

## In this issue

### Lilliputs survived mass-extinctions

The Permian mass extinction event – the ‘great dying’ – had almost numbed the pulse of life on Earth. It was the most devastating of all prehistoric mass extinctions, and occurred a quarter of a billion years ago, many million years before the age of dinosaurs.

The event comprised several extinction phases separated by thousands of years. During these phases, environmental fluctuations – biotic and abiotic – remoulded the Earth’s biosphere, making it inhospitable to life.

Acid rain splashed down. Food became scarce. Temperatures soared. Anoxia, oxygen deficiency, destroyed food chains. Competition between organisms increased as they scrambled for food. Volcanic magma engulfed entire landmasses. And an enormous volume of CO<sub>2</sub> was released into the atmosphere. *The precarious balance of the biosphere was disturbed.*

Life therefore diluted thin, resulting in a fungal spike; and only 4% of the biodiversity survived. These survivors, however, underwent several evolutionary changes that allowed them to confront the extremities of extinction.

One major evolutionary change observed in the survivors was that they were significantly smaller than their predecessors.

This within species evolutionary change is also known as the *Lilliput* effect. Thus, derived from the novelist Jonathan Swift’s six inch tall *Lilliputians*, the *Lilliput* effect alludes to a certain sense of ‘dwarfism’, and has been widely recorded in several prehistoric vertebrates, invertebrates, and plants.

A Research Communication, **page 1735**, cites one particular example of the *Lilliput* effect. The communication, by analysing the post-extinction fossils of different *Glossopteris* plant species, discovers a significant variation in size of several morphological traits. The leaf sizes of the survivors, for instance, were significantly smaller than those of the pre-extinction specimens. This evolutionary change, according to the study, perhaps allowed the plants to withstand lethal levels of SO<sub>2</sub>, and searing temperatures.

In conclusion, understanding mass extinction events through evolutionary clues such as the *Lilliput* effect enables us to deduce not only the biotic factors but also the abiotic factors that birthed certain life forms hundreds of millions of years ago.

Life forms of whose the *Homo sapiens* continues to be an inevitable manifestation.

### Why invest in Romania?

Globalization today is the thread that has sewn firm the fabric of the world. The world is becoming homogenous, and no longer can countries exist as independent islands. Cultures, ideas, and peoples from all corners of the world have started to intermingle like never before. The ripple of a pebble in one country can be felt at the opposite edge of the world.

In effect, globalization has become the great equalizer: ‘*Arguing against it would be like arguing against the laws of gravity.*’ And it appears that it is the markets of the emerging economies of the world, such as India, China, and Brazil, who are being most influenced by its force.

In India, for example, one particularly important ramification of this phenomenon has been the establishment of a fiercely competitive market. Companies are engaged in a ceaseless battle, trying to trump one another by striving to gain access to superior technology, cheap labour, and intellectual capital.

India, however, though endowed with resources, is simply too small an ecosystem for so many companies to thrive in. Their survival is constrained by limited access to resources, by societal pressures, and by investment laws. Consequently, companies aspire to invest in other countries through a cross border investment strategy known as foreign direct investment, FDI.

FDI over the last decade has become a major source of revenue for India. In fact, it is speculated that more than 2000 Indian companies plan on investing in foreign markets over the course of the next 15 years. Considering such an impetus of investment, a General Article, **page 1666**, presents the case of Romania as a possible investment target.

The study delves into the market atmosphere of Romania by discussing its strengths and weaknesses, and implicitly asserts that the forging of strong economic relationships between India and Romania could be advantageous to both in the long run.

### *El Dorado’s gold*

Hundreds of years ago, Spanish conquistadors drifted through the Amazon in

pursuit of a myth: *El Dorado*, the lost city of gold. Their quest was spurred by stories of great golden pyramids, of endless tracts of fertile lands, and of long rows of houses stacked against each other, home to thousands.

The conquistadors rowed deeper and deeper through the river; but the gold always eluded them.

Eventually, after many months, disease and exhaustion forced them to return empty handed. They had discovered no cities of gold but only humble tribal villages along the river. Little did these explorers know, however, these tribes were well versed in an ancient technology far more valuable than gold. A technology that had enhanced the agricultural produce several fold in a region whose soil had been leached of its fertility by the dense rainforest.

The technology of a disarming lump of black: a kind of charcoal, biochar.

Biochar, today, has been rediscovered, and its usage as a soil amendment is being encouraged primarily because of two reasons.

First, it significantly improves soil fertility (owing to its microporous architecture, it absorbs and retains water, stores micronutrients, and births a favourable niche for microbes). Second, and perhaps more important, it could ameliorate global warming.

Biochar is the only known practicable technology that can sponge up atmospheric CO<sub>2</sub>. Like charcoal, it is formed when biomass is burned in the absence of oxygen. But unlike charcoal, it is carbon negative, and therefore a veritable sink for atmospheric CO<sub>2</sub>. In other words, during its formation, it stores the carbon of the biomass in a stable form that is resistant to the decomposing action of microbes. This results in an almost 50% decrease in the amount of CO<sub>2</sub> that would have otherwise been released if the same biomass were decomposed in open air.

A Review Article, **page 1673**, discusses other such advantages of biochar, thus highlighting its potential as a green technology.

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