earlier times (and originally disposed of as experimental error) seems to assume significance in the light of the above findings. A parallel line of argument has been advocated[11] to substantiate the contention that, in compiling the space group frequency tables on organics, all the space groups in their entirety need to be presented and documented in terms of observed structures and their space group preferences. There is no reason to suppose that there will not be found eventually an asymmetry in the distribution of frequency preferences among chiral structures even among chiral space groups, although currently the data are inadequate to analyse and draw positive conclusions thereon.

The question of understanding what 'framed our fearful asymmetry' is thus not restricted to the study of gegen-eins alone but to a larger range of materials both organics and inorganics. The probability that life, if found elsewhere, is based on L-amino acids and D-sugars is sufficiently strong. It might be added here while the above observations are to emphasize the plausible and highly probable reasons for preference of L-forms of life on the Universe, the significance of the total synthesis of the D-protein and its implications as discussed by Petsko[1] and Milton *et al.*[2] are in no way diminished.

It may not be out of place to point out that Petsko's enunciation of condition of chirality (non-superposibility of an object over its mirror image) should read as 'lack of centre of inversion or mirror' and not include 'axis of symmetry'. Chirality implies automatically the presence of any n-fold rotation axis (including $n=0$, absence of any symmetry axis) and indeed is responsible for chiral behaviour in a large number of cases.

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Editor's note

Two recent reports describe the synthesis of enantiomorphs of proteins. S. B. H. Kent's group at the Scripps Research Institute, La Jolla has synthesized the all D analogue of the HIV-1 protease (99 residues)[1], while L. E. Zawadzke and J. M. Berg of Johns Hopkins University, Baltimore report the preparation of all D rubredoxin (45 residues)[2]. This flurry of recent activity in the synthesis of all D proteins may have been stimulated by the rather enigmatic suggestion that present day synthetic methodology should be employed to produce *racemic* crystals of proteins, which would then occur in centrosymmetric space groups, resulting in a simplification of the problem of phase determination[3]. Among the intriguing possibilities considered in ref. 1 are the probable absence of an immune response to all D proteins, the potential use of enzyme enantiomers in production of chiral fine chemicals and the therapeutic applications of a proteolytically stable D-enzyme that operates on an achiral substrate (cf. carbonic anhydrase).

Finally, Srinivasan's correction (above) of Petsko's enunciation of the chirality condition is probably necessitated by an error where the phrase 'axis of symmetry' has been used instead of 'improper (rotation–reflection) axis of symmetry'[4].

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Poredam urn burial—A Chalcolithic culture

Prehistoric cultures in Kerala include the Palaeolithic, Mesolithic, Neolithic and Megalithic, and their occurrences have already been recorded from various places in Kerala[1]. In recent years, since 1988, eight Megalithic sites, one Neolithic site and a Mesolithic site have been discovered from South Kerala. Two urn burial sites, discovered one each at Poredam near Chadayamangalam in Quilon district and at Chenkalthadam in Malayalappuzha in Pathanamthitta district, have yielded child fossil bones from within the potteries. The other material cultural evidences obtained from Poredam consist of several red ware and micaceous grey ware potteries along with a few number of small black-and-red ware pots and a few iron implements (Figure 1).

The fluorine test was carried out on the child fossil bones from Poredam. This test is often used for relative dating purpose. The element fluorine occurs in almost all groundwaters and is gradually absorbed in buried bones. The fluorine content thus increases with passage of time in the buried bones. Hence its amount is more in the older bone than that in the younger bone and its determination is useful for relative dating. Oakley[2] suggested to compare fluorine/phosphate ratio which is expre-

Figure 1. Black-and-red ware pottery and an iron axe collected from Poredam.

ssed as 100 F/P_2O_5. Bones from similar environment are compared. Chemical analysis of several bone samples from different geographical settings and belonging to Holocene as well as Pleistocene period from India has provided that the regional sequences of these ratios can be built up to get a clue about the relative age of bone sample[3].

Results of chemical analysis of bone sample from Poredam shows the following: fluorine (F), 0.03%; phosphorus (P), 7.5%; P_2O_5, 17.17; 100 F/P_2O_5, 0.175.

The Neolithic bone sample from Paiyampalli (Tamil Nadu) and that from Hunsgi (Karnataka) of the same period have 100 F/P_2O_5 ratios 0.262 and 0.22 respectively. These samples belong to almost similar environment and having a little higher ratio than that of Poredam. Therefore it can be concluded on the basis of this analysis that the burial seems to belong to the period which might be later than the Neolithic period. Secondly, the bones belonging to the Chalcolithic period from other regions like Inamgaon (Maharashtra), Pamapuram (Andhra Pradesh) and Jodhpura (Rajasthan) have the ratios 0.125, 0.21 and 0.166 respectively and are very near to the ratio in the bones from Poredam which probably denotes it as a Chalcolithic culture.

With this for the first time the prehistoric cultural continuity in Quilon district beginning from the Mesolithic to Neolithic, Chalcolithic and Megalithic has been established. The Tenmala Mesolithic rock-shelter habitational site in Quilon district has the absolute date by ^{14}C to 5210±110 BP[4]. In India the Chalcolithic phase is approximately dated between 1000 and 2000 BC, while in South India, particularly in Karnataka and Kerala, the Megalithic culture has been dated around 1000 BC.

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Occurrence of giant Stegodon tusks from Narmada Valley, India

The present note records the occurrence of longest pair of *Stegodon namadicus* tusks from Dhansighat (22°50'27": 77°52'00"), Hoshangabad district, Madhya Pradesh, India (Figures 1 and 2).

The Quaternary deposits of Narmada[1], Ganga[2] and Godavari[3] valleys, Sayamalai area of Madras[4] in Peninsular India as well as Pinjor Formation[5] of Siwaliks, NW India have occasionally yielded the 'Stegodon' fossils in the past.

A new species of Stegodon named *Stegodon namadicus* was reported from alluvial quaternary deposits of Narmada valley in Dhansighat, Hoshangabad district, Madhya Pradesh[6]. Two fragmentary tusks detached from the skull; one tusk having a preserved length of 390 mm was reported[6].

On 21 December 1991, from the said locality, an almost complete left tusk of *Stegodon namadicus* measuring 3225 mm in length weighing 137 kg and a broken right tusk measuring 1350 mm in length attached with part of skull with portion of molar teeth were found by the author, which were later excavated on 2 January 1992 under the guidance of S. Biswas of the Geological Survey of India. The tusks being highly friable were first wrapped in papers, cotton and then coated with plaster of paris to form capsules. These were then shifted to the District Archaeological Museum at Hoshangabad where plaster of paris, cotton and paper wraps were removed.