tle as the present volume (*5*), one whose author did have the courage to synthesize. Science is not only about what we know, but also how well we know it. Not all of the evidence discussed in this volume's various chapters is of equal value; some of it is very probably misleading or its implications misunderstood, and some may even be just plain wrong. Courage is needed as well to sort through the conflicting data. Perhaps a strength of the book is that it exposes the fractured state of knowledge about planetary origins, and thus forms a good foundation for future endeavors.

*Origin of the Earth and Moon* is very competently produced and reasonably priced for an academic tome. It goes without saying that it deserves a home in every planetary scientist's library. Unfortunately, this will not result in best-seller status. The exploration of the solar system has been grossly under-appreciated as an intellectual adventure.

Before the era of space travel, our understanding of Earth had been held back by the problem of uniqueness—we had only Earth itself to study. The Apollo program changed this. In particular, exploration of the Moon fostered thinking about Earth from an expanded perspective. One consequence has been the growing awareness of Earth's special qualities and how very rare the circumstances leading to the formation of a habitable planet might be. Could Earth and its life be unique?

I would like to believe that this subject would be central to the intellectual aspirations of all people, whatever their cultural background. But the list of authors who contributed to this volume reveals a sorrier reality. More than 50 of the 66 are from the United States, and most of the others work in Japan and Germany. Although the conference's California location may partially explain this bias, the participation is also a fair reflection of activity in the field. Sadly, there is nothing at all from anyone still practicing science in the former Soviet Union. Maybe current economic woes are to blame there. Yet the science discussed in this volume is not expensive to carry out, and the costs hardly excuse other countries that are conspicuously absent from the list of authors despite their cultural and intellectual pretensions. I hope that the perspectives offered in *Origin of the Earth and Moon* will catalyze more widespread international interest in the subject.


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NOTA BENE: ENVIRONMENT

## Sounds of Silence

The British Antarctic Survey (BAS) has found an inspired way to bring scientific issues to the attention of a wider audience—through music. With the Philharmonia Orchestra, it commissioned a symphony from Peter Maxwell Davies, who traveled to Antarctica in the austral summer of 1997–1998 in preparation for the work. The British composer led the Philharmonia in the premier of the resulting *Antarctic Symphony* at Royal Festival Hall, London, on 6 May; an upcoming performance in Scotland will be broadcast on BBC Radio 3 on 27 June.

**Antarctic Symphony**
*Peter Maxwell Davies*
Information on performances is availabe at www.maxopus.com

The work consists of a single movement in which the composer weaves sounds based on his Antarctic experiences (some created with unusual instruments such as a biscuit tin filled with broken glass) into a fabric of classical music that evokes his impressions of the continent. Among Davies's inspirations were the sounds of the ship breaking through sea ice and of an avalanche of snow enveloping those on deck when the ship passed through a narrow channel—which he found "more profoundly quiet than the previous silence."

The symphony also commemorates the 1953 *Sinfonia Antarctica*, which Ralph Vaughan Williams (who never traveled to Antarctica) developed from his own score for the film *Scott in the Antarctic*. I would have liked to have heard the two pieces in succession.

A wealth of beautiful pictures and the composer's diary from his trip have been combined in a book, *Notes from a Cold Climate* (Browns, London, 2001). The BAS and the Philharmonia Orchestra have also collaborated on an accompanying education project, Antarctic Waves (www.antarcticwaves.com). This toolkit will offer Antarctic sounds, images, and scientific data to help high school students create music.

—JULIA UPPENBRINK

CREDIT: EBERHARD HUMMEL/PANORAMIC IMAGES

A DAY OUT: PLANT ECOLOGY

## Paradise Regained

**Sandra Knapp**

The garden of Eden in the Bible was the paradise from which humans were banished. At the Eden Project in Cornwall, we are welcomed in to discover how we interact with and influence our environment through our actions and our lack of action. In a reversal of the Biblical creation myth, this garden is conceived with the acquisition of knowledge at its center.

The Eden Project is a world of superlatives: the world's biggest greenhouses, built using the largest free-standing scaffolding; the "compost heap to beat them all," for the making of 85,000 metric tons of soil. It aims to change the way we think about the world we inhabit. To facilitate this goal, the project is enhancing the presentation of the plant collections with commissioned art from a range of media including sculpture, music, animation, and performance. This ambitious and poetic vision has inspired many in a country where another giant dome built to mark the Millennium instead sparked controversy and unseemly bickering. The project opened this spring with a blaze of publicity in the midst of the foot-and-mouth epidemic, and it has far exceeded its visitor targets.

**The Eden Project**
Bodelva, St. Austell, Cornwall PL24 2 SG, UK.
www.edenproject.org.uk/

But is this Eden really paradise? Does it make places like London's Kew Gardens obsolete and old-fashioned? And most importantly, will its future really be as solid and sustaining as the drama of its creation? We went to Cornwall to see how the

The author is in the Department of Botany, The Natural History Museum, Cromwell Road, London SW7 5BD, UK. E-mail: sk@nhm.ac.uk

project felt to us, a group of mixed ages and scientific abilities but all passionate conservationists and lovers of the environment, both tropical and temperate.

The site is dramatic. The greenhouses ("biomes" in Eden-speak) are situated in an abandoned china-clay quarry. The entire complex is invisible from the approach until one crests the edge of the bowl. The "oh wow" factor is incredible for children and adults alike, and the long path from the visitor's center into the bottom of the 50-meter-deep pit increases one's excitement at getting there. The innovative architecture of the "biomes" is astoundingly beautiful. Each of the two giant conservatories, which seem small in their surroundings, is a series of linked geodesic domes built from hexagons and pentagons. They are eerily attractive; a budding architect with us loved the ventilation opening, which suggested a giant flower opening to the sun.

The giant conservatories are entered through a grass-roofed connection, which also houses the restaurants and was thought by the children among us to be just the thing to join habitats in a sympathetic way. The two "biomes" could not be more different. Not only do they contrast warm temperate and tropical plant communities, but each has its own marked atmosphere. The displays of Mediterranean groves, South African fynbos, and Californian chaparral are calm and soothing, whereas the tropical settings are frenetic and exciting. None of us are not sure how these different atmospheres are created; it can't just be temperature, but it works.

However, Eden's aim to show plants in populations rather than as individual species seems a bit far-fetched. Even in structures as large as these, functioning ecosystems like those in the wild will not be possible. Where in the world could one find lavender, cork trees, and proteas all growing feet from each other but functioning separately? It might be better to admit that the "biomes" are simply samplings of actual habitats—and that those real habitats need the commitment of people like visitors to Eden in order to survive.

The tropical biome is fabulous. Humidified by a huge central waterfall, it is a bowl within a bowl. From the top, a vista of trees and greenery from Amazonia, Malaysia, West Africa, and oceanic islands stretches out below. This is a great place to visit with children. They can rush about wildly, and if they get lost, you can just go up to the top and find them by looking down. I have spent many an anxious time going around and around in large greenhouses searching for lost children; here even the most nervous parent could relax.

A few butterflies fluttered by—apparently only males are kept, in order to avoid the problem of escapes, so these cannot be self-sustaining. The sanitized nature of the greenhouse environment was not lost on those children who had been in an actual tropical rainforest. Where were the snakes, ants, and mosquitoes? Not that one would suggest inserting them into these geodesic domes; but to claim that a visitor is experiencing an authentic functioning habitat is an overstatement. Regardless, the biome holds really interesting plants—not only endangered species such as the St. Helena Ebony, but a rice paddy and a grove of cacao. I liked the devotion to the "ordinary" rather than just the spectacular and critically threatened. More could be made of this aspect of Eden's plantings.

The emphasis in both temperate and tropical conservatories was on useful plants. Simple and concise labels (of which there are currently too few, but this is bound to improve) allow visitors to think about what they are seeing rather than just read, and we noticed children telling their adult companions all about plants, a good sign that a place really does foster knowledge. Staff members stood along the paths. One near the cork trees in the warm temperate biome held children (of all ages) spellbound with his story of cork trees, sustainable family businesses based on the ownership of trees, and the integration of the environment and animal husbandry (reflected in the wooden sculptures of pigs feeding on fallen cork oak acorns behind him). His engagement of the audience was, unfortunately, unique; he appeared to have taken the initiative to speak to visitors himself. The project needs more like him.

**Garden in Eden.** The fruits, spices, and vegetables are some of the useful plants displayed around this Malaysian home in the humid tropics "biome".

Outside the domes, the rest of the bowl will eventually be planted up. This "roofless biome," open to the cool temperate climate of Cornwall, is probably four times the size of the two conservatories put together. In it, the exhibits will concentrate on plants we use. Displays such as "The making of garden flowers," "Plants for paper," and "Plants for tomorrow's industries" all promise much. When the weather is good, they will be terrific fun, interspersed as they are with art works of many kinds. As we walked—and the younger children ran, still ready to see more even after an entire day of walking (a sure sign of a great place)—from the "biomes" back up to the entrance, gardeners were busily putting in mass plantings of hardy ferns. One teenager with us felt this was a bit boring and expedient; large drifts of single species are easy to care for, but don't really tell a story. Nonetheless, places must look good too, especially if not all visitors are botanists on busman's holidays.

Eden is a project still in progress, and visitors are invited to watch the show. Nothing is quite finished—the plants are still growing, the art works are still under construction—so a visit is, in a way, an invitation to come back and see it again. We all liked that dynamic aspect to the project, the palpable feeling of a place on the move.

The Eden Project is billed as living theater, and it certainly is. Project founder and executive director, Tim Smit, and his team have created something from nothing, provided employment where it is desperately needed, and have done it with great panache. This is not Kew Gardens writ large, it is different. The interweaving of art and botany through every aspect of the Eden Project is impressive. The sculptures are fully integrated into the plantings, and the commissioned artists have shown great sensitivity in linking their works with the Eden message.

But I disagree with Smit when he says "if this place becomes no more than an upmarket theme park it will all have been the most gigantic waste of money." Theme parks are not all bad, and this enterprise has a theme well worth promoting. How we depend on our environment is something the Eden Project, with all its dynamism and theater, is poised to show. If the majority of visitors leave having acquired better knowledge and understanding of the world around them, then I would gauge the project a success. The positive imperative to acquire knowledge, for education, is the seed of this garden of Eden's success. All of us left wanting to go back.

**Notes**

1. My review team consisted of Jim, Alfred, Isabel and Victor Mallet, and Kate Wilson. Sarah Darwin and Peter and Christine Wilson visited the Eden Project separately and contributed their useful comments.

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