

## NITTALA KRISHNA BRAHMAM (1936-1997)

Interested in the tracing of ancient impact structures, I found that Krishna Brahmam of NGRI was the first to make the suggestion that the Cuddapah basin, a prominent Proterozoic sedimentary basin, was the effect of a giant asteroid impact. This was in 1984 when Krishna Brahmam had put in a service of nearly seventeen years at NGRI, being one of the earliest scientists to be recruited to the organization. I had been seeing Krishna Brahmam off and on during my occasional visits to Hyderabad and it struck me as strange, that this brilliant scientist, who had played a key role in the preparation of the first gravity map of India



and had other important contributions to his credit, had not become the leader of any group and, was nowhere near the senior position in the organization.

Reading through his contributions, which had great relevance in understanding the geological evolution of the country, I felt that here was the case of a scientist who had been unfairly treated, and that there was need to put on record, in a correct perspective, his life and work to enable readers to evaluate his work and accord him the recognition he deserved.

### *Family History and Early Education*

Before attempting such an evaluation, I should like to present a brief background of his family history and early education.

Nittala, where Krishna Brahmam was born, is a seaport town in the East Godavari District of Andhra Pradesh. The deltaic regions of Krishna-Godavari in the north and Cauvery

in the south are inhabited by persons of extraordinary culture. Scholars of early vedic times, nourished on the banks of the Saraswati until it showed signs of drying up, migrated eastwards by land and southwards by sea-route and settled down at different points close to the coastline where the land was fertile and water was available in plenty. The Kalinga, Pallava, Chola and Pandyan kings of these regions were great patrons of learning and endowed rich lands to the scholarly newcomers, enabling them to settle and pursue their intellectual avocations. The Thanjavur valley on the banks of the Cauvery, and the Krishna-Godavari delta in Andhra Pradesh along the east coast, thus came to be recognized as centres of culture with some of our greatest intellects in arts and science hailing from these regions.

The ancestors of Krishna Brahmam, well versed in the Vedas, were originally from Kuchipudi in Krishna District. Nittala Muthanna, grandfather of Krishna Brahmam, migrated to Pithapuram near Kakinada, another seat of learning and patronized by the Raja of Pithapuram. Krishna Brahmam's father, Nittala Venkata Chalapathi Rao, started his career as a medical practitioner, is believed to have earned a name as a well-known doctor at Pithapuram and was drawn, like many others of his day, to the freedom movement. He married Veturi Subbalakshmi, from whom he had two sons, Jayaram being the elder and Krishna Brahmam the younger.

Krishna Brahmam was born in 1936 at Kakinada, but lost his father when he was just three years old and was brought up by his maternal grandfather, Veturi Krishna Brahmam, who had distinguished himself as a well-known lawyer. He fought for the rights of the Maharaja of Pithapuram and it is said that his arguments were so good that they found a place in textbooks of Indian law. His two sons also became noted personages, Veturi Kameswara Rao as a Judge of the High Court and Veturi Ramakrishna Rao as a distinguished Professor of Applied Physics in Andhra University.

Krishna Brahmam seems to have had a lonely childhood, his only hobby being reading, excessive indulgence in which also impaired his eyesight in later years. He had an excellent educational record and by the time he left college at Vizianagaram he was known for his scientific acumen as well as wit and humour. For reasons best known to him he chose geophysics for higher studies and came under the

tutorship of M.S. Krishnan, who, after a distinguished service in the Geological Survey of India had accepted a faculty position in Andhra University. His other professors were Sundara Rama Rao and V. Bhaskara Rao and Krishna Brahmam emerged from college as a bright student.

#### *Work at the National Geophysical Research Institute*

The National Geophysical Research Institute (NGRI), had come into existence in 1963 as part of a scheme of promoting National laboratories in different parts of the country under the banner of the Council of Scientific and Industrial Research. Krishna Brahmam jumped at the opportunity by enrolling himself as a scientist in this new organization, which before the new magnificent campus in Uppal Road came up, had started functioning from a couple of residential blocks at the nearby Regional Research Laboratory. Hari Narain, who took over from M.S. Krishnan as the first Director, had the vision to select some of the best men in the field of geophysics for staffing the different sections of the Institute. It was here I first met Krishna Brahmam, who was at that time busy compiling the first gravity map of India.

I have been a frequent visitor to NGRI since its inception and every time I saw him he had a roll of maps and was having serious discussion with his colleagues. Other persons, recruited at about the same time as Krishna Brahmam, rose to higher positions, but there was no change in his own status. This greatly surprised me because I had ranked Krishna Brahmam as a bright geophysicist bubbling with new ideas. He was utterly straight forward in his expression to the point of being blunt and at times even rude – qualities that did not endear him to the powers that be.

His work at NGRI was marked by inspiration and bold thinking. Gravity data available in India was then scanty and the little information that could be gathered was scattered and no meaningful maps were available at desired scales for aiding mineral exploration. The production of a gravity map of India by Qureshy, Krishna Brahmam and others was a big achievement and Krishna Brahmam played no small part in achieving this. The first upper mantle symposium held, in 1973, brought together geologists, geophysicists and geochemists on the same platform. It was the first attempt at exposing Indian scientists to the enormity of similar work being carried out in the rest of the world and gave a tremendous boost, especially to Precambrian Research, in India. The publication of the result of the gravity studies in India by the group in the Proceedings of the Royal Society was a bench mark paper which was followed, soon after, by the study of gravity

anomalies of the Godavari basin establishing clearly its rifted character. This work was published in the Bulletin of the Geological Society of America and was soon followed by Gravity stations established in India by the NGRI, a publication which has proved useful to all subsequent workers. Krishna Brahmam in 1987 was also responsible for bringing out the Bouguer gravity map of Cuddapah basins on a scale of 1:250,000 together with an informative brochure.

Another important publication (1973), along with J.G. Negi, later to prove significant in establishing the seismic susceptibility of south India, was that which appeared in *Geophysical Research Bulletin* (v.12, pp.65-80) entitled 'Rift Valleys Beneath Deccan Traps'. The damage attributed to the Koyna and Latur earthquakes have been attributed to reactivation along this buried rift in the trap basement.

I recall a paper submitted by him and his wife Sakuntala, in 1984, to the Journal of the Geological Society of India on 'Diamond Mines near Raichur'. This intelligent conjecture made in 1984 and based on the study of old historical records was a good piece of work and has in fact led to the recent re-discovery of a new diamond field in this area.

#### *Impact Origin of the Proterozoic Cuddapah Basin*

Krishna Brahmam was probably the first to suggest an impact origin for the formation of the oval shaped Cuddapah Basin, in a workshop held at Hyderabad on the Purana Basins of India (1984). This was later expanded as a Research Note entitled 'A meteorite impact theory for the initiation of the Cuddapah'. This was a bold suggestion at that time and was cogently argued, supplemented by geological and geophysical evidences. No serious notice was, however, taken of this original observation. The occurrence of one of the largest deposits of barite at Mangampeta, the occurrence of India's largest chrysotile deposit, the presence of wide dissemination of uranium and dykes of kimberlitic affinity, all pointed to similarities with the Sudbury structure of Canada. He ascribed the intense shattering of the region for the presence of dyke swarms all-round the basin. The identification of numerous sills and intermittent effusion of basic lavas, pelley tuffs and welded tuffs supported the impact origin. Being a geophysicist, he was particularly struck by the almost circular regional gravity 'low' and the residual gravity 'high' with an amplitude of 55 mgal and used this to support the impact origin for the basin. More and more scientists are subscribing to the impact origin of Precambrian sedimentary basins and the credit of recognising an important sedimentary basin in India as the result of an asteroid body should go to Krishna Brahmam.

It is unfortunate that no one took serious note of this observation and the suggestion remains on paper without any attempt at further study

His last publication was in 1993 on 'Gravity in relation to crustal structure, palaeosutures and seismicity of southern India (south of the 16th parallel) published in Mem Geol Soc India (No 25, pp 165-201), a piece of work marked by keen observation, wide acquaintance with literature followed by rigorous thinking

A little encouragement during the palmy days of his research would have very probably reactivated his inner strengths and made him come out with more such radical suggestions. Such recognition, however, was not forthcoming, nor was he, the recipient of any award and promotion in service was denied, with the result that his genius withered and wasted itself in an inhospitable atmosphere

Although his official service did not merit any recognition it is a satisfaction to know that his domestic life was happy. He married, in 1964, Sakuntala, who hailed from the Sonni family, well known for scholarship. They had two children, the first in 1969, a boy named Chalapathi Rao, and second, a girl named Lakshmi in 1972. Sakuntala was an accomplished teacher and researcher, chose 'Travels of Tavernier and Thevenot in the Golconda Kingdom a Critical Study' as the subject for her dissertation, and was awarded the M Phil degree of Osmania University in 1980

I understand that Lakshmi had a bright academic career and, after mastering Computer Science joined the Tata Consultancy Services. She married Srinivas in 1995, and the two live with their daughter in Mumbai

Chalapathi Rao, the elder child was also as brilliant, graduate in geology from Osmania University and secured the coveted Cambridge-Nehru scholarship for higher studies at Cambridge. He had in his application stated his desire to study the Indian kimberlites and lamproites. Krishna Brahmam had not been earlier consulted and was greatly impressed by the special efforts made by his son without any assistance from him

Meanwhile Krishna Brahmam had become the victim of the dreaded disease of lung cancer. Although he knew that his last days were getting nearer he never slackened in his work and went on attending to work till the last and when I saw him during this time he did not give the impression of

being bowed down by illness. He passed away in 1997, a year after his retirement from service. His son, who was then at Cambridge, rushed to his bed side and was able to show the ailing father the copy of his doctoral thesis submitted to Cambridge. The father was very proud of his son — the recognition accorded from a great seat of learning cheered his last moments and he passed away peacefully. Krishna Brahmam was the most loving of parents and a true friend to his children

Chalapathi Rao very much wanted to serve in the same institution as his father, but the same baleful influences which had blocked the career of his father were still active and prevented the son from getting a suitable position. He thus had to seek his future elsewhere with his ambition blunted by the initial set back he had received

Writing about Krishna Brahmam makes me painfully aware of the system prevailing in this country which ignores merit and fails to encourage young talent but, at the same time I marvel at the education system prevailing in Cambridge and other great Universities of the West always seeking originality and merit and going out of the way to encourage talent. Nearly a hundred years ago, it is the same Cambridge university which extended its helping hand to an ordinary clerk in a port trust, but a mathematical genius, paid him his travel expenses, installed him in Trinity College and gave him an honoured position. An atmosphere was created there for the flowering of his genius, so that within two years Srinivasa Ramanujan who was a nobody in the country of his origin, was elected a Fellow of the Royal Society, the greatest honour that can be conferred on a scientist. Can we ever imagine such a thing happening in the setup prevailing in our country? Krishna Brahmam's life story that I have attempted, should make us pause and ponder on the narrow mindset that plagues our institutions of higher learning

I am told that on the entrance door at the University of California is written in bold letters — 'Give me men to match our mountains'. Will we ever reach such a stage?

Krishna Brahmam, like every other human being, had his failings, needs, temptations and stresses. I had met him only on a few occasions but felt that he was a man worthy of love, respect and admiration

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