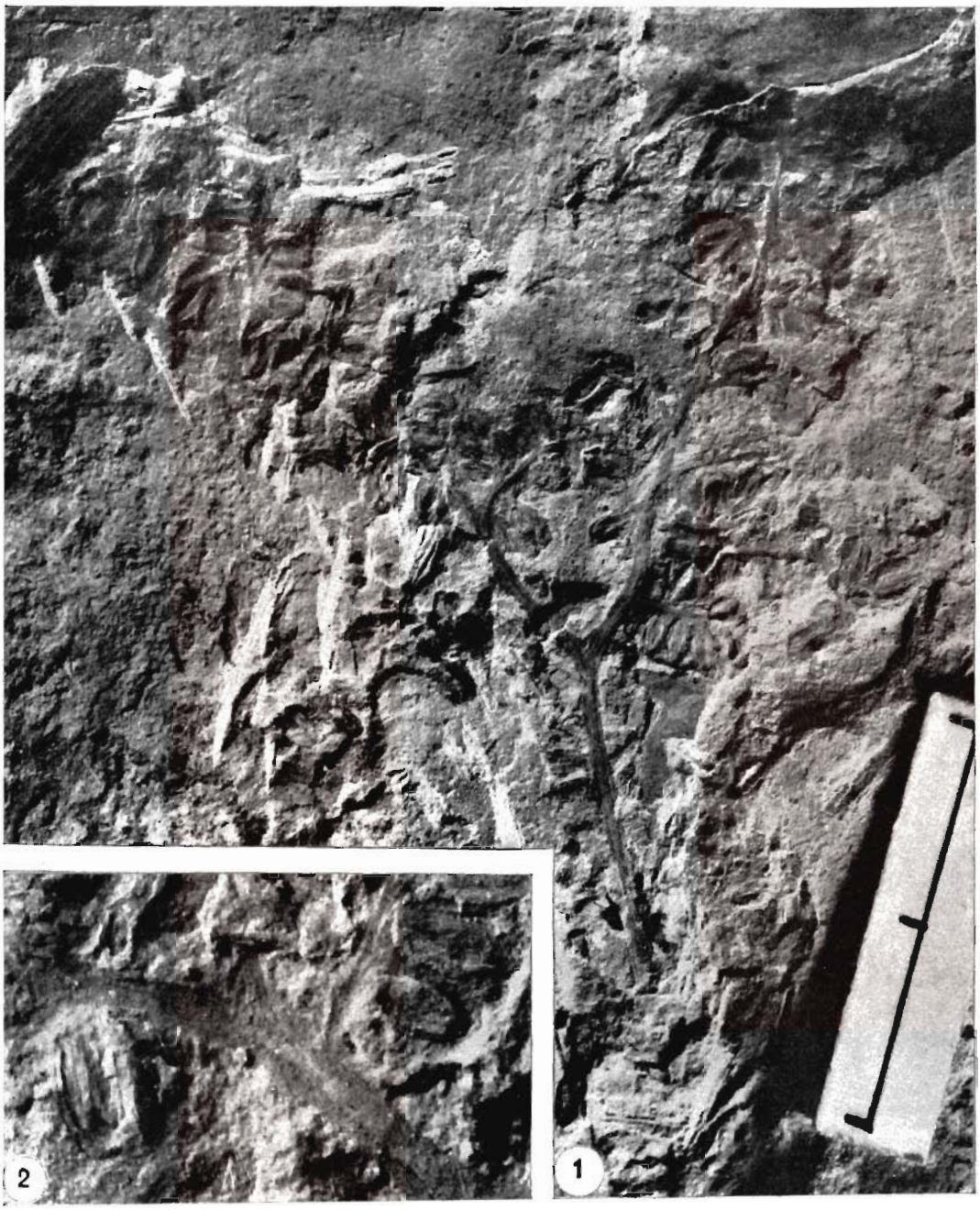

PLATE 1