

# Science

By Clive Cookson

'It doesn't matter when you were born – in general, people get happier as they grow older' See page 50

## ENTOMOLOGY

### Insect treasures in an ancient amber setting

One of the world's most spectacular collections of prehistoric insects and other small creatures entombed in amber has been excavated from a lignite mine in India.

The discovery, from Cambay in Gujarat, has led scientists to revise their ideas about global biology in the era following the extinction of the dinosaurs.

The range of bees, flies, ants, termites and spiders fossilised in the 53 million-year-old tree resin shows that India – then an island continent – was biologically less isolated from the rest of the world than had previously been believed.

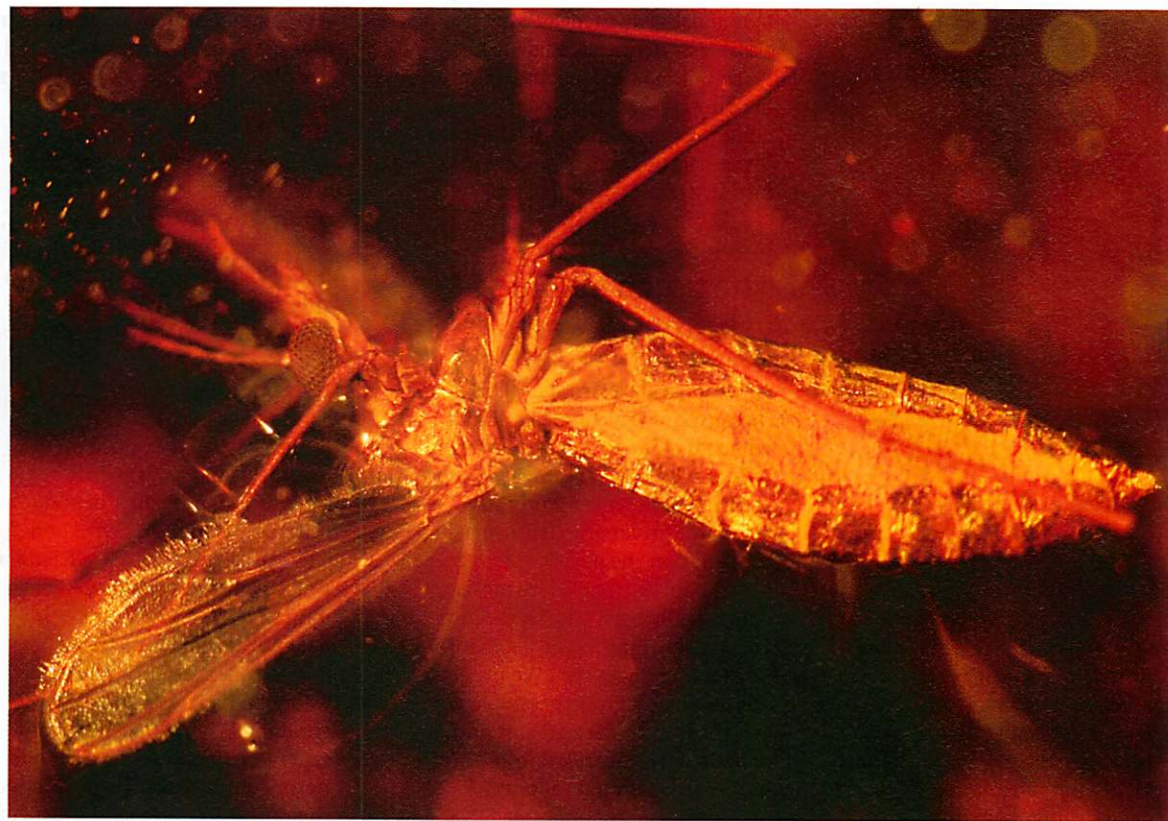
By the time the Cambay amber deposits were formed, what is now the Indian subcontinent had been separated from other land masses for 110 million years. Geologists believe it broke off from the ancient supercontinent of Gondwana 160 million years ago. And it had not yet collided with Asia.

But the palaeontologists who analysed the Cambay amber found that the creatures trapped inside it resembled those found elsewhere much more closely than expected. Very similar insect fossils from the same era have been collected in Europe and Central America.

"This indicates that there was a lively exchange of species before our amber formed," says Jes Rust of the University of Bonn. He believes that chains of volcanic islands on the border between tectonic plates – like Indonesia today – might have enabled species to mingle across continents by "island hopping".

The researchers found more than 100 different insect and other arthropod species in the 150kg of amber they examined. These are described scientifically in the Proceedings of the National Academy of Sciences.

The ancient living tissues were preserved much better than in the more familiar Baltic amber, where the outlines of insects contain little biological material. When the



A midge preserved in 53 million-year-old tree resin

scientists dissolved away the Cambay amber, they managed to extract whole bodies of insects that lived 53 million years ago, just 12 million years after dinosaurs became extinct.

Although the scientific examination of Cambay amber has only just started, the researchers do not expect to be able to extract genetic material from the fossils. Conditions would not have favoured the preservation of ancient DNA.

Besides the insects and other creatures trapped inside it, the amber itself was biologically interesting. Chemical analysis shows that it came from broadleaf trees called *Dipterocarpaceae* – a hardwood family that still makes up most of the forest canopy in tropical Asia. Scientists had not realised these trees evolved so long ago.

Sadly for Indian jewellers, Cambay amber is much softer than Baltic and Central American amber – too soft and sticky to be used for personal adornment.

### Who are the world's top young scientists? Students will be challenged to build their own living systems at an MIT international competition this weekend

The International Genetically Engineered Machine competition, known as iGEM, gives undergraduates a taste of the up-and-coming field of synthetic biology.

The student teams are given a standard kit of biological parts, or BioBricks, which are essentially DNA sequences of defined structure and function. The undergraduates then have a few months to design and create new living systems, by incorporating the BioBricks into living cells – usually bacteria.

Started with just five teams in 2005, iGEM has 130 universities from around the world taking part this year. Projects

have ranged from bacteria that smell of banana and wintergreen to a biosensor that detects the presence of arsenic.

Teams from British universities have always done well at iGEM. Last year Cambridge won the Grand Prize – for generating a rainbow of coloured pigments in bacteria – while Imperial College was judged to have the best manufacturing project, for designing a pill precisely targeted to release a drug into the large intestine.

Richard Kitney, chairman of Imperial's Institute of Systems and Synthetic Biology, is a great fan of iGEM. "The most exciting

thing is to see all these young undergraduates fired up with enthusiasm to carry on doing research," he says. "We have about 30 students doing PhDs or master's degrees [in synthetic biology] and almost all of them had taken part in iGEM as undergraduates."

This year, Imperial students have designed bacterial biosensors that detect a range of disease-causing parasites. Kitney is optimistic about his team's chances of winning another award but not complacent: "The projects get more complicated and the competition becomes tougher every year."