

ECONOMIC DEVELOPMENT AND SCIENTIFIC TEMPER

(T.A.Pai Memorial Lecture-10)

By

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New Delhi: 17, 1993

Tenth T. A. Pai Memorial Lecture on "Economic Development And Scientific Temper"

delivered by Shri P. R. Kumaramangalam, Union Minister
for Science & Technology on January 17, 1993.

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Today, the theme word all over the world is change, whether it is change in the political system or the economic system or a mix of the two. The last few years have seen tumultuous changes all over the world. In the area of economy and industry, Mr T. A. Pai was one of the early proponents of the thought of liberalisation and I deem it an honour that I have been given this opportunity to deliver the 10th T. A. Pai Memorial Lecture. I recollect with a feeling of nostalgia, the discussions that Mr T. A. Pai used to have with my father during the early seventies on socio-economic reform. His strong views on the cutting of red tape and greater autonomy for the public sector were path breaking.

His views even in the arena of science and technology and his commitment to the technological progress of the nation, especially during the time while he was the Vice President of CSIR, were no less illustrious. I have had the proud privilege of being one of the successors in the Ministry of Science and Technology and that is the reason why I have chosen to speak today on the subject of Economic Development and Scientific Temper.

India is known to be one of the oldest civilisations in the world. When the nomads consisting of tribes led a primitive life 7000 years ago, a city civilisation flourished in the Indus Valley – a civilisation rich in culture, science and

technology. Even today the world is amazed at the level of technology developed by the Indus people nearly 5000 years ago. Not only were their towns well planned and buildings constructed of fire bricks but also their drainage systems were well installed. To top it all, they were well versed in the art of manufacturing products of smelted copper and bronze. Use of the wheel and plough was extensive and in fact the Indus Valley was not only a cradle of civilisation but also of science.

We are also aware that nearly 5000 years ago, the Vedas held the field of intellectual superiority. Today, the interpretation of Vedas has established that it is a modern art not only for understanding the strength of the intellect of man but also understanding nature itself. The universal law of symmetry, the force of motion and the fundamental fact of science that all matter is nothing but energy was appreciated and understood in depth during the vedic age. Their ability to convert four dimensional equations into a two dimensional concept of the plane showed their authority over the equations of physics which in the modern world still enthrall the students of science. It may surprise many of us that the Vedas spelt out not only the theory of relativity but went much further to establish that speed of light is not constant in either time or space, which today is one of the major theoretical stand points of physicists the world over.

Thus we saw the vedic age in India, when, not only was there clear understanding of astronomy and physical sciences but also dominance in mathematics. It is an admitted fact today that historically, the zero originated in India and spread to other cultures from here.

Barbaric invasions and natural calamities destroyed much of what was built from Indus to the Vedic days; but the spirit of science did very much survive through the Maurya and Gupta ages. The great iron pillar in Mehrauli is

a testimony to the level of technology that prevailed during this period. Mathematicians of this age like Aryabhata, Bhaskara I, Bhaskara II and Brahmagupta used most of the advanced formulae that we know today. Ancient India's achievements in medicine, astronomy and architecture are well known the world over, so I would not like to dwell upon them for long. However, it is relevant to point out that even in the arena of engineering, way back in the 12th Century, we were using iron girders and beams on a scale unknown to the rest of the world. The temples of Puri and Konark as well as the temples in the South are examples of unparalleled, advanced architecture. The observatories in Ujjain, Mathura, Delhi and Jaipur are definite signs of advancement of astronomy based on science.

I have brought to your notice the historical perspective only to hammer home and highlight the most important factor in India's history and that is – India was always strong and powerful wherever the influence of science was predominant. It is a harsh reality that the decline in India's position as a world civilisation, came into being when man moved from science to greed, when nation states became smaller and the sub-continent was strife torn. This was the period of invasion after invasion. It was during this period that India lost its grip with science and lapsed into superstitious interpretation of the magic of nature. While the world was enjoying the fruits of renaissance, of science in the form of the industrial revolution, we were in the throes of pain inflicted by servility born out of a colonial status. That was the period when India saw the worst form of exploitation of her resources, whether men or matter. All our resources, whether agricultural, natural or human were plundered ruthlessly in the most calculated manner. In their greed to rule and plunder, the British injected the Indian nation with the virus of communalism and sectarian values. It would be interesting to note at that moment, while the Moghuls adapted and adopted India as their motherland and did their best through Sufism and even

Akbar's Din-e-Ilahi to bring about religious coherence, the British kept aloof and consciously built up the communal divide. By the time the freedom movement and Gandhiji's weapon of non-violence gathered momentum, the British successfully ensured the rise of the ugly head of communalism. They left India not only a dismembered country but also a divided nation. Their agents, instead of applying a healing touch, sought only to ensure that the aberrations of history were remembered to be avenged.

The task of India's resurgence after freedom fell upon the shoulders of Pandit Jawaharlal Nehru and his dedicated associates. As a visionary and a keen student of history, Panditji had appreciated more than anyone else that a modern and strong India could only be built on science and technology. If I may be permitted to quote his thoughts as reflected by his own words, "it is science and technology which has made other countries wealthy and prosperous, and it is only through the growth of technology that India shall become a wealthy and prosperous nation".

The Scientific Policy Resolution of 1958 which is relevant even today set a new agenda for the country. We have achieved self-sufficiency in food production through varied use of science and technology. In fact our advancement in the area of bio-technology and agriculture, whether in the varieties of wheat and rice or in the whole arena of crop science, soil and water management techniques, live-stock sciences, fisheries, or even farm equipment has been acclaimed the world over. In fact, our achievements in the arena of science and technology as a whole, including advanced research in indigenous technologies, have given birth to many indigenous technologies including petroleum refining processes, novel catalysts, a range of modern pesticides, clean leather processing, and so on. In fact, the increase in the use of genetic engineering in the area of agriculture and industry has paved the way for a new era of innovations.

India's dominance in space is established by the Insat-II-A which is considered to be one of the most modern communication satellites in the world. India's expedition to Antarctica on the one hand and its achievements in Atomic Energy on the other have put India on the map of industrialised nations. With all its diversity, poverty and centuries of political turmoil and exploitation, India's having made such progress in such a short span of four decades, cannot but give every Indian a sense of pride. However, we should not keep ourselves in the illusion that our job is all done. As a country with nearly 900 million people and with a vast land mass encompassed in the sub-continent, we cannot thrive and grow on mere comparisons. The need to build modern infrastructure whether in power or in communications and the need to catch up with the rest of the developed world in the arena of Information Technology cannot be taken too lightly. More than ever before, Panditji's words need to be recalled today. We cannot become a prosperous nation unless we have a strong spread of science and technology in every sphere of life. We have travelled a long way on the road to progress in the field of science and technology in the last few decades, but then there are many miles to go. Unfortunately, at this crucial juncture, when the Information Technology revolution is catching on the world over and converting it into a global village, we see reactionary forces spreading venom in all institutions that form our nation. These venomous retrograde forces are spreading the virus of communal hatred in the name of religion, caste and creed. The fundamental principle of a scientific nation is scientific temper – the term that distinguishes man from beast; the spirit of enquiry that identifies homosapiens as intelligent beings. We see godmen perform magic and call it miracles and sway masses into a frenzy to do the unthinkable. To a country which is neither theocratic nor athiest, to a country which has been the model of all parliamentary democracies in the world, the rise of divisive forces portend the most harmful future. While this is so, how does one face the

challenge? Does one meet it using mere force, or the authority of the state, or does one face these divisive forces with the superior weapon of knowledge that is ingrained in the very gene of every Indian? With mere incantations in the name of any god, can we push away hunger and destroy poverty? It is time for us to look within ourselves and ponder whether the actions that have created communal divide are such that our forefathers who built the most advanced civilisation in the world would be proud to see. The need therefore, is to understand that those who speak of communal differences and those who are speaking of avenging aberrations of history are only playing rules of the game which our colonial masters set down when they ruled us. The only way that this venom can be extricated from our system is by infusing every man with the principles of scientific temper, that is the spirit of enquiry. It is time that every informed person appreciates that dangers of communal disharmony and takes steps to strengthen the unity and integrity of the nation by leaving his ivory tower and moving amongst the masses to educate them about the wonders of nature. It is not for no reason that the Rigveda identifies Truth as the only God and Energy as the Supreme Being. Let there be in the land of the Vedas, a renaissance of knowledge. Today, technology is power and knowledge is wealth. Therefore, let all Indians, specially the youth, not fritter away their energies in primitive prejudices and instead, work unitedly to elevate India to its original glory and status. Let us be major contributors to the fund of knowledge and technology for mankind. It is what, I am sure, Mr T. A. Pai would have said today if he were amongst us.

The Pai Foundation and its trusts have, instead of getting embroiled in mere talk and technology dissipation in terms of words, rightly decided to put into action plans of giving education through private trusts. They have gone much further into the rural areas. I must congratulate them because what the nation is talking of today, is mass

employment generation through Science and Technology. It is an action which the Pai Foundation took very early, much before, I am sorry to say, the scientific community woke to the fact, really woke to the fact that they can go among the people, make them understand the beauty of science, the talent of technology, the wealth of knowledge and work for their development. Today, really, the need of the hour is that all of us, whether we are in public life, whether we are officers in the government, or outside government, whether we are educationists, scientists, or technologists or whether we are mere babus who push the files, understand that the nation is really at peril. Today once again, the forces which were very active during the period of partition have raised their ugly heads and I repeat they can't be fought by force. They can only be fought by one weapon and that is knowledge. It is time that we, who have the good opportunity and the good luck, I may say of education, move among those who did not have this opportunity and communicate to them the realities of life, really communicate to them the brilliance of science; speak to them about our history and culture and civilisation, communicate with them about how they could improve their standards of living and how they could take the nation forward. It is very easy for us to sit back and criticise each other. Only yesterday, in the Council of Ministers, when we had a meeting with the Prime Minister, many views were voiced about the criticisms that are there in the country. Some of them are justified. But the most important thing which I think we should really look at is; what are we doing to fight this terrible venom that is entering all our institutions. I do not think that it is the job of Government alone, I do not think it is the job of leaders alone. It is the job of each one of us who believes that India has a great future and India is a great power.

To ensure that we establish the right scientific temper, which basically is the spirit of enquiry which does not believe in superstitious prejudices, we should realise that if

there is really any god, the only God that is there, is Truth. After all, it is not for no reason that the motto; "Satya Meva Jayathe" has been adopted. That is the thought which is embedded in the Constitution which we have today, a Constitution which was created after deep deliberations, by understanding that unity can remain only if diversity is understood. I would like to thank the organisers for having given me this honour and opportunity to deliver this 10th Memorial Lecture. We have lost many a stalwart in the recent past. Mr T. A. Pai, I remember, was one of those who was not just an industrialist, who was not just an economist, who was not just a man of knowledge but a man who believed that every bit of knowledge that he had the good opportunity to acquire should be disseminated; and I believe that is the principle which has to be adopted by each one of us.
