

In this issue

Forever amber

Like most Indian schoolboys I too had been taught that amber when rubbed against 'catskin', wool or silk gets charged with negative electricity and would attract light objects like bits of paper. This is often demonstrated in physics classrooms but the specimen used is never real amber but a substitute resin. Thales of Miletus knew of this peculiar property of this exquisite substance which has been described as 'the frozen tears of the gods'; the simple word for amber in Greek is *electron* from which is derived the word electricity. Strangely, amber is rarely seen in India.

Later when reading about gems, I learnt that amber was one of the very few prized gems of organic origin; and that its colour ranged from light yellow to brown to red. Amber is a fossilized resin and the older textbooks wrongly identified that the resin came from the pine tree *Pinus succinifera*, for which reason the gem is often called *succinite*. When a tree in which the resin had oozed, fell on the sea-shore, the tree itself disintegrated or decomposed over time, leaving the resin to fossilize. The largest deposits of amber are found in regions near the Baltic sea. Due to wave action of the sea the amber is washed into the sea; and being only slightly denser than sea water it is cast on to the shore again.

Little insects and leaves are often encapsulated in their original form inside in the fossilized resin. The preservation of these flora and fauna is attributed to the presence of compounds in the original sap which functioned as natural fixatives. One of the most exciting things that has happened in recent years is the

recording by George O. Poinar Jr. and Roberta Hess (*Science*, 1982, 215, 1241) of the ultra structure of preserved tissue present in the abdomen of a 40-million-year-old fossil fly embedded in Baltic amber. This was followed by the almost miraculous extraction and sequencing of the DNA from a leaf 25–40 million year old from Dominican amber and later from a weevil 120–135 million year old from Lebanese amber!

When I read an article entitled 'Insects in amber' in the *Annual Review of Entomology* I invited its author George O. Poinar, the pioneer in the field, to write an article for *Current Science*; and to discuss the possible occurrence of amber in India. Prof. Poinar most graciously agreed (see page 417).

When I wrote to Poinar, the film *Jurassic Park* had not yet come to India. Nor had I read the bestseller by Michael Crichton in which the acknowledgement says, 'Certain of the ideas presented here about palaeo-DNA, the genetic material of extinct animals was first articulated by Charles Pellegrino based on the research of George O. Poinar Jr. and Roberta Hess who formed 'The Extinct DNA Study Club at Berkeley'. Poinar's work suggested to Crichton the wildly imaginative idea that a modern generation of the extinct dinosaurs could be created using the latest cloning techniques, from the blood of these ancient creatures sucked by mosquitoes and which had got entombed in amber.

S. R.

The polymerase chain reaction

Most of us have heard of the story of the King who told his wily courtier

to ask for any reward he wished. The courtier, who worked part-time in the income tax department, asked for a grain of rice for the first square on a chess board, two for the second square, four grains for the third square and so on. Rumor has it that the King's descendants are still paying off the courtier's progeny. And you do not need to be a rocket scientist to figure out how much the king owed the courtier. Kary Mullis, then at Cetus, replaced rice with DNA and devised a method by which he could amplify extremely small amounts of DNA using what is called the polymerase chain reaction (PCR). PCR has changed biology for ever just as the discovery of the structure of DNA changed it and just as the recombinant DNA revolution did. In addition, it has had a large number of biologists cursing themselves for not having thought of the method. Many molecular biologists, from Bangalore to Bloemfontein were, at the time Kary Mullis went on a car ride with a friend and used his grey cells, using the Klenow enzyme and sequencing away. Any one of them could have thought of it, or could they? Once again, when everyone thought that only hard work could yield interesting results and that all cute ideas were exhausted, we are pleasantly surprised. Biologists were getting to be dull people who had forgotten that they were once admonished, by an outsider, not to confuse hard work with hard thinking. On page 421 S. K. Nanda and S. K. Jain review progress in the PCR world.

VR