hydrocarbon rings. Turin proposes that below a threshold of 400 cm^{-1}, the vibrational signal is swamped by 'background noise', so is not detected by the nose.

As different isotopes have different masses but similar chemical properties, they affect the vibrational energy. It can be seen from the formula for reduced mass that the biggest difference results from replacing hydrogen (A_r = 1) with deuterium (A_r = 2) — the numerator is doubled. Indeed, deuterated acetophenone smells fruitier than ordinary acetophenone ($C_6H_5COCH_3$). It also smells slightly of bitter almonds, just like many compounds containing the cyanide or nitrile group (ON) — both C-D and ON bonds vibrate at about 2200 cm^{-1}.

One challenge to Turin's theory is the different smells of some enantiomers (optical isomers), as they have identical vibrational spectra. For example, R-carvone smells like spearmint, and S-carvone like caraway. The answer is: the spectra are identical only in an **achiral** medium, as in solution or gas phase. But the smell receptors are **chiral** and orient the two enantiomers differently. This means that different vibrating groups lie in the tunnelling direction in each enantiomer. Turin thinks that the caraway S-carvone is oriented so a carbonyl (C=0) group lies in that direction, so is detected; in the minty R-carvone, it lies at right angles, so is ignored. Turin supported this by manufacturing a caraway scent by mixing the minty carvone with the carbonyl-containing butanone ($C_2H_5COCH_3$).

If Turin's theory were true, then infrared and Raman spectroscopy would be essential tools for the perfume industry! Turin is also using **inelastic tunnelling spectroscopy** — 'inelastic' refers to the energy loss before tunnelling, as with the proposed sensory mechanism.

The precise chemistry of olfaction is still little understood. But Turin believes he has found a sequence of amino acid residues that could function as the electron donor together with NADPH. He has also found five residues coordinated to a zinc atom that could be the acceptor site. One warning sign of zinc deficiency is loss of the sense of smell, and zinc is often involved in biological electron-transfer reactions.

Whether or not Turin's idea is correct, the olfactory system exhibits what the biochemist Michael Behe calls **irreducible complexity,**[6] and is therefore evidence of design. This means the system requires many parts for it to work, and would not function if any were missing. The chemical sensing machinery needs proteins with just the right shape to accommodate the odour molecules. And under Turin's model, the right energy levels as well. And even if the sensors were fully operational, the chemical information gathered by the nose would be useless without nerve connections to transmit it and the brain to process it.

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J. D. ***Sarfati***

Aboriginal Paintings 'Whodunnit'

In the remote Kimberley region of northern Western Australia, a group of rock paintings are causing a scientific and political controversy of international proportions. The paintings are collectively known as the 'Bradshaws', after a 19th Century explorer in the region. They feature delicate human figures *'exquisitely painted in mulberry-tree juice'* on sandstone[1] (see Figure 1).

The big furore turns on just who painted the Bradshaws, which, by current dating estimates, are assigned 'dates' of at least 17,000 years, ranging up to 60,000 years.

The Ngarinyin tribe claims that the paintings had to be made by their ancestors, and are a direct link to their cultural past. This is tied to land rights issues, which is what makes this more than a scientific dispute.

The counter claim is that the paintings are 'too good . . . too distinctive . . .' and portray too sophisticated a culture to have been painted by the Ngarinyin's ancestors. Proponents of this view are led by rock art enthusiast Grahame Walsh, who thinks they were done by a previous, totally different group of people. Bradshaw himself said it was almost like *'viewing the painted walls of an Egyptian temple'*.

By looking at the evidence put forward by both sides, a picture of great interest emerges in relation to the Biblical account of human dispersion after Babel. Before looking at the controversy further, let's first run through a Biblically-based scenario.

The catastrophic, supernatural

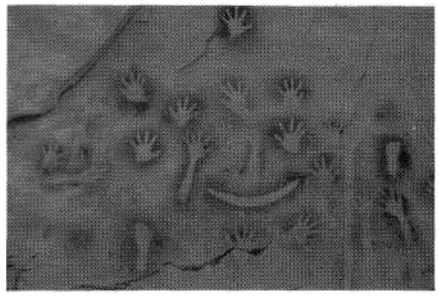

Figure 1. *Aboriginal paintings on a 'wall' of sandstone in Carnarvon Gorge, Queensland.*

dispersion at Babel was just the right genetic scenario to lead rapidly to the formation of daughter populations distinct in appearance. These were all closely related, but would have each carried a slightly different subset of the total gene pool, and remained in effective reproductive isolation from each other for thousands of years. Apart from the fact that each such group would have taken various subsets of the total technological 'know-how' at Babel, anthropologists have long recognised that small, rapidly migrating populations are the most likely to lose technology rapidly.

It is of interest that in general, groups such as the Australian aborigines which are the furthest from the original centre of dispersal appear to have had the greatest rate of such technology loss. There may even be a pattern that this is more prevalent the further south one goes, with groups such as the Tasmanians having suffered the most such loss.[2]

There have been recent discoveries in eastern Australia which indicate that early aborigines, far from never having been anything other than hunter-gatherers, had cultivated gardens. Dr Wendy Beck, archaeologist from the University of New England, says they *'were sophisticated resource managers who worked together in large groups'?*

In the early centuries after the Flood, evidence is consistent with creationist climate modelling that Australia was a much lusher place with much higher rainfall[4] (see Figure 2). As the centuries progressed, Australia gradually converted to its present status of the world's driest continent, limiting options for many aboriginal tribes, and dramatically affecting their lifestyle and culture.

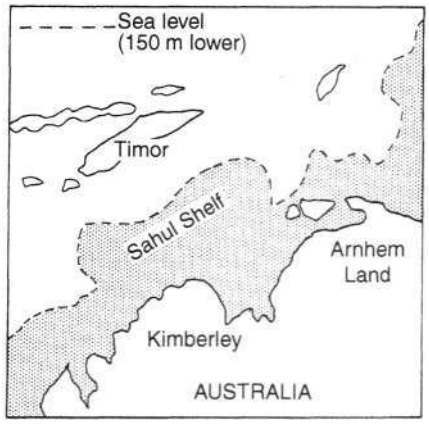

Figure 2. *The continental shelf area of the Kimberley coast off north-west Australia that would have been exposed land during the lower sea-level of the post-Flood Ice Age, which would have made easier the migration of the Aborigines' ancestors from Babel.*

BACK TO THE BRADSHAWS

The evidence each side puts forward will be summarised here:-

(1) In favour of the paintings being done by a previous, unrelated culture.

(a) The style is much more sophisticated than later aboriginal paintings done over parts of some of them, which by comparison are 'primitive'.

(b) The distinctive figures have tassels, headdresses and armbands unlike those worn by the local tribe and more like 'rainforest people'.

(2) In favour of the paintings being done by the Ngarinyin's ancestors.

(a) As far back as they can remember, the Ngarinyin people's oral history and tradition has been linked to the Bradshaw paintings.

(b) The distinctive style is linked to aboriginal rock art sites in other parts of Australia. Virtually every item of apparel in the Bradshaws is worn in aboriginal ceremonies somewhere in Australia.

(c) Pre-World War II photos of Ngarinyin people show them wearing headgear, adornments and tools like those in the Bradshaws.

Notice how our Biblically-based model sits comfortably with all the evidence, as follows:

(1) The paintings depict a more sophisticated culture, because that is what it was. The postulation of a different race arises from the evolutionists' desire to see cultural evolution as invariably 'upward', and ignoring the fact that aboriginals (like all other tribes and nations) descended from a group that around 4,500 years ago built big cities and an ocean-liner.

(2) The apparent connection with rainforest people, if real, does not require postulating a group that came down from what is now Indonesia, for example. It may well be because of the fact that much of the Australian continent was once like that.

(3) The fact that Ngarinyin were still wearing the same ornaments this century is not surprising, since all these events are not tens of thousands of years ago at all.

(4) Finally, a striking fact which is played down by both sides. Although it has been hard to get the actual data, Walsh has, in at least one newspaper article some years ago, referred to these paintings as having 'apparent Christian links'. When I communicated with him directly about the matter, there was no evidence forthcoming of any Biblical themes other than those that were pre-Babel. Walsh, a non-creationist, assumes that ancient rock art, depicting stories such as Creation and the Flood which closely parallel Genesis, must have been done by some Christianised earlier culture.

To confirm this Genesis link further, the article previously cited says that a trader in Kimberley art, Peter Harrison from Melbourne, is awed by the Bradshaws and desperate to protect them. His overseas friends can't believe that there is not even a ranger in the area, and that grazing cattle are allowed to, as he puts it, rub their bottoms *'on paintings that depict the first flood, for example'.*

Of course, it is no surprise that Australia's early settlers drew pictures of such a dramatic cultural memory as the global Flood of Noah.

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whose hand? 'Good Weekend' section, *The Sydney Morning Herald*, June 21, 1997, pp. 30-35. Most of the information for this item comes from this detailed report.

2. There are of course many other complex factors involved, and this is probably an oversimplification.
3. Quoted in *The Daily Telegraph* (Sydney), January 29, 1998, p. 18.
4. During the Flood, most water came from beneath the ground (Genesis 7:11; 8:2). Warmer oceans after the Flood meant much greater evaporation and precipitation. Thus the Ice Age in some areas. Those without a glacial period had a pluvial period of increased rainfall. There is ample evidence of rainforests in what are now vast Australian deserts.

C. Wieland

Dating Method in Doubt

The dating method pioneered by a prominent geographer at the Arizona State University in Phoenix is now under critical scrutiny, due to accusations of scientific misconduct.[1] An inquiry is being conducted by the National Science Foundation and the rival University of Arizona in Tucson where some of the analytical work was performed. Legal counsel for the accused has already tried to block publication of an article in the journal **Quaternary Research,** while a critical paper is 'in the pipeline' and expected to be published in **Science** soon.

The dating method in question is the cation-ratio dating of desert or rock varnish, a mineral coating commonly found on exposed rock surfaces in semi-arid and arid environments.[1] The scientist whose work is under investigation is Dr Ronald I. Dorn. Earlier controversy over the validity of the technique and the way the data have been manipulated has already been reported, with it being concluded that

> *'we have much reason to be skeptical of the techniques and the derived ages'?*

A thin layer less than half a millimetre thick, rock varnish consists of about 70 per cent clay minerals, 20-30 per cent oxides of manganese and iron, and trace amounts of over 30 other compounds. The origin of this desert varnish is not completely known, but is believed to be due to bacterial action and/or physico-chemical precipitation.[35] It appears to thicken and darken with age, and cations of several trace elements in the varnish supposedly decrease with time. Dorn and co-workers have thus constructed the cation-ratio dating method based on the ratio (K + Ca)/ Ti, which is said to decrease with age due to the leaching of potassium and calcium (see Figure 1).

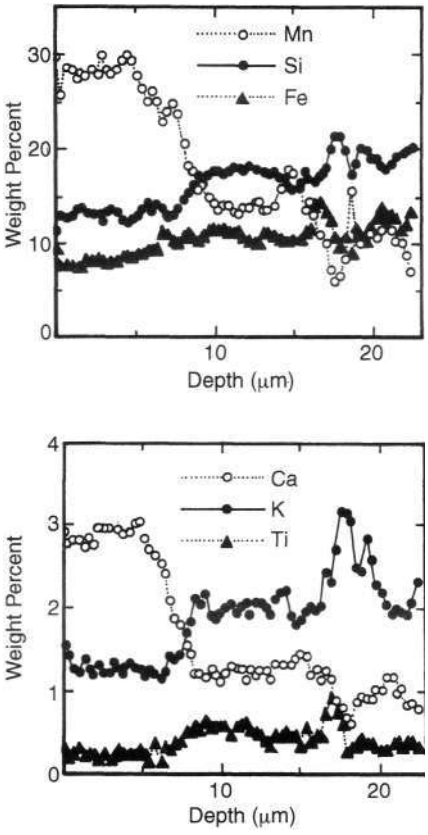

Figure 1. *Plots of Fe, Mn and Si versus depth* (top) *and Ca, K and Ti versus depth* (bottom) *for a line profile across a sample of desert varnish.*

However, the 'catch' is that to make the method produce 'absolute' dates, the cation-ratio has to be 'calibrated' by AMS ^{14}C dating of carbon in the rock varnish. Other aspects of the method have been questioned previously, but the method's accuracy of course depends upon the reliability of the calibration with ^{14}C dates. And this is where the latest challenge has come — Dorn has been accused of adding mixtures of charcoal and bituminous coal to desert varnish samples to secure specific radiocarbon-dated ages of rock surfaces.[1]

Dorn maintains that he and other researchers have shown that charcoal and bituminous coal are naturally present in rock varnish, so the inquiry is trying to confirm this, or determine whether Dorn did add these two substances to 'doctor' samples.[1] Consequently, some of Dorn's sample residues have been subpoenaed. Inquiries are also under way into discoveries by University of Arizona scientists that may raise questions about the findings of a number of Dorn's published articles.

For several years, Dorn's methods have been of great interest — and some controversy — to a small group of scientists who try to determine the age of hard-to-date landforms. A book by Dorn is shortly to appear in print.[6] The first allegation about Dorn's work was received by the National Science Foundation in September 1996,[1] so now the results of this probe are eagerly awaited by this fledgling discipline. If the inquiry were to find that the discrepancies were due to misconduct rather than error, this would also have wider implications because of the controversial nature of some of the sites Dorn has studied.

For instance, Dorn was involved in dating landforms at Nevada's Yucca Mountain, under investigation now for some time as a burial site for highly radioactive nuclear waste.[1] The results of Dorn's dating of rock art found in the Côa River valley, Portugal, were used during a public debate over plans to flood the valley as part of a reservoir. The threatened Stone Age