a random process can generate all these *without any alterations. Thus, it* appears that 'dice throwing' (a random process) can generate all that is seen in nature, including all the 'yes' patterns, while an orderly process has limited consequences. *The world of randomness can be exhaus*tive while that of orderly processes cannot be unless there are as many underlying processes as there are orders. And if the simplest of the explanation could be the best, we might have to consider randomness as a more powerful process than science considers it to be.

Let us consider an imaginary planet 'Binearth' in which all the 'Binets', the four-segmented organisms are created randomly from binary digits 0 and 1. If one *considers all the possible combinations* (see below) and classifies them as 'good' or 'poor' patterns then clearly, a majority of them fall into the 'good' category (though the decision on some of them might be contested, a sample of 25 postgraduate students indicated certain categorization from which a common consensus could be developed); clearly, 75% of these sequences (12 of the 16 marked bold below) can be shown to have some pattern. In fact, it is possible to argue reasonably as to why these are non-random.

0000	**0001**	**0011**	**0111**	**1111**	**1000**
1100	**1110**	**1010**	1011	**1001**	**0110**
0101	0010	0100	1101		

Now let us imagine that only a fraction of these patterns have survived on this planet Binearth purely by a random *process such that still 75% of them are* non-random. Let us say a biologist from earth happens to study this planet and addresses the question 'is the arrangement of the segments in the life forms on Binearth regulated by any orderly process?'. He is obviously likely to conclude wrongly that life on this planet is not a consequence of random creation because among those alive there is a *greater proportion representing non-ran*dom arrangement of 0s and 1s. This is *especially true if the process of extinction* has lead to a random drift towards bias in the patterned organisms such that the percentage of the patterned organism is more than that expected purely by a random process. Obviously, these scientists would be even reluctant to think of randomness as a force generating the order seen in that planet.

It is clear to see that while the orderly *process would, in fact, limit the diversity* of the life forms, the random process *results in a wide range inclusive of the* non-random forms. The world of the random processes is more diverse and all-encompassing than that of an orderly process. Thus, if God likes to create diversity, he shall rather go for a random than for an orderly world. In fact, from an orderly world it is possible to eliminate randomness whereas it is difficult to eliminate order from a random world. This is reflected from the Ramsey theory.

On the 'Ramsey theory', Graham and Spencer[4] wrote thus: Fran Plumton Ramsey proved that complete disorder is an impossibility. Every large set of numbers, points or objects necessarily contains a highly regular pattern. Constellations and such patterns are implicit in any large structure, whether it is a group of stars, an array of pebbles or a series of numbers *generated by throws of a die. Given* enough stars, for instance, one can always find a group that very nearly forms a particular pattern: a straight line, a rectangle or for that matter a big dipper. In fact, the Ramsey theory states that any structure will necessarily contain an orderly substructure . . . implies that complete disorder is an impossibility.

Could it be that a scientist sitting in such a random world is myopic for all *the random part of it and only concentrates* on the non-random component? That would be a tall claim. It is, however, likely that world could certainly be more random than we think it to be and the *basic instinct of science to look for pat*terns for its own survival might be biasing our view of the world to be highly orderly. Finally, I am aware that the views expressed here are certainly highly personal and to borrow the words of Dr. S. Chandrasekhar,

'I am clearly treading on dangerous ground. But it does provide me the opportunity to draw attention to a fact which has been a source of considerable puzzlement to me'.

– *S. Chandrasekhar*[1]

1. Chandrasekhar, S., *Truth and Beauty. Aesthetics and Motivation in Science,* Viking Penguin, New York, 1987.
2. Garner, W. R. *Am. Sci.*, 1970, **58**, 4–42.
3. Berg, H. C., *Random Walks in Biology,* Princeton University Press, New Jersey, 1983.
4. Graham, R. and Spencer, J. H., *Sci. Am.*, 1990, **263**(1), 80–85

ACKNOWLEDGEMENTS. This article is an outcome of the talk given during Avalanche-III meeting. I thank the members of Tuesday Group, Drs N. V. Joshi and M. K. Chandrashekar for their comments and suggestions on the ideas expressed here.

K. N. Ganeshaiah is in the Department of Plant Genetics and Breeding, University of Agricultural Sciences, G. K. V. K., Bangalore 560 065, India.

SCIENTIFIC CORRESPONDENCE

Comments on 'Jasra–ultramafic–mafic alkaline complex: A new find in the Shillong Plateau, northeastern India' (*Curr. Sci.*, 1994, 66, 64–65)

I have the following comments on the above paper.

1. Authors describe pyroxenite as the *dominant rock unit of the complex* (Abstract & Figure 1). Further, bulk of these are found to be 'coarse-grained with euhedral diopsidic augite as their dominant component with sphere, calcite, rutile and perovskite . . .' (para 3 of the text). *The analyses of the two representative* pyroxenite samples depicts 33 82 and 38 82% SiO_2 and total iron nearly three times the MgO content (Table 1 of the paper). There are two major inconsistencies in the reported representative analyses. Pyroxenite has an average of 46.27% SiO_2, which is significantly higher than that reported for the Jasra pyroxenite.

These rocks are described to be made up of 90% or more (by definition) of diopsidic augite Diopside is Ca–Mg pyroxene while augite can be considered an intermediate member in the diopside–hedenbergite series. Considering (a) the average chemical composition of these pyroxenes[2] and (b) the nature of rock (pyroxenite), the total iron content (and even FeO vs. MgO wt.%, which is > 1) in comparison to the MgO content does not tally with the described mineralogy. In this context it may be useful to note that Cameroon and Papike[3] suggested the usage of pyroxene names such as Mg–augite or Fe–augite and these adjectival modifiers found favour with the recommendation of subcommittee of IMA on nomenclature of pyroxene[4].

2. In a similar manner high iron content (FeO–0.40%; Fe_2O_3–4.87%) and relatively low MgO content (8.77%; Table 1) is reported for olivine gabbro, which has plagioclase and augite as major minerals (para 3 of the text). Olivine, in this rock, though constituting a minor mineral, depicts a very wide compositional range (Fo_{15}–Fo_{85}; method of determination not described). It may have petrogenetic significance as this preserved range of composition will necessitate a quickly reacting solidification sequence. It will be interesting to find out if zoning is present in plagioclase and other associated mineral phases and what its nature is.

3. Besides lacking in these details, some of the petrographic description is rather paradoxical. I quote; 'The alkali pegmatite is a coarse-grained, leucocratic rock composed mainly of titanomagnetite, clinopyroxene and nepheline' (para 4 of the text; lines 10–12). It is strange that in a leucocratic rock two of the three main minerals are dark-coloured.

The paper on the whole is a welcome addition to the growing awareness of alkaline mafic–ultramafic associations in the rather difficult terrain of Shillong Plateau, Mikir hills region.

1. Le Maitre, R. W., *J. Petrol*, 1976, **17**, 589–637.
2. Deer, W. A., Howie, R. A. and Zussman, J., *An Introduction to the Rock-Forming Minerals*, ELBS and Longman, 1978, pp. 105–123.
3. Cameroon, M. and Papike, J. J., *Am. Mineral.*, 1981, **66**, 1–50.
4. Morimoto, N. *et al.*, *Mineral. Mag*, 1988, **52**, 535–550.

N. C. PANT

Geological Survey of India
Project-3, Op. P. H. and H. P.
NH-5P, N. I. T.
Faridabad 121 001, India

A note on the Megalithic cultural remains from the cist burials at Arippa in Kollam District of Kerala, South India

Two cists burial excavations during May–June 1993 at Arippa in Kollam District of South Kerala (Figure 1) resulted in the discoveries of a large number of potteries, iron implements, ornaments of gold and copper, skeletal remains of humans and animals, a stone tool, and food materials (Figure 2). Ceramic types included various types of pots, bowls, cups, lotas, lids, wheel, etc. Iron implements included swords, daggers, sickles, hoes, rods and knives. Ornaments included three-slotted gold ear-rings and a copper bangle (Figures 3 and 4).

Figure 1. Site map.

The biological remains obtained during the excavation were found to be unique and included several pieces of adult human bones, cranium of a child, a few animal bones, and food grains. All the organic remains were found in various pots and bowls, which were filled either with fine soil or sandy soil, or both. The organic remains were highly decayed and calcretized due to the water logging at the depth of 2 m, where the materials were found. The wetness of the soil at the site is felt even during the summer season. Above all, the acidic medium of the soil in the trench is indicated by the high level (5–6%) of acidity which probably might have caused the poor preservation of the organic remains. This may be one of the reasons for the poor preservation or absence of bones in most of the Megalithic sites in Kerala. However, a good number of organic remains could be retrieved from the wet clay in the pots.