➜ further 2,000 years, but not to its present-day dimensions. While this initial study is far from complete, it does raise the worrying possibility that some of the changes humans are making to the earth system may have irreversible consequences.

BRIDGE is also beginning to develop research on how climate has influenced human activity in the past. John Hughes is involved in examining the impact of a changing climate on hominid evolution and dispersal: 'Our contribution to this project is to model the climate from two million years ago to 20,000 years ago. This spans the time period from when the oldest hominids found so far as fossils were living in the African Rift Valley, to when humans were well established as the only global species living in every environment from tropical beach to icy tundra. Vegetation, ice distribution and land bridges resulting from sea level fall must all have had impacts on where hominids migrated to and how big their populations could be. Comparison of these environmental models with our models of hominid dispersal patterns will help us understand just how important climate factors were in the past.'

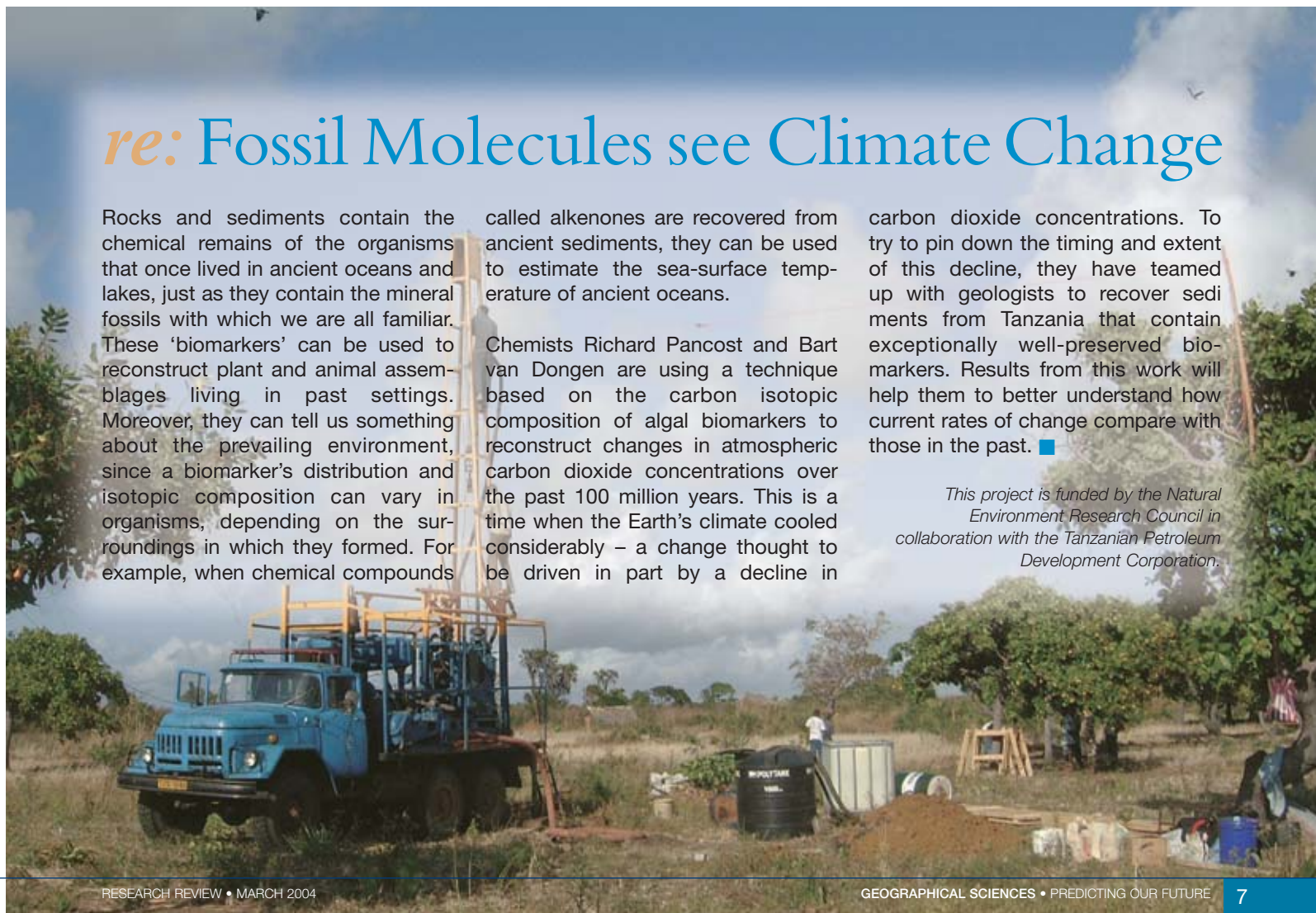
The appointment of Professor Colin Prentice to the Department of Earth Sciences is a further boost to climate change research in Bristol. He is to lead NERC's £13 million research initiative entitled QUEST – Quantifying and Understanding the Earth System. Professor Prentice said, 'QUEST is a fantastic opportunity to tackle some of the tricky questions like what's going to happen to the carbon we are putting into the atmosphere as the climate changes; what are the potential effects of global warming on human activities; and what has controlled the Earth's atmospheric composition naturally – things we need to understand far better if we are really to make sense of what's happening to the Earth today.'

> QUEST is a fantastic opportunity to tackle some of the tricky questions

Bristol researchers are also responding to many other aspects of environmental change. For instance, the biogeochemistry laboratories have just been refurbished to the tune of £2 million, facilitating the biogeochemists to improve our understanding of the global carbon cycle, including the controls on greenhouse gas concentrations, and the atmospheric chemists to measure and model the effects of pollutants. In addition, the hydrologists and civil engineers are developing European flood forecasting and flood risk management systems, and research in economics and sustainability is helping to decide policies to adapt and mitigate the impact of climate change.

These are just a few examples of the exciting new challenges faced by Earth System scientists. It is a diverse research area requiring interdisciplinary input to respond coherently to the growing concerns about environmental change. The University recognises this and with substantial investment has ensured that Bristol will make a difference. ■

The Natural Environment Research Council funds QUEST and many other projects mentioned here



re: Fossil Molecules see Climate Change

Rocks and sediments contain the chemical remains of the organisms that once lived in ancient oceans and lakes, just as they contain the mineral fossils with which we are all familiar. These 'biomarkers' can be used to reconstruct plant and animal assemblages living in past settings. Moreover, they can tell us something about the prevailing environment, since a biomarker's distribution and isotopic composition can vary in organisms, depending on the surroundings in which they formed. For example, when chemical compounds called alkenones are recovered from ancient sediments, they can be used to estimate the sea-surface temperature of ancient oceans.

Chemists Richard Pancost and Bart van Dongen are using a technique based on the carbon isotopic composition of algal biomarkers to reconstruct changes in atmospheric carbon dioxide concentrations over the past 100 million years. This is a time when the Earth's climate cooled considerably – a change thought to be driven in part by a decline in carbon dioxide concentrations. To try to pin down the timing and extent of this decline, they have teamed up with geologists to recover sediments from Tanzania that contain exceptionally well-preserved biomarkers. Results from this work will help them to better understand how current rates of change compare with those in the past. ■

This project is funded by the Natural Environment Research Council in collaboration with the Tanzanian Petroleum Development Corporation.