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EDITORIAL

DR. B. C. GUHA

THE DAY June 7, 2004 is a memorable day for not only the Department of Biochemistry, Calcutta University, but also for the whole country. Today is his birth centenary (born on June 7, 1904 in Mymonsing now in Bangladesh). While studying at Presidency College, Calcutta, he became actively associated with the national freedom movement. Dr. Guha was not only put to jail, but also later suspended from the college. By the admiring support of Sir Ashutosh Mookerjee and Sir P. C. Ray, B. C. Guha was admitted to City College in 1919. There was no botany teaching at City College that time. So B. C. Guha attended lectures on Botany in IACS founded by Dr. Mahendralal Sircar. B. C. Guha was highly influenced by Acharya P. C. Ray, the father of Indian Chemistry during 1925-26.

After a uniformly brilliant academic career, Prof. Guha went to England and did his Ph.D. and D.Sc. of London University under the able guidance of Prof. J. C. Drummond. Thereafter, he did his postdoctoral research at Cambridge under Prof. F. G. Hopkins, the father of British Biochemistry. In 1936 at the age of 32, Prof. Guha was appointed the Ghosh Professor and Head of the Department of Applied Chemistry of Calcutta University, the post which he held till the last day of his life.

I had the fortune of being his student during my study of M.Sc. (Tech) in the Department of Applied Chemistry. As a teacher, Dr. Guha took a few classes at the beginning. He did not teach us any particular topic, but general history of biochemistry, nutrition and in between he scattered many bits of information from living and nonliving, microbes, "why do you consider Ganges water holy ?" etc. etc. He said "I take these classes to know yours faces at least, so that when some time later you come to me for certificate, at least I can remember your face ; yes this young man was a student of Applied Chemistry".

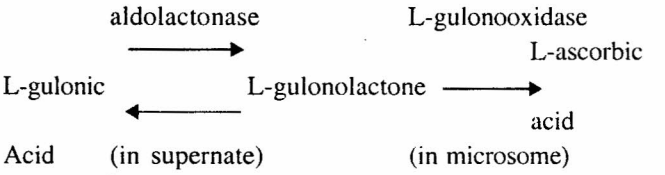
As a patriot, Dr. Guha was actively associated with freedom movement and with this same feeling, he lived simple life later also. Once our senior class students appealed to him for a water cooler, A.C. was unthinkable that time. Dr. Guha rebuked the students saying that as technologists, they will have to work in big factories, sometime they may have to drink hot water from a boiler. From that day even today, I myself do not drink cold water from the fridge. Whenever my family members take out a water bottle from the refrigerator in summer, I remember Dr. Guha's words.

Dr. Guha was a genius with inherent capacity to take any responsible job and execute it competently. During his appointment on loan from C.U. as Technical Director of DVC, Dr. Guha handled highly technical power Generation, Distribution and Management problems so competently that everybody thought he was an engineer and must have been trained at either MIT or Caltech, USA. The power engineers in DVC were amazed when they came to know that he is a Professor of Nutrition from C.U. and has a doctorate in Biochemistry. So much was his intuition and conviction that when UNESCO prescribed minimum 1500 calories nutrition for people of the underdeveloped countries (now apparently a more respectable term 'developing' is used), Dr. Guha said these people are adapted to much less food for generations, and recommended 1300 calories as basal requirement and that was accepted. By the same patriotic feeling, he started work on leaf protein concentrate to supplement poor man's diet to give them enough protein nutrition. He was very much respected by CSIR and he was pivotal for the creation of Central Drug Research Institute in Lucknow

and Central Food Technological Research institute, Mysore. B. C. Guha's broad biological vision of Biochemistry shaped the development of the new discipline of Biochemistry in Calcutta University and subsequently in other Universities in India. He himself was interested in work on assessing the nutritional values of Indian foods and spices and inspired others through CSIR to take up such studies.

Dr. Guha was a member of Editorial Board for many years of the renowned Calcutta-based journal *Science and Culture,* along with Drs. D. M. Bose, S. N. Sen, P. Ray and J. C. Sengupta (there was no Editor-in-Chief at that time). Apart from contributing thought provoking editorials and general articles, Dr. Guha published many research findings of his group in Science and Culture, again from a patriotic obligation to raise the prestige of the journal. His break through work on Biosynthesis of Vitamin C (ascorbic acid) was published in many short letters to Editor papers in Science and Culture, although he published quite a few papers in more renowned journals like Science (USA), Biochemical Journal of Nature (U.K.). This I will discuss in a bit details.

Both the source compound and biosynthetic pathway of ascorbic acid biosynthesis were not known before 1950. During the 1950s, a host of labs were busy to unravel the pathway. Giants of Biochemistry like Albert Szent-Georgy, A. L. Lehninger, C. G. King with animal systems and later, Mapson and Isharwood with plant system were busy in studying the biosynthetic pathway. During the fifties and early sixties, Dr. Guha with his colleagues published at least 5 papers in Science and Culture, 1 each in Science, Biochemical Journal and Nature (probably there were some more for which I did not have enough time to search). From joining of two 3-C Units (pyruvic acid) to synthesize L-ascorbic acid (AA), the idea shifted to 6-C glucose as a precursor of AA. In 1956, Guha published a letter entitled "Enzymatic synthesis of ascorbic acid in animal tissues" (I. B. Chatterjee, N. C. Ghosh, J. J. Ghosh, R. N. Roy and B. C. Guha, Sci. & Cult., **23**, 50-51, 1957). Here the authors showed that mitochondria- and nuclei-free rat liver homogenate could convert gulono-lactone to AA in presence of high concentration of cyanide. In a subsequent paper (I.B.C., N.C.G., J.J.G., B.C. Guha, Sci. & Cult. **23**, 382-383, 1958), Dr. Guha showed that the ultracentrifugal microsomal pellet could convert L-gulono lactone to AA both in presence or absence of cyanide, but could convert glucurono-lactone in presence of cyanide only. The role of soluble supernatant fraction was clarified in a paper [IBC, G.C.C., NCG, JJG and B.C. Guha, Sci. & Cult. **24**, 340-342, 1959]. In contrary to earlier reports of A. P. Grollman and A. L. Lehninger (Arch. Bioch. Biophys. **69**, 458, 1957 and C. Bulitz, A. P. Grollman and A. L. Lehninger (Biochim. Biophys. Acta. **27**, 221, 1958) claiming free gulonic acid as the precursor of AA, Guha's group showed the pathway like this :



This research subsequently became text book reference (e.g. in Frutton & Simonds : Biochemistry). The enzyme system was further solubilized from microsome by treating with deoxycholic acid and salt, purified 80 folds (IBC, G.C.C., N.C.G., J.J.G. and B.C. Guha, Sci. & Cult. **24**, 534-535, 1959).

After Dr. Guha's demise, all his colleagues diverted their research. But fortunately, I. B. Chatterjee alone like "Eka Kumbha" stuck and worked for more that 50 years extensively horizontally and intensively vertically to probe the mystery of function and evolution of vitamin C. Work on ascorbic acid alone can place Calcutta in the international arena of biochemical research. Guha also worked on Vitaminogens like ascorbigen and niacinogen.

Friends, colleagues and students, this was a man like Prof. B. C. Guha. Many of my personal recollections are from my direct knowledge, literature search, but some are obviously from hearsay, which may contain a bit of myth. If that is so, I beg to be excused for those factual errors; but even without those titbits, Dr. Guha will be revered as a great teacher, a pioneer and a builder of Nehru's "Scientific Temper" in India.

Dr. Guha was respected by all biochemists and allied scientists in India. When the first summer school in Biochemistry was proposed by CSIR, Dr. Guha was chosen as the Convener. But due to his untimely death, Prof. P. S. Sarma of IISc, Bangalore became its convener, the school being held in Srinagar, J&K in 1964. The most prestigious and unique informal conference which started in 1958 (a brain child of P. M. Bhargava), named after the first meeting place "Khandala Type Conference" was registered after Dr. Guha's death as a society in 1965 in Hyderabad as "Guha Research Conference", the first memorandum being signed by great biochemists like Late B. K. Bachhawat, D.

P. Burma, P. K. Bhattacharya, V. Jagannathan, G. P. Talwar and others. From a mere 10/12 members, GRC has grown to about 100 members. GRC has been mostly responsible for establishing modern biology (that includes Biochemistry, Microbiology, Molecular Biology, Biotechnology, Genetics, Bioinformatics, Structural Biology, Immunology, Neurobiology, Biophysics, etc.) in India at an international level. The name of the confernece itself shows the respect Prof. B. C. Guha commands among he pioneering biochemists of the country.

– R. K. Mandal