LETTERS TO PROGRESS IN PHYSICS

Comment on the "Declaration of the Academic Freedom" by D. Rabounski

Marian Apostol

Department of Theoretical Physics, Institute of Atomic Physics, Magurele-Bucharest MG-6, PO Box MG-35, Romania
E-mail: apoma@theory.nipne.ro

At least four major misconceptions gravely affect science and technology today, and the progress of scientific and technological research. These misconceptions are related to a utilitarian view of science, whereby large-scale collaborations and institutions of higher learning are conceived of as the only means for developing science and technology, where scientific publication is the sole aim of scientific research, within a commercial view of the nature of these human endeavours and activities. It is revealed herein just how abusive and destructive these misconceptions are, and to what great extent they now plague society. In complementing D. Rabounski's recent Declaration of the Academic Freedom, scientific and technological research should reaffirm its free, universal and critical nature, as a source of human dignity and honour, honesty and lucidity. Unfortunately, a despicable vulgarization of science and technology has led nowadays to a widely held relativism and uncertainty, which is employed as a theoretical ideology for manipulation and domination, placing human society in great peril.

Science and technology has changed human life essentially and irreversibly, both personal and social, the environment, and created a new, artificial world with profound cultural implications at the level of human behaviour, psychology and mentality. Human society today depends essentially on science and technology, to the point that life on Earth can be irreversibly damaged by the loss of science and technology. The only thing today that still remains outside the scope of science and technology is the creation of life, although basic modification of life is already present, and destroying life by science and technology is routine. Today's science and technology teaches us that the planet Earth, the Solar System, and perhaps the whole Universe, are very likely casual, and perhaps not eternal. It is therefore much more sensible to do everything possible to preserve life, for as long as possible.

Science and technology are now in great peril, not only due to social and political changes, and not only by a very uncontrollable economic activity, but also by various misconceptions. The latter are the most pernicious, because the human world is indeed a "matter of will and representation" (Schopenhauer). There are at least four plagues which the vulgarization of science and technology have generated in our modern society: relativism, indeterminacy, utilitarianism, manipulation and domination, and which now collectively turn against science and technology.

I adduce herein a series of current injurious misconceptions related to science and technology.

It is wrong, but widely held today, that science must satisfy any immediate desire or need, either physical or mental, as whimsical as may be, and that technology must satisfy as soon and most economically as possible. This is profoundly wrong. Science responds only to our intellectual impulse, this is its nature, to "accommodate in the most economical way our sensations to our ideas, which is a basic need for our survival" (Planck). It is indeed a deep wonder, which nobody could have ever explained, and probably cannot ever, that answering our intellectual questions may sometimes result in practical, technological applications that make our life more comfortable. History shows this, without explanation, but it also definitely shows that the way from science to technology is not direct, but a very mediated one. To bring scientific discoveries into practical life one needs commitment, investment, patience, competence, a lot of work, and, especially, the acceptance of the possibility that it may never happen at all. Science teaches us basically that its technological applications are in fact a matter of good luck, and we must accept this point as a scientific statement, as strange as it may sound. It reveals the autonomy and the freedom of science, which bears upon its profound nature. The politicians and policy-makers of today must accept that it is not they who should direct science and technology, but instead precisely the opposite, it is science and technology which should direct them, if life is going to be preserved and cultivated. Admittedly, it is difficult to accept that science would not be "scientific". Actually, as a matter of fact, science is nothing else but that endeavour that makes human the mysteries of the natural world, as the history of Mankind testifies.

Another common misconception about science nowadays is that science must be done exclusively in collaboration, and, as such, the broader the collaboration, the better — it is the only possible way to achieve scientific advances.

This is wrong. First, history proves the contrary. Newton worked alone, Maxwell similarly, Boltzmann worked alone and much against the current wisdom, Einstein likewise notoriously, the quantum physicists in the first half of the 20th century worked in a restricted cooperation, etc, etc. Feynman used to talk a lot with people around and about, find problems and work them for himself, alone. There is no other way. Similar examples occur in sciences other than physics. No profound scientific discovery has ever been made by many people, but always by one or, occasionally, by a few at any time. This is not only a historical fact, but a logical one too. If a discovery emerged in the heads of many, then it would not be something new, nor revolutionary, but instead, it would be a routine, trivial thing, by definition. Another, positive argument, without resorting to the *demonstratio per absurdum*, is the following. Suppose that for one scientific problem there would be many, most valuable contributors. Since the problem is one and these contributors are many it follows that each of them brings only a small contribution. Then, the problem is never solved by any one of them, but by one, who synthesized the work of the many. That does not mean that many workers in science or technology are not desirable, or that they would be superfluous. On the contrary, they make a valuable research environment, their work is the fuel of great discoveries, but it is only the coal in the scientific furnace. It is not science, it is only the probable way toward science. Science is what a few do based on the work of many. As such, the opinion of the many in science is useless, and always dangerous, because they do not know. They are non-scientific, they are only the material used in scientific and technological discoveries. Democracy in science and technology is a most dangerous thing, because it is contrary to the scientific spirit and to the nature of these endeavours. In contrast with political and social life, where today democracy is the accepted way of making mistakes, in science and technology the only acceptable medium of making mistakes along the way to the correct answer is the scientific and technical aristocracy. Only the latter "knows what knows and what does not know" (Socrates), which is its claim to competence. The former, people at large, do not know what knows, or what they don't. In its endeavour to acquire positive knowledge, *i.e.* that knowledge which is so probable to be taken as granted and warranted, science must only use lucidity and honesty, and cannot afford any inconsequential talk. This points again towards a basic feature of science and technology, that of creativity, which comes from their profound freedom and autonomy, a sense of honour generated exclusively by honesty and lucidity. Our attention nowadays is insistently and ideologically forced, by politics and the media, towards great scientific and technological organizations, as the only way of developing science and technology. This is a dishonest enterprise, the content of such actions is anti-scientific. Such people say one thing but mean the opposite. They abuse science, falsify and manipulate it, for image and political ends. Science and technology can only be achieved in an adequate environment, and the institutions of research of today are more than welcome, the larger the better. But we must be aware that they are there only for the purpose of an act of scientific or technological discovery, and not for becoming ends in themselves. Scientists must not, by necessity, belong to any such large organizations, in order to be scientists, or engineers. The requirement of an institutional enrollment for scientists and engineers is an abusive plague upon our mentality nowadays, with profound negative consequences. Today, scientific work can be carried out by electronic means as an individual, building upon the work of smaller or larger scientific and technical organizations. The factual reality shows that any discovery in science and technology was made by individuals, who used the work of many, sometimes of hordes. The big organizations of scientific research and technology are necessary, but not sufficient, by no means. They are just disposable means. Since the means should not dictate our aims, democracy must not be permitted to decide upon scientific and technological matters. It must be fully and for ever banished from science and technology. In science and technology we do not know the solutions. But certainly the "solutions" of the many are wrong, especially because they do not know what they do not know. This is why the opinion of those who "know that they do not know" is by far preferable, and history proves this point. In political and social life democracy may be a convenient instrument, especially when and where the majority is meager. Then, we have a permanent civil war in society, without a very definite outcome, which gains time for social life.

Another misconception which produces much damage to scientific research is related to scientific publications. Scientific publications are a means of doing scientific research, and they do occur naturally in the process of research. They are meant to present results of scientific research to the scientific public, in order to help science advance. The aim of scientific research is to get scientific results, which naturally are materialized in scientific publications. If we define, as is the case today, that scientific publications are the aim and the goal of scientific research, we confound the means for the aim, thereby falsifying scientific research and impeding the progress of science. Scientific authors of today no longer publish for a scientific aim, they publish instead only for the number of "papers". The great pressure of "publish or perish" placed today upon scientific researchers by various political and administrative bodies, by the research institutional organizations and universities, has definitely turned the attention of the researchers from science to publications. The scientific literature has been invaded by an enormous amount of publications, at a tremendously increasing rate, which contains no scientific result, which nobody reads, and which is completely useless. Such publications are merely

"progress reports", which mean only that "time has passed" (Oppenheimer), and reveal only that the research funds have been spent. They have been spent indeed, but not on research. They have been spent on useless publications, and the costs obviously do not match the output. The requirement of publications as an end *per se* is one of the greatest attacks the political and administrative media are now mounting against scientific research, its freedom, liberty, and its very nature. It has deliberately misled contemporary scientific research along a false path, and locked genuine scientific individuals outside the social organization of scientific research. Mankind is losing and wasting one of its most valuable natural resources, scientific creativity. Moreover, influential political and administrative bodies and organizations with a commercial orientation have defined a number of scientific journals as the "main stream", according to their rate of citations, in the "impact factor", in complete disregard for their scientific contents. Research which is not in this "main stream" perishes, it is not funded, whilst those which belong to such influential organizations are published, funded and run forever, without any scientific result: producing only with a massive literature, good for nothing. Because the frequent citation of such literature is improper, there is no reference to the scientific content, which is absent, because it is just a formality, a ritual of the publications industry. The "impact factor" is defined by these organizations as the ratio of the number of citations to the number of published papers, so the scientific journals of today publish only those papers which are most likely to be cited, *i.e.* those which come precisely from the same influential organizations which define the impact factor. This is a self-approving type of institutional activity, which is closed in itself, permits no criticism, no contrary opinion, and, as such, is typical of underground, criminal, terrorist-like, dictatorial, secret societies and organizations. In fact, the secret character of these organizations is obvious in their practice of the "anonymous peer review" procedure. These "main stream" journals have in fact a quite notorious and ignominious past: they have rejected from publication authors like Einstein, Schwinger, Fermi and also Feynman. Many articles published today by the foremost "main stream" scientific journals are withdrawn soon thereafter by the authors, which reflects conflict within those organizations, very similar to the fights and wars between rival criminal mobs. Moreover, if the "impact factor" was instead referred to the number of papers in the sold copies according to declared users, we would have a very different picture, and the "main stream" would be seen immediately to be in fact a "mean stream", because there are a lot of declared-users sold copies of these journals which nobody reads. Research funds are spent not only to produce such journals, but to buy them, without being read or used. This is a vicious activity which falsifies scientific research, and to impose the "main stream" upon scientific activity is another great attack upon the freedom of scientific research. To exclude from publication people who do not belong to those influential organizations is an attack upon the universality of science. In 1920 Sommerfeld established a new scientific journal, which soon became the famous Zeitschrift für Physik. This journal never had reviewers, let alone "anonymous reviewers". The scientific articles were published under the sole scientific and moral authority of Sommerfeld. This real freedom permitted the birth of quantum mechanics, nuclear and solid-state physics and all the other branches of modern Physics. Of course, not all of the papers published in Zeit Phys were good, and Sommerfeld did not understand them all. But he was a professional of science, and where his professional expertise could not help him, he exercised his honesty and lucidity. This is competence in science.

Another misconception regarding the scientific research of today is that it must be self sustaining, as any commercial activity. This is a nonsense. The nature of scientific "products", which are the scientific results, is such that not only does nobody buy them, but they are also offered freely. These "products" have no immediate practical utility. The best we can expect is to bring them to the attention of as many learned people as possible, and even to society at large, in order to get new ideas, visions, perspectives, etc., and to make apparent possible practical applications. The latter depend on technological skills and means, which is an undertaking in its own right. It does not only make use of the scientific results, but it provides scientific research with new suggestions and ideas. As such, both scientific research and technological development, which aims at practical applications of the scientific results, must be funded by society with no regard to immediate commercial reward. In comparison with other social costs, and in regard to its enormous benefits, as proved by history, the funding of scientific and technological research is modest; the highest spending today on science and technology does not exceed about 3–4% of GDP in the most developed countries. Scientific and technological research is funded today by government or corporations, by universities and private companies, and to a much less extent by sponsors, benefactors, philanthropists or a sort of "mecena". In all of these situations the misconceptions described above prevail and dominate, mixed up with a misleading financial "reasoning". First, the notion of "project funding" tends to be generalized up to the point that researchers get their salaries exclusively on an "competition" basis. This is nonsense: one cannot expect honest work from a worker who is not paid a regular salary. Consequently, "project competition" generates corruption, it is "lobby and lottery", it provides only an occasional, temporary and irregular income. Scientific researchers turn their attention from their real work to the process of getting funded through such a "competition" basis. "Project funding" was originally restricted to temporary jobs for PhD students or post-doctoral researchers, until these beginners secured a stable research, teaching, or technical position, and was mainly limited to

universities as a form of further education and instruction, facilitating social insertion. Today, this "competition of project funding" tends to be generalized, destroying scientific research and scientific education. Indeed, it is almost universally accepted today that university professors should no longer concentrate upon their teaching mission, but should instead do research. This is a grave diversion, which explains why scientific education has degraded and declined so much in our modern society. As for research funding from sponsors or other individuals, this is a naive conception. Almost nobody gives personal money without asking for something rewarding in return. Scientific results produce satisfaction only when one takes part in getting them. Otherwise, such sorts of things are absurd. According to an old joke, "I love work. I would sit and watch it for hours". Such sponsors, benefactors, philanthropists and various "mecena", desire in fact publicity and image for their money to use these for getting in turn even more money. But image and publicity gained by scientific research means diverting the latter from its nature, and, in fact, abusing it. This is another grave injury inflicted upon scientific research by our modern society. A man who relatively recently invested $50,000.00 in a private research institute, took twice as much from government and public funds, and acquired 3 or 4 permanent staff. The institute now accommodates many visitors, whose expenses are paid by their respective institutional employers, and who deliver public lectures on nonsense such as black holes, the Big Bang, conscience, etc., etc. This is nice, to "scientize" the public at large, but it is pseudo-science. In addition, that fellow became an influential member of various government and academic bodies, from which he draws a big salary, which overcompensates by far the original $50,000.00, for his vulgarization of scientific research and his "great service" to society. Such are the methods of modern society for destroying science.

Funding scientific and technological research without asking for an immediate revenue, according to the nature of these activities, does not mean that these activities are unaccountable. On the contrary. But first let us remark that their products are not physical, but intellectual. As such, the printed paper, or the electronic archives, which embody the present scientific literature cannot be mistaken for the scientific results. Not even the experimental setups or apparatus produced by technological research should be mistaken for the result of this research, because they only serve to represent physically an idea. Scientific and technological research is accountable by its scientific and technical results, which are essentially spiritual, or intellectual, objects. This accountability is realized by the scientists themselves, who are able to speak clearly, logically and, especially, critically about their own work. The democratic vote of the majority is nonsense in this enterprise. (I have witnessed, at a degraded nuclear laboratory, the neutron lifetime established by majority vote; they decided about 1 second.) The responsible political, administrative and social elements are afraid of being trumped by scientists in this process of accountability. I can assure them that they wouldn't. But of course, these people must try to become a little literate in science and technology. And finally, what is not risky today in any enterprise? A sure and safe business either does not exist or it is illegal. The fact that we do not know does not give us the right to abuse and destroy scientific research, nor to falsify it. The latter is illegal, and deserves legal punishment, the former is bad and irreversibly damaging for us, for our children and for the whole future of Mankind. It is morally culpable.

The Declaration of Academic Freedom, or Scientific Freedom, is quite welcome, and essentially declares the following Rights.

According to its nature, scientific research has the Right of doing Science; it has the Right of doing it in perfect Freedom and Universality, aiming exclusively at spiritual and intellectual results, without interference from political, administrative or social organizations, to publish its scientific results wherever, whenever and in whatever way it considers appropriate. It has the Right of discussing openly, freely and critically, whatever the result declared as being scientific, and society must warrant this Right and facilitate its exercise. It has the Right of being funded appropriately by society and the Right of accounting for its own results according to its own criteria, ways, methods and procedures. Scientific and technological research has the Right of dismissing as abusive, intruding and falsifying, the use of democracy in scientific matters, the "main stream" publications and "impact factor" as means of evaluation, "project competition" as a means of funding. It has the Right of being Free and Autonomous, and to give account of its results to the whole of society, according to its own methods, practices, procedures, historically established. The Right to Scientific Research is a Fundamental Human Right.

Submitted on April 12, 2007
Accepted on April 16, 2007