On Charles Darwin and Madras

Àpropos the note entitled 'Annotations on India and Indians in *The Descent of Man* by Darwin' by Sri Kantha[1], the following information also, I think, would interest readers of *Current Science*.

Walter Elliott (1803–1887; later Sir Walter) who started as a civil servant in Madras and became the Governor of Madras in 1858, sent specimens of pigeons to Charles Darwin. Elliott distinguished himself as an archaeologist, and antiquarian, zoologist, botanist, linguist and orientalist. Elliott was the co-founder of the Madras Society for Literature and Science in the 1830s. Several of his articles on the anthropology of southern Indians have been published in the professional journal published from Madras, the *Madras Journal of Literature and Science*[2].

In his two-volume book *The Variation of Animals and Plants under Domestication*, Darwin[3] refers to specimens of the Indian Ground Tumbler, Indian Frill-back, Laugher and Nun, and a few plants sent by Walter from Madras as follows:

On Indian Ground Tumblers Darwin remarks: 'Sir W. Elliot, however, writes to me from Madras that he is informed that they tumble exclusively on the ground, or at a very small height above it. He also mentions birds of another subvariety, called the Kalmi Lotan, which begin to roll over if only touched on the neck with a rod or wand…From Madras I have received several specimens of the Common Tumbler of India, differing slightly from each other in the length of their beaks.'

On the Indian Frill-back, Darwin remarks: 'A specimen of this bird, in spirits, was sent to me from Madras by Sir W. Elliot. It is wholly different from the Frill-back often exhibited in England. It is a smallish bird, about the size of the common Tumbler, but has a beak in all its proportions like our short-faced Tumblers… Had this bird occurred in Europe, I should have thought it was only a monstrous variety of our improved Tumbler: but as short-faced Tumblers are not known in India, I think it must rank as a distinct breed. Probably this is the breed seen by Hasselquist in 1757 at Cairo, and said to have been imported from India.'

On the Laughers, Darwin remarks: 'A pigeon which seems to say *Yak-roo* is mentioned in 1600 in the "*Ayeen Akbery*" and is probably the same breed. Sir W. Elliot has also sent me from Madras a pigeon called Yahui, said to have come from Mecca, which does not differ in appearance from the Laugher; it has "a deep melancholy voice, like Yahu, often repeated". Yahu, yahu, means Oh God, Oh God; and Sayzid Mohammed Musari, in the treatise written about 100 years ago, says that these birds "are not flown, because they repeat the name of the most high God". Mr. Keith Abbott, however, informs me that the common pigeon is called Yahoo in Persia.'

On Nuns, Darwin says: 'Nuns are symmetrically coloured, with the head, primary wing-feathers, tail, and tail-coverts of the same colour, namely, black or red, and with the rest of the body white. This breed has retained the same character since Aldrovandi wrote in 1600. I have received from Madras almost similarly coloured birds.'

On the plants Darwin refers as follows: 'We have seen that according to Labat the vine and wheat require acclimatisation in order to succeed in the West Indies. Similar facts have been observed at Madras: "two parcels of mignonette-seed, one direct from Europe, the other saved at Bangalore (of which the mean temperature is much below that of Madras) were sown at the same time; they both vegetated equally favourably, but the former all died off a few days after they appeared above ground; the latter still survive, and are vigorous healthy plants". So again, "turnip and carrot seed saved at Hyderabad are found to answer better at Madras than seed from Europe or from the Cape of Good Hope".'

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2. Sewell, R., *Sir Walter Elliott of Wolfelee. A Sketch of his Life and a Few Extracts from his Notes*, Private Publication, Edinburgh, Scotland, 1896.
3. Darwin, C., *The Variation of Animals and Plants under Domestication*, John Murray, Albemarle Street, London, UK, 1868, two volumes.

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Conservation of pitcher plant

Mandal and Mukherjee[1] have discussed about the conservation of pitcher plant, *Nepenthes khasiana* Hook. f. The plant is endemic to Meghalaya, where it is found in different places of Khasi Hills, Jaintia Hills and Garo Hills[2]. The Khasi people call it 'tiew rakot', which means 'demon flower'; the Jaintia people call it 'kset phare' which means 'fly net with a lid' and the Garo name of this plant is 'memang koksi' which means 'basket of the devil'. The plant is used in the traditional medicine system in Meghalaya. The fresh juice of the pitcher is used in the treatment of asthma, kidney problems, night blindness, skin diseases and leprosy[2]. The juice is also used to treat urinary infection and blockade[3]. The Jaintia people use the juice of closed pitcher as ear drop in ear infections. The pitcher pounded to a paste with water is used in the treatment of cholera. As the traditional medicine system is popular in Meghalaya, a large quantity of this plant is used by the folk healers in the state. In Khasi and Jaintia Hills, about 1878 kg of pitcher is used annually in traditional healing systems[3]. In the Nokrek Biosphere Reserve, Garo Hills, over-exploitation of this plant for medicinal purposes has been identified as one of the causes for decrease in the number of its natural populations[5]. Though there is a report of cultivation of

this plant for medicinal use[3], mostly natural populations are destroyed for the purpose. The plant also has ornamental value[5] and seedlings collected from forests are sold in the market for Rs 20–30 per seedling[5].

Efforts have been made for the conservation of this rare, endemic and endangered plant. The regeneration capacity of this plant is good in its natural habitats[5] and there are many places where *Nepenthes* is still growing abundantly. However, due to habitat destruction, unsustainable harvesting and other factors[5,6], pitcher plants may disappear in the near future. The Government of India has already included the plant in the appendix-I of CITES and negative list of exports[7]. Protection of the plant in its natural habitat is one of the important conservation strategies. In Jarain area of Jaintia Hills, a pitcher-plant lake and a small reserve forest have been established for the purpose. The Baghmara Pitcher Plant Sanctuary has been set up in South Garo Hills. Tissue-culture approach has been utilized successfully by some workers for multiplication and conservation of *N. khasiana*[8,9]. However, the best method of conservation would be to protect the plant permanently in its wild by creating public awareness and involving local people in the process of conservation.

Pitcher and fruits of the Pitcher plant, *Nepenthes khasiana*.

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2. Lakadong, N. J. and Barik, S. K., In *Ecology, Diversity and Conservation of Plants and Ecosystems in India* (eds Pandey, H. N. and Barik, S. K.), Regency Publications, New Delhi, 2006, pp. 274–311.
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4. Jaiswal, V., *Indian J. Tradit. Know.*, 2010, **9**(1), 38–44.
5. Singh, B., Phukan, S. J., Sinha, B. K., Singh, V. N. and Borthakur, S. K., *Int. J. Conserv. Sci*., 2011, **2**(1), 55–64.
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Need for geological studies to probe land subsidence

Land subsidence is a worldwide problem due to withdrawal of material (gas and fluid) from deeper levels. Because of such withdrawal (water or oil) over a long period of heavy pumping, the pore pressure within the fluid-bearing rocks would diminish considerably. Simultaneously, the fluid level would sink, causing a vertical compression of fluid-bearing rocks. With reduction in pore pressure, the grain-to-grain load would become dominant, leading to compaction and eventually land subsidence.

The quantity of material removed through deep excavation for foundation must be equal to the weight of the planned structure. Similarly, the amount of gas or fluid withdrawn from the subsurface should be replaced with an equal quantity of gas or fluid to maintain the safety factor (natural balance) to reduce land subsidence. Otherwise, land subsidence could occur. This might be the main cause of human-induced activity.

Vertical sinking of a five-storeyed residential complex (Shyamala Sadan), up to its ground floor into the subsurface on 16 September 2011 in Kakinada, Andhra Pradesh, is a serious environmental issue of great concern.

The role of geological studies must not be ignored before commencement of heavyweight civil structures, because the subsurface geological conditions are not uniform within a short distance in any area. The geological tests would help knowing the nature of the soil – whether it is clay or sand, and rocks – whether they are soft or hard, with their mineral composition and texture, and their association with geological structures like joints, folds, faults, bedding planes, etc. Understanding the bearing capacity of the rocks would be essential to withstand the weight of structures. Generally, the bearing capacity of the rocks considerably reduces by increasing the weak zones in the geological formations.

Following geological tests, seismic survey should be done in the affected and unaffected areas of land subsidence to get a clear picture of the subsurface geological formations, and also the nature and extent of the hazards and the factors which promote, initiate and accelerate land subsidence, and know whether they are local or regional phenomena. These studies would help solving engineering problems before construction of heavy structures and also formulate effective strategies for mitigating risks to life and property.

The Kakinada incident is the best example of ignoring the role of geological study, while the news about the possible damage to the Taj Mahal due to gradual depletion of water level of the River Yamuna is worrying.

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