

Table 2.

Antioxidant	ED ₅₀ (mg/ml)
Tea	0.28
Vitamin E	2.60
Parabenzquinone	0.06

These data are best representative of six separate experiments

identical conditions. From the literature, it seems that a cup of tea contains 50 mg of caffeine and 1 mg theophylline¹¹, but *in vitro* experiments show that ED₅₀ value for tea is 0.28 mg (prepared as described above), which is equivalent to 2.6 mg of vitamin E and 0.06 mg of parabenzquinone for its anti-lipid peroxidative property.

Based on these observations, it could be concluded that low intake of tea will prove to be a good antioxidant without showing any adverse effect such as psychic dependence, habituation, hyper-

central nervous stimulation, myocardial stimulation and gastrointestinal irritation. Tea can be claimed as a prophylactic measure for free radical diseases. Based on clinical findings it is suggested that tea be taken after intake of some food to avoid gastric irritation.

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A Cretaceous belemnoid from Palar basin, southern India

Palar basin forms an intermediate one between the Cauveri and Krishna-Godavari basins in the southern part of India¹. The possibility of the occurrence of coal in this basin has attracted drilling and other exploratory methods to study the rock sequence here. The basic palaeontological research was chiefly aimed at the study of commonly found megafloora and mioflora from this basin²⁻⁴. Stoliczka⁵ and Misra and Gupta⁶ described a few invertebrate fossils and Murthy and Sastri^{7,8} reported foraminifera, suggesting Lower Cretaceous age. The present note deals with the find of a belemnoid and its bearing on the age of the beds.

A number of belemnoid specimens were collected at different levels from a borehole (PBSD-2 near Virapuram, 13°10'N; 80°05'E) drilled in Palar basin by the Geological Survey of India. An ammonoid *Pascoites crassus* Spath was also recovered. The stratigraphic interval from where these specimens have been recovered is assigned to Avadi Formation dating to Upper Gondwana, which is the marine equivalent of Sriperumbudur

Formation⁹.

The present find of belemnoid guard is significant in that it is the first report of belemnoid from Palar basin. The guards are short and stout, terminating at an acute apex (Figure 1). The outline is symmetrical and slightly hastate. The maximum inflation is around mid-length. The surface is smooth with no visible markings on it. The phragmocone is complete, short and ventral in position. These characters reveal the specimens to belong to the genus *Peratobelus* Whitehouse¹⁰. The species *Peratobelus australis* (Phillips)¹¹ from Australia is closely allied to these specimens from India.

Genus *Peratobelus* has been reported from the Aptian of Antarctica, Australia and Mozambique in Africa (three members of the pre-breakup Gondwanaland)^{12,13}. The present find adds India to the list of occurrences of this genus. Thus, the discovery of species belonging to *Peratobelus* demonstrates the beginning of uninterrupted distribution of belemnoids in the Aptian of Gondwanaland and this trend continued in Albian times also (see

Doyle¹⁴ for the distribution of Albian belemnoids in Gondwanaland). This find further indicates that the age of Avadi Formation in Palar basin is Aptian. The outcrop samples that have earlier formed the basis for age determination are apparently younger than the borehole samples. Considering that the borehole was drilled to the west of the fossil localities known earlier, it would be appropriate to assign the age of Sriperumbudur/Satyavedu/Avadi Formations to Aptian age. It is also possible to extrapolate this (Aptian) age to other coastal Gondwana outcrops, viz. Sivaganga, Uttattur, Budavada, Gollapalli and Raghavapuram, where megafloora, mioflora and ammonoids identical to those found in Palar basin have been reported¹⁵.

The belemnoid specimen in Foote's collection (No. G 282 of GSI, labelled as *Belemnitheuthus* cf. *conotheca*, presumably the same as that mentioned by Pascoe¹⁵) is much obliterated and obscure and is not in any way comparable with *Belemnitheuthus conotheca*. The belemnite collections¹⁶ made in the first half of this century deemed to be questionable

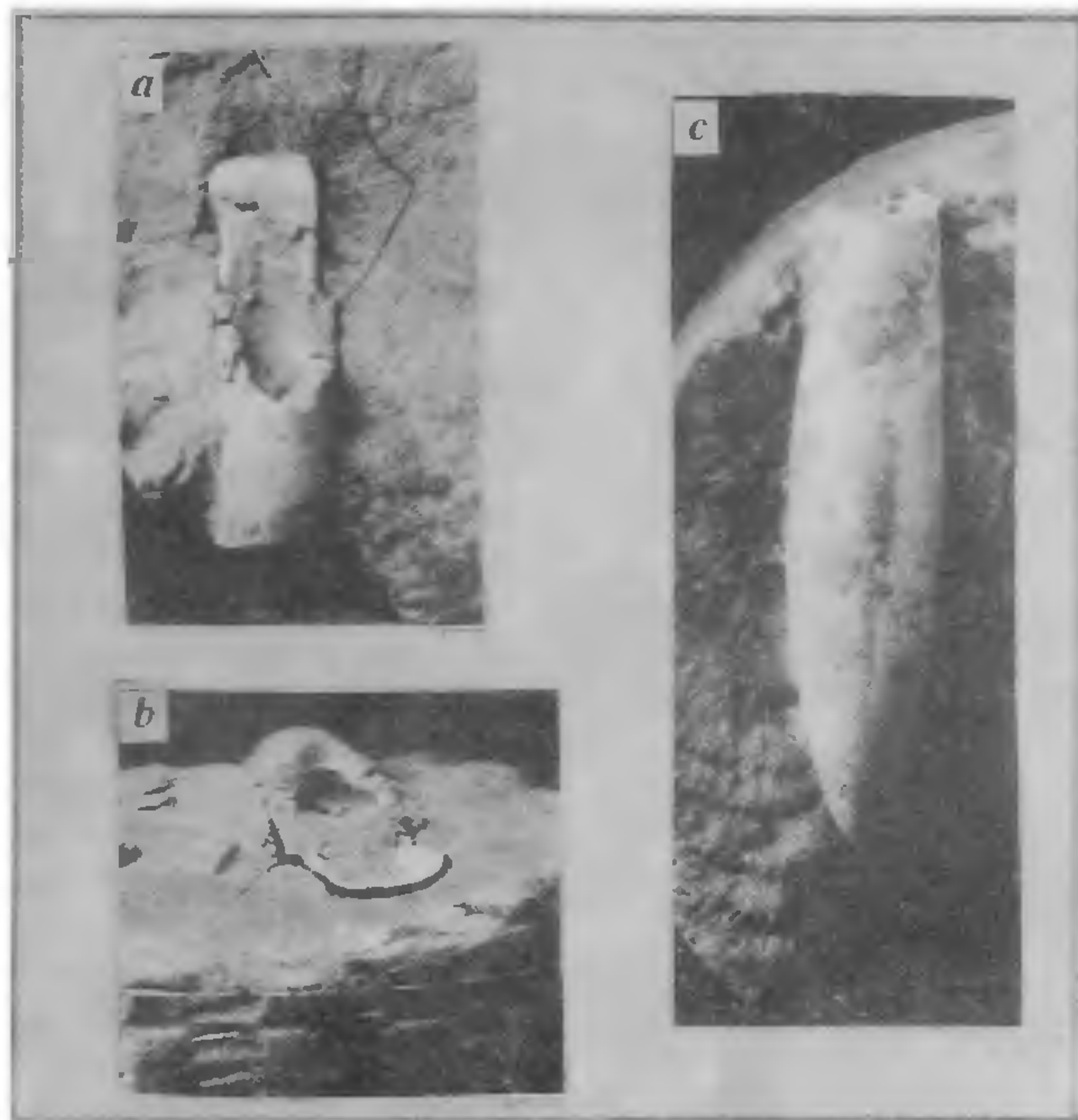


Figure 1. a, b, Specimen preserved with phragmocone c, Another specimen showing the apex

for want of confirmation. Hence, the present find of species of *Peratobelus* Whitehouse of Aptian age is the first authentic report of belemnoid from the Upper Gondwana sediments occurring along the southeastern coast of India.

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'i's right!

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The interdigitated tetraplex model of DNA with cytosine repeats has recently received crystal structure confirmation^{1,2} from the group of Alexander Rich at the Massachusetts Institute of Technology.

This 'i' (for 'intercalated') motif consists of two pairs of oligocytosine strands. Each strand of a pair is hydrogen-bonded to the other, parallel, strand by means of C-C* base pairing. The two pairs are intercalated to form the tetraplex (Figure 1). Since the base pairing scheme requires the cytosines to be hemi-protonated, the

structure is observed at low pH.

The first observation of the 'i' motif came from NMR studies³ on the oligonucleotide d(TCCCC) at pH 4.3. The structure consisted of twelve intercalated base pairs, including two possible T-T pairs. On the NMR time scale, a 222 symmetry was seen in the structure, which implied that the two interdigitated duplexes were anti-parallel to one another. The tetrad as a whole had a right-handed helical twist of about 16° between base pairs belonging to the same duplex. The

cytosine-cytosine base pairs were evidenced by lack of significant exchange broadening of the imino protons. Interpretation of the NOESY spectra led to the intercalated model for the base stacking. Similar results were reported by the same group for several other oligos with continuous stretches of cytosine bases.

Nothing under the sun, of course, is entirely new, and aspects of the 'i' motif have been suggested earlier. Parallel duplexes containing C-C* base pairs were constructed to explain the fibre diffraction