

# Reminiscences

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It is a great honor, privilege and pleasure to contribute a note on my long association with the late Dr. M. S. Krishnan, eminent Indian geologist and earth scientist, in appreciation of his services to Indian geology.

Dr. Krishnan was a Geophysics enthusiast from the beginning and he was deeply interested in geophysics in which he had taken a course at the Imperial College of Science in London in the 1920's when he was a student there studying for a PhD degree in Geology. He had even then fully realized the importance and usefulness of geophysics as an efficient tool in the hands of geologists for subsurface geological exploration of economic minerals, groundwater and petroleum. When the Geological Survey of India, under the Directorship of Dr. C. S. Fox and later Dr. J. A. Dunn, initiated plans for the setting up of a Geophysics Unit in the 1940's, Dr. Krishnan who was then Superintending Geologist of the GSI in charge of the Madras Circle, lent his strong support to the proposal, and the Geophysics Division of the GSI was established in 1945.

Dr. Krishnan's textbook on the Geology of India and Burma, first published in 1943 has run into several editions is popular and widely used both in India and abroad as an authoritative reference book on Indian geology. The book has been translated into Russian. Krishnan has included in this book important results of geophysical work in India and other aspects of geoscience. Dr. Krishnan's writings were not confined to India but dealt with other parts of the world (reference: his paper on Island Arcs as an example).

I joined the Geophysics Division of the GSI in the beginning of 1946 as its first physicist, and Dr. Krishnan had from the very start took a keen interest in my work not only until his departure in 1955 from the GSI but throughout most of my career of 33 years in the Geophysics Division of the GSI. He very much appreciated my work especially in exploration for oil in the Cambay Basin of Gujarat and the eastern coastal sedimentary belt of Madras, and later in my work in geodynamics and tectonics under various international projects such as the International Upper Mantle Project, Geodynamics Project, etc., especially my work in the Deccan Trap region. During this period, I had a strong association with him as a fellow Member in the Central Board of Geophysics in which I had served as Secretary (1957-1962) and Executive Head of Office for its Geophysics Research Wing in Calcutta, and the Oceanographic Research Wing in Cochin which I had organized and set up in 1957 and which were developed subsequently by the CSIR as the National Geophysical Research Institute in Hyderabad and the National Oceanographic Institute in Goa.

Dr. Krishnan was not only an authority on the structure and tectonics of India, but was considered as its foremost economic geologist at that time, and for a term served as

one of the editors of the prestigious Journal 'Economic Geology.' Indian Economic Geology owes its development to Krishnan who was responsible for guiding large, field party surveys and training young geologists of the GSI. As one of the eminent Indian geologists, he had several foreign friends and admirers, like Tuzo Wilson of Toronto, Buddington and Foss of Princeton, Morrison of Berkeley, in addition to several friends in Europe and England. In India, Dr. Krishnan had many distinguished friends and contemporaries among whom may be mentioned Dr. D. N. Wadia, Sri. B. Rama Rao (formerly Director of the Mysore Geology Department and President for several years of the Geological Society of India), L. Rama Rao, Dr. C. S. Pichamuthu, Prof. C. Mahadevan, Dr. B. P. Radhakrishna and several others in the geology profession, and Dr. K. R. Ramanathan and Prof. Bhagavantham among geophysicists and fellow members of the Central Board of Geophysics of which Dr. Ramanathan was the Chairman.

Dr. Krishnan and I were also members for about eight years of the Geological and Minerological Research Committee of the CSIR under the chairmanship of Dr. D. N. Wadia, to consider and scrutinize various proposals for research projects for funding assistance by the CSIR. Dr. Wadia used to praise Dr. Krishnan for his work in assessing proposals in a thorough manner.

Dr. Krishnan took charge of the CBG at Calcutta from me as its Director in September 1961 when we shifted the CBG to its new rented premises on Brabourne Road in north Calcutta where he had his office. It was a great pleasure and honour for me to have him as my guest in my residence in Belvedere during this period of his stay in Calcutta as we could discuss all matters pertaining to the CBG and its two research wings. The CBG was shifted to Hyderabad early in 1962 and redesignated as the Geophysics Research Board with Dr. K. R. Ramanathan as Chairman and myself as Member Secretary. I had served the CBG from 1957-1962 as Executive Head of Office in addition to my duties as Chief Geophysicist of the GSI.

During the year 1961 when Dr. Krishnan was in Calcutta with me, Prof. Thacker invited Prof. J. Tuzo Wilson to visit India to study the teaching of geology and earth sciences at various centers, universities and institutes in India and to advise the Government, especially on the proposed setting up of a Central Geophysical Research Institute. It was during this period when Dr. Krishnan was in Calcutta with me that Prof. Wilson visited Calcutta and lectured at the Geology Department at the University of Calcutta, and visited the GSI and our Geophysics Department and its research laboratory along with Dr. Krishnan. He had high praise for our work, and both Prof. Wilson and his wife Mrs. Isabel Wilson who had accompanied him, spent a few pleasant days with us. On one of the days, Prof. and Mrs. Wilson had lunch with Dr. Krishnan and myself. The two eminent geologists exchanged notes on their experiences and reminiscences with their friends abroad at international conferences, etc. It was an enjoyable occasion in the course of which we talked about several topics. All this is chronicled in "The Indian Excursion" written by Mrs. Isabel Wilson and published in 1964 by Heinemann, London, a very interesting and thoroughly enjoyable book.

Just as I had known Dr. Krishnan for more than three decades, I had also known Prof. Wilson for several years since the early 1950's when I was a student at St. Louis University under Prof. James B. Macelwane, renowned geophysicist and seismologist.

Prof. Wilson was a good friend of Prof. Macelwane and had sent one of his bright students G. D. Garland, who was a fellow student with me, for research under Prof. Macelwane. I had visited the University of Toronto at that time and met Prof. Wilson and his laboratory staff. Prof. Wilson visited India in the 1960's during the International Upper Mantle Project and my collaboration with him continued since then and also after I came over to the U.S.A. in 1984. He had appreciated my work and contributions under the International Upper Mantle Project. Prof. Wilson was one of the foremost earth scientists of his time and a chief architect of the Plate Tectonic theory; his famed postulate of transform faults, published in Nature, was the forerunner of the present Plate Tectonic theory. While Dr. Krishnan was my mentor in geology and tectonics, so was Prof. Wilson in earth physics, geodynamics and tectonophysics.

Dr. Krishnan moved to Hyderabad early in 1962 with the staff of the CBG and its Research Wing. Prof. Thacker had by that time appointed a Planning Committee for the Central Geophysical Institute under his chairmanship and with Drs. Ramanathan, Krishnan, Bhagavantham, L. Venkata Krishna Iyer (Chief Engineer of the Andhra Pradesh PWD) and myself as members to plan the organization of this Institute. The committee for setting up the Institute had a couple of meetings in Hyderabad. It was decided to name the Institute as the National Geophysical Research Institute and Mr. Venkata Krishna Iyer was requested and authorized to procure the necessary land for the building of the new Institute at Hyderabad from the Andhra Pradesh Government which had already gladly agreed to donate land for the Institute. The Oceanographic Research Wing at Cochin developed as a separate unit of the CSIR as the National Oceanographic Institute at Goa.

Dr. Krishnan had extended to me a standing invitation to stay as his guest at his residence in Hyderabad which I readily accepted as it provided both of us opportunities for discussions of the program and work of the Institute, and applications of geophysics to various geological problems in the country in general in which he was deeply interested. Work on the building of the NGRI was promptly taken up. Prof. Thacker and Dr. Krishnan had both urged me to join Dr. Krishnan as his deputy, eventually to succeed him on his retirement. But this could not happen as my department "the GSI" could not release me. I did not mind this at all as I was quite happy to continue in the GSI where I had another 15-16 years of service and complete the development of the Geophysics Division of the GSI as its Head, which was a very interesting and rewarding task. It was during one of these visits of mine to Hyderabad that a proposal for setting up an Indian Geophysical Union (IGU) on the lines of the American Geophysical Union was made at a meeting held in Dr. Bhagavantham's house which was attended by Dr. K. R. Ramanathan, Dr. Krishnan, myself, Dr. P. R. Krishna Rao (Director General of the Meteorological Department) and Dr. S. Balakrishna. At that meeting it was decided to constitute the IGU, and the program and outline of its functions were drawn up and circulated among all the leading geoscientists in the country and speedily approved. The IGU was set up towards the end of 1962 with Dr. Ramanathan as its first Chairman with a two-year term of 1963-1964 with a council of members to assist him. The IGU soon instituted a Gold Medal in 1963 in honor of Dr. Krishnan "the Krishnan Gold Medal" to be awarded annually to a geoscientist below forty years of age for outstanding contributions.

Dr. Krishnan was honoured by his friends, admirers and fellow scientists in 1962 on his attaining 64 years of age at a special function at Osmania University which was well-attended and presided over by the President of India Dr. S. Radhakrishnan, who presented him with a special volume to which many scientists from India and abroad including Prof. J. Tuzo Wilson had contributed. I also had the privilege of making a contribution to this volume.

Dr. Krishnan retired in 1963 on superannuation from the CSIR at the age of sixty-five. Thereafter, he spent some time teaching geology at the Department of Applied Geology in Osmania University, Hyderabad, for a short period. Then he finally retired to his residence in Hyderabad, where he continued to take active interest in geology and the geosciences until his passing away rather suddenly and unexpectedly in 1970 at his native village in Tanjore, Tamil Nadu, while on a visit there after developing a serious intestinal complaint.

In this note I have endeavoured to recall and recount some of the main events of my association with Dr. M. S. Krishnan. He was a Fellow or Member of several important scientific bodies in India and abroad, and was also the recipient of several honors and distinctions including "Padma Bhushan" from the Government of India, all of which he wore lightly. He was a simple man with a generous disposition and singular magnanimity of heart. Although he was a strict disciplinarian and hard taskmaster, he was very pleasantly disposed toward all his colleagues, and geologists and geoscientists of the younger generation to whom he was easily accessible and always helpful in discussing with them freely their problems. He had a very good sense of humour and was always pleasant, kind and courteous to his friends and fellow scientists. Dr. Krishnan's contributions were prolific and wide-ranging. He was a giant in geology and his contributions to geology especially in stratigraphy, structural geology and tectonics and economic geology were prolific, profound and wide-ranging. Though he was primarily a geologist, he had a good grasp and knowledge of related disciplines of earth sciences such as geophysics (besides tectonophysics), geochemistry, geochronology, etc., as reflected in his publications. His publications are still used widely as a reference and source both in India and abroad. Future generations of students of Indian geology and professional geologists and geoscientists will continue to draw inspiration from his example, books and publications for many years to come.