My Reminiscences as a Physicist
(A Self Appraisal Report)

Prof. Hardev Singh Virk was born in village Majhiwala Bhuller (Chak No. 270) in district Lyallpur (now in Pakistan) and migrated to India in 1947. His family settled in village Chhokran and he studied up to 8th class at Khalsa High school, Lassoi, in a rural area school near Malerkotla. He topped in matrculation in Govt. High School Malerkotla (1957). He did F.Sc. from Govt. College Malerkotla (1959) and B.Sc. from Govt. Mahendra College, Patiala (1961) with distinction in physics. He went to Aligarh Muslim University, Aligarh for his postgraduate studies in Physics and got M.Sc. degree in 1963 under Prof. P.S. Gill, a renowned cosmic ray physicist of India. Prof Virk started his teaching career in Lyallpur Khalsa College, Jallandhar in July 1963 but soon shifted to Guru Nanak Engg. College, Ludhiana where he served for 2 years. He joined the faculty of Physics Department at Punjabi University Patiala in Oct. 1965 as Instructor, became Lecturer in 1966 and Reader in 1975. During his tenure at Panjabi University Patiala, he won a French Government Scholarship (Bourse) in 1970 and started his doctoral research under Professor Max Morand of Marie Curie University, Paris. He got his doctorate degree in High Energy Nuclear Physics (Elementary Particles) in 1972 with highest distinction 'Tres Honorable' and returned to India despite the offer of a post doctoral fellowship in Paris.

There were no high energy accelerators during seventies in India and Professor Virk decided to pursue his research activity in

inter-disciplinary area of geochronology using fission track dating. The field of Solid State Nuclear Track Detectors (SSNTDs) opened up during sixties in USA and it spread to Europe and India soon after. Professor Virk set up his SSNTD laboratory in 1974 at Patiala with the help of project grants sanctioned by UGC and CSIR. He took the plunge into the new field with great vigour and guided his Ph.D. and M.Phil. students.

There were no research journals or sophisticated equipment and Professor Virk started his activity by borrowing reprints and a student microscope. His training in nuclear emulsion technique and particle physics came to be handy in the field of trackology. Soon the SSNTD laboratory got recognition at national and international levels.

SSNTD research collaborations were set up with Dr. Robert McCorkell of Carleton University in Ottawa, Canada and Dr. Reimer Spohr of G.S.I. Darmstadt in Germany after Prof. Virk moved to Guru Nanak Dev University, Amritsar in July 1979. Dr. McCorkell donated his personal library and supplied neutron dosimeters and persuaded Professor Virk to start Radon/Thoron studies in the natural environment. Dr. Spohr helped in getting beam time on heavy ion accelerator (UNILAC) at GSI and thus Prof. Virk initiated heavy ion radiation damage studies in SSNTDs for the first time in India. Major research projects were sanctioned by UGC and DST to promote the study of heavy ion radiation effects in insulators. The research work published in this field brought laurels to SSNTD laboratory after the empirical formulation of Single Activation Energy Model. Professor P.B. Price at University of California,

Berkeley used it for the determination of charge and isotopic resolution of cosmic ray nuclei in Space Shuttle 'Ions' experiment.

Professor Virk joined as Reader and became the founder Head of Department at Guru Nanak Dev University, Amritsar in July 1979. He was selected as Professor in Dec. 1980 and is now the seniormost Professor in its faculty. It was a herculean task to lead the young department to its present position; from 5 faculty members in 1980 to 22 sanctioned faculty positions in 1990. The expansion reached its peak value during 1992 with four M.Sc. programs, viz. M.Sc. (Hons), M.Sc. (Pass), M.Sc. (Energy Science) and M.Sc. (Applied Geophysics). Research activity was promoted in Radiation Physics, Material Science, Chemical Physics, Nuclear Geophysics and Theoretical Physics. Professor Virk organised refresher courses for College teachers and introduced UGC-COSIP courses at B.Sc. (Pass) and Berkeley Physics course at B.Sc. (Hons) level. Innovative experiments of Prof. B. L. Saraf designed under UGC-ULP programme were also introduced. Special courses at M. Phil. level, viz. Concepts of Physics and History and Philosophy of Science were taught by Professor Virk. Thus Guru Nanak Dev University was among the first five Universities in India to teach History and Philosophy of Science.

Professor Abdus Salam, Nobel Laureate visited Guru Nanak Dev University in 1981 and in a friendly gesture provided grants for setting up Centre for Promotion of Science (CPS) in the University. Professor Virk published 3 books, organised popular science lectures, delivered radio and T.V. talks and awarded prizes to budding scientists to meet the objectives of the CPS. Federation arrangement was signed up with International Centre for

Theoretical Physics (ICTP), Trieste, Italy under which the visiting faculty members were provided full travel and hospitality for participation in ICTP programs. Professor Virk was awarded Senior Associateship of ICTP (1988-93), South-South fellowship of Third World Academy of Sciences (TWAS) (1991,92,94) and an international research project founded by TWAS during 1986-88. Radon studies for uranium exploration, earthquake prediction and environmental pollution causing health hazard occupied Professor Virk's domain of activity during the last two decades. He participated in a national Coordinated Radon Project (CRP) sponsored by Department of Atomic Energy (DAE), Govt. of India (1996-2000) and surveyed more than 100 villages in Punjab and Himachal Pradesh to estimate the radiation dose delivered to the inhabitants inside the dwellings. The results of (CRP) survey have been published and considered as a bench mark by DAE. Earthquake prediction is still an enigma but the investigations carried out by the group of Professor Virk in N-W Himalaya established radon as a useful geochemical precursor. Research collaboration has been established with Hungary, Uzbekistan and Italy. Earthquake Research Centre (ERC) was set up on the campus of Guru Nanak Dev University with the support of Department of Science and Technology (DST) and Govt. of Punjab. ERC is equipped with both analogue and digital seismographs and strong motion recorders. It has been accepted as a part of national network proposed by Indian Meteorological Department (IMD), Govt. of India, once the Memorandum of Understanding (MOU) is signed.

SSNTD and its applications in diverse fields have been promoted by professor Virk in India. Ion track technology is the latest fad with him. Ion track filters/membranes have been used in air/water pollution control, filtration of cancer cells and creating micro/nano structures. Characterization of heavy ion irradiated polymers has been undertaken using Pelletron ion beams available at Nuclear Science Centre (NSC), New Delhi.

Professor Virk has published 35 books, 380 research papers and 130 scientific articles. He is a prolific writer in Punjabi language and has published more than 150 literary articles in popular magazines. He is considered an authority in scientific fiction and his travelogues are very popular in Punjabi circles. He has been awarded Shiromani Sahitkar Award of Punjab State Languages Department, Patiala and several other prizes for his contribution in promotion of scientific literature in Punjabi.