

Prof. R. Narasimha elected to the Fellowship of the Royal Society of London

Professor R. Narasimha, Vice-President, Current Science Association; President, Indian Academy of Sciences, Bangalore; Director, National Aeronautical Laboratory, Bangalore, has been elected Fellow of the Royal Society of London in March 1992, for his distinguished work in fluid mechanics and aeronautics, particularly on the problem of transition from laminar to turbulent flow, and the reverse process of 'relaminarization', and for the fundamental contributions he has made to the study of rarefied gas dynamics, of shock wave structure, and of the structure of the atmospheric boundary layer.



Dedicated scientist and teacher

An obituary of M. R. A. Rao

In the death of Prof. M. R. Aswathanarayana Rao on 24 May 1992, the scientific community of Bangalore has lost a dedicated teacher and research scientist who always strove for meticulous methodicity in his work.

Born in Gowribidanur, Kolar District, Karnataka on 7 November 1910, Rao had his university education in Central College, Bangalore. He received his BSc degree of the University of Mysore in 1930 with chemistry as one of the optional subjects. He came under the influence of B. Sanjeeva Rao, the then Head of Department of Chemistry, Central College, Bangalore, who recognizing the experimental skill of Rao, initiated him into research. Rao obtained his MSc degree in 1933. After a brief stay as a research scholar at the Indian Institute of Science (1934-35), Rao joined the Central College as a Member of Faculty of the Chemistry Department. There in 1941, he received his DSc degree of the University of Madras for his thesis entitled 'A new method for preparing unstable iodides'. In 1944 he was appointed as a Lecturer

in the then Department of General Chemistry, Indian Institute of Science, Bangalore, which was later named as the Department of Inorganic and Phy-



sical Chemistry. He became an Assistant Professor in 1953 and was appointed to the Professorial Chair in Physical Chemistry in 1957. He served as the

Chairman of the Department for nearly a decade till his retirement in 1971. During his Chairmanship, the Department of Inorganic and Physical Chemistry received recognition from the University Grants Commission as a Centre of Special Assistance. This paved the way later for the upgradation of the status of the Department as a Centre of Advanced Study in 1980.

Rao's early work in Central College, Bangalore, was concerned with the synthesis and characterization of unstable iodides such as sulphur moniodide, thionyl iodide and sulphuryl iodide. He also studied the reactions of many sulphur compounds in nonaqueous solvents and developed analytical methods for the estimation of elemental sulphur. This work demanded a high degree of experimental skill and design of innovative methods since there was virtually no instrumental facility available at that time for characterization of unstable compounds. In this task, Rao's excellent abilities as a glass blower came in handy to fabricate intricate glass and quartz apparatus required for his work.

Later at the Institute, he became interested in colloid chemistry, electrochemical preparation of several inorganic compounds such as sodium hydrosulphite and beneficiation of inorganic minerals (e.g. chlorination of phosphatic minerals, chromites and ilmenite; concentration of low-grade manganese ores by froth floatation). Adducts of ferric chloride with phosphorus oxychloride, $2\text{FeCl}_3 \cdot 3\text{POCl}_3$ and $\text{FeCl}_3 \cdot \text{POCl}_3$ were characterized by vapour pressure measurements using an all-glass Bourdon gauge. These adducts were identified as intermediates in the chlorination of ferric phosphate in the presence of charcoal.

Rao was deputed by the Institute to undertake a study tour in UK and Europe during 1949–50. Among the places visited by Rao, mention may be made of the University of Cambridge and Imperial College, London where he worked with H. J. Emeleus and G. I. Finch respectively. He gained first-hand experience of instrumental techniques such as electron microscopy and emerging research fronts such as high-pressure reactions involving technical gases, heterogeneous catalysis and polymer chemistry. On his return, Rao intensified research work in physical chemistry mainly in the areas of adsorption and catalysis in which he had an abiding interest even from his early career as a research student. The adsorption of argon, nitrogen, oxygen, hydrogen and carbon monoxide on iron supported on Kieselguhr and iron powders derived from the decomposition of iron pentacarbonyl was investigated. Detailed kinetic and mechanistic studies were carried out to gain an insight into the nature of the adsorbed species. The adsorption of carbon monoxide, hydrogen and a mixture of the two gases

on cobalt–silica and iron–silica catalysts with and without an alkali metal promoter was studied to elucidate the mechanism of Fischer–Tropsch synthesis of hydrocarbons from ‘synthesis gas’. Preferential adsorption of CO on both catalysts was observed. The formation of a carbene species of the type, $\text{M}=\text{C}(\text{H})(\text{OH})$ on the surface of the catalyst was postulated to explain the results. A notable accomplishment in the area of high-pressure chemistry was the synthesis of *sym*-di-*n*-alkyl ureas from aliphatic amines and carbon monoxide and that of *n*-propionic acid from CO, dioxane and water at high pressure in moderate yields.

Other research programmes undertaken by Rao’s group included direct chlorination of rubber latex by emulsifying it with CCl_4 at room temperature, determination of the spreading properties of natural rubber and its derivatives and light scattering and viscometric measurements on poly (vinyl chloride), poly(methyl methacrylate) and their copolymers to determine their size and shape as well as solvent effects on the properties of these polymers. Twenty students took their Ph D degrees at the Institute under the guidance of Rao. Much of the later work on adsorption and catalysis reported in the Ph D theses (available at the Institute library) was not published in scientific journals, thus precluding a wider dissemination of their importance.

Rao won several distinctions for his work in various aspects of inorganic and physical chemistry. He was elected a Fellow of the Royal Society of Chemistry London (then known as Royal Institute of Chemistry) in 1951 and a Fellow of the Indian Academy of Sciences in 1956.

Even after his retirement, Rao was

intellectually very active first as an UGC Emeritus Scientist (1971–73) and later as the Editor of *Current Science* for more than 15 years.

Those who studied under Rao remember him with great affection and high esteem. He was not only an excellent teacher but also a friend and philosopher who would guide the young students in their chosen careers. As a fresh research student of the Department of Inorganic and Physical Chemistry in 1962, I still recall vividly the lucid lectures that Rao gave on ‘statistical thermodynamics’. Rao endeared himself to the staff and students alike by his amiable and friendly disposition. What struck everyone was his imperturbable calm even in the face of grave provocations and his deft and tactful handling of ticklish situations in discharging his administrative duties. His organizational abilities were nowhere better evident than in his successful convenorship of the golden jubilee celebrations of the Indian Institute of Science, Bangalore in 1959.

Rao was a well-rounded personality typifying the best traditions of his generation. He was extremely sociable and kind at heart. A connoisseur of good food and tastes, Rao was a generous host and enlivened the conversations with his witty repartees and amusing anecdotes. How can any one, who has come into contact with him, ever forget his stentorian (but never rude) voice?

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Explorer of Himalayan mycoflora

An obituary of K. S. Thind

With the passing away of K. S. Thind, mycology in India has lost one of its stalwarts. Thind’s demise on 3 December 1991 at Chandigarh brings to an end a career of forty odd years in the pursuit of mycology. He was elected to the Fellow-

ship of the Indian Academy of Sciences in 1960. He was also a Fellow of the Indian National Science Academy (1968) and of the National Academy of Sciences (1958).

Born in the Punjab on 30 October

1917, Thind had his School education in Sultanpur Lodhi and higher education in the Panjab University, taking his BSc Honours (1939) and MSc Honours (1940) degrees from that University. He earned a first class throughout, and a