

work together confidently towards fulfilling them. Let us rededicate ourselves to the pursuit and attainment of excellence in technical education inspired by a sense of mission.

Let me conclude by a very appropriate quotation from a verse from *Gitanjali* of Rabindranath Tagore:

Where the mind is without fear and
the head is held high;

Where knowledge is free;

Where the world has not been broken
up into fragments by narrow domestic walls;

Where words come out from the depth
of truth;

Where tireless striving stretches its
arms towards perfection;

Where the clear stream of reason has
not lost its way into the dreary

desert sand of dead habit;

Where the mind is led forward by thee
into ever-widening thought and action-

Into that heaven of freedom, my Father,
let my country awake.

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Are we losing our heritage?

P. V. Sreekumar

Fragile ecosystems, aborigines and their traditional knowledge of the flora and fauna are apparently on the verge of extinction. The unique heritage on the lifescape of these pristine islands needs to be conserved.

Since the age of Darwin and Vavilov, the oceanic islands have been popular for their rich and diverse biological heritage. These strips of land masses isolated by vast expanses of blue waters quite distant from any biotic interference, proximal to adaptive radiation and optimum downpour were found congenial for organic diversity, endemism, evolution and speciation, they thus had biogeographical significance. Andaman and Nicobar archipelago with over 572 pristine islands, islets and coral reefs tells a similar story in a contrasting evergreen colour over the 'then turquoise blue' Bay of Bengal. Are these ideal heritage sites now intact, or are they under threat of extinction?

Stretching to a land mass of about 8293 sq. km, with a green cover of over 86% of it, and a coast line of 1962 km, this chain of islands runs almost parallel to Malay peninsula and shows marked affinities to that as well as to Burma, Malaya and Indonesia in its analogous elements of biodiversity. These tiny islands, possessing a warm-humid climate with an average rainfall of over 3800 mm, apparently look like rugged terrain, consisting mostly of undulating hillocks just emerged or lifted out of deep sea, the highest point being the Saddle peak of the North Andaman with an altitude of only 732 m. Saldanha¹ speaks of the hypothesis behind these emergent peaks being submerged

mountains related to the Arakan Yoma Range of Burma. The fragile ecosystems of these islands could be categorized into the forest, the marine and the mangrove.

Despite many exhaustive surveys to explore the rich biological resources of these islands, a comprehensive knowledge of their traditional wealth and genetic resources is ironically still lacking or yet to be catalogued. Out of the probable 2500 species of flowering plants occurring here, about 11% are endemic to this archipelago and another 11% are

economically important or otherwise useful to mankind². A recent census lists over 150 species of wild relatives of crop plants. Over 100 ornamental plants grow wild which could be domesticated and interpreted for further crop improvement as well as for aesthetic beautification programmes. On these tiny islands are found over 250 medicinal plants, 110 species of orchids³ and over 75 species of wild edible fruits. Moreover these islands have over 110 species of grasses, 80 kinds of underutilized vegetables, 50 species of



Nicobarese of Trinkat island construct their huts in a traditional way - Are we not losing this heritage now?



Onges of Little Andaman dig out tubers of *Tacca leontopetaloides* (L.) O.K. and substitute them for potatoes.



The aborigines of Nicobar islands relieve their 'pain of hunger' by chewing the endosperm of *Gnetum gnemon* L. – a tree species.

timber trees, 30 varieties of figs, 25 fibre-yielding plants, 20 species of lightwood for canoe making, 18 species of commercially exploitable canes⁴, 15 plants as piscicides and many plants with miscellaneous uses. It is feared that they may vanish from their natural habitats unless the relevant authorities do not curb the over-exploitation of resources, unsustained developmental activities leading to habitat alternations, expansion of agriculture and indiscriminate felling of forest, etc. Nair⁵ points out that during the last three decades, habitat loss of tropical forests in India is

so rapid that about 30% of Indian plants are in the twilight zone of extinction.

The ecological status and origin of the grasslands of the Nancowry group of islands were considered a puzzle by many workers. This peculiar park-like 'grassheaths' spread under an area of 10,500 ha (covering islands like Trinket, Camorta, Katchal, Teressa, Bom-poka and Nancowry) is also gradually diminishing. Unless atleast some of these grassland patches are protected from biotic interference like annual burning, overgrazing and conversion of forests into agriculture lands, planta-



A small population of *Bentinckia nico-barica* Becc. – an endemic and endangered palm in the Nancowry group of grasslands.

tion, these grassland ecosystems will slowly vanish.

The archipelago harbours 6 ethnic tribes, of which the Jarawas and Sentinelese are rather primitive and still hostile. The primitive tribes like Onges and Shompens are threatened with extinction, due to several known or unknown reasons. Nicobari lifestyle is a rare blend of tradition and modernity. they are well-known for their warm hospitality and instinctively protect and conserve biowealth. Nicobarese of Camorta and Trinkat islands, for instance, habitually start their day over a steaming cup of 'China grass tea'. Likewise, they often find pleasure in closing their laborious day or, at times, the occasional feasts, over a cup of the same tea.

Upon query it turned out to be nothing but fresh leaf blades of a *Cymbopogon* sp. The village chief further claimed that the same was a good refreshing tonic, gets rid of fatigue and also a powerful appetizer. The tribals often depend on nature for their day-to-day food, medicine and shelter. When they work hard in the forests patches, *Calamus andamanicus* Kurz quenches their thirst by its good amount of crystal clear sap and the fruits of the same and

Gnetum gnemon L. reduces their hunger. The Shompens and a few Nicobarese still depend on the fruits of screw pines (*Pandanus* spp.) for their staple food. The Onges dig out tubers of *Tacca leontopetaloides* (L.) O.K. and consume them as we do potatoes and Cassava. As stressed by Gadgil⁶, information for monitoring population of thousands of species of human significance needs to be continually collected from traditional knowledge.

Over an intensive study on the ethnic tribes of these islands, T. S. Naidu (personal communication) of Pondicherry University was alarmed that the 3 primitive tribes, viz. Onges, Great Andamanese and Shompens numbering 104, 37 and 187 respectively, were on the brink of extinction and our knowledge on their primitive and traditional

lifestyle would be completely wiped out from this world unless we take some steps to save these aborigines and their habitats from imminent extinction. Sami⁷ reports that the present population of Great Andamanese is decimated by pneumonia, syphilis and measles to just 20. The dwelling sites of these rare tribals are threatened by various calamities and are on high extinction risks. Thus there is an urgent need to take steps to conserve their habitats, flora and fauna.

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RESEARCH NEWS

The Permian mass extinction – Are the killers from outer space?

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The history of life is not necessarily progressive; it is certainly not predictable. The Earth's creatures have evolved through a series of contingent and fortuitous events.

– Stephen Jay Gould

It was decimation on an unprecedented scale – over 90% of marine species, 80% of vertebrates and more than 30% of insect genera vanished from Earth^{1,2}. Land plants were not left untouched either, and vegetation was hit to such an extent that their decay brought about supremacy of fungi thriving on rotting and dead wood over the continents for a brief geological span³. The close of Permian and early Triassic, the P–Tr times, about 250 million years ago (Ma), witnessed this orgy of destruction of the living species that had so abundantly evolved over the preceding 300

million years since the early Palaeozoic era. Though the march of life on Earth has been punctuated by bouts of such extinctions (at least 5 major ones during end of Ordovician, late Devonian, end of Permian, end of Triassic and end of Cretaceous, see Figure 1), the end Permian annihilation was the worst in the planet's history, pushing to the background the much worked out and publicized Cretaceous–Tertiary (K–T) event, 65 million years ago, that witnessed the exit of dinosaurs and other genera, to a mere 47%. Over the past few years, scientists have been examining various types of geological records and other tell-tale evidences to identify some of the possible mass killers, both earth bound and beyond; however, most of the suspected agents do not appear to be the perpetrators of the P–Tr extermination, when evaluated against 'taxonomic, physiological, ecological and biogeographic patterns of extinction'⁴.

Climatic changes, sea-level fluctuations, dissolved oxygen depletion in oceanic waters leading to anoxia and suffocation, enhanced carbon dioxide build up on land and water, volcanism and its after effects and, very recently, a killer asteroid from outer space, are some of the agents advanced to explain the P–Tr extinction.

Many researchers believe that the end Permian extinction was due to a certain chain of natural events affecting the chemistry of air, land and water. Their onset was supposed to have been triggered by mantle changes during that period. This had resulted in ocean spreading, parting of land masses and drop in sea level leading to emergence of continental shelf, all of which precipitated severe inland erosion and burial of vast amounts of soil and vegetation⁵. The abrupt shifts in ¹²C to ¹³C ratios found in the sediments of this age, due to the greater abundance of