SCIENCE JOURNALISM IN INDIA AND ABROAD

In 1976 I delivered the 10th Jawaharlal Nehru Memorial Lecture in Delhi. The then Prime Minister Smt. Indira Gandhi was in the chair. The topic of my lecture was 'The Role of Scientific Outlook in the Development of Science and Society'. The lecture was meant to be a public lecture and its copies were freely distributed afterwards. However, at the end of the lecture, when I was leaving a newspaper reporter approached me for a written version.

From my earlier experiences of other lectures I had been familiar with this kind of request. Although billed as a public lecture, the journalists automatically assume that they won't understand it if it is being delivered by a scientist. So they want something in writing from the speaker so that he is not mis-reported.

On this occasion I felt myself well-prepared. I triumphantly pointed out to him that copies of the entire talk were available then and there.

'I know it, Sir' he replied politely producing a copy from his bag.

'So what is the problem?' I asked.

'Well, Sir! I have to report the lecture in 100 words and I do not know how to shorten it. Could you tell me in a few words, what you said?'

I gave up after that! I had not realized that the reporter wanted to be spoon fed with a summary of my talk prepared by me.

This incident illustrates the dismal state of science reporting in the country. As in every case, there are a few exceptions, of course, who rise above the norm and are able to make a good job of it. But why should the norm be so low?

Take another example. a U.S. astronomer gave a public lecture in Bombay on 'Violence in Astronomy'. He discussed in a simple language with a lot of slides of astronomical objects how the central (nuclear) regions of galaxies show evidence of violent activity such as explosions, ejection of matter etc. He mentioned a conjecture that quasars, known to be highly compact bright objects might have been ejected by such active galactic nuclei.

The next day a leading English national daily announced that the scientist said that galaxies are ejected by explosions in quasars!

Whatever might be the reporter's training (or lack of it) I find it hard to understand how he could make this type of mistake of simply reversing the roles of quasars and galaxies.

It is against this background that I have ventured to set forth my comments on science journalism in India. But before I do so let me say something about the almost universal fear felt by the layman that he is not sufficiently equipped to understand and appreciate anything that has to do with science.

Thanks to the way science is taught in our schools, the typical student looks upon it as a mysterious subject which is to be memorised by heart and reproduced ditto, much as a parrot trained to speak words and sentences does. None of the thrills of science, the agonies of unsolved problems, the ecstacies of finding the right solutions etc. are conveyed to him or her. So the school children grow into adults who are happy to be relieved of the burden of science. It is something they were made to learn at school and are now glad to leave behind.

I can still see the venerable professor of Sanskrit who accosted me before my talk at the Vasant Vyakhyanmala in Pune with the remark: 'I am looking forward to your talk, not that I will understand any of it'. The topic of my talk was 'What would the life be like hundred years hence?' I am sure, if I announce that I were reading out a story of mine, the reaction would have been the same. Even educated adults of non-scientific background have a complex that science is too difficult to understand and that whatever the scientist talks about will be unintelligible. So to project science to them is not going to be easy to start with.

The Age of Science

It is often stated that we live in the age of science, that science and technology are shaping our very existence. No one described it more graphically than Alvin Toffler in his book 'The Future Shock'. I summarize below in my own words his description of the way science and technlogy have become increasingly rapidly integrated in our lives.

Divide the last 50,000 years or so of known human existence on this planet into some 800 human line spans-each life span comprising of 62.5 years. Of these, the first 650 or so were spent by man in primitive conditions in the caves. The art of writing is not more than 70 life spans old and that of printing only six life spans old. The electric motor is two life spans old. In fact most of the things we use in our daily existence involve technology much younger, some of it not more than one life span old. The discovery of atomic energy, use of space technology and the proliferation of computers are all less than a life span old.

... Science journalism does not mean only simplifying science and explaining it to the layman. It is not an exercise in pedagogy.

- says Jayant Narlikar



This indicates how rapidly scientific ideas are being translated into technology inventions and how rapidly we are assimilating them in our lives. Yet the rapidity with which this is taking place is not proving entirely beneficial to the society. Rather, the situation resembles that of a human being confronted with a feast of excellent eatables served in rapid succession and tempted to eat them as fast as they come. The banquet may look dazzling but the dinner ought to pick and choose keeping in mind his imitations of health and capacity to digest. This the human society has not managed to do.

The dinner in the above example may ask : 'How do I know what is good for me - and what items I should avoid ?' Who is to tell him? This is where science journalism has a role to play. I shall shortly discuss a few typical examples.

Research in science and technology is broadly supported by the governments of the different countries although private sectors also contribute small fractions depending on the economics of the countries. So by and large the tax payer is the ultimate source of funds.To what extent should he or she exercise control on the funding? How do we make wise collective decisions today to ensure a better tomorrow?

With rapid changes taking place in science and technology, forecasting their status even ten years from now is not easy. Yet some assessment of how things will go in the future is necessary for planning. For example, the Science Advisory Council to the Prime Minister set up by the late Prime Minister Rajiv Gandhi during 1986-89 undertook such an exercise. In a paper entitled 'An Approach to a Perspective Plan for 2001 AD' the council said:

'It is clear to us that everything that we plan can be accomplished by government machinery alone. We need to fully exploit the potential of voluntary movements in crucial areas such as population control, family welfare, school education and adult literacy. It is likely that many of these tasks are better executed by motivated citizens, especially the educated women who ar not yet fully utilised for the benefit of our society.'

So here we have another possible role for science jounalism- that of motivating the people about future prospects so that they are prepared for them and can take far reaching wise decisions now. I shall return to this aspect later.

Reporting on Scientific Events

What appears as a technological marvel today has roots in some scientific discovery in the past. Very often the former is ignored while the latter is highlighted. In fact while the discovery was made the discoverer or his contemporaries had no idea what the implications of the development would be. Here are a few examples .

(i) Aircrafts are impossible

"...The demonstration that no possible combination of known substance, known forms of machinery and known forms of force, can be united in a practical machine by which man shall fly long distances through the air, seems to the writer as complete as it is possible for the demonstration of any physical fact to be."

-Simon Newcomb (1835-1909)

(ii)Alternating currents are too dangerous to be any use

"...There is no plea which will justify the use of high-tension and alternating currents, either in a scientific or a commercial sense. They are employed solely to reduce investment in copper wire and real estate. My personal desire would be to prohibit entirely the use of alternating currents. They are unnecessary as they are dangerous.... I can therefore see no justification for the introduction of a system which has no element of permanency and every element of danger to life and property. I have always consistently opposed high-tension and alternating systems of electric lighting, not only on account of danger, but because of their general unreliability and unsuitability for any general system of distribution."

-Thomas A Edison (1889)

(iii) Intercontiental ballistic missiles are too hard to make

"...There has been a great deal said about a 3000 miles high-angle rocket. In my opinion such a thing is impossible for many years. The people who have been writing these things that annoy me, have been talking about a 3000 mile high-angle rocket shot from one continent to another, carrying an atomic bomb and so directed as to be a precise weapon which would land exactly on a certain target, such as a city. I say, technically, I don't think anyone in the world knows how to do such a thing, and I feel confident that it will not be done for a very long period of time to come... I think we can leave that out of our thinking, I wish the American public would leave that out of their thinking."

-Dr Vannevar Bush (1945)

(iv) The atomic bomb will never explode

"...That is the biggest fool thing we have ever done. The bomb will never go off, and I speak as an expert in explosives."

- Adm. William Leahy to President Truman in 1945

Nevertheless, there are a number of cases where the future implications of the discovery can be imagined. The implications may not be practical ; they may represent advance in pure knowldge. When Stephen Hawking found that a black hole can (and does) radiate energy, the result was hailed as an important advance in our understading of how quantum processes operate in the strongly curved spacetime, near black holes for example. Why did the scientists feel excited by the result even though there was no chance of observing it in operation now?

There are occasions, on the other hand, where a new discovery, seredipitous though it is, opens out numerous technological falls outs. The discovery of high temperature superconductivity was of this kind.

The point is that scientific events kind are worth reporting to the layman. He may not appreciate the details but he should be given a chance to capture the excitement of creativity, of unravelling one of nature's secrets, of the vista of future applications etc. Such reporting brings science one step closer towards humanity- a step away from the ivory tower in which humanity has placed it.

(Article based on the Jagzap Memorial Lecture delivered at The Department of Communication and Journalism on December 7, 1991).

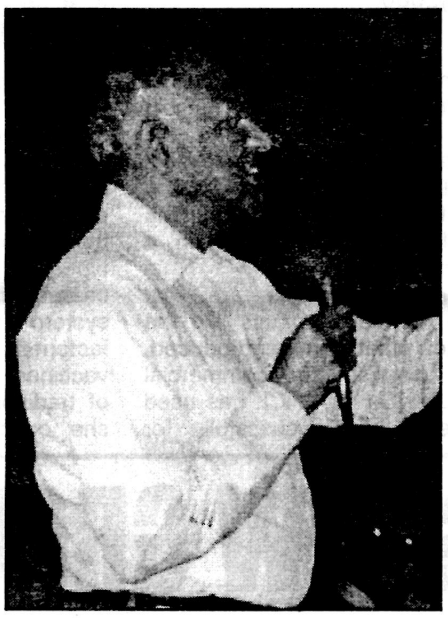
(To be continued in *Vritta Vidya* Jan. 7, 2000)

SCIENCE JOURNALISM IN INDIA AND ABROAD-II

Investigative journalism covers these days many cases of corruption, crime, spying, conspiracy and war stories. Once in a while the scientific world too offers challenging and highly interesting cases. In a typical case, a claim to an important discovery is made but without proper substantiation. In some situations the result is based on fraud while in others it is a genuine mistake.

Scientific Frauds

In 1903 the eminent French physicist R. Blondlot claimed to have discovered a new type of radiation called N- rays (N for the town Nancy where the discovery was supposedly made). Coming shortly after the discovery of X-rays in Germany, this discovery of rays with remarkable properties was hailed widely in France partly because of the competition between the two neighbouring countries in many fields including science. The N-rays became fashionable and a large number of research papers began to appear in French journals. Soon Blondlot was awarded the prestigious Lalande Prize by the French Academy for this discovery.



However, a scientific experiment should be repeatable. This was not happening in the case of N-rays. The rays could not be detected in similar experiments in England or Germany. What was wrong? To find out, the British scientists asked R. W. Wood, a distinguished American scientist to visit Blondlot's laboratory and inspect the experiment. Wood made the trip and found that the claim for N-rays was totally false. His own account of how he detected this fraud makes a very interesting reading even for the layman.

The temptation to make spectacular but fraudulant claims comes more strongly in the present times than in the relatively placid times of the turn of this century. This is because a scientist is judged by his performance much more stringently today than in the last century. Awards, peer support, promotions, project grants are all linked with performance. Thus, if Mr. X has made a stupendous discovery he stands to attract a lot of financial support as well as power in the scientific circles. So there is every incentive for him to rush out and make premature announcements. In spite of these temptations science has remained relatively clean mainly because fraud is detected sooner than later. However, such cases as do turn up from time to time need to be widely reported to the public.

Another related area where investigative journalism can do a lot is in testing the claims of UFOs as extra-terrestrial spacecrafts. The real explanations of the UFO's may be quite mundane : the object may be Venus, or an optical illusion (like a mirage) or a man-made spy satellite, or simply the figment of highly fertile imagination.

Philip Klass, a journalist from Washington DC, has written a book entitled 'UFOs Explained' in which he has given absorbing details of investigative journalism which removed the mystery around several such claims. He has also shown how the so called photographic evidence can be faked. Indeed, in some cases the UFO sighting has been turned (fraudulantly) to material gains.

Debunking 'Miracles' and Superstitions

India has a special problem of its own! The so-called holy men who take advantage of the gullible by producing miracles apparently defying science can wield considerable evil influence on individuals and the society. Scientists and magicians together can play a valuable role in debunking such cases. And the journalists can get a good story out of it.

The nearest to this type of situation arose in the West with the advent of Uri Geller who claimed to have supernatural mental powers by which he could bend spoons at a distance. The fact that even scientists were initially fooled by him and that it took a magician (James Randi) to demonstrate the secret illustrates that considerable subtlety is involved in these deceptions and the claims have to be probed very carefully.

India is a curious mixture of scientific advance and traditional superstitions. Superstitions are deeply ingrained and cannot be eliminated overnight. They cannot be removed by dictat but can be countered by rational arguments. Take astrology, for example. Scientists have tested astrology in many different ways and found it devoid of any scientific basis. Yet, to convince the believer that this is the case is not easy. Patience is needed. And information, which science journalism can provide.

Technological Disasters and Boons

With high technology entering in every field there are disasters also. The Space Shuttle Challenger exploded on take off in January 1986. The nuclear reactors in the Three Mile Island in the USA and in Chernobyl in the USSR developed malfunctions that led to leakage of damaging radiation. The Bhopal gas tragedy of 1984 is still green in our memory. Sophisticated aircrafts crash or rockets fail to take off or railway accidents occur due to signalling faults.Potent medicines may turn out to have damaging side effects....

The list is long. Whenever such a disaster happens there is a popular reaction against science. Argue the critics : 'Look this is what happens, when you go in for science and technology. Abandon it all (they continue) and go back to the simple days of the last century.'

This is where technical experts and journalists need to get toegether. It may not be possible to analyse and diagnose what went wrong immediately. But openness and dissemination of factual information can go a long way towards allaying public fears. When the cause has been found out it will become clear what corrective action or precaution is needed for the future. In most cases it will also turn out that the initial panic against science and technology was akin to throwing the baby out along with the bath water.

There are interesting and informative articles written on most of these disasters. The problem is how to give them as wide a circulation as possible. A valuable contribution science journalism can make to science and technology is to mitigate fears of the irrational type, discuss what went wrong and point where the fault lay. This may not be easy since there may be vested interests keen to suppress the truth.

Science dissemination at the popular level also should emphasise the positive aspects of science and technology. There are several ways of doing it. Take medicine, for example. Max Perutz in his book 'Is Science Necessary' has given a list of highly creative persons in the arts and sciences who died young - in the days when science was yet to provide remedies that could have cured them - remedies that we take for granted today. Today science has provided quick channels of communication that are pressed into operations whenever natural disasters like cyclone, volcanic eruptions, earthquakes, etc. call for immediate help.

The journalist can highlight these positive aspects of science and technology besides the negative ones I mentioned earlier. In making any forward planning these inputs should form essential ingredients. In our country they are at best peripheral largely because science and technology have not seeped into the planners' minds to the extent they should have. One still notices two cultures - with the scientific one kept in a closed box to be opned on some purely ceremonial occasions.

The Status of Science Journalism Today

Let us first consider the advanced countries of the West. Writing about science journalism in his book 'The Wisdom of Science' R. Hanbury Brown has moaned that 'Although advances in science and technology have given us an unparalleled ability to communicate with one another by radio, television and vast quantities of print, these so-called 'media' are seldom used to tell us anything about science...' He goes on to say:

'As far as journalism is concerned, it would prefer science to go away; of the 1,750 daily papers published in the USA only 50 employ full-time science writers. The reason is, of course that the popular media prefer topics that are more sensational and entertaining, and so they avoid science; they do this only because they think science will bore their customers stiff, but also because it is difficult to find people who can put it over to the public successfully. However there is some light at the end of the tunnel. In recent years there has been a marked increase in the number of programmes and semi-popular magazines devoted to science, particularly in the USA, which suggests that, maybe, the popular media have underestimated the market.'

Compared to the West, the situation in India is even more dismal. As mentioned by Hanbury Brown, the 'market economy' operates here too. And so astrological forecasts appear regularly in our newspapers but science and technology are touched if at all, only with a barge pole. In a recent survey conducted by the Energy and Environment Group and the National Council for Science and Technology Communication (NCSTC) the fraction of space devoted to science coverage in the national newspapers (over the 6-month period July-December 1989) was found to be in the range of 2.10% to 6.56% of the total reading matter exclusive of advertisements.

Even in these reports on science it is not known how much was of indigenous origin and how much taken over from foreign sources! Many reports in our newspapers come from the New York Times, *the* Nature-Times *science reports, and other news items or articles in the western media.*

To provide our own sources of scientific news, the NCSTC launched Srote *- a publication that has science coverage compiled and prepared in India. This experiment was launched in 1988 and in the form of a monthly newsletter. Newspapers, and radio stations, etc. were invited to subscribe. Those that did were put on the mailing list. The newsletter contains science items that could be published in newspapers and being in 'ready-made' form removed the editors' difficulties of locating sources. What was the response?*

> *Astrological forecasts appear in our newspaper as a regular feature but science and technology are touched if at all, with a barge pole, points Jayant Narlikar.*

At the end of the second year (1990) only around 90 clippings had been picked up! The reasons for the apathy were mainly as follows (-as discerned from the feedbacks received from newspaper editors, proprietors, etc.). First, being a monthly newsletter, the items in it tended to be dated from a 'news-value' point of view. Second, the articles in the newsletter were longer than what the newspaper would like to have. Further, some newspapers would have liked the articles 'jazzed up' to make them more exciting or dramatized if not sensational.

To get round these difficulties Srote *was made a weekly newsletter with shorter crisper articles. The total number of pages per month is still the same; but the response has been much better. During the ten month period December 1990 - October 1991, 336 clippings were picked up. However,* Srote *editors pointed out that many clippings were used by newspapers, etc. without acknowledgement of source let alone the payment of the modest fee for it! Thus the extent of unauthorized use of* Srote *articles may even be larger.*

The list of newspapers using the facility had some 35 names, but they were largely from the Hindi belt in the north. In fact, science coverage in Hindi newspapers is claimed to be better than in the English ones.

Another silver lining is the regular weekly publication of science supplements by leading newspapers in different languages. Here I feel our scientists can contribute effectively in many ways - by writing articles on the latest developments, by giving interviews on their work or even by helping out in answering readers' queries.

Concluding Remarks

This last point needs to be underscored heavily. In modern times the scientists themselves, with the large public funds supporting them, owe it to the public to inform them on what they are doing. By remaining in their ivory towers they will only help foster a growing feeling that science is a luxury that we cannot afford.

Rather, it is the other way round! Science is something that we cannot afford to abandon or leave to others. I have already pleaded strongly why the society needs to be well informed about science and technology. To make the correct decisions about the country's developments, to employ the right strategy with regard to the controlled use of the rapidly growing science and technology and to nurture the vital spark of scientific creativity, the scientists as a body have to keep the public well informed about the vital issues.

And the media should help scientists in this crusade. Newspapers play a vital role in spreading information and opinion in times of stress. In the present age of science they should not treat science journalism as quiet backwaters. They should look upon it as an ocean vibrant with waves and tides that affect our destiny.

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Concluded