

A statement on Scientific Temper signed by outstanding intellectuals, released by P.N. Haksar at the Nehru Centre in Bombay (*Mainstream*, July 25, 1981) has touched off rethinking in a broad spectrum of our national life. Seven comments on the Statement have so far been published in *Mainstream* (August 29, October 10, November 14 and December 19, 1981 and January 2, 1982). We publish here a fresh contribution from Dr. Subbaram, who belongs to the Department of Physics, M.D. University, Rohtak.—Editor

## Bane of Indian Society

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WE have had the dubious honour of exposure to Dr Ashis Nandy's verbose and noisy article (*Mainstream*, October 10, 1981) ranged against 'A Statement of Scientific Temper' signed by some of the topmost scientists, intellectuals, and thinkers of this country who met sometime ago under the aegis of the Nehru Centre, Bombay (*Mainstream*, July, 25, 1981).

In his overzealousness of debunking every aspect pertaining to science the reviler, I am afraid, has missed the whole point the signatories intended to put forward, by confusing the words 'Science' and 'Scientific Temper' and their meanings. To make things worse, Nandy quotes only certain parts of the Statement by the intellectuals and proceeds to critically analyse those parts of the statement, conveniently avoiding everything else that is contained in the original statement on scientific temper.

In the process of interpretation, P.N. Haksar who is still alive and Jawaharlal Nehru who has been dead for long are set on a collision course by Nandy which ends up as the most macabre joke of the year. And now the good news: the intellectuals, in fact, gave all the credit for the call for inculcation of scientific temper among the general public to Nehru. To quote them "...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..."

Thus Jawaharlal Nehru had not been reduced to a fourth-rate pamphleteer of modern science by the signatories, as Nandy would force us to accept,

but had been put on a pedestal as a first-rate visionary with clarity of mind, ideas and a positive attitude to execute those with enthusiasm, and with respect towards modern science and scientists. But for Nehru, Dr Bhabha would not have been able to achieve what he had achieved till the point of his untimely death. Had Dr Bhabha not been extended the encouragement he was rightly given towards a sound foundation for development of science and scientific ideas in this country, we would have been further wallowing in the past with more of the kind of patting on our backs we do now with our own obscurantist hands, displaying a passive non-scientific attitude if not an aggressive anti-scientific one as is presently postured by Nandy, the new Messiah.

Scientific temper does not imply blind belief in the conventional sense in science and/or the material gains it provides as it is often mistaken to be and projected as such. It means possession of a spirit of inquiry, comprehending the rationale behind performing a particular act, convincing oneself that it is indeed proper to do so, and then proceeding accordingly in a methodical manner keeping away all the apparently meaningless and random deeds. 'Scientific Temper' is the cause (hinterland) and 'Science' is the effect (the produce).

This does not *per se* mean that every individual who already has or has acquired scientific temper contributes to science. It only means that scientific temper becomes a prerequisite to the development of science by an individual or a group of individuals who wishes to pursue science as a profession. Everyone does not pursue science as a profession but whoever does, has to proceed with scientific temper that is, in a methodical, systematic, dispassionate, unprejudiced and in a disciplined manner to arrive at something new which again has to be substantiated by logic and rationality.

Nandy might accuse this procedure as narrow-minded and, in a way, conformistic but then the acquisition of a spirit of inquiry with 'why's and 'how's does necessarily narrow down to the above characteristics however much, as it is alleged, they may attenuate the kind of limitless freedom an individual would like to have to let his mind go wherever it pleases. The power of intuition for and the extent of rationalisation of a certain idea in science are mutually exclusive only up to the point of a sound mathematical basis and experimental verification, and thereafter the former becomes

complementary to the latter.

It must be confessed here that, although disconcerting it is, the extent of rationalisation most of the times supersedes (perhaps it even drowns) the power of intuition once the mind is satisfied about the logical basis of the argument under consideration and the ensuing verifiable results. What has been just said applies only to physical and biological sciences; the social 'sciences' have to be necessarily excluded from this domain of verifiability as it is not possible at all to predict human behaviour). In the absence of rationalisation, the scientist becomes restless and wanders in a world that is devoid of roots to base his theories on.

In this context, it is relevant to quote a concrete example from modern physics, the Danish physicist, Niels Bohr, while trying to satisfactorily explain the observed spectrum of Hydrogen early this century suggested that, the angular momentum because of the motion of the electron around the nucleus must be an integral multiple of  $h/2\pi$  [ $\pi$ (pi) Greek Symbol] where 'h' is the Planck's constant. Later-day scientists showed that this particular postulate manifests naturally in the mathematical solutions of the relevant equations while solving the hydrogen problem in a rigorous manner. Neither Bohr alone should be wholly applauded for his intuitive capacities (which are essentially visionary in nature) nor the later-day scientists, who had revealed the said postulate through a logical basis, should be assailed. Full credit should be given to all concerned to have arrived at the truth of the problem, albeit by different routes.

Science does not exclude out of the way theories and ideas as long as their veracity can be tested inside a laboratory. In fact, most modern sciences grew out of empirical ideas. The very nature of scientific inquiry encourages rebelliousness (Nandy is pleased, I am sure) through questioning the existing propositions and observations, however big and famous the scientist who is being questioned might be and however uncomfortable the questions might turn out to be.

This is not true of faiths and religious beliefs which are primarily based on dogmas and deemed to be infallible. No doubt these do give some psychological solace to human beings who all the time lead a difficult present with an uncertain future before them. And no one apprehends people for their personal 'beliefs' so long as they do not interfere in the public conduct of an individual in society, displaying antiquity through sterile modes of thinking and action, and rationalising every deed however obviously illogical it might seem, and further harping on the same illogicality as the product of a higher level of consciousness the individual seemingly has reached which, it is said, cannot be attained by others with different (often condescendingly portrayed as 'lesser') perceptions. It is with reference to this public conduct, which is necessarily dependent on an individual's private beliefs, habits and deeds, that the idea of inculcation of scientific temper is invoked and is suggested as an asset to the general public of an indisciplined society like ours.

The difference between acquisition of scientific temper and possession of religious temper is that the former if developed well is a preventive to many of the man-created ills of the self and of the society and installs self-discipline and self-confidence in individuals, while the latter is a soother of the mind after the calamity had happened which definitely could have been avoided in the first place in most cases if only people were less obscurantist, less superstitious, and less fatalistic in their approach and reaction. For instance, towards diagnosing and following up their cure, and such adverse circumstances people very often find themselves in. Ignorance is the main cause for many human disasters, and superstition acts as a permanent catalyst in the process of debilitation of the mind leading to the collapse of the individual.

The human mind is multi directional and multi-dimensional and is an animal travelling with a speed more than that of light, and unless controlled effectively it would lead the individual to tremendous amount of confusion and mental strain. Unrestrained spontaneity, unlimited freedom, misplaced rebelliousness, and non-conformism, as propagated by Nandy, shall have to be contained to have their limits within the boundaries of the society in which we live among other human beings, and there is nothing absolute then. Further, all humans are not adequately equipped with the necessary discipline to cope with these extreme individualistic qualities. It is a fact of history though that those persons who were bestowed with the above unconventional qualities and, more importantly, who were also able to put up with them have been the harbingers of spectacular discoveries in science and innovations in the arts and literature.

How does a scientist in a largely faith-oriented country like ours behave and what are his social responsibilities? Does he not find himself in a contradictory situation by clinging to a nurtured religious temper at home and to a trained scientific temper outside of it, be it in a laboratory or in a factory? The answer is a firm 'yes' in the case of the Indian scientist, and thus this individual has quietly come to terms with living on different planes, namely, the spiritual and intellectual (among others) at the same time. As an example, the Indian scientist wrapping around a loin cloth takes a holy dip in the heavily polluted river, and comes out and dries himself to adorn a western attire of suit and tie, and nonchalantly delivers a thunderous lecture on the perils of environmental pollution of the said river and on how to combat them through committee meetings, panel discussions and through perhaps trips abroad.

For a Westerner (also a rational Indian) who looks for an integrated personality in individuals, this kind of combination seems an anathema; he is dismayed, and feels baffled as to how the Indian has developed compartments in his mind to reckon with the various aspects of his life. The Westerner would go so far as to suggest psychiatric treatment for the obvious contradictions the individual displays. In a true personality development, an individual is the same wherever he is and whatever work he under-

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does not lead one anywhere, and encourages *status quo* which means lack of progress. The kind of positive, constructive attitude one advocates for scientists and governments alike might sound Utopian, but nevertheless is the precondition if one has to live and coexist with others peacefully in an uncertain world with constantly increasing population and rapidly depleting global resources. The alternative is not encouragement of religious faith/orientation but acquirement of scientific temper, alongwith 'humanistic temper' as proposed by Nandy, with genuine sensitivities, and intense concern for the welfare of fellow human beings and for the advancement of human civilisation.

The various religions and religious texts have failed to preach the process of humanisation in the past, and it is true of it even now. Several intra-and inter-religious denominations have been creating feuds since time immemorial which continue till today as we witness all around us, and the darker side of the coin of science has at times been indiscriminately used to prolong these feuds into long drawn out sectarian wars and large scale battles. On the other hand, ideological polarisations of political variety (another kind of 'religious' fanaticism) have increased the possibility of short, intense wars although uptill now only bullying tactics have been employed by the various powers that be, and no real war has yet been fought with modern (exclusively nuclear) weaponry. The consequences of such confrontations are too obvious and frightening, and however pigheaded they might be, the hawkish heads of states are too timid about and weary of initiating global destruction. Religious faith based on dogma does not hesitate to continuously annihilate others in the name of superiority of one belief over the other, whereas differences in ideological faiths stagger to undertake such large scale destruction although the itching sensation and motives are very much there, and the annihilation in this case is undertaken in a more subtler and slower manner than by the obdurate and hardcore conventional religious orders.

Oppression of the masses has existed even before the advent of modern science, and it is the carnivorous nature of humans which has primarily remained the same over the millennia — science or no science. Science and scientific discoveries in modern times might have, unwittingly, helped perpetuate this global evil by dumping various undesirable technologies on ancient societies in general as is obvious by the available detailed reports on several (mostly western) multinational organisations. But the most laudable feature of modern science is that it has at the same time helped the humanity to improve their living standards, whereas the earlier oppressive forces, mainly religious in nature, successfully opiated the psyche of the masses into numbness, inaction and into accepting their pathetic situation as fatalistic. And further, one fails to understand why the weak should always remain weak and the strong remain strong? Does this not in itself amount to a perpetuation of oppression?

It is the warped interpretation of the history, particularly of science, that puts dogmas (essentially authoritarian) far above scientific methods and theories (always open to questioning and scrutinisa-

tion) thus pushing the theological forces to undertake distasteful debunking of renowned scientists and their (human or inhuman) personalities. Nandy absolves the 'liberal' Roman church of persecution of Galileo in a matter-of fact manner portraying Galileo as the real culprit in the whole episode of interpretation of the solar system and its dynamics. It might be true that the church might have had plural images of the cosmos but the crime, it seems, of Galileo was that his view did not fit into any of those plural images of the cosmos the church had held, and he dared to put forward his own view (based on Copernican theory as opposed to the uptill then accepted Ptolemaic view) which ultimately was conclusively proved to be the correct one. Is this attitude of the church not a blatant display of authoritarianism by the establishment which persecuted a rebellious and dissenting individual because of his perceptive insight?

One can clearly see the panic in the priest's attitude in denigrating science as stratarchical — replacing the order, established, and unquestioningly accepted forms of sedation. This kind of panicking had occurred in the past too whenever new modes of thinking tried to replace the older forms of thinking, euphemistically called 'traditions'.

Tradition as such is not something sacrosanct that cannot be touched at all, and it should indeed be subjected to modifications and if necessary to total rejection according to changing times in case the situation so demands. Scientific tradition is still to take roots in India which uptill now has been in the firm grip of every other tradition except scientific. It now seems unlikely that this would happen, in view of the insults and innuendoes that have been allowed to be liberally showered by Nandy on science, scientists, and scientific temper. It also seems unlikely that the scientific tradition would, in fact, be widely accepted by the Indian public and would take roots here unless some restraint is clamped on derogatory propagation of vagaries.

And whoever said that science is the only answer as a cure to all the ills of this society (or any other society for that matter) and that through science alone can one find the *ultimate* truth? Science always encourages challenging of its theories and remains an in-built competing idea system, contrary to what Nandy complains. The beauty of the scientific method in quest of truth is that it offers verifiable proofs, whereas all the other methods rapaciously thrust their dogmatic theories into the minds of people without ever giving them even a remote chance to question, let alone confront. Empty statements are not made in science for the general public to swallow unquestioningly as antidotes for their physical, mental, and spiritual crises or problems.

There lies the contrast as well as the superiority of the scientific method over other illusory exercises, and there also lies the hegemony of science, however much individuals like Nandy resent it and laboriously try to thwart all efforts in regard to the progress of science and proliferation of scientific temper in our country.

Stupidity has been the biggest enemy of mankind and it is about time it is relegated to an inferior position. □



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takes. His innate characteristics are reflected in his speech, writings, actions and his behaviour. To a logical, rational mind the Indian scientist remains an enigma with so many mental garbs to wear on different occasions. The only way to reconcile with this puzzling situation, it appears, is to accept the Indian scientist as 'super-human'. There is no use acclaiming only some great Indian scientific personalities and their inner contradictory characteristics, as Nandy does, since for the common man they do not set any great example insofar as the inculcation of scientific temper goes. And, in any case, the common man imitates what he has been accustomed to — namely, the religious faith part of the individual scientist, and dismisses the other face as only a monthly-salary-earning part like any other individual earns in any other profession.

The Indian scientist thus has not helped the society at large in infusing scientific temper into it, and so has remained the biggest detractor to the proliferation of scientific temper by playing it down sufficiently in favour of the religious temper he has acquired right from birth and by surviving in later life as an inconsistent, often contradictory, and a multiple personality. This is one of the reasons why we have not been able to make collective, large scale creative scientific contributions vis-a-vis western scientists in spite of statistics hammered at us about possession of the third largest scientific and technical community in the world. However, we do find occasional sparks of individual geniuses and their contributions to science, again in spite of the person's many contradictions.

Under these disturbing — nevertheless true — circumstances, it is all the more necessary and very important for all concerned people with scientific bent of mind and thinking to come forward, as had indeed been recently done by the group of intellectuals, and inform the laity as well as the formally educated yet ignorant general public about scientific temper and the lack of it, and the full scale advantages of it to a largely indisciplined and obscurant society such as ours. Else, it only encourages the vituperative tirade undertaken by Nandy and his friends against scientific temper, science, and scientists which will lead to regressive thinking, and further obfuscates the paths of the already confused and gullible public.

It is unfortunate and at the same time disappointing that Nandy, it looks, would like the proletariat (on behalf of whom he speaks) to remain forever where it now is — praying most of the time — rather than elevate them to an enlightened state by stimulating their dormant curiosity and inquisitiveness, through questioning and defiance of old value systems. Will it be considered improper if one asked Nandy whether he would like the common man to hold the ladder obediently while the rest of the community (particularly, the elite including the scribe) climbs up the steps of the ladder — both materially and spiritually? Will it not be condemnation of the worst kind of the peoples for whom he sheds tears? And pray, what sort of folk-sciences and folk-philosophy has Nandy exactly in mind to be further encouraged among

the masses? Or, then astrology, clairvoyance, and crystal gazing; and revival of sati (as only his procedure is believed to give ultimate mental solace to the dead man's wife), sacrifice of young children to propitiate some god or goddess (as this is supposed to help beget progeny, hopefully sons, in barren women), exorcise some one suffering from mental illness by merciless beatings, and manufacturing *vibhuti* from nowhere (as smearing of this material on the forehead and on the body is deemed to bring one closer to God and salvation)? Some revelation that would be, I reckon, in terms of syllabi and course work for the common folks.

Science and scientific discoveries have been accused by Nandy in an adroit manner as pre-emptive forces for destruction of mankind. This is not untrue except that the above accusation is made by 'scholars' and 'learned' persons with compassion, sitting in the comfort of science's positive contributions to society and humanity at large. It is again unfair of Nandy to applaud the efforts of some non-existent social welfare organisations, not modern science, in eradication of diseases and epidemics so far as our country is concerned. It is like praising the ration shop for the grain it distributes, not the farmer who toils to produce the grain in the first place.

Moreover, there has been little change in the social structure of our land during the past many centuries. Cheap energy is still a dream. The increase in agricultural outputs is mainly due to new methods of breeding and due to large scale use of new fertilisers for better yields. Yet if certain scientific discoveries and their technology have led to wars, destruction, and hunger it will be unfair to blame science and scientists including those who work for governmental organisations (political in structure) that lay down policy decisions regarding aggressions, fights, and wars. In an increasingly belligerent world mostly governed by hawks (being a dove is deemed to be not a sufficiently aggressive quality in the modern world) it becomes inevitable that science and its technological consequences are used towards manufacturing of offensive weaponry for defence purposes. Most of the scientific research is government-funded in one manner or the other, and it is imperative then that governments do have motives in encouraging one or the other kind of scientific research.

Any scientific discovery by a scientist is not necessarily made either with the positive contribution it might make or the negative one in mind, and it emerges as the fruit of dedicated efforts done with scientific temper and zeal. Once the discovery is made and its (destructive) potential realised, the scientists have no control over the uses (or misuses) of it as it becomes the sole property of the policy makers of the particular country. It is in this context, Nandy's point about *humanising* science and scientists must be seriously considered, moralistic as it sounds. But, merely owing to also the destructive uses science is capable of, one should not discourage science and scientific research. It is like not undertaking a train journey lest an accident occurs on way. This is a negative attitude in itself and