

# Briefing

## Science

**Flowering plants in the making** The first plants to emerge on land, some 425 million years ago, were mosses, to be followed later by firs, ginkgoes, conifers and the like. The fossil record then appears to indicate that the flowering plants emerged from nowhere much later, about 130 million years ago. But could they possibly have evolved so suddenly without any transitional species linking them to ancient plants? Darwin called this 'an abominable mystery', a problem that is still with us today. However, a team of geochemists (*sic*) at Stanford University, California, led by J. Michael Moldowan, has now come up with evidence that flowering plants were on their way 250 million years ago, long before the first pollen grain in the fossil record. The crucial data come from oleanane, an oily organic compound produced by many flowering plants as a defence against insects, fungi and various microbial invaders, but absent in other seed plants such as pines and ginkgoes. Using gas chromatography and mass spectrometry, Moldowan and his colleagues have been able to extract oleanane from Permian sediments associated with extinct seed plants known as gigantopterids. These gigantopterids are therefore the oldest oleanane-producing seed plants now on record and thus presumably the earliest known relatives of flowering plants. Incidentally, the supposed role of gigantopterids in the evolution of flowering plants is enhanced by the knowledge that gigantopterids with leaves and stems quite similar to those of modern flowering plants have recently been found in China.

**Fossils thrown up** In one of *Nature's* 'brief communications' (v.409, p.998, 2001), José L. Sanz and six colleagues from Spain and California report that they have discovered at Las Hoyas in Cuenca, Spain, a small mass of early Cretaceous fossil bones (area, 23 cm<sup>2</sup>) of four juvenile birds that bears evidence of having been digested (Fig. 1). This apparently regurgitated pellet is, it seems, the first evidence that Mesozoic birds were prey animals. The four birds digested probably comprise three or four different species, but they have a comparable degree of ossification. Moreover, the lacustrine sediments of Las Hoyas were evidently deposited in still water, so it seems unlikely that the four immature birds in the discovered assemblage could have perished apart and then have been

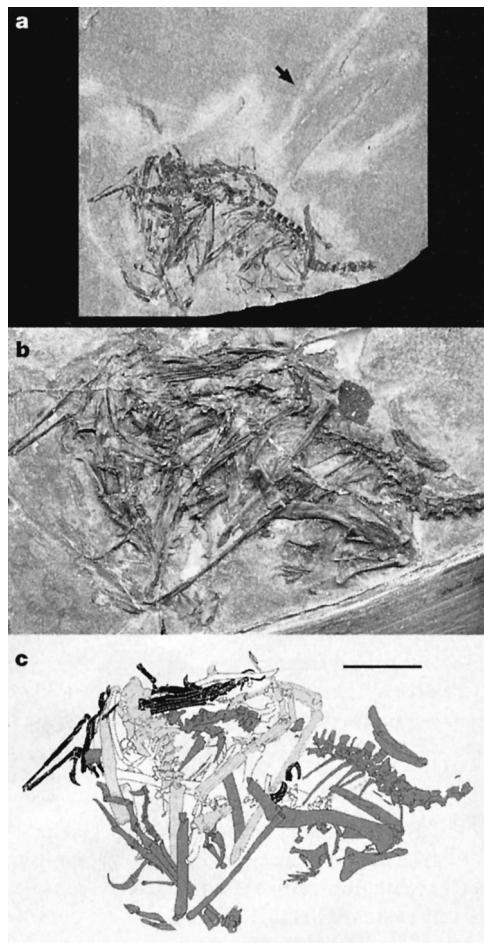
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brought together within such a small area. All the other 200 vertebrate specimens found there were fully articulated, complete and usually isolated. One other possible explanation is that the birds were together in a nest when they perished, but that seems unlikely in view of the number of species. Another possibility is that the pellet is faecal; but as it lacks any faecal groundmass, that seems unlikely too. If the pellet was indeed digested, what was the predator? On the basis of the Las Hoyas fossils, it could have been a large fish, an early mammal, a lizard, a crocodile, a pterosaur or a dinosaur; but a lizard or bird is unlikely on grounds of size (comparable to that of the pellet), fish and mammals generally regurgitate much looser masses of bones, and crocodiles would have digested the mass more completely. This leaves as the most likely predator a small, non-avian theropod dinosaur or a pterosaur, either of which would have been able to swallow the birds whole and then regurgitate the indigestible remains.

**Faking process revealed** The *Archaeoraptor* fossil has become one of the most notorious forgeries in recent palaeontological history, not least because it took so many people in. Supposedly coming from Cretaceous beds in China, from which spectacular fossils transitional between non-avian dinosaurs and birds had already been extracted, *Archaeoraptor* was itself hailed as an important (possibly even more important than *Archaeopteryx*) transitional species until, that is, it was revealed as a clever fake in which bones of a primitive bird and a non-flying dromaeosaurid dinosaur had been combined. Rowe and others (*Nature*, v.410, p.539, 2001)

**Fig. 1.** The fossil pellet from the early Cretaceous of Las Hoyas (specimen LH11386, Museo de las Ciencias-La Mancha, Cuenca, found by local collector D. A. Diaz Romeral). The arrow in *a* points to feather impressions. *b* shows the acid preparation of LH11386; and *c* is a *camera lucida* drawing of the bird assemblage, showing the four bird specimens in different shades. Reproduced, with permission of Macmillan Magazines, from *Nature*, v.409, p.998, 2001.



have now examined the specimen in greater detail using high-resolution X-ray computed tomography (CT) to determine the nature and the extent of the forgery and how it was constructed. They conclude that the specimen was built in three layers. The top layer is a mosaic of 88 pieces, some of which contain bone; the bottom layer is a single, unbroken shale backing plate; and the middle layer is grout, used to mount the 88 pieces on the base plate and to join the pieces by their edges. In the building of the top layer, 23 pieces were first set in natural relationships; 26 were then inserted with little relation to the 23 and generally not naturally associated with each other; and then 39 boneless 'shims' were put in to complete the specimen. The whole was assembled from at least two, and possibly up to five, separate specimens. Wouldn't it be interesting to meet the man/woman who went to the trouble of applying his/her skills to all this, who fooled the western world for so long, and who, incidentally, probably received a very small proportion of the price the specimen was later to be sold at in the USA!

### What the papers say

**Dinosaur boom boom** 23 February was the day that scientists announced the discovery of evidence for an asteroid's having caused the mass extinctions at the end of the Permian, as well as that at the Cretaceous-Tertiary boundary (see Geodigest, this issue); but on the same day, Anjana Ahuga (*The Times*) chose to draw attention back to the dinosaurs, pointing out that during the four days 17–20 February over 48 000 people had visited the latest dinosaur exhibition at the Natural History Museum. This was a greater number than that of visitors to the Palace of Westminster over the whole experimental period of two months last summer (where the Dinosaurs were not in residence). The new NHM exhibit is a 3.6-m-high robotic replica of *T. rex* that gnashes fangs, lashes its tail and smells awful. The smell, Angela Milner is quoted as saying, is not that of rotting flesh to be expected of a living *T. rex* but the not-quite-so-bad one of marshland, specially imported. Ahuga goes on to speculate as to why the fascination with dinosaurs continues. Simon Gelsthorpe, a clinical psychologist, puts it down to awe, a category of fear. 'Awe' is not a word much used these days, but it is apt, says Gelsthorpe, because large dinosaurs are awe-inspiring whilst not likely to put real fear into children by actually materializing in front of them. And because dinosaurs are mainly of interest to children, Angela Milner attributes the fascination to half-remembered early childhood stories of monsters and dragons. Of course, the press is responsible for much of the dino-hype; but Milner is keen to note that the

dinosaur boom is based not only on ever more spectacular museum exhibits but also on genuine scientific advances over the past two decades or so.

**Guilty museum** Another scare story had appeared in *The Guardian* a few days before (James Meek, 17 February 2001) to the effect that the Natural History Museum had pleaded guilty to exposing staff and visitors to 'hot spots' of radiation in its mineral gallery. It was, indeed, a court case (Blackfriars Crown Court). The Health and Safety Executive was prosecuting the museum for exhibiting rocks with too-high levels of radioactivity; a sample of thorite, for example, was 50 times over the acceptable threshold. Apparently, the museum carried out a major cull of radioactive specimens in the 1970s, but evidently not ruthlessly enough, for 'hundreds of rocks in the ornate gallery, where specimens of rare and exotic minerals were laid out in glass cases for public display, contained far higher levels of radioactive metals than curators knew.' Moreover, even when the error was discovered, the museum failed to remove the specimens quickly, preferring instead to remove them 'piece by piece in a clandestine after-hours operation' after consultation with the National Radiological Protection Board. Well, the HSE found out and decided to prosecute. Result: conditional discharge for 12 months and costs of £6300. A few months later, the museum's director was knighted. Incidentally, the same story also appeared in *The Independent* (Charles Arthur), with the curious assertion that the HSE had found radioactivity '1,000 times higher than it should have been'. However, an interesting perspective was offered by Roger Highfield of *The Daily Telegraph*, who pointed out that as many as 891 over-radioactive specimens been removed, although only 165 had actually been in public display. Whatever will the HSE make of spraying the public with offensive smells (see last item)?

**Another dinosaur graveyard** Still on dinosaurs, Roger Highfield (*The Daily Telegraph*, 16 February 2001) describes a site in the Chubut province of Patagonia, being excavated by Oliver Rauhut of the Egidio Feruglio Museum of Palaeontology, Trelew, Argentina, which appears to contain a remarkable quantity and some remarkable examples of vertebrate fossils about 160 million years old. At one extreme are examples of *Gigantosaurus*, a carnivore bigger than *T. rex*, and *Argentinosaurus*, a herbivore 30 m long and weighing 100 tonnes, but the site is also remarkable for the number of small vertebrates – frogs, fishes, turtles, mammals (rodent-sized) – and plants – tree trunks, pine cones, fruits and seeds. Still, it's the large specimens that particularly impress, not least an unknown sauropod dinosaur whose backbone lies exposed to the Patagonian sky (Fig. 2).



**It's really all over, for the White Cliffs of Dover (well, ultimately)** As Matthew Beard reports (*The Independent*, 1 February 2001), the elimination of Britain has continued apace with the fall of another 100 000-tonne chunk of chalk into the sea between Dover and St Margaret's Bay the day before. As this stretch of coastline is popular with walkers, a 0.4-km stretch of it was closed to the public. The coast here is receding at an average rate of about 1 cm a year, but that conceals very irregular decay. The following day, David Sapsted (*The Daily Telegraph*, 2 February 2001) reported a second fall of another 100 000 tonnes within 12 h of the first, thus justifying the closure caution. However, 'caution' is a word unknown to some. The National Trust, which owns the coastline hereabouts, was reporting people going to the very edge of the cliff to peer at the new boulders below. 'There is a danger of them disappearing over the edge', as Steve Judd, an NT warden, understated it. Interestingly, the coastal footpath is a public right of way which Dover council is obliged to maintain!

**Fuji stirs** Its near-perfect symmetry has turned Mount Fujiama (Mount Fuji) into a Japanese icon, widely depicted in all the arts. On a clear day, the real thing can be seen against the setting sun from Tokyo, 100 km away. It has been thus for so long – 300 years – that people forget that it is a volcano dormant rather than extinct. But, says Richard Lloyd Parry (*The Independent*, 7 February 2001), scientists report that things are stirring deep down. The 10 very minor earthquakes beneath the volcano each year became 35 in September 2000, 133 in October,

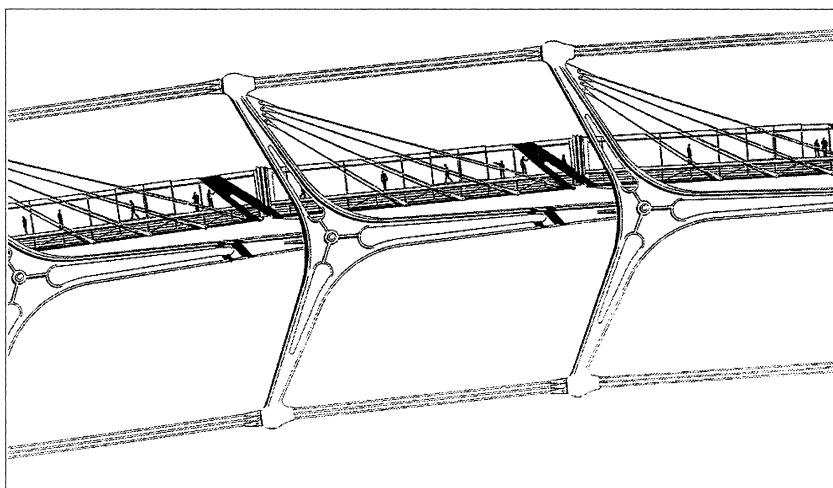
222 in November and 144 in December. In January 2001, the number went down to 36, but the warning was clear. Magma is moving at depth (15 km).

**Fig. 2.** The backbone of a sauropod not yet excavated in Patagonia.

**Dinosaurs to bridge a gap** And talking of the use of geological imagery in art, Peter Forbes, in a fascinating article in *The Guardian* (8 February 2001), discusses biomimetics, the search for engineering solutions based on nature. This movement can be said to have begun in 1917 with D'Arcy Thompson, whose *On Growth and Form* examined engineering in terms of biology – for example, Thompson compared suspension structures with the backbones of mammals. Much of this was forgotten until the 1970s, when there was a movement in architecture to reject compression structures (e.g. Greek columns) in favour of tension structures (e.g. suspension bridges). One result of all this is that David Marks and Julia Barfield (who, with engineer Jane Wernick, designed the London Eye) have designed a 'dinosaur bridge' (not yet built). The design exploits the fact that a long dinosaur neck was supported by tension in the backbone and rib cage. A bridge with a spine like a dinosaur's (Fig. 3) would therefore only need to be anchored to rock at one end! At the other end, the bridge would slide in and out as loading upon it varied. There was talk at one time that the Millennium Bridge might be a dinosaur bridge, but Marks and Barfield lost that one. Still, perhaps a gorge would offer more spectacular possibilities.

**Perfumed Pompeii** Richard Owen reports (*The Times*, 30 March 2001) that the perfume shop at Pompeii is to be reopened after 2000 years, thus becoming the only Roman perfumery to have survived, albeit with a slight hiatus in operation. Pier Giovanni Guzzo, the superintendent of Pompeii, is quoted as saying that Pompeii was a wealthy and sophisticated town before its destruction by Vesuvius in 79 AD – the 'Paris of its time'. The products to be sold in the revived perfumery

**Fig. 3.** Design for a 'dinosaur bridge'.



ery will be derived from plants grown from semi-carbonized seeds found at Pompeii and used to create a typical Roman perfume-maker's garden. The perfumes themselves were/are based on unripe olive oil mixed with essences from flowers and herbs such as the iris, the rose, marjoram, violets, basil and myrtle; and the modern versions will be served in reproductions of phials found in the ruins. The ruins have even revealed how to do it all, for one of the frescoes found at the house of Vettii depicts the art of perfume-making in great detail.

**Tale tall and deep** David Sapsted reports (*The Daily Telegraph*, 27 March 2001) that civil servant Michael Whittaker returned to his home at Thorpe St Andrew, Norfolk, after shopping, to find that his back garden was a 12-m-deep hole. 'A geologist told him an ancient [Ice Age] glacier had melted and created an underground void that had finally collapsed.' Note that this was four days short of 1 April.

**GIY marble** According to Dalya Alberge (*The Times*, 26 March 2001), French scientists have discovered how to grow marble in a few days from bacteria. The bacteria concerned are calcinogenic bacteria less than a micrometre in size and found naturally in the soil. They are collected and placed in jars containing a 'liquid-growing medium' that includes pectin. The bacteria feed on minerals in the liquid, and when they die their bodies remain as a fluid of almost pure calcium carbonate, which can be sprayed on to marble statues, etc. to fill holes, cracks and other gaps. So far the process can only be used to consolidate what is already there but damaged, although it might be developed in the future to generate new statue-quality marble. John Larson of the Conservation Centre of the National Museums and Galleries on Merseyside is quoted as saying that all the highest-quality marble at Carrara has now gone, so that a replacement for the pure white rock will ultimately be required. What could be more convenient than growing your own? And, yes, this story too was short of 1 April.

**Geological artefacts destroyed ...** Ahmed Rashid (*The Daily Telegraph*, 12 March 2001) reports that, over the weekend of 10–11 March 2001, the Taliban carried out its threat to dynamite the two largest statues of Buddha at Bamiyan in Afghanistan (Fig. 4). These statues, carved out of the sandstone cliff, were the largest known (one being 50 m tall) expressions of geology as art (and religion). Carved by Greek artists over 1700 years ago, they survived Genghis Khan, Tamerlane and the recent 20 years of civil war to become archaeological treasures and tourist attractions, only to become victims of a war of a different kind.

**... but others rediscovered** And now to a geological (mineralogical) monument of a different kind, one revived against the odds. Elizabeth Nash (*The Independent*, 1 March 2001) recounts that, two hundred years ago, Spanish ceramicists were producing, at a factory in Madrid's Retiro Park, porcelain of such dazzling whiteness that no one in Britain or France could compete. It all came to an end in 1812, however, when Wellington's army razed the factory – some say an unnecessary act in the context of the Peninsula War and one specifically designed to stop the competition from white Buen Retiro porcelain. Be that as it may, subsequent efforts to reproduce the Retiro formula have all failed – until now. According to Nash, part of a makeshift race track recently set up on the site of the Retiro factory collapsed into one of the factory's ruined vaults that was found to contain broken porcelain samples, making the porcelain available for analysis for the first time. As a result, scientists have discovered that the porcelain contained alpha-quartz and alpha-cristobalite, to which was added local sepiolite, which provided the characteristic translucent whiteness.

**Managing retreat** This issue's main coastal erosion story comes from John Naish (*The Times*, 24 March 2001) under the heading 'The Atlantic is coming'. It's coming to Selsey (West Sussex), it seems, traditionally, says Naish, a place where nothing happens. (Eric Coates was inspired to write *Sleepy Lagoon* – the Desert Island Discs theme – whilst living there.) But something is happening now. In the past three years, the town has been hit by two tornadoes, causing over £10 million of damage, and sea waves 9 m high have started crashing over the sea defences. As a result, Selsey council has decided to move the defences inland in a programme of 'managed retreat'. The irony is, however, that the pull-back will speed the destruction of those homes between the old and new defensive lines – and the homeowners concerned are less than happy. They should look on the bright side. In March, Elliot Morley, the Agriculture Minister, said in Parliament that 'we cannot surround the country with a wall of concrete. It is unrealistic to expect to maintain all the coastline as it is now. I am sorry to say that compensation is not payable to people who are affected by flooding or erosion, except in limited circumstances, such as where it has been decided not to defend a particular area or to undertake managed realignment.' This seems to indicate a major advance in government thinking, consistent with *Geology Today*'s long-expressed views, and appears to offer hope

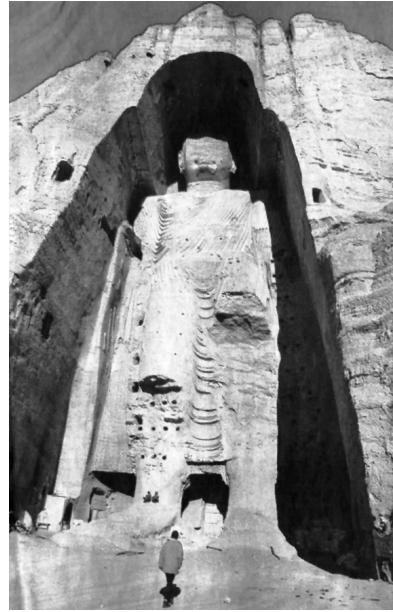


Fig. 4. Target for the Taliban.

to Selsey's between-zoners. However, it does not help the tens of thousands of people who have, or are due to, become victims of coastal erosion where there is no official policy of managed retreat. The war is not yet won.

**Smithsonian cuts back** According to Josette Chen (*Nature*, v.410, p.727, 2001), the Smithsonian Institution in Washington DC is to close two of its research centres, with the loss of 350 jobs. Neither closure affects the Earth sciences directly, but one – the Smithsonian Center for Materials Research and Education, which develops new techniques for preserving museum artefacts – could have an indirect impact. Moreover, staff at the Smithsonian suspect that further closures, some of which could affect the Earth sciences, are on the cards. The Smithsonian was founded in 1846 with money bequeathed by the English chemist and geologist James Smithson. It now has an annual budget of about \$600 million, some of which comes from Congress and some of which is provided by private donors. Unfortunately in some respects, both funding sources see exhibitions as more important than research, as may Larry Small, a former banker who was appointed in 2000 as the Smithsonian's first secretary not to be an academic. No wonder the Smithsonian staff's morale is low.

**Important palaeontological site saved for research** About 25 million years ago, a lake in Shanwang Basin (Fig. 5), Shandong Province, China, apparently lost its circulation for several million years, during which time plants and animals fell into its oxygen-poor water, were covered with sediment and were thus preserved. Much of this 'time capsule' has been destroyed by excavation for brick-making material; but *Science* reports (v.291, p.1481, 2001) that the rest has now been preserved for science. The site was actually discovered in the 1930s, but then fell into obscurity until, in 1999, Bilal Haq of the US National Science Foundation began a campaign to save it. Success came remarkably quickly in Chinese terms; in July 2000, mining was stopped and the quarry fenced off. The provincial government has agreed to pump the water out of the basin and establish a park for research and education. The site has already yielded over 500 animal and plant species and can be confidently expected to provide many more.

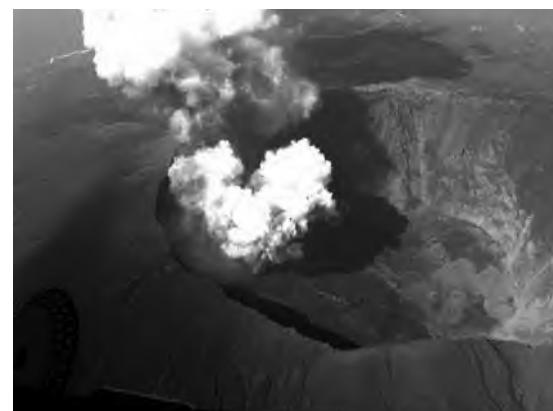


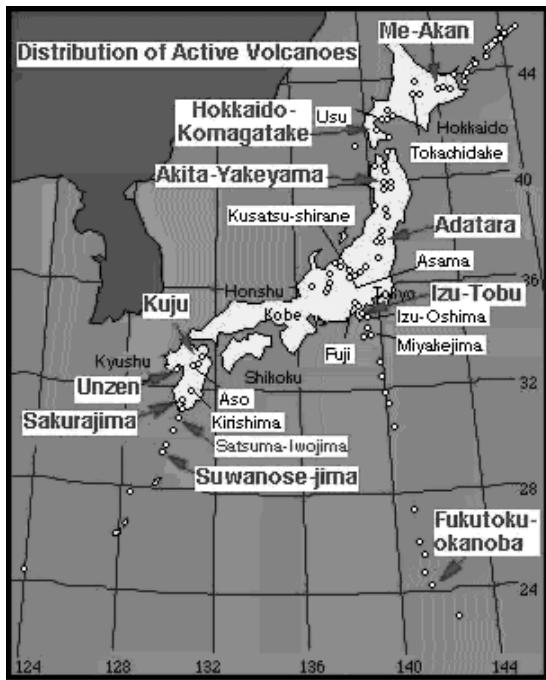
**India relaxes rules for visiting seismologists** K. S. Jayaraman reports (*Nature*, v.409, p.968, 2001) that the Gujarat earthquake of January 2001 has forced a pledge from the Indian government to increase seismic research and to allow participation by foreign seismologists. Hitherto, India has been reluctant to allow foreign scientists into the Himalayan region, claiming that they would use any data obtained to detect Indian nuclear weapons tests or, especially in the case of US scientists, use their access to spy on Chinese missile programmes (which they did in 1974, using a nuclear-powered sensor). Certain areas of the Himalayas are also militarily sensitive from the purely Indian point of view, which is why the Indian government halted a US gravity survey in 1988 in the belief that the data could be used to programme the path of US missiles over Indian territory. Even Indian seismologists are not allowed into certain parts of the Himalayas – e.g. the vast Allah Bund, created by an earthquake in 1819, which lies close to the border with Pakistan. Quite how these fears – some real, some imagined – will be overcome is anyone's guess, but it is a fact that over 30 foreign groups have already been allowed into India to study the aftershocks of Gujarat. In the meantime, the government has announced a \$12-million plan to build 40 seismic monitoring stations in the Himalayas.

**Much SO<sub>2</sub> in Japan** According to David Cyranoski (*Nature*, v.410, p.970, 2001), Mount Oyama on the island of Miyake, Japan, 200 km south of Tokyo, was, as of February 2001, still belching thousands of tonnes of toxic gas, mainly SO<sub>2</sub>, into the atmosphere every day. As a result, the island's 3900 residents, evacuated early in the eruption six months earlier, are still being kept off the island. The activity first became apparent in June 2000, when researchers detected rising magma at depth, but the eruption proper began on 18 August when volcanic smoke shot several kilometres into the air and a 1.5-km-diameter crater developed at the top of the cone (Fig. 6). Since then, the main activity has been the ejection of SO<sub>2</sub> in such quantities never before

**Fig. 5.** (left) Shanwang Basin, China.

**Fig. 6.** (below) The crater at the top of Mount Oyama on 3 September 2000.





**Fig. 7.** A summary of current volcanic activity in Japan.

**Volcanic activity predicted** Reporting on the winter meeting of the American Geophysical Union in San Francisco, Richard A. Kerr (*Science*, v.291, p.583, 2001) draws attention to a successful prediction of volcanic activity in Iceland, described at the meeting by Kristjan Agustsson of the Iceland Meteorological Office (IMO). Hekla volcano, 120 km east of Reykjavik, last erupted in 1991, and subsequent examination of seismic records revealed that an hour before the eruption there had been a burst of small earthquakes and that half an hour before the eruption a strainmeter 15 km away had started to record increasing compression. But were these precursors specific to the 1991 event or did they offer more general prediction? Scientists had to wait nine years to find out. When small seismic events occurred beneath the normally quiescent volcano at 17:00 on 26 February 2000, volcanologists sat up. By 17:29, the intensifying swarm persuaded the IMO to issue a notice of a 'possible imminent' eruption. At 17:45, the same strainmeter began to record increasing compression; and so at 17:53 the IMO issued a 20-minute eruption warning. The eruption began at 18:17. A success, therefore; but can it be applied to other volcanoes? It remains to be seen, but there is some optimism. 'You can't escape physics', said one geophysicist in San Francisco.

**The landslide(s) in El Salvador** On 13 January 2001, a magnitude 7.6 earthquake caused a landslide that overran part of Santa Tecla, El Salvador, burying over 500 homes and killing over 150 people (Fig. 8). At least 250 people also died in landslides and other

observed. The violence of the eruption was a surprise, Oyama having hitherto been regarded as a steady emitter of magma when it becomes active. Further details of the eruption are at <<http://hakone.eri.u-tokyo.ac.jp/vrc/erup/miyake.html>>, which contains details of the eruption so far (including activity since that mentioned above), numerous pictures and diagrams, and information about earthquakes, ash distributions, etc. The site also includes links to details of 20 other current or recent eruptions in Japan (Fig. 7).

earthquake damage elsewhere in the country and in Guatemala. According to David Gonzalez (*The New York Times*, 15 January 2001), residents of the Los Colinas area had earlier gone to court over a new residential area in the hills above Santa Tecla, and the consequent clearing of land, instigated by a former housing minister who had been granted a waiver to build in a forest reserve. The development would endanger the Los Colinas area, said the residents – but they lost the case. That their fears were justified became all too clear on 13 January, although, of course, there can be no proof that the forest clearing really did destabilize the hillside.

**Quote–unquote 1** 'Take last night's *Horizon*: Extreme Dinosaurs (BBC2). I flirted with the idea that extreme dinosaurs might turn out to be something out of the ordinary: base-jumping brontosauri, say, or iguanadons who want to privatise air-traffic control and abolish maintenance grants for higher education (I know that's not very extreme these days, but cretaceous politics were very staid). But no, they just turned out to be big.' – Robert Hanks, *The Independent*, 24 November 2000. [Thanks to David Nowell]

**Quote–unquote 2** 'Waitrose has several interesting wines also on offer until February 4. Abbotts Ammonite Côte du Roussillon 1999 (15.5 points, £3.99) has superb tannins and texture for the money. There is great elegance and class here, as the wine has something to say for itself.' – Malcolm Gluck, *The Guardian*, 27 Jan. 2001. [Thanks to Peter J. Perkins]

**Quote–unquote 3** 'Sir: Perhaps the reason why the Weasel's web search for information about volcanoes



**Fig. 8.** Santa Tecla overrun.

under pyroplastic flows (27 January) failed is because he should have been searching under pyroclastic flows. That's the trouble with computers – they are so literal.' – John Gribbin, letter in *The Independent*, 30 January 2001. [Thanks to David Nowell]

**Quote-unquote 4** 'Sir: Stephen Churchett ... is right that Eminem's shocking offensiveness will only hold the public's attention for so long. His lyricism however does bear scrutiny. "You faggots can vanish to volcanic ash" replicates an alliterative structure and metre straight from *Beowulf*. By accident or design the incendiary and volcanic images echo the burning sands and perpetually falling fire in the seventh circle of Dante's *Inferno* – the punishment reserved, inter alia, for sodomy. Appearing in hell with the match to ignite your own punishment is a wickedly cruel but undoubtedly poetic image.' – Steven Aquilina, letter in *The Independent*, 14 February 2001.

## Community

**Very old tree...** One of the most fascinating aspects of the 19th century is that everyone who lived in it did so not knowing that radioactivity lay beneath their feet and, indeed, all around them; but at least they had the excuse that radioactivity was an unknown phenomenon. A tree is certainly not an unknown phenomenon and yet for many decades Australian scientists managed to fail to see a tree of major importance even though it grows in a much-studied rainforest. Now 'found', the tree is being hailed as a 'living fossil', for it turns out to be of a species at least 90 million years old. The 39-m-high tree, known as a Nightcap oak, was discovered by botanist Robert Kooyman in the Nightcap Range forest some 650 km north of Sydney, although its precise location is being kept secret. It belongs to the Proteaceae family, which includes macadamias, and has dark green leaves, nuts and clusters of small white flowers that smell like aniseed. It was the unfamiliar leaves and nuts that drew Kooyman's attention. When the species originated, Australia was linked to Antarctica, New Zealand and South America in Gondwana in a rainforest environment. It's conceivable therefore that other examples of Nightcap oak still exist elsewhere in the world.

**... and an even older one** At the risk of being accused of mean-spiritedness, I react against the suggestion that 'the oldest tree' (*The Times*, 28 December 2000) has turned up in the Nightcap Range north of Sydney. At 90 million years, it would slot into the Cenomanian give or take a zone or two, which is quite old as things go. But back almost 100 million years earlier, root stock *Ginkgo*, hardly distinguish-

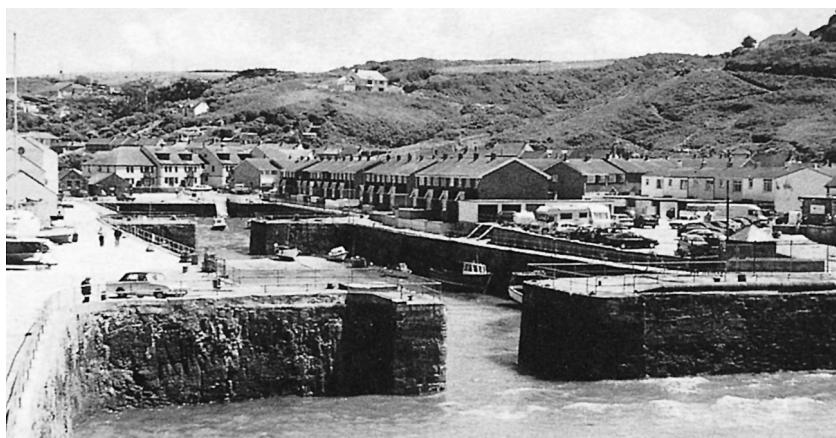
able from the *Ginkgo biloba* that grows vigorously on my street, was shedding its distinctive forked leaves to be fossilized in the sandstones of the cliffs north of Scarborough. The date? About 170 million years back in time. Sorry Bruce, but it took ships a long time to reach Australia in those days. [ER]

**Portreath expanded** In 1999, we published an article by Adrian Marks on the interpretation of geology at Portreath, Cornwall (Fig. 9), seen as a resource for geological education (*Geology Today*, v.15, p.149, 1999). One advantage of Portreath in this context is that its geology is preserved both in natural outcrop and in local buildings, giving two lessons for the price of one. Of course, the article's diagrams and photos were in black-and-white, so it's a pleasure to be able to say that Adrian has expanded the story into a 40-page booklet\* in full colour (over 100 colour photos!) and, thanks to financial support from Cornwall College, Cornwall County Council, Kerrier District Council and others, available at the remarkable price of £2.99. The booklet covers the geology of Portreath from several points of view (Fig. 10), how the fishing community developed in the context of the geology, the minerals, the beach environment, building stones – indeed, all the aspects covered in the *Geology Today* article but at greater length. And with added value, not the least of which is the story of the 1-in-10 railway incline (now rail-less), cut through granite and sandstone, that linked the railway terminus to the harbour. This is a fascinating booklet, one of the great virtues of which is that it relates geology to the community within it. It's well worth reading even by those who cannot, or don't want to, get to Portreath.

**The amateur in British geology** A two-day joint meeting organized by the History of Geology Group (HOGG) of the Geological Society of London and the Geologists' Association is to be held at the Geological Society, Burlington House, Piccadilly, London, on Thursday–Friday 14–15 March 2002. Anyone interested in giving a paper on any aspect of geology or

\**Portreath Geology Guide & Illustrated Rock Trails: A Rock and Stroll Story!* by Ade Marks. ISBN: None (paperback). £2.99. 40 pp. Further details from Adrian Marks, Cornwall College, Trevenson Road, Redruth, Cornwall TR15 3RD (Tel.: 01209 611611; Fax: 01209 611612; E-mail: a.marks@cornwall.ac.uk).

**Fig. 9.** The inner and outer basins of Portreath.



palaeontology within the scope of the title should contact the convenor, Stuart Baldwin, Fossil Hall, Boars Tye Road, Silver End, Witham, Essex CM8 3QA (Tel.: 01376 583502; Fax: 01376 585960; E-mail: sbaldwin@fossilbooks.co.uk). The intention is to publish the proceedings.

**Books elsewhere** Incidentally, Fossil Hall Bookshop is closing down so that the proprietor, Stuart Baldwin, can work from home on a reduced basis, to give him time to concentrate on his PhD. In the meantime, he has several thousand books to dispose of, many of which are reduced to £1 each. The book sale will last as long as stocks do. Stuart is still buying, however, and visitors will be able to see many shelves of stock just arrived. Topics cover the whole of geology, palaeontology and Earth sciences and other sciences from astronomy to zoology, plus natural history, biography and numerous other subjects. Visitors will also be able to see prints, minerals and other items for sale at reduced prices. Address as in the previous item.

**TGD2001** The new edition of *The Geologist's Directory*† (Fig. 11) is now out as it has come out for over 20 years (but not, in the early times, every year). A couple of years or so ago, we made the point that what had set out two decades ago to be a reference work for both individuals and companies now seemed to be geared more towards companies or people/companies seeking geologists than to individual geologists, largely, though not entirely, on grounds of cost (£79, although Fellows of the Geological Society get £40 discount). The content still seems to be geared

more towards the commercial world than the academic, although there is much here for individual non-commercial geologists too. The main sections, as before, are a who's who of chartered geologists (both alphabetical and classified by subject expertise), a buyer's guide, an A-Z of brand and trade names, a company listing, a list of associations, institutions and societies, and details of government and university departments. For an overview of the profession, biased towards the applied side, there really is no substitute for this authoritative guide.

**Prizes** The last round of American Geophysical Union award winners included James H. Dieterich of the US Geological Survey, who received the 2000 Walter Bucher Medal for work that 'revolutionized the understanding of frictional processes in rocks, their description by constitutive relations, and implications for earthquake nucleation and seismicity rate changes', Joseph L. Reid of Scripps Institution of Oceanography, who received the Ewing Medal for his 'outstanding original contributions to observational physical oceanography', Richard J. O'Connell of Harvard University, who received the Inge Lehmann Medal 'for determining that the whole mantle was subject to flow; for his model of the mantle flow associated with plate motions and subduction; for creating a model that globally predicted plate motions in which plate tectonics stir the upper mantle; and for the way he has connected geophysics with geochemistry', and Juan Roederer of the University of Alaska, who received the Edward A. Flinn III Award, which is given to those who personify the AGU's motto 'unselfish cooperation in research'.

**More prizes** The US equivalent of Britain's Royal Society is the National Academy of Sciences, to membership of which some, but not all, scientists aspire. However, the US also has the National Academy of Engineering to which few scientists aspire, although some who have done work with engineering implications finds themselves there anyway. This year, two Earth scientists found themselves in that position: Amos M. Nur, a professor of Earth sciences at Stanford University, California, and George H. Brunnall, a professor of geology at the University of California at Berkeley.

**Still more prizes** Meanwhile, back at home the Royal Society has this year (May) elected the following Earth scientists as Fellows: John Rex Beddington of Imperial College, who has made 'contributions, both theoretical and empirical ... to understanding the management and harvesting of natural resources', and Henry Elderfield of the University of Cambridge, who 'helped establish modern oceanic trace metal chemistry'.

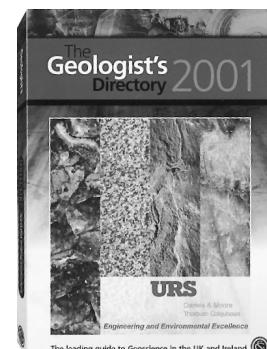


Fig. 11. The 10th edition of *The Geologist's Directory*.

†*The Geologist's Directory 2001* (10th edn). ISBN 186239 088 6 (paperback). Geological Society Publishing House, Bath. £79. 310pp.



Fig. 10. Seaward-dipping turbidite units at Portreath.