

The majority of the colouration is from varying levels of iron oxidation. As iron oxidises it turns yellow first, then with increasing oxidation becomes brown then red. Iron oxidation can be hindered by carbon (which is dark) so the bright colouration does not develop. However,

*'When clays containing carbon and iron are burned, as in brick-making, the carbon is burned up, thus freeing the iron to oxidise; and it forms its vivid yellow, brown, and red colours'*.<sup>4</sup>

They list the main sources for the primary colours as follows:

**White:** lime (in chalk or white limestone), sodas, borates, magnesium and potassium compounds, quartz, diatomaceous shale, alumina, kaolinite, talc — (all of these in the pure state).

**Black:** carbonaceous material from vegetation, manganese oxide, and other mineral compounds.

**Blue:** carbonaceous material, some copper-sulphur combinations, some silver compounds, and many minor sources.

**Yellow:** from sulphur in many forms, from the first step in iron oxidation, etc.

**Brown:** mixtures of greens and reds, also second step in iron oxidation.

**Red:** from complete oxidation of iron, and from many other mineral oxides and other compounds, all very much less in amount than iron.

**Green:** mixtures of yellows with blues, silver chloride, and blue carbonaceous material tinged with yellow iron oxidation, etc.

**Purple:** reds and blues mixed.

The authors note that they had written a thorough technical paper on rock colouration which they intended to publish, but evidently it never was. If anyone knows of the whereabouts of this work I'm sure it would make fascinating reading.

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## REFERENCES

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## THE ORIGIN OF LIFE

Dear Editor,

In reading the article 'The origin of life' (Aw)<sup>1</sup> I noticed the reference to Schidlowski's 1988 estimate of life's antiquity based on the ratio of <sup>12</sup>C/<sup>13</sup>C in rocks at Isua in Greenland,<sup>2</sup> held to be the oldest on Earth. Although Schidlowski's proposition was made years ago I was amused, nay disgusted, when in October this year this was presented on the media as if it was a conclusion scientists had only just reached!

Pflug, Jaeschke-Boyer and Sattler reported finding structures in the Swartkoppie cherts, South Africa, in 1979, similar in size, shape and formation to modern yeast cells.<sup>3</sup> The cherts are supposedly 3.4 Ga old, and the existence of yeasts in these rocks would push back the antiquity of eukaryotes by an alleged 2 Ga. The structures were not therefore initially presented as microfossils. Later that year Pflug and Jaeschke-Boyer reported similar structures in the metamorphosed rocks as Isua.<sup>4</sup>

Regarding the <sup>12</sup>C/<sup>13</sup>C proportions in the Isua rocks, Walters, Shimoyama and Ponnampuruma reported such as evidence of photosynthesis in the Isua deposits at a meeting of the American Chemical Society in autumn 1979.<sup>5</sup>

*'In a broadcast interview for the Sri Lanka Broadcasting Corporation in January 1980, Ponnampuruma was more positive: ". . . we have now what we believe is strong evidence for life on Earth 3,800 million years ago . . . we are now thinking, in geological terms, of instant*

*life...'*<sup>6</sup>

As Schidlowski's suggestion would mean that 'Almost from its beginning the Earth had life', the idea of this life being an immigrant from outer space seems to be growing in favour. Perhaps his conformist colleagues may follow Hoyle in discarding belief in evolution altogether in a decade or two from now?

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See pp. 2-4 of this issue for further comments and developments on these topics.

— Editor

## ARCHAEOASTRONOMY THEORY — IS IT THE PITS?

Dear Editor,

This *Perspectives* item<sup>1</sup> notes the findings of Linda Therkorn, University of Amsterdam, that pits dug at sites in the Netherlands in prehistoric times seem to be arranged to match certain familiar constellations (Taurus, Canis Major, Pegasus, Hercules). The item is based on a brief review of this work