

A Statement on Scientific Temper

On July 19, 1981, at the Nehru Centre in Bombay was released a document by P. N. Haksar, along with Dr Raja Ramanna and Dr P. M. Bhargava, under the title, "A Statement on Scientific Temper".

In the Introduction to the document, Dr Raja Ramanna says:

"The nation owes a deep debt of gratitude to Jawaharlal Nehru, more than to any other, for the sustained growth and many-sided development of modern science and technology in India, as viable instruments of social transformation. The need of the time is the diffusion of science and technology into the societal fabric at all levels. This can only be achieved by promotion of what Jawaharlal Nehru chose to call the Scientific Temper — a rational attitude, the importance of which he emphasized time and again. Indeed, the Scientific Temper has to be fostered with care at the individual, institutional, social and political levels."

In his Foreword to the document, P.N. Haksar writes:

The Nehru Centre arranged for some of us to assemble together in a quiet corner of our country to share our common concern at the accelerating pace of retreat from reason. The venue of our meeting was Coonoor, so lush and green and full of promise as our entire land is.

For four days and nights, from October 22-25, 1980, we discussed and debated what needed to be done to halt the process of decay of reason and rationality. I had the honour of presiding over the deliberations. The end result of it all was a Statement on Scientific Temper.

That Statement was subsequently shown to others. It was further refined. We now present this Statement as revised. We are not unaware of its inadequacies. However, it is our earnest hope that the Statement will generate a wider debate and discussion in our country.

There are more than two million scientists and technologists in our country. In addition, we have a large number of economists, historians, sociologists and anthropologists, lawyers, doctors, administrators, management specialists and teachers who, in one way or another, apply the scientific temper and scientific methodology in pursuit of their respective professions and disciplines.

If the Statement succeeds in generating a nation-wide discussion, it will also, hopefully, generate a movement for the much needed second renaissance in our country. The first renaissance inspired the struggle for freedom. The second must of necessity provide the necessary fillip for the re-structuring of our country embodying the aspirations of our people.

Only in the measure we succeed in installing Scientific Temper as the dominant ethos of our collective being, can we hope to face the accumulating problems of our national existence. We must understand that it is not going to be easy. We shall have to do a great deal of heart-searching ourselves.

It is often argued, with seeming profundity, that while scientific temper is alright, it does not satisfy humanity's spiritual needs; that the entire realm of art and music, poetry and drama fall outside its ambit. In answer to such critics, I can do not more than remind ourselves of how Jawaharlal Nehru resolved the seeming contradiction between our material and spiritual needs. In *The Discovery of India*, he defines in the following terms his own attitude:

The real problems for me remain problems of individual and social life, of harmonious living, of a proper balancing of an individual's inner and outer life, of an adjustment of the relations between individuals and between groups of a continuous becoming something better and higher, of social development, of the ceaseless adventure of man.

In the solution of these problems the way of observation and precise knowledge and deliberate reasoning, according to the method of science, must be followed. This method may not always be applicable in our quest of truth, for art and poetry and certain psychic experiences seem to belong to a different order of things and to elude the objective methods of science.

Let us, therefore, not rule out intuition and other methods of sensing truth and reality. They are necessary even for the purposes of science. But always we must hold to our anchor of precise knowledge tested by reason ... we must beware of losing ourselves in a sea of speculation unconnected with the day-to-day problems of life and the needs of men and women. A living philosophy must answer the problems of today.

1 Preamble

THE history of humanity bears witness to periods of enlightenment as well as to periods of darkness. It bears witness to the rise and fall of civilizations. Through all the vicissitudes of time the knowledge gained by humanity has retained a quality of indestructibility. Viewing the entire panorama of the universal history of mankind, one becomes conscious of a continuous but forward movement towards greater knowledge, and to an increasing capacity of human beings to exercise control over their environment.

While humanity as a whole accumulates knowledge, there is no guarantee that the availability of such knowledge will, by itself, enable every country to use it successfully for its own advancement and the well being of its people. There are examples in history where predominant social, political, cultural and value systems inhibited the absorption of knowledge resulting in periods of stagnation, decay and retreat from reason, rationality and science. Though the Renaissance began in Italy, and Galileo, the harbinger of modern science, was an Italian, adherence to obscurantism enforced by the Church led Italy to losing the benefit of the Renaissance which fertilized Northern parts of Europe. The Renaissance

and the Reformation then combined together to revolutionise thought as well as society.

In our own country too we have known of periods of creativity when the spirit of enquiry led to the accumulation of scientific knowledge; there was creativity in literature, music, arts and crafts. However, we have also known of periods when the spirit of enquiry got extinguished. During those long stretches of time everything was reduced to unquestioning dogmas and to the performance of dead rituals. There was deadening of curiosity and questioning. There was only passivity and acceptance. And finally, we were overtaken by the greatest of disasters—our complete colonisation and subjugation to British imperialism.

Contemplating our decline, decay and subjugation, some of our best minds began asking themselves why and how it all happened. This spirit of enquiry and questioning gave birth to a wide social cultural movement which we call the Indian renaissance. The best Indian minds in the pre-independence times insistently propagated the need for the people to think independently and fearlessly, and to question traditional beliefs. This effort, in time, produced a critique of the colonial system. Out of this critique was born a powerful national movement for our liberation. The British imperial system, aligning itself with the vested interests, endeavoured to counter the broad stream of nationalism by encouraging revivalism and obscurantism. And though Indian renaissance never elaborated a critique of our entire ancient society and unfortunately made compromises, the urge to acquire knowledge and the scientific outlook remained strong. The spirit of questioning ultimately overwhelmed an imperial system which seemed so powerful and even immutable.

There is a wide awareness in our times that we are living in a scientific age of great discoveries in science, affecting and moulding both our material and social existence. It is indeed remarkable how a comparatively small number of physical laws seem sufficient to explain a great part of behaviour of matter, right from the huge and massive heavenly objects located at the very edges of outer universe to the minute regions of atoms and atomic nucleus. In life sciences, we are in the midst of far reaching, even revolutionary, changes. The entire history of humanity shows that it is the scientific temper which not only created and promoted science, but also gave humanity the means to affect the natural and social environment. It is, therefore, the scientific temper which is the most precious heritage of humanity. It is the result of incessant human labour, search and struggle.

Jawaharlal Nehru gave an impetus to Scientific Temper by setting before the people the target of catching up with the rest of the world with the help of science and technology. He unfolded the perspective of leap-frogging the centuries. Implicit in such a vision was a vast change in the intellectual climate of our people. Our Constitution and the subsequent Resolution on Science Policy were predicated upon the assumption that our ancient society needed basic changes. However, there was not enough appreciation of the relationship between the objectives to be achieved and the methods as well as

the instrumentalities appropriate for bringing about the desired changes. No systematic and sustained effort was made to work out, specifically and concretely, what needed to be done to build a society which is animated by a spirit of enquiry rather than passivity and acceptance. The result of this lack of directed efforts was accommodation, even compromise, with the forces of obscurantism and with the existing inegalitarian social and economic structures. Failure to give mass dimensions and appropriate institutional forms to Scientific Temper, more specially to our educational system, led to the erosion of confidence in our capacity to mould our destiny.

In such an environment, Scientific Temper is beleaguered and besieged by deep rooted structures of an ancient society with superimposed colonial structures. Consequently, there has been frustration of our hopes of optimising the results of the application of science and technology for our national reconstruction. Inevitably, such frustration has encouraged a search for and reliance upon authority. Inevitably too, there has been a growth of tendencies to escape into magical beliefs and instant solutions. Even science and technology are being offered not as methods of enquiry or value systems but as magical cures for our ills, reminding one of the time when Roman intellectuals sought refuge in Levantine magic. There is inadequate appreciation of the close interaction between science and technology and society and of the fact that the benefits of science and technology can reach the people only if the socio-economic conditions are conducive. If the cultural environment, socio-economic conditions and institutional structures inhibit the spirit of enquiry, the desired results can never be achieved.

The gravity of our predicament is increasing day by day. While we rank high among the industrialised countries in the world and are the third largest country in the world in regard to the stock of manpower trained in science and technology, we are close at the bottom of the list in terms of per capita food consumption, longevity, health care and general quality of life. We have all the technology available right now within the country to give water, food, shelter, and basic health care to our millions. And yet we do not. Something has gone wrong. The logic of planning and the logic of our socio-economic structure are at variance. Hence, our failures and disappointments.

In such an environment, there is an erosion of belief in the capacity of human faculties to solve national problems through a systematic critique of the existing social situation. There is a cancerous growth of superstition at all levels. Rituals of the most bizarre kind are frequently performed often with official patronage. Obscurantist social customs are followed even by those whose profession is the pursuit of scientific enquiry. Our entire educational system works in an atmosphere of conformity, non-questioning and obedience to authority. Quoting authority of one kind or another substitutes enquiry, questioning and thought.

Obscurantism and irrationalism practised by a hierarchy of authorities, has the predictable effect of reinforcing retreat from reason. Voices raised against

such a state of affairs get silenced. The decision-making processes are increasingly being divorced from any rational purpose or design. There is no long-term perspective based on ascertained facts and scientific analysis. Adhocism, whims and the narrowest of considerations take the place of well-planned programmes. Priorities, if any, are fixed without sufficient data-base and without any attempt at scientific evaluation of national needs, potentialities and feasibility of implementation. Mere slogans tend to be used as a substitute for action and for creating an illusion of achievement. Dramatic crash programmes are launched. These, inevitably, crash. There are no prospective plans. Even Five Year Plans have been reduced to annual exercises of allocating funds.

As our country enters the last two decades of the 20th century, the need to move forward is becoming ever more insistent. We either overcome the obstacles or we shall be overcome by unreason and dark reaction. We must understand the meaning as well as the imperatives of Scientific Temper, representing as it does, humanity's assertion of being in charge of its destiny and not a passive victim of malevolence or benevolence of stars. To do so, we need to actively combat beliefs which erode Scientific Temper and undermine its growth. Only then shall we illumine our darkening national horizon and provide our people, once again, with a vision and a method for translating that vision into reality. Such a vision must have a Scientific Temper as its integrating bond.

2

Attributes of Scientific Temper

SPREAD of Scientific Temper in society is much more than the spread of science or technology. Scientific Temper is neither a collection of knowledge or facts, although it promotes such knowledge; nor is it rationalism although it promotes rational thinking. It is something more. It is an attitude of mind which calls for a particular outlook and pattern of behaviour. It is of universal applicability and has to permeate through our society as the dominant value system powerfully influencing the way we think and approach our problems—political, social, economic, cultural and educational.

Scientific Temper involves the acceptance, amongst others, of the following premises:

- (a) that the method of science provides a viable method of acquiring knowledge;
- (b) that human problems can be understood and solved in terms of knowledge gained through the application of the method of science;
- (c) that the fullest use of the method of science in everyday life and in every aspect of human endeavour from ethics to politics and economics — is essential for ensuring human survival and progress; and
- (d) that one should accept knowledge gained through the application of the method of science as the closest approximation to truth at that time, and question what is incompatible with such knowledge; and that one should from time to time re-examine the basic foundations of contemporary knowledge.

The method of science, therefore, constitutes a regenerative process for collecting information and processing the collected information to create meaningful patterns leading to an ordered understanding of nature of man himself, his natural and social environment. In this sense, the method of science encompasses all aspects of communicable human knowledge and cuts across all artificial compartmentalisation like natural science, social science, applied science, etc.

The spirit of inquiry and the acceptance of the right to question and be questioned are fundamental to Scientific Temper. It calls upon one to ask the 'how', the 'what', and the 'why' of an object, event or phenomenon. It further calls upon one to exercise the right to question, provided of course, the questioning of an existing theory, hypothesis or statement or social situation is done in accordance with the scientific method and is not merely a bare assertion of one's belief. Scientific Temper is, therefore, incompatible with the acceptance of authorities of all kinds or of 'high priests' who may not be questioned. It leads to the realisation that events occur as a result of interplay of understandable and describable natural and social forces and not because someone, however great, so ordained them. These forces are often complex and intertwined and have to be analytically disentangled.

Scientific Temper is compatible with observation and insight, reasoning and intuition, systematic work and creative impulse. It gives rise to an attitude of mind which while being conscious of vast areas of ignorance, is nevertheless, optimistic about human ability to gradually unravel the mysteries that surround us. In this process, Scientific Temper becomes a part of the culture, a philosophy, and a way of life which leads to pursuit of truth without prejudgement.

Scientific Temper implies the recognition that knowledge often progresses by disproving earlier ideas, beliefs, theories and laws. It considers knowledge as open-ended and ever-evolving. It lays emphasis on verifiability and repeatability, wherever possible, and on the fact that scientific theories, laws and facts allow one to make predictions which can be tested. It recognises that answers to many questions that may be asked at any given time, may not be available at that time. It, then, demands the courage and humility to say, 'I do not know'.

Scientific Temper calls for recognition of the several major differences between the scientific attitude and the theological and metaphysical attitude specially in respect of dogmas proclaimed in the name of religion. There is in fact, essential incompatibility of all dogmas with science. While science is universal, established religions and religious dogmas are divisive. Consider the divisions which exist between Christian, Islamic, Buddhist and Hindu denominations. Science, in contrast, transcends divisions and is universal.

Scientific Temper has deep emotional content and has, within it, a sense of beauty. That is why considerations based on beauty and simplicity have been often invoked to choose between alternative theories that are otherwise equally tenable.

Inherent in Scientific Temper is a system of value

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judgements. The inculcation of Scientific Temper in our society would result in our people becoming rational and objective, thereby generating a climate favouring an egalitarian, democratic, secular and universalist outlook. Consequently, Scientific Temper cannot flourish in a grossly inegalitarian society where 50 per cent of the population lives below the poverty line and almost 70 per cent of our people, especially females, are illiterate. Social justice, widespread education and unrestricted communication are, therefore, pre-requisites for spread of Scientific Temper and for optimising the results of science and technology.

3

Role of Scientific Temper

HAVING outlined the essential elements of Scientific Temper, let us survey our national scene. Despite Jawaharlal Nehru's advocacy of Scientific Temper, we are witnessing a phenomenal growth of superstitious beliefs and obscurantist practices. The influence of a variety of godmen and miracle makers is increasing alarmingly. The modern tools of propaganda and communication are being used to give an impression that there exist instant and magical solutions for the problems that confront our people.

In an age when man has travelled to the moon and returned safely, astrological predictions based on the movements of planets or the lines of one's palm or the number of alphabets in one's name, are widely believed. Food fads, irrational health practices are on the increase. In a poor country where millions live below the poverty line, vast amount of wealth is consigned in *havanas* and *yagnas*.

Myths are created about our past. The origin and role of the caste system is explained in a way that would justify it and imply that some castes are inherently superior. The ancient period of our history is interpreted to inculcate chauvinism which is false pride; the medieval period is misinterpreted in a way that would fan communalism; and the struggle of our people for freedom is over-simplified as if it was the handiwork of a few great leaders and the masses of our people did not matter.

While it is important to understand the origin of these unscientific beliefs, the more immediate and pressing problem is to understand the remarkable phenomenon of their persistence and the resulting social consequences.

The sustenance of such beliefs and superstitions must be recognised primarily as a historical and social process. Such beliefs continue, because they have ready relevance to the personal situations of the majority of our people. Vast uncertainties of our daily lives, frustration of hopes and aspirations of millions, denial of any vision which would sustain the spirit drives millions to seek mental equilibrium in faith healing. Thus, when one believes that one's miserable personal situation cannot be improved, acceptance of fatalism becomes natural. Beliefs then rationalise the status quo and breed fatalistic

doctrines. In such a situation of social and cultural malaise, a major role of Scientific Temper is to revive confidence and hope and to dispel fatalistic outlook. The campaign to promote Scientific Temper must inculcate values like equality and dignity of all human beings, distributive justice, dignity of labour and social accountability of one's actions. All these are essential for bringing about social, economic and cultural transformation of our country.

The emphasis on the method of science does not imply that science and technology have solutions to all human problems at any given time. Indeed, Scientific Temper warns one against the simplistic view that through the introduction and pursuit of science and technology, most social problems and contradictions will automatically get resolved. The role of reason is to apply scientific knowledge to problems, to grapple with them through the method of scientific inquiry and to work for social transformation inspired by Scientific Temper.

We must equally combat the tendency to treat science and technology as a sort of magic. It should be explained that it is unscientific to believe that if scientific and technological solutions exist to a range of problems, these will be automatically adopted. The nature of social stratification and the power structure in a society prevents the acceptance of such solutions. Technologically, one may be able to grow enough food for everyone, but the pattern of income distribution prevents the benefits of increased food production reaching large segments of the population. When the social structure and stratification prevent the application of rational and scientifically proven solutions, the role of Scientific Temper is to lay bare the anatomy of such social barriers.

If we have to regain our place in the world and are not to be relegated once again to the dustbin of history; if we wish to offer a life of fulfilment to our destitute millions; indeed, if the light of our civilisation is not to be extinguished, we have to undertake, on a priority basis, the task of nurturing Scientific Temper. All of us scientists, technologists, social scientists, educationists, teachers, media men have to

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join hands and undertake this task. We draw inspiration from the way our people in all walks of life joined hands and struggled against colonial domination of our land and of our minds. We believe, it can be done again if only we have the will. And it must be done without any loss of time. Our nation's survival and its future depends on upholding Scientific Temper. Superstition shall not pass and darken our portals.

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At the function where the document was released, Dr. P.M. Bhargava, one of the convenors, announced that the following had signified their complete agreement with the Statement: Dr M.G. K. Menon; Dr Yash Pal; Dr Romila Thapar and Dr Rais Ahmed.

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