closing its nuclear option. In fact, its present policy of 'nuclear ambiguity' (a more accurate term would be nuclear abstinence) appears to be the minimal nuclear posture consistent with the adversarial scenarios facing Indian defence planners.

No effort at non-proliferation can succeed only on the wishes and good intentions of its proponents Any serious effort must take into consideration political realities, defence needs and public perceptions of these needs. Does this mean that non-proliferation is not possible today? No. It does mean that *non-proliferation will be possible only when the NWPN are all persuaded or pressurized to adopt minimal 'non-initiatist nuclear deterrence postures'*. An important corollary of the above analysis is that the condition precedent for a non-proliferation treaty is a preliminary treaty of a different kind: a 'nuclear non-initiation treaty' (NNIT). In such a treaty, each signatory agrees not to initiate in any way, the use, or the threat of use, of nuclear weapons.

Such a treaty would forbid the use, or a threat of the use of NW against non-nuclear nations. It must also be noted that immediately after such a treaty, all nuclear weapons of first use, including the so-called 'tactical nuclear weapons' would become redundant, and would have to be eliminated. These are precisely the most destabilizing weapons which have so far been excluded from agreements between the USA and USSR/Russia.

It is necessary to mobilize public opinion, especially opinion in the NWPN and potentially nuclear nations in favour of this enabling treaty. International pressure of the peace movement, of scientists, etc., must be directed towards making a NNIT as point number one on the international non-proliferation agenda, including the agenda of this conference/ workshop.

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SCIENTIFIC CORRESPONDENCE

Tea – A strong antioxidant

Tea leaves (*Camellia sinensis*), of the family Ternstroemiaceae, a popular beverage, is in use since centuries. As per ancient belief, it has stimulant and antisoporific action that elevates mood, decreases fatigue, increases the capacity to work and clears the flow of thoughts. In some societies, drinking tea has become a part of life[1]. The morning cup gives a feeling of well-being and increased performance. The people are more or less habituated to the same[2]. Because of dependency and side-effects of excess intake of tea and other xanthine beverages (coffee, cocoa, etc.), its use is discouraged by many people However, this report indicates its strong antioxidant and antilipid peroxidative properties and advocates its optimal use, which varies from individual to individual.

Tea leaves were boiled in water for 1–2 min as routinely prepared in the kitchen and cooled. The filtered extract exhibited concentration-dependent inhibition of lipid peroxidation (measured as thiobarbituric acid reactive products) in rat liver homogenate incubated with either enzymatic (ADP-complexed iron) or non-enzymatic ($FeSO_4$) radical-producing system[3,4] (Table 1) In brief, 5% liver homogenate was incubated with tea liquire for 20 min in 35 mm Petri dishes. Thereafter, lipid peroxidation was induced by adding different agents. After 20 min, 0.1 ml of incubation mixture was taken to estimate MDA by using thiobarbituric acid and absorbance was recorded at 535 nm as reported by us earlier[5,6]. Tea liquire of different concentrations ranging from 0 6 g/100 ml to 5 g/100 ml were prepared and tested. Tea exhibited dose-dependent protection. It also maintained the level of reduced glutathione content, which was measured at 412 nm by using 0.01% DTNB[7], and checked the ongoing lipid peroxidation process (data not shown).

Thus, it appears that besides other reported activities of stimulation[8], tea is a strong inhibitor of lipid peroxidation induced by free radicals. This observation is supported by the previous observations that caffeine is anti-inflammatory and it interferes with the synthesis of prostaglandins[9]. Besides methyl xanthine, there are several compounds such as carotene, nicotinic acid, kaempferol, quercetin, myricetin, flavonols, inositol, polyphenols, chlorogenic acid, etc., which are present in tea and have been found to be antioxidant[10]. On comparison with known antioxidants like parabenzoquinone and vitamin E, tea is found to be significantly active (Table 2). ED_{50} for all the three agents are determined by using the dose–response curves for these agents under

Table 1. Protective effect of tea against induced lipid peroxidation

Dose of tea (mg/ml)	Conc. of liquire (g/100 ml)	TBARS (nm/100 mg protein) mean ± SD	
		$FeSO_4$	ADP–iron
0 00	0.00	474 98 ± 9 60	480 67 ± 9 30
0 05	0 60	438 00 ± 9 96	421 02 ± 9 60
0 13	1 60	372 59 ± 8 98	357 21 ± 7 92
0 27	3 30	250 29 ± 9 66	245 14 ± 8 65
0 41	5 00	193 40 ± 8 86	177 84 ± 5 50

$FeSO_4$ = 4 mM
ADP-complexed iron = 1 6 mM ADP + 62 µM $FeCl_3$

Table 2.

Antioxidant	ED_{50} (mg/ml)
Tea	0 28
Vitamin E	2 60
Parabenzoquinone	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 theophylline[11], but *in vitro* experiments show that ED_{50} 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 parabenzoquinone 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 India[1]. 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 megaflora and mioflora from this basin[2–4]. Stoliczka[5] and Misra and Gupta[6] 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 *Pascoeites 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 Formation[9].

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* Whitehouse[10]. 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 Doyle[14] 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 megaflora, mioflora and ammonoids identical to those found in Palar basin have been reported[15].

The belemnoid specimen in Foote's collection (No. G 282 of GSI, labelled as *Belemnotheuthis* cf. *conotheca*, presumably the same as that mentioned by Pascoe[15]) is much obliterated and obscure and is not in any way comparable with *Belemnotheuthis conotheca*. The belemnite collections[16] made in the first half of this century deemed to be questionable