

# SIXTIETH SESSION OF THE INDIAN SCIENCE CONGRESS

## THE DIAMOND JUBILEE YEAR

### SIXTY YEARS OF SCIENCE IN INDIA

PRESIDENT : S. BHAGAVANTAM

*Extracts from Presidential Address*

*Delivered on 3-1-1973 at Chandigarh*

**I**N our country, in the early years, scientific education was an important aspect of the progress of science and we naturally had to depend on universities for that. There were only a few universities in pre-independence India and not many of them had the resources to support strong schools of science. One good thing that stands out prominently when we look back on the achievements of those days was the emergence of individuals, though a small number, with outstanding achievements in selected fields like mathematics and physics. Srinivasa Ramanujan, for instance, will be remembered as a mathematician from India, long after many of his noisy contemporaries would have been forgotten. Similarly, the fact that Chandrasekhara Venkata Raman was awarded the Nobel Prize for a discovery of his, named after him and made when the facilities for scientific work in India were so poor that all the tools he used for that purpose did not cost more than about three hundred rupees, will remain for a long time to come without a parallel in the history of contemporary science.

These and other similar individual achievements apart, science and technology in their broader and more recent aspects, particularly as aids to industry and as instruments of economic development and affecting the lives and outlook of the people in general are features largely of Independent India. That modern science and technology are items of high

priority in the process of socio-economic development in a developing country like ours is now a universally accepted concept. It therefore follows that the recognition of such a concept constitutes the foundation on which to build a sound national science structure. That in Independent India, we did start very well in this regard is evident from the fact that no one perceived the significance of such an instrumentality more clearly than the late Jawaharlal Nehru. I wish to quote from one of his speeches, even if it is a repetition of what was done on earlier occasions and by others who preceded me.

“It is science alone that can solve the problem of hunger and poverty, of insanitation and illiteracy, of superstition and deadening custom and tradition, of vast resources running to waste, of a rich country inhabited by starving people. Who indeed can afford to ignore science today? At every turn we have to seek its aid. The future belongs to science and to those who make friends with science.”

In the international context, we must recognise that science has taken some wonderful strides. On the side of economic growth, it has been proved that at the stage at which most developing countries are and certainly our own country is and before reaching saturation, research can effectively increase the Gross National Product. On the side of

human welfare, it has been proved that problems like the average duration of life being too low and the need to provide minimal requirements to each and every citizen can be successfully tackled, where they need to be tackled. It will be a repetition on my part to state that these aspects should receive the highest priority in our science plan when we look at science in its broader aspects. Alas, in spite of what all of us had done in this regard during the past few decades, a large percentage of our people in this country die prematurely of malnutrition because they have not enough to eat and what little they eat is ineffective. Even the rest, a small percentage of our people, also die prematurely because they have so much to eat and they overeat. The fact that science has today acquired the ability to control and exploit energy, to manipulate materials and fabricate new composites, has drastically affected the life of man and has completely altered the fundamental economic realities.

Scientifically advanced and economically affluent countries today talk of global problems in another context. Their scientists and decision-makers talk of environmental deterioration, depletion of natural resources, pollution control technology, irreversible metabolic changes effecting man's mental make up, nuclear armaments and biological and chemical weapons pointing to a possible mass destruction of the human race and so on. The less advanced and economically poorer countries like ours are bewildered. The now well-recognised fact that while a low GNP leads to poverty, squalor and suffering, an unlimited growth of GNP leads to crime, drugs and suicide adds a great deal to the prevailing confusion. In our bewilderment, we seem to forget what is good for us and what is needed most by us. However, somehow and somewhere, the decisions are made and have to be made, for time and tide do not wait for anyone. Thus, we too have

begun to talk in this country of exactly the same problems as listed by me a little while ago, unmindful of the fact that we are at a different rung of the ladder and even on a different ladder itself. We have a proverb in my part of the country which says that as soon as Lord Siva starts his cosmic dance, all the lesser gods, the nymphs, the angels, the attendants and even the devils begin the same dance, unmindful of the ruggedness of the floor under their feet and of the status on the chain of evolution in which each of them is. Political pressures and personal considerations, which are far from scientific realities to say the least, are brought to influence the decision-making processes. It is of some relevance here to point out that human behaviour, alas, does not lend itself to be described by simple or even complicated physical laws. It abounds in dichotomies, exceptions, contradictions and uncertainties. Science has, no doubt, tried to extend its sphere of analysis to such areas by talking of statistical methods, probability laws and Gaussian functions but the major problems of today are beset with too many parameters, some of which are simple and some complex, to permit of quick and correct decisions being reached. Thus, in this age of science, decision-making has become an art, and a difficult art at that. In this context, we certainly need a group of people who are well versed in the art of decision-making and who will lay down our priorities in science.

The needs of world's inhabitants and therefore the needs of all of us have steadily grown. Opportunities of a hitherto unsuspected kind have presented themselves. Man has, in this process, emerged as a trustee of an inheritance dominated by science and technology with an obligation to bequeath the trust to his children with increased benefits. Everyone wants food. Everyone wants clothing and a house to live in. We need to have drinking water in as many places as

possible before we talk of pollution of water, because there must be some water that can be further polluted. We have a situation in our country without a parallel in the rest of the world in that there is a staggering number of 386 million people who do not know how to read and write, co-existing with the rest of our population. The only consolation is that the Indian Science Congress, by sheer accident, is today meeting in the Union Territory of Chandigarh which, according to the recent census, happens to show up the highest percentage of literacy in the whole of India. In all this confusion, our universities seem to be working hard to produce large numbers of unemployable graduates. With these large numbers on our hand, not knowing what else to do, we talk of making plans as will find employment for all the unemployable graduates. These are surely examples of putting the cart before the horse. I fail to see the logic behind our establishing scores of new universities while the already established ones are facing serious financial deficits and do not have facilities for technical education worth its name. How can educational standards be maintained with ill-equipped laboratories? How can teachers who are drawn from amongst sub-standard degree-holders contribute to inventive development and throw away imitative research? How can the leaders in science set right the ills that have crept into their programs, given such material to build their structures with?

Occasionally and particularly while looking at ourselves, our countrymen and our problems, one feels that all countries of the world do not have to talk about the same problems

and in the same manner and all of them at the same time and on the same platform. I have an interesting statement here which I like to quote. "It has been estimated that a child born in the United States today will consume during his lifetime at least twenty times as much as one born in India, and contribute about fifty times as much pollution to the environment. In terms of environmental impact, therefore, the most industrialized countries are also the most densely populated." One feels like sitting up and saying to oneself that India is not the same as the USA or the USSR. After all, we sleep when many of them work and we work when many of them sleep. Our problems and our priorities are different. Our resources and our traditions too are different. Perhaps, we can afford to be a little more Indian in identifying our scientific problems than what we are at present.

We certainly need to use science and technology for promoting our economic development. Our laboratories have to be modernised. Our libraries should endeavour to replace their stocks of obsolete books by more recent ones. Our teachers should bring themselves to be up-to-date by becoming students for a while. Our scientific programs should be looked at by someone who has a feel for their relevance and who is not so busy as those who actually handle them often are, and so on and so on. This is an unending chain and has irritating links in it. It is not right that I should misuse your indulgence. I should now conclude. I once again thank you for the honour you have done me by the patient hearing you have given me.

---