the Paul Siple Award (1971) of the Army, as also a commendation for technical writing – an ability quite visible in his contributions to *Current Science*.

On returning to India, Rao started to look at phonons in 'molecular' ionic solids, e.g. KNO_3. In systems with increasing number of atoms per primitive unit cell, the number of phonon branches increases and the experiments become more difficult due to lack of neutron intensity. Nevertheless, Rao pushed successfully into this area with tenacity – perseverance was another quality of Rao. To be able to do these experiments intelligently, Rao developed necessary theoretical framework and computer programs to find out the regions of the reciprocal space where intensities would be favourable. These calculations needed a sensible lattice dynamical model and he chose to use the so-called rigid molecular-ion model for the purpose. The generalization of this programme to all kinds of complicated structures formed the basis of his long-term plan of action for studying lattice dynamics in geologically important (e.g. Mg_2SiO_4) materials. This led Rao and his group (Chaplot, Narayani, Mala and Mittal) to perform collaborative experiments in a number of high-intensity neutron sources around the world to measure phonon dispersion curves and frequency distribution functions and predict thermodynamic properties. This was highly appreciated internationally, as it gave important insight into (phase) changes occurring in geological materials as a function of temperature and pressure. This programme was also used to try to derive a universal set of potentials for each element which could be used for any compound. Measurements were also made in a number of other compounds, including high-temperature superconductors, etc. Rao also initiated computer simulation studies of the atomic dynamics of a number of solids, partly with a view to examining non-harmonic movements of atoms, for example, in palladium deuteride among others.

In 1972, BARC announced plans to build the high-flux Dhruva reactor. A whole new set of opportunities would become available to the neutron scattering group, as it could now consider better designed beam tubes and spectrometers. A set of about a dozen spectrometers was conceived along with special beam-tailoring devices. All of this was to be locally designed for optimizing intensity and resolution. This was an important challenge, as over the next several years newer designs had to be tested and implemented. Rao played a substantial role in this major team effort consisting of more than a dozen scientists and technical personnel. In this short write-up I will not be able to do justice to his personal contributions to the instrumentation development for Dhruva neutron utilization. However, I should mention at least a few – the neutron guide tubes for cold neutrons with Madhav Rao, modular design for spectrometers and data acquisition systems with P. R. Vijayaraghavan and spin-echo spectrometer with S. L. Chaplot.

When the Dhruva reactor became available we put in major efforts towards making these spectrometers available to all universities through the Inter University Consortium for DAE Facilities and by the time of Rao's retirement in 1996, more than thirty university groups were performing experiments at Dhruva. This was another very satisfying period of working together. I also remember organizing the International Neutron Scattering Conference, NS-91, Mumbai, where we both worked closely together as Convener and Secretary. Quiet efficiency, which was the hallmark of Raghavendra Rao, was fully visible at this time and just in spite of the first Iraq war at the time of the meeting, and visitors apprehensive of travelling East, the Conference turned out to be a resounding success.

Rao became Head, Solid State Physics Division, BARC in 1990 and Director, Solid State and Spectroscopy Group in April 1996, from which position he retired later the same year. He was elected Fellow of the Indian Academy of Sciences in 1986 and Indian National Science Academy in 1989. After retirement, Rao moved to Bangalore and soon after was persuaded to take up the role of an Associate Editor of *Current Science*, which he did with dedication and distinction; his balanced write-up in *Current Science* on the issues involved in the Indo-US nuclear deal, was an excellent example of his clarity on the subject and his ability to express it in simple and clear terms.

Raghavendra Rao and Soni were good friends of ours. Soni was a perfect companion and strength to Raghavendra, and he found it extremely difficult to bear her loss. We will miss them both and I express this sentiment on behalf of all our colleagues and friends.

B. A. DASANNACHARYA

No. 4, Beach Resort CHS, Plot 1,
Sector 10-A, Vashi,
Navi Mumbai 400 703, India
e-mail: dasannacharya@mtnl.net.in