

## Zafar Futehally (1920–2013)

Zafar Futehally, whom one may think of as one of the foremost promoters of ‘Citizen Science’ in India, breathed his last at the ripe old age of 93 on 11 August 2013 at Kihim, south of Mumbai. Kihim is the site of a large number second homes of the scions of the Badruddin Tyabji clan, many of whom, like Zafar, distinguished themselves in public life. It was here that Salim Ali, a cousin of Zafar and his wife Laeq’s maternal uncle, had conducted his classic studies of the social organization and breeding behaviour of the Baya Weaver birds and of the role of birds in pollination. Badruddin Tyabji, the first Indian Chief Justice of the Mumbai High Court, was one of the founders of the Indian National Congress along with Allan Octavian Hume. Hume, a British Civil Servant has been called ‘the Father of Indian Ornithology’ and founded one of India’s earliest scientific journals, ‘*Stray Feathers*, a journal of ornithology for India and its dependencies’ whose first issue appeared in November 1872. The distinguished biochemist, Erwin Chargaff, who pioneered the understanding of DNA, is a strong advocate of a return to science by nature-loving amateurs in the tradition of Descartes, Newton, Leibniz, Buffon and Darwin – science dominated by ‘amateurship instead of money-biased technical bureaucrats’. Hume belonged to this genre, as did Salim Ali, Zafar’s senior by 24 years. Salim Ali was introduced to the scientific study of birds by his uncle, who was a member of the Bombay Natural History Society. This Society was founded in 1883 by six European and two Indian gentlemen interested in Natural history who proposed to meet monthly and exchange notes, exhibit interesting specimens and otherwise encourage each other. Birds, along with stars have attracted nature-loving amateur scientists since ages and the still vibrant Bombay Natural History Society has served a pivotal role in encouraging them and promoting their efforts over a long span of 130 years. Zafar, trained in economics and engaged in running his family business, was an enthusiastic amateur ornithologist since his young days. He very ably served the Bombay Natural History Society as its Honorary Secretary from 1962 to 1973.

All along Bombay Natural History Society has led nature conservation efforts

in India and Zafar emerged as a major figure in this movement. He was instrumental in the establishment of an Indian branch of the World Wildlife Fund and in the initiation of the Project Tiger. Throughout his life he continually interacted with Government authorities at the Center as well as in states of Maharashtra and Karnataka, urging them to take up various conservation measures. His approach mirrored that of Badruddin Tyabji, who, in his capacity as the third President of the Indian National Congress in 1887 had advised: ‘Be moderate



in your demands, be just in your criticism, be accurate in your facts, be logical in your conclusions, and you may rest assured that any propositions you may make to our rulers will be received with that benign consideration which is the characteristic of a strong and enlightened Government.’ While there were some who thought he was too tolerant of the powers-that-be, he was nonetheless quite effective and all fellow conservationists greatly respected his integrity.

Zafar was not only a lover of birds, but also of horses and of open spaces. His native Mumbai was getting too crowded for his tastes and so he shifted to Bengaluru in 1973. After living for a couple of years in a house next to the Raman Research Institute, where he began to cultivate the lively scientific community of the city, he shifted to a farm house set in an orchard at Dodda Gubbi outside the city where he personally maintained horses on whom he would ride into the town. In these spacious surroundings he entertained many a gatherings of nature lovers and conservationists, conducting bird watching trips to the local lake and organizing vigorous scientific discussions. Laeq, an avid gardener, and from time to time their two daughters, Shama and Zaida, all of them gifted writers,

greatly added to the charm of these gatherings.

Zafar was a great source of encouragement to younger amateur naturalists and professional scientists. When I wrote what was the first ever scientific paper on sacred groves the staid editors of the *Journal of Bombay Natural History Society* refused to publish it. Zafar, then the Honorary Secretary of the Society, intervened and saw to it that the paper was accepted. By now *sacred groves* has become an established field of scientific research, and Zafar’s timely intervention, with his broader outlook has played a valuable role in taking it forward.

But Zafar’s greatest contribution was the *Newsletter for Birdwatchers*. The *Journal of Bombay Natural History Society* had severe limitations as a medium for recording the observations of amateur scientists. Its editorial policies were rather rigid and it took several years before any contribution accepted for publication could appear in print. Zafar, who had been penning popular pieces on birds for many years, decided to remedy this situation and started a *Newsletter for Birdwatchers* beginning 1959. The *Newsletter* was cyclostyled, first by Zafar at his office in Mumbai, and then at the Indian Institute of Science when he shifted to Bengaluru in 1973. In this *Newsletter* were published, without much delay, a variety of bird related observations and checklists from all over India, quickly building up a valuable information base, and knitting together a community of naturalists. Zafar continued to edit the *Newsletter* till 2003, when some unfortunate disputes led to its splitting into two separate publications, the *Newsletter* and a bimonthly *Indian Birds*. In 2007, he edited and published an anthology of writings by Indian birdwatchers, ‘India through its birds’.

Today we talk a great deal of ‘*citizen science*’ (also known as crowd science, crowd-sourced science, or networked science) as scientific research conducted, in whole or in part, by amateur or non-professional scientists, often by crowd-sourcing. Formally, citizen science has been defined as ‘the systematic collection and analysis of data; development of technology; testing of natural phenomena; and the dissemination of these activities by researchers on a primarily

avocational basis'. It has, by now, become a powerful movement and bird watchers continue to play a significant role in this form of knowledge generation. The data on birds of United States, collected through Audubon Society's Christmas Bird Count, which began in 1900, has been compiled and analysed to yield many valuable insights such as those captured in J. H. Brown's 1995 book *Macroecology*. The Internet has been a boon to citizen science, and we have today a large number of websites that serve communities of citizen scientists. As expected, bird-watchers are by far the most significant component of this community; notable examples include: BirdSleuth K-12, birdsleuth.org; Celebrate Urban Birds, CelebrateUrban-

Birds.org; eBird, ebird.org; Great Backyard Bird Count, birdsources.org/gbbc; NestWatch NestWatch and finally India's own MigrantWatch, supported by the National Center for Biological Sciences in Bengaluru through the initiative of a young ornithologist, Suhel Quader.

Zafar was a large-hearted, highly cultured man, singularly devoid of any class, caste or communal prejudices. Despite his many achievements, which included the Vice-Presidency of the International Union for Conservation of Nature, Order of the Golden Ark, the Karnataka Rajyotsava award and the Padma Shri, he never thought of blowing his own trumpet. He had a large circle of friends from a wide diversity of backgrounds with whom he shared a love of

nature and whom he tried to help without any reservations. He was a man of genuine social commitments, focused on the conservation of nature and the study of the natural world. Regrettably, the cause of nature conservation that he espoused over his long life today appears to be floundering. But it is a tribute to him that the seedling of citizen science that he nurtured with so much affection seems to be thriving robustly.

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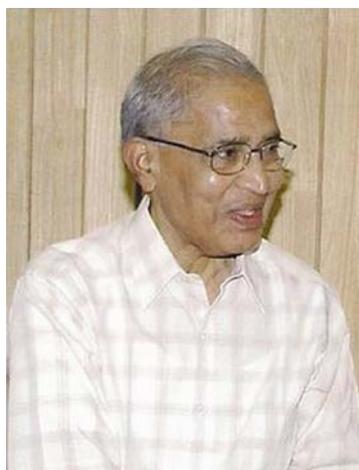
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## Vallurupalli Sita Raghavendra Rao (1931–2013)

During the silver jubilee of the Department of Crystallography and Biophysics, University of Madras in 1978, the Nobel Laureate Dorothy Hodgkin remarked in her presidential address that Madras (currently Chennai) is synonymous with conformation. This was a glowing tribute to the original contributions made on all the three biopolymers at the Centre. Madras school then was perhaps the only Centre that dwelt on the fundamental study of the conformational aspects of proteins, nucleic acids and polysaccharides. This is understandable as the group had taken the lead and recognized the universal applicability of the stereochemical methods for exploring the conformational properties of other biopolymers as well. Vallurupalli Sita Raghavendra Rao (V. S. R. Rao) led the polysaccharide group successfully through his pioneering contributions and steering conformational aspects of carbohydrates to new heights. He passed away on 26 September 2013 quietly, typical of his way of doing things.

During his postdoctoral tenure with Joseph Foster at the Purdue University, Rao published some important papers based on the experimental work on carbohydrates including the one in *Nature* (1963, **57**, 200). After this, G. N. Ramachandran chose Rao to pursue experimental line of studies on polysaccharides. Rao in fact built a functional light

scattering set-up. However, it was the good fortune of carbohydrate chemistry that triggered Rao into thinking about applying the computational methods to address some of the basic, unanswered



questions in carbohydrate chemistry about which he was very familiar. At that time, there was still a lingering question of whether D-glucose prefers <sup>4</sup>C<sub>1</sub> chair or one of the boat forms. It was argued by some of the notables that the former would be improbable for α-D-glucose in view of steric conflict that it would encounter due to the axial disposition of the glycosidic C–O bond with 1,4 linkages. Then there was the question of whether amylose chains exhibit helical or totally

random coil conformation in solution. While most argued for the random coil, Rao's NMR work during his postdoctoral tenure suggested that the chain is a random coil with helical segments. He wanted to employ computational approaches to resolve these and other unexplored avenues in carbohydrates.

Computational methods were evolving at that time, and the Madras group was making seminal contributions to polypeptide, protein and nucleic acid conformations. Perhaps inspired by the novel and successful approach to decipher conformational aspects of proteins at the Centre, Rao made the decision to switch to computational approaches. It was a learning curve for him and his first student (P.R.S.) had the benefit of learning the basics from C. Ramakrishnan. Apparently, Ramachandran was quite upset by this development, but reconciled when he recognized that Rao had advanced way ahead. In fact he joined as a co-author along with Ramakrishnan in the first research article by Rao and his student; it appeared in the proceedings of an international conference held in 1967 at Chennai, participated by luminaries such as Linus Pauling and Paul Flory. Being a total outsider, it was a great relief to Rao that Ramachandran reconciled; the other faculty members were either direct students of Ramachandran or he knew of them. Rao never looked