Khadg Singh Valdiya (1937–2020)

Until the fateful evening of 29 September 2020 when he passed away, Prof. Khadg Singh Valdiya – scholar, explorer, field geologist par excellence, science communicator and a true son of the magnificent Himalaya stood tall as a living legend among geoscientists of India. In the early years following India's independence, Valdiya led the way to study the geological complexities of the evolution of the Himalaya, and remained a dominant name to reckon with in this area of knowledge; notwithstanding his many other pursuits and roles for a little over six decades. With his ability to untiringly wield the pen that resulted in a tally of 20 books both in English and Hindi, and also the ability to captivate audiences by his powerful delivery of popular and scientific talks, Valdiya was a source of inspiration, strength and confidence for his students as well as for many generations of geoscientists across the length and the breadth of the country. He was a proud geologist and instilled a sense of pride in the practice of the profession. In this connection, I cannot but help recall his emotional article titled 'The tragedy of being a geologist' published in *Current Science* in 2012, the content of which strongly resonated in the minds of Earth scientists. His unwavering commitment to geological researches of mountain belts, more particularly the Himalayan orogen, was borne out of a deep sense of love, belonging and identity with the Kumaun Himalaya. Apart from his geological researches, Valdiya developed a keen interest on issues of societal relevance such as environment and development of the hilly regions, and the connections between the land and peoples of his home territory, Kumaun.

Undoubtedly, Valdiya's innumerable scientific and popular science contributions will continue to influence young minds and professionals who in future embark on journeys of exploration of the Himalaya, and in unravelling its geoscientific mysteries and complexities. Although deeply rooted in the geological sciences, his was an instinctively multi-faceted personality, and he made several forays into the environmental sciences and into prehistory in his long career.

Valdiya's demise has created a void in the geosciences community which will be hard to fill.

Born to Deb Singh Valdiya and Nanda Devi on 20 March 1937, in Kalaw, Myanmar (Burma of those times), young Valdiya grew up in the hills of Kumaun and went to different schools in Pithoragarh. He then went on to pursue higher studies in Lucknow University from

1953 to 1957, and obtained the BSc (Hons) and MSc degrees in geology from that institution. The Geology Department at Lucknow University in the late fifties under the leadership of late Professor R. C. Misra had developed as a centre of geological research on the Vindhyachal as well as the Kumaun Himalaya. The young Valdiya embarked on a teaching career as a Lecturer in his alma mater, and served that institution until 1969, barring a stint as Fulbright Fellow at John Hopkins University, USA, where he was mentored by the legendary sedimentologist of those times – Francis J. Pettijohn.

During his tenure at Lucknow University, Valdiya immersed himself in investigating the geology of the Kumaun region; these studies earned him the doctoral degree from Lucknow University in 1964. As chance would have it, India hosted the 22nd International Geological Congress in Delhi in 1964. This mega-geological event of international significance and prestige afforded the opportunity to budding Valdiya to share his recent researches of the Himalaya, and the Kumaun Lesser Himalaya, in particular, with the leading national and international geoscientists. He presented three papers which were later published in *Proceedings of the International Geological Congress*. At that time, these were seen in some ways as path-breaking studies on the tectonic design and evolution of the Himalaya. The focus of one of these three papers was on the fossiliferous formations of the Lesser Himalaya and their correlation. In those early years, Valdiya also studied the origin of magnesite deposits of southern Pithoragarh; and additionally dwelt upon the origin of phosphorite in the Late Precambrian Gangolihat dolomite of Pithoragarh. These studies were noticed by late Dr D. N. Wadia, the country's most influential geologist of those times. From then on, there was no looking back for the young Valdiya. He moved as a Reader to the Geology Department of the University of Rajasthan, located then at Udaipur. But destiny had ordained that this was to be a brief interlude in his academic career.

Another development that took place at about that time was the seeding of the Institute of Himalayan Geology by the Government of India with Wadia as its President, and Professor A. G. Jhingran as its first Honorary Director. The Institute of Himalayan Geology took birth in the campus of the University of Delhi, where earlier in 1966 Jhingran had been appointed in 1966 as a founding Professor to establish a Department of Geology. Soon thereafter, Wadia was instrumental in getting Valdiya to join as Senior Scientific Officer (the first working scientist) in the Institute of Himalayan Geology. There were others (S. K. Shah, R. P. Sharma, A. K. Jain, V. C. Thakur and A. K. Sinha) who followed Valdiya to start structured and planned investigations in the exciting and challenging area of Himalayan geology. It was here at the University of Delhi that I met Valdiya for the first time in 1970. I was in the last year of my doctoral studies at the University of Delhi, and a year later joined the Institute of Himalayan Geology as a Scientific Officer and became his colleague. As younger colleagues, there was a sense of pride in working with an acknowledged leader in Himalayan geology. Besides, the warmth of his persona

and that of his wife, Indira, brings back strong memories of their ever-welcoming and affectionate household.

Valdiya seized the opportunity of being a full-time research scientist, and dedicated himself to preparing the geological map of the Lesser Himalaya of Kumaun, as well as planning and implementing expeditions into the poorly accessible Tethyan zone of the Kumaun Himalaya. This entailed long and strenuous periods of field work, an activity that came naturally to him, being a son of the Himalaya. His passion for research and his total dedication to the cause of Himalayan geology was both evident and infectious. But then, the Emergency was declared and several institutions were asked to move out of Delhi. Wadia was no more, and the rechristened Wadia Institute of Himalayan Geology (WIHG) was also moved to Dehra Dun. Valdiya was at that time the Deputy Director of the Institute; he moved to Dehra Dun but soon thereafter, in 1976, was invited to be the founding Professor of the Department of Geology at Kumaun University, Naini Tal. Being from that region, Valdiya could not resist the offer. He did return to WIHG briefly once more in 1980 to be its Additional Director.

Two decades at the Kumaun University, Naini Tal

Valdiya had long cherished the dream of building a Geology Department from ground zero. He did this with admirable success by carving out an independent space for the Department of Geology in a relatively secluded part, Durham House of Naini Tal. Under his watchful leadership, a new building was meticulously planned and built. Valdiya had the foresight to build two guest rooms in this new premises for Visiting Faculty. He was able to attract several eminent teachers from various parts of the country to engage with his students over extended periods of time. During those initial years of the Department of Geology at Kumaun University, there was an air of vibrancy, an urge for all – faculty, students and technical staff to perform and excel in their own spheres of activity. The magical infection of Valdiya was at work and he turned the Kumaun region into his 'karambhoomi', as well as for that of his many students. I had the good fortune to witness some of this 'action' that was taking place at Naini Tal as a Visiting Faculty in the area of geomorphology. Valdiya set the bar high not only by way of personal example in the pursuit of geological research and teaching, but also in the way he brought a personal touch to all those who visited the Department as guests for teaching or to partake in other academic activities. Having placed the Department on a firm footing, Valdiya became the pre-eminent face of the Faculty of Science of Kumaun University. He went on to adorn the Office of Dean of the Faculty from 1977 to 1980 and then took over as the Vice Chancellor of the University in the early eighties. After having spent almost two decades in the serene surroundings of Naini Tal in the Himalaya, Valdiya moved to set up the Geodynamics Unit at the Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengaluru. Here, besides pursuing his lifelong interest in the geodynamics of the Himalaya, he also added the subjects of neotectonics and geomorphology of the Sahyadri Range to his research portfolio.

Valdiya remained associated with JNCASR for more than two decades, indeed till the time he breathed his last as an Honorary Professor of Geodynamics. During his long stint at JNCASR, Valdiya held the prestigious Bhatnagar Research Professorship from 1997 to 2003 and the INSA Golden Jubilee Research Professorship from 2003 to 2008. He also held a Distinguished Guest Professorship from 2008 to 2010 at IIT-Bombay and an Honorary Visiting Professorship at IIT-Roorkee from 2009 to 2010.

Valdiya – scholar, author and science communicator

Valdiya's scholastic abilities were strongly rooted in what may be referred to in geological parlance as geosemiosis – the strong power to read nature's messages, i.e. the practice of keen field observations at the outcrop scale and preparation of geological maps that elucidated the structure and stratigraphy of a region. He subscribed to the dictum that the best geologists are those with a sturdy pair of legs and a keen pair of eyes. He described his works as 'the products of thousands of kilometres of arduous foot traverses in unbelievably difficult terrain where a simple trek transforms to epic struggle'. This approach followed by him for four to five decades paid rich dividends in over a 100 published papers in some of the most prestigious journals, and benchmark research monographs that particularly elucidated the geology of the Lesser Himalaya of the Kumaun region. These regional studies did influence our larger understanding of the tectonics and evolution of the Himalaya.

He had an ever unsatiated urge to wield the pen, and as noted earlier that resulted in a tally of about 20 books. Here, he was conscious of his prowess as a writer, and therefore took on the roles of not only authoring influential textbooks but popular science books as well as more general books that would spread awareness among the lay public, particularly so for kindling interest in the natural sciences in those who hailed from the Kumaun region. His scholarly books were aimed at both students and professionals in the geological sciences and environmental sciences. Of the many books that he wrote, Valdiya remained highly involved in the latter years of his life on writing the *Making of India: Geodynamic Evolution*, whose first edition was published in 2010 at an affordable price for students; its updated second edition was published by Springer in 2016. He authored books, mostly in single authorship, for over almost four decades. Some of his influential textbooks include *Environmental Geology: Indian Context* (Tata McGraw-Hill, 1984) and *Environmental Geology: Ecology, Resources, and Environmental Management* (McGraw-Hill, 2013). His urge to be a communicator of science to student audiences led him to write short books such as the *Dynamic Himalaya* (Universities Press, 1998), *Himalaya – Emergence and Evolution* (Universities Press, 2001), and *Saraswati – the River that Disappeared* (Universities Press, 2002). It may be mentioned here that Valdiya maintained an abiding interest on the Saraswati, resulting in a more recent book authored by him titled *Prehistoric River Saraswati, Western India* (Springer, 2017). Valdiya's interests were varied and his writings extended into more general writings such as *Geography, Peoples and Geodynamics of India in Puranas and Epics: A Geologist's Interpretations* (Aryan Books International, 2012), *Kumaun: Land and People* (Gyanodaya Prakasan, 2001) and *Coping with Natural Hazards* (Orient Longman, 2004). His writings were not only limited to the English language, and as an example I mention *Ek Thi Nadi Saraswati* authored

by him in 2014. Having recounted his profundity as a science communicator through his writings for a variety of audiences, I must also add that Valdiya was a much sought-after speaker for keynote addresses and plenary talks. Indeed, he was to be a plenary speaker at the now postponed 36th International Geological Congress that was scheduled to be held in the National Capital Region, India in March this year. His presence will certainly be missed.

Professional service

Being an acknowledged leader in both domains – geological sciences and environmental sciences – Valdiya's services were sought after by several Government bodies as well as autonomous institutions. He had the distinction of being the Chairman of ICL (Inter-Union Commission on Lithosphere from 1982 to 1986), member of the Council of INSA from 1984 to 1986, member of the Research Council of the National Geophysical Research Institute from 1984 to 1987 and 1991 to 1997, member of the Governing Body and the Research Advisory Council of WIHG from 1988 to 1991, member of the Research Council of the National Institute of Oceanography from 1994 to 2000 and Chairman of Research Council of the Centre for Earth Systems Science, Thiruvanthapuram. Besides, he held the position of Vice-President of the Geological Society of India from 1993 to 1996. He remained as the President of the Governing Body of WIHG for nine years from 1997 to 2006.

Valdiya was a member of the Scientific Advisory Committee to the Prime Minister from 1983 to 1988.

In his role as an environmental scientist, Valdiya served in many advisory committees to the Department of Environment (Government of India, GoI), the National Ecodevelopment Board, the Planning Commission and also chaired the Committee on Paleochannels of the Ministry of Water Resources, GoI. He was a member of the Governing Body and Research Advisory Committee of the GB Pant Institute of Himalayan Environment and Development from 1991 to 1993.

Valdiya was also associated for long as a member of the Editorial Boards of *Current Science*, and *Mountain Research and Development*.

Outreach and social service

Valdiya took keen interest in policy-related issues that mattered in the development of the hilly regions of India, particularly those concerning the environmental implications of water resources development in the Himalaya, the environmental impacts of mining activities, and the protection and maintenance of the lake systems of the country, as well as those pertaining to geological hazards such as landslides and related movements.

As far as institution building is concerned Valdiya's role will be remembered with reference to WIHG, Dehra Dun; Centre of Advanced Studies in Geology, Kumaun University, Naini Tal; GB Pant Institute of Himalayan Environment and Development, Kosi-Katarmal (Almora); and the Uttarakhand Science Education and Research Centre, Dehra Dun.

Valdiya in an interesting experiment had been reaching out to pre-university students of colleges of remote areas of Uttarakhand, who in his words were 'forgotten by governments and uncared by officials'. Taking one or two scientists of other disciplines along with him, Valdiya visited college after college in the remote areas of the border districts of Uttarakhand, conducting science courses. In the summer, 100–120 students from across Uttarakhand along with their teachers were invited to Gangolihat for a three-day programme 'Vigyan Jigyasa Aur Anubhuti'. Eminent professors and scientists from leading universities and institutions were called upon to conduct classes in different disciplines with the objective of awakening interest in the pursuit of science and apprising students from these remote parts of Uttarakhand about the recent discoveries and developments in the sciences.

Awards and honours

As one who was a gifted scholar, science communicator and prolific author, awards and honours almost naturally followed Valdiya. The highest civilian awards of GoI, *Padma Shri* and *Padma Bhushan* were conferred on him in 2007 and 2015 respectively. Apart from the coveted S. S. Bhatnagar Prize of CSIR in 1977, the other awards bestowed upon him include the L. Rama Rao Medal of the Geological Society of India in 1977, the L. N. Kailasam Gold Medal of the Indian Geophysical Union in 2009, the S. K. Mitra Award in 1991 and the D. N. Wadia Medal in 1995 of INSA, the National Mineral Award in 1993 and the National Mineral Award of Excellence in 1997 of the Ministry of Mines (GoI), and the P. N. Bose Memorial Medal in 2017 of the Asiatic Society. Only recently in 2018, he received the Lifetime Excellence Award of the Ministry of Earth Sciences, GoI. He was also given the Hindi Sevi Samman (*Atmaram Purushkar*) for his science writings in Hindi in 2007.

Apart from these awards and prizes, Valdiya was elected to the Fellowships of INSA in 1980, Indian Academy of Sciences in 1980, National Academy of Sciences in 1987, The Third World Academy of Sciences in 1995, and the Indian Geophysical Union in 1998. He was also elected as an Honorary Fellow of the Geological Society of Nepal in 2001 and as an Honorary Fellow of the Geological Society of America (GSA) in 2001, the latter being a rare honour for an Indian geologist. Valdiya was considered by GSA to be 'an outstanding Himalayan Geologist who is also a leader in environmental studies'.

One can only take pride in paying homage and respect to a stalwart of the geosciences, who has rendered yeoman service to furthering knowledge by his researches in both the geological and environmental sciences; and in fulfilling the role of a true 'guru' in the best Indian traditions for generations of students.

Valdiya is survived by his wife and his family. Mrs Valdiya by her affectionate ways, so full of warmth, had early on many decades ago become an integral part of the community of geologists and endeared herself to all who came in contact with her. We join the family in praying for his soul to rest in peace.

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