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Main objectives of the 'Society for Scientific Values

1. To promote objectivity, integrity and ethical values in pursuit of scientific research, education and management, and
2. To discourage the unethical acts in these areas

Editorial

In 1981, several middle level scientists working in different scientific institutions of the Delhi formed a group to promote ethics and norms in scientific research and management. As a convenor of the group, I wrote an article in 1982 on 'Creating Healthy Environment of Research'. the article is reproduced in this issue with slight change. At that time I did not advocate punishment to the violators of ethics in research saying that by punishment one can not transform a deceptive person into a good scientist. However, the cases of misconudct in scientific research and publication are being reported from all over the world in increasing number. Not a day passes without such a news appearing in one or the other newspaper.

The Society for Scientific Values saw this emerging trend two decades ago. It has been organising awareness programmes like seminars, symposia and group discussion for the promotion of scientific values which are based on basic human values like truth and honesty. The Society has also been investigating into major cases of misconduct in research and publication.

The findings of the enquiry were sent to the Employing Organisation for taking action against the guilty person. Since the SSV has no power other than moral, those Heads who respect morals took appripriate action, other ignored it. Moreover, because of its very meagre financial resources and practically no infrastructure, the Society has not been able to handle growing cases of allegations of misconduct in research and publication, and since no other agency in the country looks into such allegations, therefore, the President of the Society Dr. K.L. Chopra presented a proposal for the establishment of 'National Science and Technology Ethics Committee' before the 'Scientific Advisory Committee to the Cabinet (SACC) in February, 2005. Though, several members appreciated the suggestion, the SACC has not taken any action to establish such a committee.

Constituting interacademy committee by the Indian National Science Academy under the Chairmanship of Dr. M.G.K. Menon to prepare a report on 'Responsibility and Ethics in Science and Technology' is a good development. Dr. M.G.K. Menon delivered the first Dr. A.S. Paintal memorial lecture on this very topic on August 22, 2005. He supported the suggestion of SSV for setting up the 'National Science and Technology Ethics Committee'. A report on his lecture is included in this issue. The Indian Academy of Sciences, Banglore has also prepared a good report on scientific values. An abridged version of the report is included in this issue. These reports may remain good academic documents unless specific steps are laid down to investigate into specific allegation and take appropriate action against persons found guilty. These misconducts are broadly of two kind; misconduct in research and publication, and misconduct in management of science. Plagiarism, outright fraud, fabrication of data, omission of authorship and undue authorship etc. come under the first group of misconduct. Under the second group come wrong appointments, wrong awards and recognitions, and wrong project fundings. There is at least one society, SSV which has been investigating into the first group of misconduct in the country. But there is no agency which looks into misconduct in management of science which has been causing much greater damage to the development of science and technology in the country.

— P.N. Tiwari

Letter to Editor

Deviation from Scientific Ethics has a much broader spectrum than (1) inclusion of name amongst authors without any contribution, (2) plagiarism or (3) support to unethical activity particularly in view of the fact that unethical activity has not been properly defined in the context of state of science in the country.

In USA, the malady is largely related to (2). In India we should be particularly concerned with (3). Science teaches humility and respect for others views. Science is based on objectivity and cautious approach to conclusion. Self-appreciation, manipulation and psychophancy for recognition is anti-science. Broad-mindedness is necessary for appr;eciating display of ingenuity by a young student, a scientist from not necessarily a reputed area or Institution. Unfortunately these qualities are fast disappearing in the Indian Scientific scene with the result that young scientists are not inspired and healthy traditions are not being set up.

The above ideas are equally relevant for scientific development and management where objective and dispassionate attitudes are the prerequisites. Scientific temper is the prime necessity.

For generation of appropriate scientific temper and real scientific attitude, the emphasis has to be given right from the school level. Unfortunately, the present trend is disappointing in this respect.

— Prof. R.P. Rastogi
FNA, Former Vice Chancellor, B.H.U.

Letter of Dr. K.L. Chopra, President, SSV to Head of Educational and Scientific Organisations

The Society for Scientific Values (SSV) conveys its serious concern and seeks your intervention to curb the tendency of science administrators in universities and institutes to misuse their position as "forwarding authorities" to suppress/ delay applications of their scientists /academics for research grants, fellowships, collaborations etc. The SSV routinely hears about how Directors, Heads of Departments/Divisions and even Vice-Chancellors use their authority to extract co-investigatorships, co-authorships or other benefits from younger or vulnerable scientists, or to simply harass them and settle scores on other counts. Such cases seldom come to public scrutiny due to the inherently vulnerable position of the scientists involved. As an example, we have recently received a formal representation from one of our members, Prof. V. Sitaramam from the University of Pune, about the manner in which his application to UGC for a research project has not been forwarded by his university authorities for over a year without sufficient reason. His repeated attempts to sort out the matter with the VC, Prof. A. S. Kolaskar, has not lead to any results. His representation to the Chancellor and Governor of Maharashtra, S.M. Krishna, was sent back to the VC for appopriate action, but has not yielded any results so far.

It is pertinent to point out that Prof. Sitaramam is a senior professor of the university with excellent academic credentials and research publications. If such academics can face such a treatment, the condition of vulnerable young scientists who wish to speak up can easily be imagined. Allowing any arbitrary delays and denials in forwarding grant applications clearly amounts to suppression of research and defeats the very purpose for which such institutions have been established.

May we suggest the following policy measures, for your kind perusal, to remove this malady in Indian Science:

1. All faculty members with requisite qualifications for conducting research, independently or jointly, be allowed to submit an advance copy of the research proposal, as per the rules of the Institution, to a funding agency. If the PI does not require any special facilities of the department, the approval and submission of the proposal should be automatic.In case of any objection,it is expected that the approving/forwarding authority conveys its objections in writing and returns the proposal within a reasonable time, failing which it is understood that that the proposal is acceptable.
2. For implementation of an approved proposal, the PI should be entitled to financial and administrative powers of an HOD, as is already being practiced in premier universities.

I am sure you will agree that these suggestions are in the best interest of your own institution. Competing for research support is the only funding mechanism available to most Indian scientsits in the universities. Research is critical to Universities and cannot be allowed to be interfered with for any reason unless there is fraud.

— K L Chopra
President, SSV

Creating Healthy Environment for Scientific Research

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Pandit Jawaharlal Nehru, in his message to the inaugural ceremony of the Central Food Technological Research Institute, Mysore, on 21st October, 1950; said "One of the remarkable developments in India, during the last three years (after independence), has been the opening of National Laboratories and Research Institutes. We have put up some magnificient laboratories, not only impressive to look at, but I hope, the homes of productive effort and work. It is ultimately on the basis of work done in our research institutes and laboratories that we can progress in most directions. Thus far, we have depended on other countries and have merely copied them or taken advantage of something that they have done. We cannot go far with this dependence. We have laid good and true foundation for scientific progress. It is for the young scientists of India to take advantage of the great opportunities offered to them and thus help in building up the New India".

More than 30 years have passed since Panditji expressed the hope that our National Laboratories and Research Institutes would be homes of productive efforts and work, and we will not depend much on foreign knowledge for our developments. It is now not too early to examine to what extent we depend upon foreign technology for the economic developments of our country. In order to know this, it is necessary to ask a more specific question : how much original contributions have been made in science and technology after independence. An answer to this question has been given in a paper entitled, "Impact of Science and Technology on Indian Society — An Evaluation" by S.N. Ghosh, presented as key note address to the 5th Congress of the Indian Social Science Academy held at Udaipur from 6th July to 8th July, 1980. The third paragraph of the paper stated "It must be made clear here that we are not discussing the impact of science and technology originating in India, for it will be truly difficult to claim such contribution to basic knowledge from India after independence. In comparison, the contribution of Indian scientists in pre-independence India was greater. One cannot also easily identify the major technologies which can be said to have originated in India". M.G.K. Menon also expressed similar view in his presidential address of the 69th session of the Indian Science Congress Association, 1982 at Mysore when he said "One can trace many of the first rate scientists in India to school nucleated by C.V. Raman, Meghnad Saha, S.N. Mitra, Homi Bhabha and so on. However, it takes time and appropriate environment with long-range support to ensure full flowering of any such school. Unfortunately, in India, what should have been points from which whole generation of excellence came forth, *dried up too early*". In the recent past

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* The author wrote this article in 1982 as the convenor of the group that was formed in 1981 by several middle level scientists working in different scientific and educational institutions of Delhi to promote ethics and norms in scientific research, publication and management. The group got transformed into the Society for Scientific Values in 1984 when Dr. A.S. Paintal agreed to lead it.

the Prime Minister has repeatedly emphasised the need to improve the environment of research in the country. In order to do this it is necessary to know why the environment for research has dried up. Some persons who have not cared to go deep into the matter hold politicians responsible for it. But on deeper examination, one finds that this is not the main reason. The politicians might be interfering in decision making in other fields, but they generally do not interfere in the working of our big National Laboratories and Research Institutes. One can also not say that the Government do not give financial support to run these institutions. In fact, the Government have been very generous in giving funds for the development of science and technology without much demand of accountability which is not the case even in scientifically advanced countries. The main reason for drying up of the environment for research must be different from lack of funds and political interference.

Main reason

The main reason for drying up of the environment of scientific research would be found by conducting a survey using the methodology of science to find out what fraction of our scientific population possesses scientific temper which is an attitude of mind that keeps the mankind on the lookout for change, better the best performance and higher productivity. Scientific temper improves critical and creative thinking, and increases the resourcefulness, enterprising spirit and the capacity to utilise new ideas. It changes the way of life and build competence, confidence and self-reliance. All these are possible only by keeping mind strict to truth. But very often facts, logic and reasons are subordinated to opinions in deciding important scientific issues for undue gains cutting the very root of scientific temper and drying the environment for scientific research.

There are several glaring examples of facts being ignored in deciding purely scientic issues. A widespread impression has been created in the country that the increase in our wheat production, called Green Revolution is the result of original scientific work done in the country. But the facts do not support this impression. Explaining the higher yields of wheat varieties developed in Mexico in mid 1960s, the book 'Environmental Science', 1978, published by W.B. Samder Company, Philadelphia, London, Toronto has stated, "In India and Pakistan massive shipment of Green Revolution wheat from Mexico in the late 1960s raised the wheat harvest between 50 to 60 per cent during a period of two growing seasons". The increase in wheat production has been mainly due to the extension workers who demonstrated the advantages of the imported technology to the farmers who accepted the technology quickly and, to the Government who arranged the supply of high level of irrigation and fertilizer needed for getting high yields from Mexico dwarf wheat. The name of our scientists who made some scientific contributions in this effort are not known to the people. Likewise, several exaggerated or totally false scientific claims have been made for getting scientific awards, higher position and more power. Some of these have even been reported by the press from time to time. About the possible causes of the illness of research, O.P. Jain, Director, IIT, Delhi observed "In India, there is lack of scientific ethos; there is no sacrifice and research is treated as a profession. The personal equation is very important and very importantly, when a respondence makes an incorrect claim, his colleagues close their eyes to it" (India Today, October 1, 1981, page 85).

After the suicide of a scientist of IARI in 1972, the Government of India appointed a high level ICAR Enquiry Committee under the Chairmanship of a retired Chief Justice of the Supreme Court (late P.B. Gajendragadkar) to examine the working of ICAR. The Committee in its report stated, "There are many junior scientists in IARI who, rightly or wrongly, feel that they are not free to publish a scientific finding because it does not suit somebody higher up or that in fact unscientific data are being passed on to the higher authorities in return of favour and promotion. We are reluctant to recommend any specific measure to correct the situation in the present case because, unfortunately, the phenomenon is not confined to ICAR and its institutions. Barring minor exceptions, it pervades the entire scientific and academic community in the country. At the root of it is the greed for bureaucratic power and love of a comfortable life which affects this class. In this matter, there is no distinction between the juniors and seniors; the juniors are intellectually as corrupt as their seniors".

The aforesaid descriptions give the main reason of the drying up of the environment for research in the country. It is the wide spread intellectual dishonesty among our scientific community born out of greed for undue gains that has dried up the research environment. Can the environment be regenerated? The answer is yes, if there is control on undue gains, by proper monitoring and by self-improvement through introspection and moral teachings. Both these thingts are difficult to do but there is no other easy solution to the problem. If the problem is not solved soon, the country cannot aspire for a bright future. This is not to suggest that all our scientists are dishonest. There are many who have preserved their scientific integrity even in the present dried up environment and have emotional urge for the advancement of the country. They should join together to create a healthy environment by setting personal examples of integrity and dedicated work. They should make all possible efforts to remove the wide spread intellectual dishonesty from our scientific community and improve the state of science and technology in the country which is the key to all advancement.

Cause and Effect

In order to remove intellectual dishonesty in science, it is necessary to know why some scientists make false claims and how they succeed in creating an impression of being a big scientist on the basis of such claims. There is no answer to these questions in science. The answer can be obtained by psycho-analysis of such persons. They want to get power and money by any means; fair or foul. When they happen to take scientific research for their career advancement they become pseudo-scientists. In a healthy environment of research such scientists seldom succeed in becoming important because science is not search for power and money but it is the search for truth. They are not seekers of truth. However, due to a combination of several factors, such scientists occasionally succeed in becoming very important in scientific administration and spoil a whole generation of scientists. Such persons are intellig;ent and possess a capacity to speak and write very well. They possess a great capacity to please persons in power by their super sycophancy, deception, lobbying and publicity. In the beginning of his scientific career such a person might have done some genuine work and thus won the appreciation of his fellow scientists. After that he uses all possible means to become close to the persons in power. He

fabricates such scientific claims which would please the Government. By using all kinds of means, he manages to become very important and get most powerful positions in scientific organisations. He uses his power, so acquired, to distribute favour to a few deserving and many undeserving persons who become his followers and admirers. A few scientists who try to criticise his unscientific acts are muffled. He uses different methods including constant publicity to keep his image high in the Government, while the Government thinks high of him, most of the scientists working under him lose their capa;city of critical analysis and act according to his will losing obedience to facts which is the basis of science. The longer is the period such person remains in power at a particular place, greater is the damage done, resulting in the drying up of the environment of research to its core at that place.

Science and technology are interdependent processes. In fact, science is the essence of technology. Original technology suited to specific requirements can not be developed without a sound base in science. In modern times, the prosperity and strength of any nation depends mainly on science and technology of the nation. Therefore, no Government will do anything knowingly to harm the development of science in their country. After independence, Indian Government has always been very eager to encourage the scientists by giving great importance to their scientific achievements. Unfortunately, some of the scientists exploit this eagerness of the Government and become very important and powerful in a short time by making hollow claims. This has created a very unhealthy trend among our scientists. Indeed, many scientists holding managerial positions seem to compete with each other in this respect. Obviously, junior scientists working under them are also tempted to do the same. This is a very dangerous trend which must be checked by all means.

Removal of Intellectual Dishonesty

It may be argued that since dishonesty is rampant in the society there is nothing abnormal with scientists also doing the same. It is true that the scientists are part of society but they are a very special part of it. Even now, many people in our country do not think that the scientists would indulge in dishonesty. Indeed, it is possible to get position, power, money and even scientific awards by dishonest means but it is not possible to make any lasting contribution to science by such means. An unfaltering devotion to truth and use of knowledge for man's upliftment are the essential qualities of a genuine scientist. Dishonestry has no place whatsoever in science. At present, there is no work more important than to remove intellectual dishonesty from our scientific community. How can a river remain pure down stream, if it gets polluted at its origin.

Seekers of truth were known as Rishis in ancient India. They were embodiment of the highest human values and conscience keeper of the society. Though the Rishis were concerned mainly with spiritual knowledge and the scientists are concerned mainly with material knowledge, in essence a genuine scientist is a Rishi. Einstein said "Liberation from the bondage of the self constituted, the only way towards a more satisfactory society". He added "Man is here for the sake of other men". About the fear of death he observed "I feel such a sense of solidarity with living things that it does not matter to me where the individual begins or ends. There is nothing in the world which I could not dispense with at

a moment's notice". About the relation between science and religion he said science without religion is blind and religion without science is lame'. About morality, Einstein said, "The most important human endeavor is the striving for morality in our actions. Our inner balance and even our very existence depend on it. Only morality in our actions can give beauty and dignity to life". How close to our great Rishis are the ethical convictions of this great scientist. Several other examples can be given to show the close similarity between Rishis and scientists. In fact, there is no way other than unfaltering devotion to truth for seeking any kind of knowledge. To a genuine scientist name and fame are only the side gains of his work. He does not bother about them. Contrary to this, a pseudo-scientist is mainly concerned with name, fame, power and money. He cooks scientific data to mislead colleagues, particularly persons in power for personal gains. The publication of cooked data in scientific literature misleads generations of scientists. Correction in such cases usually takes long time after painstaking researches against the ascending authority of the wrong doer who keeps on suppressing facts for fear of exposure. This is the worst form of corruption a scientist could indulge in. Can such a person be changed into a Rishi by punishment? A criminal might be changed to an average man but cannot be converted into a Rishi by punishment.

In the long history and great epics of our country, there is not a single example of a bad man being converted into a Rishi by punishment. However, there are a number of examples of the worst men transforming themselves into great Rishis by self-realisation through introspection. The author of our great epic 'Ramayana' Maharishi Balmiki was a robber in the beginning. One day when he was going to kill a saint, the saint asked him, "Why are you committing this sin?" "To take away whatever you have to share with my wife and children," replied Balmiki. The saint offered to be tied to a tree so that he may not run away, and asked Balmiki to go and ask his family members whether they will share his sins also. After getting a negative reply from his family members, Balmiki returned to the saint full of remorse and begged him for pity and salvation. The saint advised him worship Ram. Balmiki worshipped Ram with great devotion, and wrote 'Ramayana' and become a great Rishi. The essence is that if one does anything for himself or for his family which comes in conflict with just interests of others, he is committing a sin. The realisation of this essence is the first step of self-realisation.

The interests of individuals and groups are bound to clash with each other causing misery to all unless all of them observe a basic value system. In the scripture of different religions such value systems have been described in detail. The essence of all these systems is a set of 'enduring values' which are natural derivatives of the concept of oneness of all. In reference paper of the 1981 seminar on 'Value Orientation In Human Problem Solving' organised by Vivekananda Nidhi, these values have been recapitulated as (1) courage and kindness, (2) tolerance, (3) fortitude, (4) health and cleanliness, (5) humility and self-respect, (6) integrity, (7) justice, (i8) action, duty and freedom, (9) temperance. For the maintenance of a good society the practice of all these values is essential, but the practice of integrity, the converse of which is dishonesty is most essential. Integrity has been a corner stone in the foundation of any society. Once a boy with M.Sc. (Physics) went for a job at C.V. Raman Institute, Bangalore. He could not answer some simple

questions in the interview. Raman got annoyed and asked him not to come in future at his Institute. Next day, he saw the boy again at the Institute and told him to go out. The boy said, "Sir, I had come to return the excess T.A. which was paid to me perhaps by mistake by your Institute". Raman asked him to come to his office. He called his Administrative Officer and asked him to issue appointment letter to the boy. He said, "the boy is honest, I can teach him Physics. Honesty of a high order is necessary for the pursuit of science".

From the above facts it should become quite clear that men of the highest integrity are needed to do science. Like badness, goodness is also infectious. It spreads rapidly in favourable environment. Nobody wants to go down. Everyone wants to improve. If we try to improve together, then we help each other in our onward journey. The honest scientists and technologists who have emotional urge for the advancement of the nation should form an organisation for removing intellectual dishonesty from the research institutions. The organisation should have correct values to guide it to reach its goal of ensuring that capable and incorruptible scientists and technologists manage the research institution so that the dedicated scientists and technologists may get healthy environment for research and contribute their best to the prosperity and strength of the nation. A community of scientists and technologists with unfaltering devotion to truth and use of knowledge for man's upliftment might have a very sobering effect, similar to that of Rishis, on the whole society which is losing enduring human values on an alarming scale.

Let not words replace action. Not much new has been said here. The old principles whose validity has been established time and again have been recapitulated as the solution to the most crucial problem facing scientific research in the country. These principles will be of no use, if not pursued unrelentlessly. The worst danger that besets such pursuit, is the tendency to appropriate that portion of the truth which suits and suppress or explain away that which is inconvenient. Let us resist this tendency and apply the established principles in full to transform our Research Institutes into homes of productive work.

Ethics in Science & Technology: Global View

K L Chopra
President, Society for Scientific Values

What are Ethics ?

Ethics are a set of principles and a sense of purpose.Defined in a simple language , ethics are : “do good and be good”. Moral, religous and spiritual ethics are more or less universal foundations of all civilizations be it Indus, Greek, or Chinese. However, social and professional ethics are specific to the societies and professions. Epics such as Ramayan and Gita are storehouses of examples of ethical conduct and are, indeed, used as reference material for teaching-learning process by some respected management schools in India.

Professional ethics became recognized as early as 400 BC in the form of the Hippocratic Oath by practitoners of medical science and medical profession. The significance of the Oath is indicated by the fact that , even today ,it continues to be universally adopted by the medical profession .After the industrial revolution , and certainly after the 2nd world war, business management ethics assumed importance and were accepted during 60’s as core curriculum in most management institutions in the developed world. Professional engineering societies and institutions in western countries recognized the need to frame codes of conduct for their respective profession during 80’s. During 90’s, mandating of an exposure and sensitization of S&T knowledge seekers to ethical values through a suitable teaching-learning experience in numerous western academic institutions has taken place.The beginning of the 21st century is getting ready to witness a movement towards defining globally acceptable ethical values for S& T workers by international organizations.

Why Ethics in S&T ?

Why are ethics in S&T increasingly becoming important ? The answer lies in the recognition of the fact that there are tectonic shifts in the knowledge paradigms arising out of the utilitarian pursuit of scientific knowledge, the emergence of new frontiers of S&T based on manipulation of matter on an atomic scale, the role of knowledge in driving world economies, and globalization of world trade and markets.

Being a creative search for true Knowledge, Science is synonymous with ethical values. However, the process of pursuit of science and its applications are not necessarily ethics-neutral. Much of science today is no longer being driven by the curiosity of individuals. It is increasingly being driven by the utilitarian aspects since the S&T Knowledge Power is the new engine of economic growth of nations.Science makes money and money is also required to undertake sophisticated S&T. Knowledge power is creativity through human resources and innovations through R&D. The prosperity of a nation, according to some economic analysts, is proportional to the number of creative workers and the square of creativity (like a clone of the familiar Einstein’s equation $E = mc^2$).

Globalisation, internet, communication and information-enabled technology revolution have internationalized R&D among nations through collaboration, exchange/migration of R&D personnel , information, and global networking. Internet provides instant sharing and communication of scientific developments.With the availability of very powerful theoretical and experimental analytical tools with well equipped research laboratories, R&D claims can be evaluated and validated in no time. In view of the economic value of the S&T, the need for legal protection of the intellectual property rights of innovators and inventors has led to the adoption of universally acceptable national and international laws through international organizations.

Ab-initio creation of matter , both living and non-living , and manipulation of its structure and thus its properties at an atomic / molecular level has been pursued by a variety of scientists and technologists for several decades. However, during the last decade or so ,with the availability of nano-analytical tools and associated powerful image and data processing techniques which allow one to literally see and position atomic building blocks of matter and manipulate their arrangements, a new scientific revolution, called Nanotechnology, has ushered in minefields of ethical concern for the humanity at large. Applied to biology, medical, or agriculture, nanotechnologies offer enormously exciting advances for mankind on the one hand, and an ethical challenge on the other hand. Cloning of cells, plants, animals, and even human embryos, and genetic modification of plants, fruits, food, and seeds are already a reality. Interdisciplinary technologies involving integration of Bits, Atoms, Neurons and Genes (called BANG) to manipulate or create new matter is already in the realm of possibilities. The world is deeply divided on the ethical issues related to man-made living species.

Economic development of any country, whether or not based on S&T, invariably comes with a price of affecting the eco- and bio-spheres which are shared by the world community. Global warming is one such phenomenon. Scientific tools have established that due to the limited carrying capacity of our earth, sustainable and GREEN development has to be accepted globally and that calls for globally accepted appropriate technologies based on scientific Knowledge. The global concern has already led to a number of international meetings of the world community on the subject and continues to be hotly debated topic of global concern.

The preceding paragraphs have clearly brought out that globalization of economies and trade, the power of Knowledge in driving economies, internationalization of S&T, the emergence of Info-Nano-Bio-Agro driven future, global concern for sustainable development, and global protection of IPR demand a serious concern for ethical values in S&T. This means the evolution of a universally acceptable value system and adherence to ethical conduct in the globalised Knowledge Republics.

What are the Issues ?

What are the main issues for S&T ethics? On an individual basis, the main issues are :

- Plagiarism

- Integrity and quality of data
- Lack of transparency
- Multiple publications
- Undue author credit and author accountability
- Manipulation of awards, rewards, and career advancement
- Intellectual Property Rights (IPR)

Some S&T ethical issues for a Knowledge worker are associated with the management policies. Typical examples are : technology development and commercialization, technology acquisition, suatainability aspects, IPR, transparency of purchase, safety, recruitment , promotional and other functional policies, respect for societal/ public interest, protection of the whistle blower, etc.

The national and societal concern for ethical conduct in S&T also needs to be kept in mind by the S&T organization and its Knowledge workers. Some examples of the recent issues in this area in India are : impact of big dams, sharing and utilization of water resources among states, environmental pollution, sustainable development, energy options, choice of fuel for different applications, the cultivation, use, and import of genetically modified food/ fruits /seeds, commercialization of technical and professional education, proliferation of R&D institutions / universities without a reasonable infrastructure, political interference in S&T institutions, corruption in government sponsored projects, etc.

Another issue of considerable importance is the existing global Knowledge, S&T, IPR and Digital Divide among the developed and the developing nations .The design of ethical practices by the Knowledge-rich nations may not be acceptable to the Knowledge -poor nations struggling to grow their economies. This is leading to heated debates between ethacists and globalists. Clearly, convergence of the two will require a graded policy.

Occurrence of Unethical Conduct

Since one sees very few reports of unethical conduct or frauds by S&T workers or institutions in newspapers or any other media, one assumes that such cases are indeed rare. The fact is that that is not true at all. Most Heads of institutions make an effort not to leak such an information for good reasons of their own. In fact, even when misconduct of their colleagues is brought to their attention, most Heads feign ignorance and are not ready even to investigate what to speak of any punitive action against the culprits. Action against misconduct is taken reluctantly only after there is a hue and cry from the media and foreigners. Also, misconduct involving insignificant S&T by beginners and not-too-known persons hardly raises eyebrows and is often forgotten as junk eventhough the same material might have got the person concerned rewards such as a PhD degree. Those who keep a critical eye on such matters, and those who have seen a large number of PhD theses will corroborate the fact that plagiarism, massaged data, and undue authorship credit are quite rampant in countries which are underdeveloped and which do not have a well defined and transparent management policies. It should be stressed that such unethical practices occur in almost all countries, including the technologically very advanced ones. The case of a fraud by a Bell Telephone Lab researcher and that of a well-known Korean Stem Cell researcher are good examples. Unethical conduct by

faculty members has also been reported from IITs and central universities in India.

It is an empirical observation that the misconduct may be fewer but are more serious in developed countries. Misconduct is generally not uncommon in developing and underdeveloped countries Degrees. Honours and ghost writers of theses are available on the internet. Students at all levels, from school to universities, worldover are plagiarizing material from the internet for their academic reports and home assignments..Besides poor quality and questionable integrity of data and false claims, undeserved co-authorship of research papers by supervisors and managers in national laboratories and academic institutions are commonplace in India.Corruption in the appointment of vice-chancellors of some state universities, political interventions, biased selections and promotions, lack of transparent and flexible management, financial corruption in the award of R&D projects by some government agencies etc. are other serious sources of ethical misconduct in India.

Global Scenario on Ethics

Having recognized the centrality of the role of ethical values in the Knowledge driven enterprises and industries, some institutions and countries have taken the following measures to nurture ehical values among the practitioners and users of S&T.

1. Most western academic institutions have made it mandatory to expose and sensitize university students to S&T ethics through formal and informal studies and discussion groups led by prominent researchers. National Science Foundation (NSF) has prepared a strategy and a variety of study materials for this purpose. Some premier institutions in India, such as IITs and IIMs have introduced S&T Ethics in their curricula and have also set up Centres for Value Education.

2. Most Technical and Professional Bodies / Institutions/ Societies in the west have evolved and adopted their specific codes of conduct and, in some cases, have also set up their own Boards of Ethical Review. In India, the professional societies are now engaged in evolving norms. The CSIR has adopted the code of conduct of the Max Planck Society, Germany. ICMR has prepared Ethical Guidelines on Bio-Medical area. CEHAT has prepared a code of conduct for Social Science Research on Human Health.

3. During his tenure, President Clinton set up a pro-active Office of Research Integrity (ORI) to examine cases of unethical practices in health and medical areas of S&T

4. The Federation of All European Academies (48 in number) has advised its member academies to set up their own National Committees for Scientific Integrity and also to evolve a code of conduct for their Knowledge workers.

5. International Committee of Scientific Unions (ICSU) has advised member academies to formulate country -specific documents on S&T ethics. In India, the Indian National Science Academy has set up an inter-academy committee for the job. In the mean while, Indian Academy of Sciences has already published its document on Ethics and has set up a committee to look into complaints of unethical practices by its Fellows.

6. UNESCO has a Division of Ethics of Science & Technology. On Dec 15, 2005, it has launched a Global Ethics Observatory. Its International Bioethics Committee has released three databanks on Who's Who in Ethics, Ethics Institutes, and Ethics Training Programmes. The Division has a challenging program of mapping of the global ethical experiences.

7. A Society for Scientific Values (SSV), a registered NGO, was founded by several prominent scientists and Fellows of INSA on August 18 ,1986 to promote integrity, objectivity andf ethical values in the pursuit of science and technology in India. Led by the Founder President, Late Dr A S Paintal, the unique and first of its kind Society has held large number of local and four National Seminars on various topics related to ethical values for sensitization of Knowledge workers in India. Through its publications and News & Views, the Society has circulated a model code of conduct and some guidelines for ethical conduct of R&D. The Society has also investigated a number of cases of plagiarism,data falsification ,false claims , and duplicate publications brought to its attention by S&T workers in the country.

The Society made a presentation to the Scientific Advisory Committee to the Cabinet (SACC) empasizing the following : 1) to advise S&T institutions to sensitize and nurture ethical values among students and research workers through formal and informal studies and discussion; 2) to advise all S&T institutions to set up Integrity / Ethics Committees (like the vigilance committees) for their respective in-house requirements; 3) to evolve a code of conduct/guidelines for various professionals in the country; and 4) to advise the government to set up an autonomous, non-governmental, National Ethics Committee, with quasi-legal powers for examining serious cases of S&T fraud.

Concluding Remarks

1. Ethics in S&T are central to a Knowledge driven globalised economy. Keeping in mind the existing global Knowledge divide, a globally acceptable value system and process of adherence thereto will need to be evolved.

2. Unethical practices are not uncommon among S&T workers all over the world, including the best of the institutions anywhere.

3. Ethics, scientific values, and research integrity are being seriously debated in academic institutions and professional bodies throughout the world. Sensitisation, study and training packages are being developed.

4. Sensitisation of students and practitioners of S&T to ethical values through formal and informal studies and through experience,refelection and introspection needs to be undertaken by academic institutions

5. To nurture ethical values, transparent, credible, accountable, responsible and flexible S&T management is essential.

6. A simple Code(s) of conduct for S&T workers needs to be evolved. An example of a simple code is that of the Stanford University : ***"Do what does no harm to your institution***".

7. Local Ethics Committees should be set up to monitor the implementation of the code.

8. An autonomous, non-government, quasi-legal National Ethics / Integrity Committee needs to be set up to examine serious cases of S&T fraud.

Finally, the following quotation from “Gita and Management” by Swami Bodhinanda appropriately sums up the topic :

“History of the world civilizations shows that societies have risen to a higher level not through mechanical or technological efficiencies but by practising sound moral and ethical values.”

Dr. A.S. Paintal Memorial Lecture by Dr. M.G.K. Menon

— A report

The Society for Scientific Values (SSV) and the National Physical Laboratory (NPL) jointly organised the first Dr. A.S. Paintal Memorial lecture on August 22, 2005 at NPL to pay tributes to its founder President Dr. A.S. Paintal, FRS and to carry forward his missionary zeal of nurturing ethical values in the pursuit of science and technology in the country.

The memorial lecture was attended by about 450 scientists, technologists and young researchers from NPL and many other institutions of Delhi. Present on the occasion were several previous Directors of NPL, Director Generals of CSIR and other distinguished personalities. Dr. M.G.K. Menon, FRS was felicitated by Dr. R.K. Kotnala, a member of E.C. of SSV and Senior Scientist, NPL. Then followed the welcome address of Dr. Vikram Kumar, Director NPL and Vice-President, SSV. He laid stress on morality and ethics being practiced judiciously by scientists on their own.

Dr. K.L. Chopra, President, SSV introduced the Chief guest Dr. M.G.K. Menon as an icon of a scientist, science policy maker and adminstrator who occupies a very special position in the history of S&T of our country. Since he had held the top position in many of our S&T departments of Government of India, Dr. Menon has served as President of all the three science academies of India and also that of ICSU. He is presently the Chairman of an inter-academy committee set up by INSA to write a country specific report on Ethics in Science and Technology.

Dr. K.L. Chopra descirbed how the unique SSV came into being under the leadership of Dr. A.S. Paintal. The main objective of the Society continues to nurture integrity, objectivity and ethical values among scientists and engineers. Leaving behind a rich legacy of notable scientific work in Physiology which earned him international recognition and numerous honours and awards, Dr. Paintal also nurtured SSV with missionary zeal through a variety of awareness seminars and also by acting as a watchdog for serious cases of scientific misconduct. "Depending on others work in doing research by piracy is a typical Paintal-speak of a very bold and uncompromising man of very high integrity". Dr. Paintal passed away on Dec. 21, 2004. The August 2005 issue of SSV News and View bulletin highlights the scientific and societal achievement of Dr. Paintal.

Prof. Menon opened his lecture by paying tributes to Prof. Paintal and said that the title of his talk was identical to that of the Inter-Academy Committee set up by the Indian National Science Academy (when Prof. M.S. Valiathan was the President). This Panel consists of representatives of all the three academies of science in India as well as the Academies of Agriculture, Engineering and Medicine. Prof. P.N. Tandon is the C0-chairman.

Prof. Menon said that the Committee was dealing with ethical aspects that come up in a variety of fields in science and technology : agriculture, biological sciences, environment, engineering sciences, education and research, energy, food security, health care (including medical ethics and drug delivery systems) information technology, space and water. This was somewhat the coverage of areas that was being handled by the Committee on Ethics

in Science and Technology (COMEST) constituted by UNESCO. The main difference between what COMEST is doing and what the Inter-Academy Panel has worked on, is that we are approaching these issues from the viewpoint of the developing countries, particularly India which are at a different stage of development and characterized by different cultural traditions. The reason for handling this wide range of subjects is because issues relating to ethics arise in all of these, whereas academics very often think that ethical issues in science are largely those faced in education and research.

Prof. Menon pointed out that ethics covers morals, moral principles and rules of behaviour. It essentially attempts to distinguish right from wrong; this cannot be something absolute and calls for judgements grounded in values. There are aspects of human rights, human dignity, equity, social justice, privacy and confidentiality and distributive justice that have to be kept in view. One has to ensure harmony with nature, culture, traditions and religion, respect for the law, protect the interest of the underprivileged and weaker sections, and ensure that the implications of actions should not be disastrous for the future.

Many of the underlying relevant value systems are essentially embedded in civilizational cultures and religions; but the latter have often become synonymous with ritual and fundamentalism. Prof. Menon said that, based on the report of a High Level Committee, President Clinton had given his Presidential finding on research misconduct. In this area we are concerned with issues of fabrication, falsification, plagiarism, credit-not-due, and such aspects.

"He mentioned that issues of ethics came to the fore in a stark manner after the atomic bombings in 1945; since then, the area of weapons of mass destruction have occupied centre stage. More recently, issues of climatic change have arisen which pose issues of equity. In the health sector, there is the need for ensuring the greatest good for the largest number. With increasing commercialization in a market economy, and the advance towards a knowledge society, knowledge is fast becoming intellectual property; this gives rise to many contentious issues that bear on the very conduct of science e.g. openness, transparency etc. It is, therefore, important to look at the fundamental principles underpinning all of this. Prof. Menon gave many examples from different areas to illustrate his basic thesis relating to the need for inculcating right value systems amongst all – in educational institutions, professionl bodies and society at large. Thus, legal sanctions related to ultrasound clinics, and harassment of those involved, will not stop the abortion of the female child; social values are responsible for this demand by society. Again, drinking water cannot be treated as a commercial activity, since denial of water constitutes denial of life. Prof. Menon emphasized the need for major programs of awareness involving the public as well as the education system, concerning ethical values, and the **need for institutional set-ups at various levels with, a high level National Science and Technology Ethics Committee, as an apex body, as proposed by the society for Scientific Values.** These bodies can examine the issues and cases that arise, monitor for development and see that action is taken where there are blatant violations."

At the end of the talk, Dr. N. Raguram, Secretary, SSV and Reader at GGS, IP University extended the vote of thanks to the speaker, and all present.

– P.N. Tiwari

An Abridged Report of the Committee on Scientific Values Set up by the Indian Academy of Sciences, Banglore

1. Preamble

Most professional bodies such as Societies, Associations, and Academies expect their members to follow the highest ethical values in the conduct of their professional work. These values are based on universal moral principles like honesty, truthfulness, and fairness. For each profession, these values get translated into a separate 'code of conduct' statement. Such codes provide guidance on expected behaviour from the members under different circumstances and enhance the credibility of the profession in the perception of the public. they also tend to define an ideal which each member could strive to attain.

The same ethical requirements apply to the scientific profession also. Science has many applied branches like engineering, and medicine, each having its own professional society and its own detailed code of conduct. These codes are based on the same basic moral principles but differ in detail because of the different activities of various societies.

Various areas of concern to the Fellows of the Academy are i) Conducting research, ii) Publications, iii) Training of students, iv) Interaction with public, v) Science management, and vi) Ethics in technology related issues. All these have been briefly discussed below. Special mention has also been made on the positive role played by Whistle Blowers.

2. Conducting Research

The following activities pursued by Scientists can be organized under this topic.

2.1 Data collection : While conducting research, whether independently or jointly, it is necessary to ensure that data collected are reliable, properly recorded, and stored (even raw data) and there is absolutely no attempt made for either fudging data, or recording false data. Wrong data when reported in literature can cause confusion and in the short run may even prevent new ideas from being proposed. Generating, recording, and reporting false data are undoubtedly a fraudulent practice, and needs to be discouraged in all possible ways.

2.2 Sharing of facilities : In most Institutions expensive equipment are few and have to be shared with other colleagues. Unfortunately, some time this does not happen even when the equipment has been procured through making the express promise that it would be used jointly. There is a consistent complaint of denial of adequate access to equipment, particularly from junior colleagues as the person in charge makes disproportionate use of it for his own personal research. Fairness should be shown by following transparent procerdures for time allotment.

2.3 Experiments involving animals : Suggestions of the already existing ethical committees in various institutions should be scrupulously followed.

3. Publications

Associated with publications, there are a number of issues like dishonestry in reporting, credit sharing with colleagues and students etc. where ethical behaviour is very important. Some of the important issues are mentioned below :

3.1 Plagiarism : Copying the already published results of others without proper reference is obviously dishonest. When exposed, plagiarism generally receives the highest publicity and the authors concerned and the system they belong to are put under tremendous pressure. In most cases, the concerned authors do offer some explanation in their defence. However, some time they disown responsibility and even the knowledge of the papers' existence claiming that the coauthors included their names without consulting them. Such disclaimers should not be accepted on face value but should be looked into in more detail. Nobody should communicate a joint paper without the knowledge of the other authors. There is a strong need to take punitive actions which could make plagiarism unattractive. There is a general impression among the Scientific Community in India that those who indulge in this form of dishonest behaviour do not receive appropriate punishment, and get away relatively unscathed. Stronger and consistent action may hopefully remove this impression.

3.2 Duplicate publications : Some times an author publishes the same article at more than one place without mentioning that it has appeared before in the same or similar form. There is need to avoid this practice.

3.3 Order of authors : Some societies spefifically suggest the order in which the names of authors should appear. However, the basic requirement from ethical point is that each author should receive adequate credit. In India, many supervisors place the name of the student as the first author but this practice is not uniformly followed. A transparent procedure of deciding the order should be formulated and followed scrupulously.

3.4 Honorary authorship : A number of Societies specifically bring out the issue of Honorary Authorship where the name of a person is included as an author in a publication or a patent even though he has made no contribution to the work. In India too, it is observed that some Scientists having adminsitrative control over others permit their names to be included in both publications and patents in which they have made no scientific contribution. This practice is very much against the spirit of doing research and reporting results and should be discouraged.

3.5 Purity of data : The data reported in a publication should be authentic and should not be based on biased observations or completely fabricated. It is necessary that sound data collection practices should be followed. Even if a part of the data has to be reported, the complete data in its original should be retained. Similar is the case with computer programmes used to make calculations.

3.6 Sharing responsibility among authors : Increasingly, papers are being published where expertise of many scientists has been pooled together. So much so that each one may have only limited knowledge of what has appeared in the paper. Thus, in the case of

misconduct regarding one of the sections, it may not be worth while to hold all the authors equally responsible. A suggestion has appeared in literature that each author's specialty should be mentioned in the paper. This may be the requirement of only a few journals. As the situation is applicable only to a small number of cases, it may be worth while for the authors to generate a written statement on the responsibility of each author. A copy of this document may be kept with each of the authors and can be used in case the need for fixing responsibility arises. In the absence of such an understanding, all authors should own equal responsibility for the whole publication.

3.7 Peer review : Many scientists act as reviewers for manuscripts submitted for publication as well as Project Proposals submitted for financial support. In both cases, they get access to information and ideas which have not yet been published. It is important for them to ensure that this advance access to information is not unethically exploited by them for their own benefit.

4. Interaction with public

In many cases, Scientists and Engineers make exaggerated claims to the press giving an impression that a major breakthrough has been achieved whereas in practice, nothing of the sort has actually happened. Some time a success in duplicating an already existing product or process is presented as if the development is the first of its kind. These kinds of statements made to the press or at public forums, bring considerable immediate prominence to the authors but eventually end up in eroding the credibility of Indian Science. Scientists must ensure that the statements made in Public are dependable and balanced and do not raise unwarranted expectations of the public in any way. Scientists should be held accountable for the claims they make.

5. Training Programmes

Most of the Scientists are teaching as well as supervising research and are hence deeply involved in training programmes. The training is likely to inculcate higher ethical values in students if the Institution concerned provides an enabling environment where honesty, truthfulness and fairplay are practiced as a matter of routine.

Firstly, the training should be such that the student is continuously exposed to higher ethical behaviour. Secondly, special training should be imparted to them about ethics.

The major issues concerning the ethical environment are associated with teaching, assessing, distribution of students to various supervisors and the behaviour of the potential role models.

5.1 Student allotment and research supervision : While allotting students to various faculty members, the interests of both the students and faculty have to be kept in mind. Different Institutions may handle this differently, but to maintain fairness, the procedure for allotment should be decided and announced before hand and should have the general approval of the concerned members. The procedure should be followed in a transparent fashion.

6. Science management

Though plagiarism is normally given the highest prominence among scientists in India, the lack of ethics in Science Management can have very far reaching deleterious effects on both Research and Education. As many of the decisions in this general activity are taken through Committees, it is here that the highest ethical standards are required. Some of the areas which impact Indian Science and where Committee make the basic recommendations are concerned with recruitment, assessments and promotions, project grants, performance awards and science policies. Each one of them is briefly discussed below.

6.1 Recruitment and assessment : It may not be wrong to state that in the long run the quality of Faculty decides the standard of an Institution to a very large extent. Once a low quality recruitment has been made, the effect can last for many decades. As candidates of higher quality are discarded to pick up one based on extraneous considerations, there is dishonesty involved in the whole process. It is equally unethical to deliberately permit personal prejudices and biases to dominate during the process of selection. Special mention needs to be made of gender bias against female candidates, particularly when a woman scientist is being considered in the same institution where her spouse is employed. Unfortunately, many compromises get made based on the assumption that the recruiting Institution has the right to pick up the candidate it wants as it has to eventually decide on its own growth. However, the members of the committee should be aware of the lack of ethics involved in such practices. When conducted on a larger scale, recruitments made on extraneous considerations can result in lowering the standard of the Institution which may take many years, if at all, to rebuild. Unfortunately, the process is legal as all the proper procedures are followed. It is therefore, all the more important to remain sensitive to these issues while participating in the decision making process.

Knowingly picking up selection committee members who are going to be pliable is equally unethical.

As a Scientist spends time in the Institution, he gets opportunities of being assessed for promotion. Each organisation has its own set of rules and regulations which are generally quite demanding and rigorous. However, most of them involve assessment by committees. All members of each committee have to observe the highest standards of ethics, and ensure that biases do not play any part in the final decisions which may result in the underserving to be promoted or the deserving to be denied promotion. Here again, it is absolutely unethical to select members based on considerations of pliability.

6.2 Project grants : Most of the active scientists look for financial support for their research. The route is through submission, assessment and grant of Projects. These projects are normally first peer reviewed and then discussed by a committee. Sometime even more than one committee examines the proposal before granting funds. As both peer review and committee discussions involve certain degree of subjectivity, it is very necessary that highest ethical standards are observed by the members of the Committees as well as referees. Denying grants based on biases of any kind is highly unethical and mechanisms need be generated to prevent them.

6.3 Awards : In recognition of excellent performance there are Awards instituted by the Government as well as by Private Bodies. To select a person out of many whose performances are only marginally different, is indeed hard and it is important for the selection Committee Members to study each bio-data carefully. Even then, wrong decisions could be made. If however, the decisions are made because of any other consideration, ethics get compromised. To maintain the sanctity of these awards, absolutely unbiased decisions should be made.

7. Whistle Blowers Role

Some times individuals are forced to expose a system as a whole, when it remains indifferent or actively suppresses the misconduct reported by them. Such whistle blowing needs careful investigation and follow up action. Whistle blowers perform an ethical public function at risk to themselves and deserve not only protection but also our admiration.

8. Regulatory Mechanism

The Committee recognized that some of the acts involving lack of ethics have local relevance and can be handled at local level. However, many actions like plagiarism are of importance to the whole Scientific Community as they have adverse influence on the credibility of the whole community. Ideally, there should be a single mechanism for handling issues involving ethics for the whole Scientific Community. In the absence of such a mechanism, the committee decided to generate a regulatory mechanism, applicable to the conduct of only the Fellows of the Academy, but hopes that all Institutions will have their own Ethics Committee operating through similar procedure until a single universally accepted mechanism becomes functional.

9. Need for national regulatory mechanism

Though the Regulatory mechanism suggested by the committee is meant for only Fellows of the Academy, the Committee felt the need for a uniform procedure for handling allegations of ethical misconduct which should be applicable to all organizations in India, engaged in scientific training, and Research and Development activities. Such a mechanism can only evolve when major organizations like UGC, CSIR, DST, DBT, ICMR, ICAR, various Academies, and other relevant organizations join hands and formulate a common procedure.

Plagiarism : A Spreading Infection*

P. Balaram

'*Critics of science make a lot of mileage out of the manifest discrepancies between the private and public actions of scientists. They also fasten on examples of scientific behaviour that obviously deviate from the norms - fraud, plagiarism, partisan disputes over priority, and so on. These are serious matters of concern, but they are not so wide-spread and prevalent that they completely corrupt the whole enterprise. Indeed, the fact that such episodes are regarded as both deviant and scandalous is a tribute to the continuing moral authority of the ethos that they flout.'*

— John Ziman
Real Science. What it is and what it means
Cambridge University Press, 2000, p. 32.

In his sympathetic treatment of the philosophy and ethos of science John Ziman notes that 'plagiarism is as infamous as fabrication in a scientific paper' (p. 40). Plagiarism appears to be on the increase. Several manuscripts submitted to this journal have substantial portions of text which are taken verbatim from published sources, with no attribution or credit assigned to the original authors. Detection of plagiarism is difficult. Hard pressed editors and referees can hardly be expected to act as policemen, preventing violations of commonly accepted ethical practice. Even as I wrestled with a couple of manuscripts that appeared to transgress all acceptable limits, I was pleased to receive a copy of an editorial entitled 'Plagiarism in the age of electronic publishing' (Sota, T., *Population Ecology,* 20-04, **46**, 219). Clearly, I was not alone, sinking in editorial distress. The case discussed, involved a review article published in an 'online journal', which appeared to have expropriated large tracts of a paper previously published in *Population Ecology*. The editorial analysis provided interesting statistics; the plagiarized paper used 29% of the original text without modification, while 93% (in terms of words)' were common between the two papers. The editorial noted that 'the prevalence of plagiarism in scientific papers is an acute problem, but tackling it is not easy when considering the rapid expansion of scientific journals supported by the worldwide propagation of the internet.'

Has the Internet contributed to the rising incidence of plagiarism? Coincidentally, while I was thinking about deviant behaviour in science, *The Hindu* (27 April 2005) reproduced (of course, with permission) an article from *The Guardian* entitled 'Ethics and plagiarism'. the report by Johyn Crace describes the rise of Jude Carroll, who is dubbed as a 'leading authority on plagiarism.' Carroll's research has focussed on plagiarism practised by students who turn in essays and reviews of literature as part of their coursework at high school or university. Copying has become easier, given the power of modern search engines and the volume of digital information readily available on the Internet. *Google* and the download

* Reproduced from *Current Science*, Vol. **88**, No. 9, 10 May, 2005

can permit assignments to be completed in record time; a new generation of students is quickly seduced by the ease of electronic plagiarism. Ironically, the search engines have also made the detection of plagiarism a lot easier. However, constant suspicion hardly facilitates any scholarly activity. Journal editors (and those at this journal are no exception) rarely attempt to establish plagiarism before a manuscript is reviewed. Authors are trusted implicitly. Cases of plagiarism are uncovered, usually by accident, long after publication, often leading to prolonged correspondence between the editors and the offending authors. Demands for redressal from the victims of plagiarism must also be addressed. These episodes are unpleasant and consume a great deal of time. In the end, there are no winners. After a couple of difficult experiences, most editors (and I must count myself amongst them) begin to view some submissions with suspicion. My colleagues and I worry about manuscripts in which the linguistic style is uneven; grammatically perfect in part and replete with erros, elsewhere. An odd figure that appears to have a distinctly higher quality than others is another tell tale sign.

Plagiarism is like an infectious disease and can spread rapidly amongst students, if the environment is conducive. The first signs of infection are evident in seminars, where wonderfully prepared slides are displayed (*Power Point* is another great facilitator), without any citation of the source. A little investigation usually reveals that most illustrations have been simply downloaded from readily accessible websites. Non-citation of the source is usually an oversight; unfortunately this quickly becomes a habit and eventually intellectual theft becomes a routine practice. Plagiarism of term papers and assignments has long been rampant in American universities, leading most institutions to circulate detailed definitions of plagiarism to students. A cursory search of the Internet revealed that plagiarism is an issue that has been seriously addressed in the West, with considerable effort expended on educating new students in colleges and universities. So far there appears to have been little effort in India to consciously educate students on ethical issues involved in the practice of science. An exercise to instruct students (and indeed more senior practioners) of science, on proper citation practices and a clear definition of what constitutes plagiarism, may be worthwhile. Such instructions must form part of pre-Ph.D. training programs. Sadly, in most of our institutions, the Ph.D. program appears to be private contract between students and research supervisors; academic administrators usually favour a course of 'benign neglect'. Indeed, educating the new generation may be the only vaccine available to stem the spread of the virus of plagiarism.

Plagiarism in India was dramatically highlighted by the Kumaun University affair a couple of year ago (*The physics of plagiarism,* Ramachandran, R., *Frontline,* 26 October-8 November 2002). Deviant behaviour is, of course, a world-wide problem. Some years ago, several plagiarism cases rocked the Chinese scientific establishment (*Science,* 1996, **274**, 337). The issue was alive several years later when plagiarism and unethical practices were discussed at the 2003 meeting of the Chinese Association of Science and Technology. More recently, plagiarism has been established in several papers in the area of materials science, published from Cambridge University (Giles, J., *Nature,* 2004, **427**, 3). Plagiarism appears to be a quick route to scientific success; fabrication of data is another deplorable practice adopted by unscrupulous climbers in science. In his perceptive and and scholarly

analysis of science John Ziman notes :'*The scientific culture depends fundamentally on personal honesty and mutual trust. For this reason, deliberate plagiarism - the expropriation of genuine research results - is almost as reprehensible as their fabrication. And yet, in spite of peer review and other safeguards, it is relatively easy to get fraudulent research claims into the literature, and to profit from them careerwise for a while. Such cases, when found out, stimulate much institutional turmoil and public comments. The contrast between their condemnation as instances of grave* social deviance and the relatively lenient sanction applied to those who perpetrate them tells us a lot about the internal sociology of research communities.' (p. 267). As the scientific community has grown worldwide and competitive pressures have increased, the incidence of unethical practices in science has become more common. Today, even students in India who wish to enter Western universities for Ph.D. degrees attempt to spend summers in research laboratories as apprentices in science. Some years ago, this short stint was viewed as 'research experience' that could be flaunted on an application form. Now, there is pressure to obtain publishable results in a very short period, inexperience notwithstanding. A research publication can quickly smoothen an admission process. The pressure to publish increases as one moves up the academic ladder, presumably easing only at the top. Tenure, promotions, awards, grants, recognition and even self-esteem seem to depend critically on publications. It is this unremitting pressure, coupled with the absence of deterrent punishment for offenders, that has led to the increasing corruption of the scientific enterprise.

Plagiarism and fabrication of results are among the most common and clearly recognized forms of deviant behaviour in science. There is, however, on the horizon a new issue which muddies the distinction between acceptable and unacceptable practice. Many areas of science require the presentation of images. For example, microscope images and gel photographs are staple features of papers in molecular and cell biology. 'Digital photography and image manipulation software allow biologists to tweak their data as never before' proclaims a news feature in *Nature* (2005, **434**, 952). *Photoshop* and competing programs now permit researchers to 'massage their data', blurring the line between 'acceptable enhancements and scientific misconduct'. As the *Nature* report highlights, 'many scientists are oblivious to the consequences of such actions, because they have only a rudimentary knowledge of the sophisticated equipment involved'. Since presentations of data are invariably prepared by students and postdoctoral fellows, who are usually more familiar with the latest software for image manipulation than senior professors, it will become essential to clearly define the limits of acceptable practice.

Global Ethics Observatory (GEObs) Official Launch — 23 January, 2006

The Division of Ethics of Science and Technology (Sector for Social and Human Sciences, UNESCO) has announced that the Global Ethics Observatory (GEObs) was officially launched during the 12th session of the International Bioethics Committee (IBC) in Tokyo, Japan, on 15 December 2005.

The GEObs is a system of databases with worldwide coverage in bioethics and other areas of applied ethics in science and technology such as environmental ethics, science ethics, and technology ethics. The following databases are now publicly available on the UNESCO webside (http://www.unesco.org/shs ethics/geobs) :

Database 1 : Who's Who in Ethics - This database is a compilation of information regarding ethics experts around the world.

Database 2 : Ethics Institutions - This database provides information on departments, institutes, centers, commissions, councils, committees, review boards, societies, associations, and other relevant entities in the area of ethics of science and technology.

Database 3 : Ethics Teaching Programmes - This database contains descriptions of existing teaching programmes within the field of ethics of science and technology.

Work is currently in progress on a fourth database on ethics related legislation and guidelines, which will be implemented at a later phase.

Users will be able to explore the databases using a number of search criteria, as well as print or email relevant search results. The GEObs will eventually be available in all the 6 official languages of English, French, Spanish, Arabic, Russian and Chinese.

The launch of the GEObs represents an essential milestone in the continuity of UNESCO's ethics programme. The observatory will help with the implementation of the normative standards that have been developed in the last decade; it will provide a platform upon which new activities can be developed; and it will map ethics expertise for Member States willing to develop activities in the area of ethics. It is intended as a portal with which existing international consensus can be more efficiently mobilized to achieve the objectives of these instruments at all levels of global society. The data contained within the observatory will facilitate the identification of implementation gaps around the world, and thus derive and enhance the basis of future ethics related activities by Member States, UNESCO, its partners, and various interested parties. The mapping of ethical expertise around the world will be made widely available, which will be of particular use for Member States looking to reinforce their ethics infrastructure.

However, this is only the beginning of a continuous process of building a reliable, comprehensive, and useful baseline. The Division would like to invite and encourage all interested parties to participate in expanding the information within the GEObs, to provide feedback on the areas in which it can be improved, as well as to utilize the information within.

For this and for further information, please contact : GEObs Secretariat, Division of Ethics of Science and Technology, Social and Human Sciences Sector, UNESCO, 1, rue Miollis, 75732 Paris Cedex 15, France. Phone: +33 1 45 68 37 81; Fax : +33 1 45 68 55 15; E-mail: geobs@unesco.org

MIT Professor fired for paper fraud*

Boston : The publisher of a scientific journal is investigating the accuracy of several papers written by a biology professor, who was fired by the Massachusetts Institute of Technology (MIT) for allegedly fabricating research data.

Luk Van Parijs wrote three papers for the journal *Immunity* in 1998 and 1999, before he finished his postdoctoral work at the California Institute of Technology and became an associate Professor in MIT's Centre for Cancer Research.

"The allegation of fraud is a very serious offense," said Lynne Herndon, president and CEO of Cell Press, which publishes the Cambridge-based journal. "This is something we take very seriously, as do all scientific journals."

MIT says Van Parijs, 35, who was fired on Wednesday, has admitted fabricating and falsifying data in a paper, several manuscripts and grant applications. He had been on leave since August 2004, when a group of colleagues reported the allegations to MIT administrators. He was not available for comment.

* Reproduced from The Times of India (News) of October 31, 2005.

News about Plagiarism and fraud in Scientific Research and Publications*

South Korean stem cell researcher Hwang Woo-Suk had to quit after he was found fabricating research. Certain Indian scientists could too, for recklessly plagiarising papers by peers.

This year, the head of the Maths department of a top Indian university was found guilty of lifting from a foreign journal. In 2003, a national lab's scientist co-authored three papers lifted *in toto* from American papers. An IIIT researcher allegedly co-authored a paper copied from a colleague's 2002 paper.

And a researcher's recent grant proposal to the Science and Technology Ministry was taken from an *American Chemical Society* paper.

The 2002 case of Kumaon University's ex VC, B.S. Rajput's plagiarism clearly has n't acted as a deterrent.

"Investigations and Ph.D. theses available online are copied by our researchers, especially in smaller universities," says K.L. Chopra, President of the **Society for Scientific Values, which comprises eminent scientists and is the only watchdog of Indian scientists**.

P.M. Bhargava, a former Society President and currently with the National Knowledge Commission, believes only 5 per cent of PhDs should have been awarded. "A lot of students tend to give the results which their supervisor wants, even if they have contrary results," he says.

A Lucknow doctor sent a 'ground-breaking' study to a leading foreign journal. He couldn't prove his result to the journal's representative; he claimed ants had devoured his record books!

Council for Scientific and Industrial Research's R.A. Mashelkar believes "swift, sure and severe action" is necessary to prevent fraud. "A three-member committee recently found a scientist in a CSIR lab guilty of plagiarism and he was immediately punished," he says.

— Neha Mehta

* Reproduced from the Hindustan Times (news) of December 25, 2005.

Membership of the Society for Scientific Values

Scientists who wish to join the efforts of the Society to promote ethics (support right and oppose wrong) in scientific research, development and management and, who meet the following requirements are welcome to become the member of the society.

1. He/she should have allowed his name to appear as an author in only those publications in which he/she was actively involved, in data collection, theoretical formulation, design and construction of apparatus, field trips, mathematic derivation and calculations, statistical analysis and interpretation of results, as distinct from administrative support and providing funds or facilities.
2. He/she should have never plagiarized or made false claims or indulged in or supported and encouraged any kind of unethical activity in science.
3. He/she should agree to withdraw from the Society if he/she ceases to adhere to the requirements 1 and 2 above.

A scientist who wishes to become member should send his brief biodata to the President or Secretary of the Society. A member of the Society may also send biodata of such scientist for the membership. Non-scientists who have promoted ethics in their profession can also become member of the Society.