

## M. S. Krishnan: Geologist *par excellence*

A. V. Sankaran

Born in a humble family, brilliant academically both at school and college, recipient of associateship to pursue post-graduate studies in England (rarely given to Indians in the 1920s under the British rule), Doctorate in geology by the age of 26, direct appointment to a senior post (geologist), unthinkable in the then British dominated Geological Survey of India (GSI), rare distinction to chair as President of Geology Section of the then prestigious Indian Science Congress by 37 years of age (later to become President of its General Session in 1956), first Indian to head the Geological Survey of India, and to cap it all a national recognition – the award of *Padma Bhushan* from the President of India. The listing of achievements can go on, and few among Indian scientists – particularly from among the lesser-known clan – the geologists, can boast of such accomplishments as Mahara-japuram Seetharaman Krishnan, born on 24 August 1898. In fact, the name 'Krishnan' has become synonymous for *Geology of India and Burma*, the classic textbook and a 'bible' for every geology student in India. This important contribution perhaps was an inevitable upshot of his intermittent teaching stints, early in his professional life at various institutions like Presidency College, Madras (1920–21), Forest College, Dehra Dun (1928–30), Presidency College, Calcutta (1933–35), during which he realized the serious lacuna in teaching Indian geology – want of a comprehensive textbook for the students. So, when Cyril S. Fox, one of the great geologists of the GSI of his times, suggested that he write a book on Indian stratigraphy, it spurred his latent longing for the same and the result was the publication of *Geology of India and Burma* in 1943 and an abbreviated version of the same, *Introduction to Geology of India* in 1944. The popularity of the former book can be gauged by the fact that more than six editions have come out, besides a Russian version also.

Krishnan had made such an impressive mark by the time he was in his

thirties that he was invariably taken as a member in committees dealing with geological science and his advice and suggestions were sought. He served as a member of Coal Mining Committee (1936–37), Member of Indian Delegation to Empire Scientific Conference in England (1946) and United Nations Conference on Conservation and Utilization of Resources, New York (1949), Chairman of Committee on Conservation of Metallurgical Coal (1949–50) (when he suggested nationalization of coal mining), and member of several research committees, Fellow or Member of many learned societies and scientific



associations in India and abroad, and before he retired, served as Government of India's Mineral Adviser and Joint Secretary in the Ministry of Natural Resources and Scientific Research (1955–57). Soon after India's independence in 1947, Krishnan was deputed to United States to study methods in radioactive mineralogy and rare earth geology and this enabled him to initiate reconnaissance of promising tracts with a small team, which later separated to form the Atomic Minerals Division, of the Department of Atomic Energy. Insti-

tutions devoted to earth sciences, sought him for advice or to serve as their Head, positions he fully utilized for the betterment of the respective centres by upgrading facilities for study of ores, minerals and rocks and research activities. Thus, he was the Director of Indian Bureau of Mines (New Delhi) from 1948 to 1951, Director of Indian School of Mines, Dhanbad, during 1957–58, Head of the Geology and Geophysics Department, Andhra University, Waltair from 1958 to 1960, and was a moving force behind the beginning of National Geophysical Research Institute, Hyderabad, of which he was also the Director between 1961 and 63. His untiring involvement in geological studies and exploration earned for him laurels in India and abroad.

Krishnan's early years in GSI were in the company of such well-known giants of Indian geology like Lewis Fermor, C. S. Fox, J. A. Dunn, A. M. Heron, H. C. Jones, and J. B. Auden, who were known for painstaking fieldwork and observations which, in those days, were the backbone for geological inferences. Krishnan must have imbibed these basic tenets as exemplified in his work as a geologist in the GSI. He had carried out extensive mapping, spanning the years 1925–33 and 1937–38, in Gangpur, Bonai, Bamra and Keonjar (parts of present Orissa State) and made some pioneering observations on the stratigraphic succession here by identifying a separate stage in the geological sequence which he named 'Gangpur Series'. This work formed the well-known *GSI Memoir 71* (1937). This was followed, between 1943 and 47, by the investigations of iron ores, manganese ores, gypsum, mica, limestone and a host of other mineral resources of the erstwhile Madras Province (parts of present day Orissa, Andhra Pradesh, Tamil Nadu, and Karnataka) which formed the exhaustive *GSI Memoir 80* (1952). His tenure heading the Southern Regional office of the GSI in Madras also saw the birth and growth of the huge lignite deposit (estimated to be over 3000 million tons) in southern

India at Neyveli. Among his other distinguished contributions were his commentary on the distinct orogenic trends of the Archaean rocks in different parts of India and their correlation (*GSI Memoir 81*, 1953), the classification of various volcanic episodes, in particular, those within the crystalline complexes, and their interpretation in relation to tectonic trends. He had also contributed to the petrography of the rocks of Girnar and Osham hills of Saurashtra (now in Gujarat), about lateritization of the peculiar meta-sedimentary rocks called the khondalites, on the mineral resources of former Central Provinces and Berar (now forming parts of Madhya Pradesh), the geology of the Vindhyan formations of northern India, the Deccan traps, the Tertiaries of Tanjore (Tamil Nadu), and some interesting observations on some of the extinct rivers of the north (Indobrahm and Saraswathi).

Krishnan never rested on his laurels and had always explored avenues to keep Indian geology abreast with advances the subject had made over the years in the fields of mapping, exploration and basic studies and added new

sections in the GSI to cover them. His contemporaries and juniors at the GSI recall that he was modest in his bearing, and easily approachable and ever willing to recognize new thinking or ideas even when it came from the juniors. He was open-minded, unlike many persons of his age, position or brilliance, who often held dogmatic or prejudiced views. This attitude of his enabled him to spot talent and bring it up. For instance, early in his stewardship of the GSI, he realized the importance of geophysics in exploration geology, and lost no time to introduce it by tapping the expertise of noted contemporary geophysicists in the country to organize geophysical investigations. These moves resulted in proper evaluation of many of the promising mineral deposits of the period. The oil exploration in India, through the application of geophysical techniques like aeromagnetic, gravimetric and magnetic surveys was one among several successful projects to benefit from his vision. As the Director of GSI, his two other notable contributions to exploit economic mineral potential of the country were the mining of the lignite deposits at Neyveli overcom-

ing problems of huge aquifer and clay cover, and the resurrection of gold mining in Karnataka, particularly the boosting of the mining operations in Hutti.

India has been fortunate to have a person of the caliber of Krishnan at a time when the country, on the threshold of industrialization soon after independence, badly needed one who could organize and plan suitable surveys for some of the economic minerals and ores, and help to build proper infrastructure for their recovery. It is but fitting that Krishnan's lifelong dedication to Indian geology was recognized and he was honoured with the *Padma Bhushan* by the renowned President of India, S. Radhakrishnan, in January 1970. Eight months later, during a visit to his native village near Tanjore, he underwent an abdominal operation, but did not survive the surgery and breathed his last on 24 August 1970, on his 72nd birthday.

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## The spirit of a giant\*

G. Venkataraman

We are gathered here today to honour the memory of an outstanding scientist, a remarkable man, and above all a great son of India, who fifty years ago founded this Institute. There is nothing special about establishing a research institute. Many have done so and in this country itself two other institutes were started by eminent contemporaries of Raman, and around the same time too, give or take a few years – I am here alluding to the TIFR founded by Homi Bhabha, and the Saha Institute founded by Meghnad Saha. But Raman's act was unique in that he started this Institute

with his own money and his own savings. He did not take one paisa from the Government; indeed, he went out of his way to summarily reject a handsome grant that came to him on a platter even without his asking. That, in my opinion, is one of the remarkable aspects of the origin of this Institute. I doubt if there is any other parallel in this country, at least in this century. Perhaps the only other example could be the founding in 1876, of the Indian Association for the Cultivation of Science by Mahendra Lal Sircar; I leave you to speculate whether Sircar in any way provided Raman the inspiration.

There was an important reason why Raman rejected Government funds. It was not that he had plenty of money – far from it. He did not take Government

money simply because he did not want to be tied down in any way – one knows how skillfully the bureaucracy can tie one into knots, besides literally driving one crazy. Moreover, Raman wanted to be able to speak out his mind, which he did boldly and without fear whenever the occasion demanded. To me it is this extraordinary and defiant spirit of Raman that stands out prominently in his life, especially in the post-retirement period. Therefore, what I would like to do today is to try and capture for you glimpses of that great, rare and noble spirit.

### Life sketch of Raman

It is useful to begin with a thumbnail portrait of Raman. No doubt the story of

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\*Text of the Golden Jubilee Lecture, delivered on 7 November 1998, during the Golden Jubilee Celebrations of the Raman Research Institute.