

DEPARTMENT OF SPACE

To: Mr. T. N. Seshan

Dear Sir:

As desired by
you, some points
are enclosed.

Regards.

Rayan
21/12/87

INPUTS FOR INDIAN SCIENCE CONGRESS

SOME HISTORICAL BACKGROUND

- * The Indian Science Congress association was formed in 1914 as a result of the efforts of Prof P S Mc Mohan of Lucknow and Prof Simon of Madras. Its first session was held in Calcutta under the Chairmanship of Sir Ashutosh Mukhopadya, the then Vice-Chancellor of Calcutta University.
- * In 1939, the Indian National Congress appointed a Planning Committee under the Chairmanship of Jawaharlal Nehru and invited leading scientists to participate in the formulation of plans of economic development and social betterment. This group, inter alia, suggested that the programmes of industrial, educational development should be closely linked with the programmes of scientific research.
- * This line of approach grew with vigour and found its articulation in the Scientific Policy Resolution of 1958 of the Indian Parliament.
- * The Post-independence rapid growth of S&T institutions, the Indian industry and educational sector, led to the need of the Technology Policy Statement of 1983.
- * For India to be self-reliant, and to be a buoyant and dynamic, much more focus is required in scientific efforts: while basic and 'blue sky' researches will still continue to be supported, it is necessary to have an "end-result" orientation; FOCUS; strict time targetted approach; in short National Missions.
- * Our Industry is still not technologically most forward; there are many areas of obsolescence leading to low productivity. Environmental issues are totally neglected. Mostly industries have survived on borrowed technologies, which are naturally one step behind that of the lender country. No efforts to adapt them have been done. While self-reliance need not be of the

"nut-and-bolt-replacement" type, basic endogenous growth is required. Poor imitators are poor innovators too. So India needs to build a good applied science base; good technological research base.

SOME AREAS OF FRONTIER RESEARCH

Though India cannot participate in every field of research, it is worth noting that there are a number of exciting developments in frontiers of S&T over the past few years: -

- * High temperature superconductivity is rapidly picking up world over with number of revolutionary implications in electronics, computer sciences, automation etc. The growth in this field is due to multi-disciplinary S&T research in material sciences, physics and chemistry.
- * High energy particle research is gaining new momentum with the availability of extremely big particle accelerators. Scientists are trying to generate particles in conditions closer to those conditions in which probably existed in the beginning of the universe.
- ° Cosmology and astrophysics continue to excite human thought.
 - Study of remotest part of the Universe such as quasi-stellar radio sources
 - Study of properties of individual objects of high density - high temperature and high magnetic field such as neutron stars
 - Discovery of fast spinning millisecond pulsars
 - Recent discovery of ^aSuper Nova in the Large Magellanic Cloud (LMC), in the vicinity of our Solar system after a lapse about 4 centuries (the earlier one detected in 1604)
- ° Biology is the field with immense future potentials. Some important discoveries are:

- Mapping of the genes of the individual, virtually characterising the person.
 - New directions in understanding and treatment of deadly killers like cancer, cardiac diseases etc.
 - Increased knowledge about the immunology system of the human body
 - Advances in understanding some of the crucial neurological functions of the brain to treat Parkinsons diseases etc.
- o In practical utilisation of biotechnology, the growth is immense.
 - o In the field of computer science applications of parallel processing techniques are reaching newer and newer areas of applications.
 - o Advances in research on artificial intelligence are exploring possibilities of having networks similar to human brain . Their implications for robotics are many fold.
 - o Environmental sciences are approaching greater capabilities with programmes to look at the geosphere and biosphere as an interacting systems.
 - o There are also a number of advances in technologies relating to telecommunications, energy sources, nuclear energy, space, pharmaceuticals etc.

S & T WORK IN INDIA

* India also is participating in some of exciting areas mentioned above. India's science and technology is however getting sharply focussed towards pressing national problems. There are the five technology missions; a number of clearly tuned national

S & T projects; there are projects to tackle the problems of drought.

- * While excellent science will continue to be nurtured, research in technology and its applications must receive national priority.
- * Technology must be viewed in the broadest sense, covering agricultural and service sectors along with the obvious manufacturing sector.
- * For example, we have been good in the country to install big systems - a power plant, or computer or a new production system or a new sophisticated hospital or a new transport system. The maintenance and operation is often neglected leading to severe economic losses and misery for people. An electric plug, or a public telephone or a ECG machine - their continued working after manufacture is as important as design and development.
- * This requires a scientific temper to look at the whole of human activity as a continuum of well planned effort, with good analytical thinking behind every step.
- * The new India into which we should usher in, requires such a scientific temper and application of science and technology to every facet of Indian life. The choice of technology high or low should be based on sound analysis and judgement and one need not be dogmatic about it.
- * While self-reliance will be our goal, the optimisation of the mix of build and buy should be based on scientific principles.
- * We need rapid growth in economic conditions; in science & technology; in industry; in welfare services; in defence; and in education of our people.

MANAGEMENT OF SCIENCE & TECHNOLOGY

- * Scientific & Technology have all the potential to realise our needs; our goals.
- * It requires a good management of S & T. We should learn from the past successes and failures and also see what should be done for the future.
- * Management of S&T has to be basically anti-hierarchical; anti-dogmatic. Combining this feature with well-focussed and end-result oriented-systems is the challenge before us. We should also not forget the large masses of Indians in this process since they possess the necessary wisdom and innate common sense to decide what is good for us.
- * We should also ensure that the findings of science are not used to undermine our basic culture in the pursuit of short term returns e.g use of advances in medicine for the determination of sex of human foetus is leading to female infanticide.
- * And above all we have duty towards our future generations. With our immediate concerns let us not destroy our environment.
- * Let us use S&T to plan our life rationally finding optimal solutions by addressing all the relevant issues though they often appear contradictory.
- * I am sure the Indian scientists and technologists will raise up to the demands of our time - the demands of history.