

Inaugural Remarks at the Silver Jubilee Workshop

I. I. T. Kanpur, November 1984

E.C.G. Sudarshan, Institute of Mathematical Sciences, Madras

It is an honour to speak to you in this Inaugural Session of the Silver Jubilee Workshop at the Indian Institute of Technology, Kanpur. This quarter century is also the time I have been of age in professional science with its joys and disillusionments, vigorous and slow periods both in my own creative life and in particle physics.

Particle physics deals with Matter unto its innermost parts, the world in its making. We seek clues to the grand design of the universe and do it by humble and often tedious steps. It is the toil of many though often a few are singled out.

In its development the practicing scientist is taken through stages where beliefs are questioned, "facts" are recognized to be beliefs and the design often unexpected. There is no certain knowledge one proceeds along the path as a "radical conservative", reluctant to abandon accepted methods unless forced to do so. Yet the nature of particle theory changes dramatically over the years.

I have been fortunate to be born where I was born and to get the education that I got; and to recognize above all that knowledge can be a source of joy, that in giving and sharing knowledge one attains greater happiness than being the "cock-on-the-walk" When I went for research study this Institute was not founded and I found myself at TIFR with its unique opportunities and frustrations. From Bernard Peters I learnt hard work in science to exhaustion and from Himi Bhabha the responsibility to be a jagot-guru in science. What was lacking in not being able to get from an excellent I.I.T. graduate education was made up by having fellow time "to pursue knowledge like a sinking star".

After my joining University of Rochester under the guidance of one of the greatest teachers I came across, Robert Marshak, I pursued the study of particle physics. It can be truly said of him:

Yasya sannidhi mātrena
Jnānam utpatyade svayam
Sa eva sarva sampatti
tasmād sampūjayet gurum.

I saw this not only in my case but also of Susumu Okubo.

My good fortune in the discovery of the universal chiral V-A interaction, the first result in broken symmetry etc. did not make it easy for a short brown man in search of science to live an untroubled life. I learnt painfully and gradually to distinguish between the universality of science and the partisan parochial behaviour of scientists, sometimes even great scientists. Yet the caravan must go on: one cannot let others decide your goals or your happiness.

In my second year as a young assistant professor I had to be responsible for more than half a dozen graduate students' research. I must have driven my family to distraction since "anytime was physics time". I remember once my son telling me when I asked him who had called on the phone "It is not important, it was not physics" One of the hardest things for me to adjust was the ingratitude of those to whom one gave without counting. But the students that I had were a continual source of stimulation. One of them who stayed on with me for a year after his Ph.D. used to greet me every morning with a few more steps of calculation than we had discussed the previous day. With such people around there is no danger of one aging.

I have traversed much ground in physics over various subdisciplines, been a member of many institutions and had the opportunity to associate with many scientists. Some of these were inspiring and I remember them with gratitude; some were painful and I am grateful they are behind me. But above all I realize that other people's opinions need not be right; one needs a number of friends whom one respects who could give you their critical assessment of your work. It is in this collective endeavour that truth often reveals itself.

Now to some observations about the nature of theoretical physics itself. As its name implies it is physics that we talk about and not mathematics; and mathematical precision is to be balanced by common sense regarding the relevance of the models and equations involved. Unlike in mathematics where there are truths and falsehoods and what theoretical computer scientists like Jay Misra call "Knowledge", theoretical physics deals with "beliefs" and possibly relevant models. One is never sure

I am often asked whether theoretical physics deals with the real world or a world of concepts, mathematics and imagination. I cannot distinguish between the two: in defense of such a defenseless position I quote from Sankara's "dakṣiṇāmurti stotram":

viśvam darpaṇamāna nagrī tulyan Nijāntavgatam
paśyannatmani māyaya bahurivodbhūtam yatha nidrayā
yaḥ sāksāt kurute prabhodhasamaye svātmānamevādvayam
tasmai śrī gurumūrtayeḥ iti dakṣiṇāmurtayeḥ

Like dakṣiṇāmurti this Institute of Technology is in the north and benevolently looking on all who wish to learn. What is the institution if it is not the set of minds united by the search for knowledge. We may play the role of the student or the guide: but all of you know that the roles often interchange.

What is needed for encouraging and enhancing the level of scientific activity in the country? Is it more expensive laboratories and libraries, more scholarships and salaries, more western scientific visits and visitors? Or do we need more dhiras, more sankalpa? A story that I learnt in my childhood was about young Solomon who had just been anointed King Solomon performed a yaga and the Almighty was pleased with him and asked to choose one of several boons. He chose wisdom since he had to rule over the chosen; the Almighty was pleased and gave him other things. We too have accepted the choice to this high calling. Let us choose the boon of wisdom so that we may see correctly, have insight, be able to judge without prejudice. While wealth and fame may not come immediately we will be happier.

It is my hope that this gathering here to celebrte the Silver Jubilee by dedicated work to the best of our ability is a portent of the continued and renewed dedication to knowledge in the highest by doing our best in mutual nurture and in joy.