

Is There a Specific Moral Responsibility of Science?

by Jan Philipp Reemtsma

Manuscript for the “vision talk” series on the occasion of the 15th Anniversary and International Alumni Day of the
Molecular Biology and Neuroscience programs

The title of this lecture sounds odd. Neither science nor any single academic discipline has a specific responsibility. Responsibility means that someone can be held responsible — one way or the other. There are some cases in which someone can be held responsible because they are a member of an organization or part of a specific sphere of activity. According to German law, if someone is a member of a terrorist group, they are responsible for what the group is doing, even if they are not part of a specific action. If you are employee of an airline, you are just responsible for your own mistakes, not for the safety standards of the airline.. As you might know, there was a very long legal debate about whether those who took part in the mass murder in Auschwitz could be held responsible solely for their own murderous activities (if and when they killed people by their own hands, which had to be proven individually and in every single case) or for being part of everything that occurred there, as well. No matter how you might decide in one case or another, it wouldn't make much sense to hold a scientist responsible for what “science” as such is doing, because “science” is not a person or an organization. As a member of an university you might be responsible (together with others) for what is happening in that community — but being a chemist cannot mean that you are responsible for what is going on in every laboratory in the world.

So let me put it this way: Does science, does any academic discipline produce from within any kind of specific morality? A specific morality, from which emerges more than the imperative “Thou shalt do your job well!”?

Perhaps you're familiar with the movie “Flight” with Denzel Washington. It was about an airline pilot who is an alcoholic. In a plane accident he saves the plane and the passengers with a very hazardous and courageous maneuver (the plane flies upside down for several minutes) — something he probably not would have done if he hadn't been drunk at the time. In the end he is sent to prison for several years. There is no reason to doubt that this outcome is correct and just. Even if a drunken pilot can act successfully in a special situation (and even if he succeeds because he's intoxicated) it is undisputed that no one is allowed to fly an airplane if he or she is intoxicated (even if he or she neutralizes the effects of the alcohol by sniffing cocaine). The reason is obvious: alcohol influences your ability to react adequately to the situation you are confronted with, no matter what. Period. This can never be compensated for by drinking a bit more and managing the crisis as a high-risk hero.

Is this an example of “pilot ethics”, so to speak? No it isn't. The point is not how you should behave as a member of a group, a profession, an elite — the point is how to protect the public. These

ethical standards do not emerge from the normative self-images of different professions (pilots, taxi drivers or physicians) but rather from what the public has a right to expect with respect to the behavior of members of those professions. I mentioned physicians: The famous oath of Hippocrates is not so much an example of professional ethics as rather the expression of what behavior the public thinks is required of those professionals, i.e. what the public (patients and potential patients) has the right to expect (and what it has the right never to expect) from someone who is defined as “a medical doctor”).

Some cases can be more subtle. If a physician has an affair with a patient, it's not against the law and we wouldn't call it unethical. If a psychoanalyst has an affair with a patient, it is not against the law but it is unethical. In psychoanalysis, to be “abstinent” is absolutely essential (the term means that private affairs of whatever kind should always be kept strictly separate from the therapeutic setting — a sexual relationship would be almost the worst form of violating that rule). If you violate the rule of being abstinent, you are a bad psychoanalyst, because professional psychoanalysis works in terms of its methods only if you follow this rule. — This is, in effect, the core of psychoanalytic theory.

So the community of psychoanalysts has to ensure that its members act professionally — that's the aspect of professional ethics. But there is a legal aspect, too: If you start psychoanalytic therapy, you enter into a contract with your therapist that includes the assurance of his or her professional competence — even if you are not very familiar with psychoanalytic theory yourself. Let's assume you fall in love with your therapist and try to seduce him or her. Even if it's your initiative in taking the first step, it is his or her professional responsibility to not agree to or take a second one. If he or she does so, then they are violating their professional self-understanding and professional rules, and so you may have grounds to demand compensation (at least for the therapy sessions you paid for so far) — if it comes to a disagreement and perhaps even to a law suit.

The professional ethics we are talking about in such cases are the result of professional knowledge, which is needed to judge professional behavior. But you need a public sphere (or, let's say, a republic and a state governed by the rule of law) which adopts, in some way or another, this knowledge to establish rules or standards for the interaction between professionals and others. In the end, professional ethics produce demands made by the public on professionals. Thus, to strengthen the standards of professional ethics from inside the profession means to tell the public what kind of justifiable claims towards the profession it has or should claim.

Now let's take a step into the ugliest region of medical science and anthropology: the medical experiments conducted on prisoners of German concentration camps and the use of body parts from human beings who were murdered in the camps for academic collections (perhaps some of whom were murdered specifically for that purpose).. What would you call this? Ambitious science — so

ambitious that it lost every sense of morality? Or would you prefer: scientific idealism so idealistic that it was beyond moral limits? I would address it differently. I would characterize people like the scientists responsible for that as individuals who seized an opportunity for self-barbarization that a particular regime offered them. In Nazi-Germany there were quite a few of such individuals. They could act as they did because there was no public control (by which I mean control by functioning institutions) and as the result of a breakdown of the idea that every human activity has moral bounds. In these and similar cases you can observe what can be seen everywhere when limits are aggressively neglected or destroyed and when negative sanctions are neither feared nor even expected: increasing radicalism and increasing self-barbarization. What we can see then is a kind of professional self-encouragement: Any lingering hesitation to violate common or traditional moral standards is interpreted as a lack of professional engagement and as an unwillingness to assign science the undisputed highest position on a list of values.

Were the medical experiments to which concentration camp prisoners were subjected even “scientific”? Some people prefer to call them “pseudo-scientific” (just as some call religious terrorism pseudo-religious). That’s nonsense, obviously. The frontiers of the realm of science are not drawn by ethics (nor are the frontiers of the realm of religion drawn by enlightenment). Science does not create its own ethics. The moral limits of science — that is, of the professional behavior of scientists — are defined by public discourse.

If this public discourse changes dramatically, it influences notions of scientists’ professional behavior. It ruins something that we might refer to as a kind of institutional pride. This becomes apparent when we read that the results of a series of experiments on prisoners suffering from typhoid fever were discussed in a conference conducted for members of the Kaiser Wilhelm Institute. The experiments were pure cruelty without any scientific or medical justification. The institute members wanted to discuss that not extensively — they seemed to be somehow disgusted (it appears) but measures to end the massacre were neither taken nor even discussed. The records of the meeting note that it was agreed that the experiments would continue. These typhus experiments were not the only ones that were unspeakable cruelties nearly beyond imagination — and that did not resemble in any way what we would call a medical experiment. The thighs of patients were cut open and fragments of glass and other junk placed in the wounds. When the wounds became inflamed they were cut open again and the pus was injected into the same patient and into other prisoners. Just to see what would happen. And to test sulfonamides versus some homeopathic medicine that was known not to be effective in healing people treated this way. In fact, these were acts of infantile sadism: Violate a creature willfully and watch what happens. You find notes in the records like: “The experiments show no results. We will continue.”

Let us consider the following crime. German physicians (members of the German *Luftwaffe*) did experiments on prisoners to find out what happens to human beings in an artificial environment, which was supposed to be a simulation of the conditions pilots forced to leave their plane by parachute are exposed to at great heights or in cold seawater. So the prisoners were placed in a chamber where the air pressure and the amount of oxygen was reduced till they died, and the progress of their dying was documented. Or they had to swim or stand in tanks full of cold water until they were dead, and the progress of their dying was documented.

British scientists, it seems, worked on a similar project. But it was not at all the same. First, the experiments were done with volunteers. Second, the experiments were stopped before physical damage occurred. The German scientists were part of the destruction of the moral bounds of a modern civilized society. The fact that what they did was counterproductive or mere scientific nonsense did not lead to professional disapproval of what they were doing. Why was it nonsense? Because the German and British air force wanted to know the *conditions under which their pilots survived* and how they those conditions could be improved, in case pilots were forced to leave a plane by parachute. So they wanted to know what had to be done to *avoid* damage (or even more life-threatening conditions). They didn't want to know how human beings die due to lack of oxygen or exposure to cold water and what their deaths looked like. So what is interesting is the life-threatening moment, not what happens if you go beyond that point (because you knew that beforehand). You know when life is in danger — that's what you want to know — and then you stop the experiment; that is satisfying in an ethical sense, just as it is satisfying in a scientific sense. Because they had the power to destroy common traditional and professional morality, the German scientists destroyed the sense of the scientific profession — but they were scientists and regarded themselves as such. Again: The seduction of stepping into the area of unlimited power to even destroy human beings at will was not weakened by specific professional self-understanding.

So what then is the precondition for morally and professionally responsible behavior? Public control: that is, functioning democratic institutions.

Leo Szilard, one of the leading members of the Manhattan Project, initiated a letter to President Truman after the first test of a nuclear bomb in the New Mexican desert. The letter urged that the new weapon should not be used against Japan before its destruction-power was demonstrated to the Japanese. The letter suggested that the weapon could be tested on the surface of an uninhabited island and the test be announced to the international public so it could be watched. Szilard and those who signed the letter hoped that Japan would surrender to avoid the use of the weapon on Japanese territory.

Only some of the scientists working on the Manhattan Project signed the letter — Edward Teller did not, nor did Robert Oppenheimer, the managing director of the project. You might assume that

Teller did not think using the bomb was problematic in a moral sense to the same degree the others did, but nevertheless he asked Oppenheimer for advice. Oppenheimer said that it wasn't a scientist's business to decide this question, and therefore he wanted to keep his distance as an advisor, so to speak. Nevertheless he took part in the process of selecting the first target, which became Hiroshima. So his expertise was part of the decision which city would be the one to be destroyed and which part of the Japanese population would be killed. Not only did he take part as an advisor in a decision he called political (or military) — in fact the decision was only in part a political or military one. The first target they were discussing was Kyoto. But there were objections to destroying this old town which was connected to the tradition of the Japanese emperors and thus a kind of "holy city". This was a political decision. But Kyoto was considered first because it seemed to be the best test area for scientific investigation of the maximum annihilatory potential of the bomb. Hiroshima was comparable in this respect, so this city and its population were chosen. This was (in a manner of speaking) the contribution of scientific responsibility to the decision and the subsequent actions.

What was the character of Leo Szilard's initiative to at least try to postpone the military use of the bomb on Japanese territory and to recommend a test on an uninhabited island that would be announced to the world (and especially Japan) instead? Oppenheimer was right: It was a political initiative. However, Oppenheimer wasn't right when he said that scientists should refrain from giving advice in the political arena. To be a scientist does not mean that you aren't a citizen anymore. Szilard's letter was the initiative of a citizen who tried to influence a political decision. But of course it was not the initiative of an average citizen — it was the initiative of a well-informed, indeed, highly-informed citizen. Only a handful of Americans knew what the Manhattan Project was about and what its outcome would be — what the use of a nuclear weapon could mean. Only the staff of the Manhattan Project knew, and those politicians and military experts who were informed by their reports shared their knowledge. So you might say that there was a kind of moral duty to make this privileged knowledge part of the political decision-making process. But that wasn't an action based on the "responsibility of science"; it was the responsibility of a citizen who was a specialized scientist and thus better informed than others and confronted with politicians who needed — perhaps — better expertise.

This is a specific responsibility that every citizen bears who has the privilege of having specific expertise. It is not restricted to science. You could say that a democratic public has the right to claim the relevant expertise of fellow citizens if and when grave political decisions are to be made. At least this is a demand that should be discussed.

Now let me take up a topic that lends itself to discussing the problem of a "specific responsibility of science" in a short and systematic way. Let me choose the question of animal

experimentation. Is this issue — which is undoubtedly and undisputedly a moral and not a technical one — a question which scientists can and/or should decide as scientists?

Considering my reasoning so far, you will assume that I will say: obviously not. And that assumption is true. But let me discuss the issues a little more. A professional scientist is the only one who can answer the question of whether this or that experiment on an animal might be useful for this or that purpose. His or her expertise is needed. Whether a particular experiment can be allowed in practice or not is decided by the law. Whether the execution of this experiment is within the bounds of morality is something one has to discuss. And so we can always discuss whether the laws concerning animal experimentation are the way we want them or should be changed.

This discussion cannot be delegated to the community of scientists. Answering ethical questions is not within the professional expertise of scientists. As we have seen in the historical examples I've been talking about, science cannot produce ethical standards. You may argue that this is merely an empirical statement which potentially can be refuted. But that isn't true. The examples from the history of science and politics should show you what the consequences might be if the fact that morality doesn't emerge from the scientific profession is forgotten or neglected or even denied. Science is a bundle of methods used to find out what is the case. To find out what is the case doesn't imply that one then knows what the world should be like. To discover *Yersinia pestis* doesn't imply that the plague is a bad thing and that human beings who suffer from the plague should be healed. To discover *Yersinia pestis* suggests how healing the disease might be managed better than in the centuries before — and the fact that humankind has suffered from the plague for centuries was a good motivation to look for the bacteria that caused the plague. That you cannot mix up the questions "What is?" and "What ought to be?" is known as "Hume's law" or the is-ought problem.

No one thinks that *every* experiment conducted with an animal is morally justified, and only a few think that *no* experiment with an animal can ever be justified. The community of the few who feel that they are waging a holy war can be cruel and (in our sense) immoral, and we know this from a lot of historical examples. But this is not the problem that we should be discussing now. Because if someone acts in a radical, perhaps stupid and perhaps unlawful and/or immoral way, that doesn't mean that he or she is wrong, in the sense of being wrong with respect to that person's moral convictions related to the issue in question. However, the individual might be wrong with respect to the notion that his or her moral convictions justify the actions she or he is undertaking. We should separate these two questions.

Animal welfare activists aim to influence public opinion in favor of their view that the laws limiting the range of animal experimentation should be more restrictive. Very radical animal welfare activists aim to convince the public that experiments on animals should be forbidden altogether. What is the role of the community of scientists (or that part of the community concerned with these

issues)? These scientists should inform the public about the kinds of experiments being conducted. They should inform the public about what it means to restrict such experiments in one way or the other, about what restricting scientific research could mean. This information will play a role in political and moral debates, but it cannot be deduced from this expertise *which* role that might be. Again, this is important. Again I draw your attention to David Hume: There is no bridge which covers the gap between What Is and What Ought to Be. With respect to our topic: To say that without experiment XYZ you will never find out whether the drug with the ingredient ABC really works or not doesn't imply that XYZ is morally tolerable. If the experiments on prisoners in Auschwitz had had any medical objective, they would nevertheless have been morally intolerable. What is more, you *cannot* say that without XYZ it will be *impossible* to... - you can *only* say that with XYZ it is most *probable* that we will find out... — and you *may add*: we don't know (yet) what to do without XYZ. This is the difference between a dogmatic and an honest scientific statement. The public has a right to demand that you be an honest, professional scientist and not a dogmatic one. Thus your statements in debates like these signal who you are and in what role you have the right to be regarded by others.

I have heard it suggested that, in order to prevent attacks by radical (or maybe even more moderate) animal welfare activists, advertisements should be shown on TV in which parents of children whose lives were saved by a specific drug say to viewers: "Without animal experimentation, the drug which saved the life of my child wouldn't exist — without animal experimentation, our child would be dead." Is it ethical — and is it professional — to do such things? It is, as I said before, unprofessional, because a statement like "without this — that would never happen" is not a sentence a scientist who is responsible for making professional statements can say. To seduce non-professionals to believe in sentences like that is unethical. To use people who are grateful that their child has survived for propaganda purposes — and who are not knowledgeable about the status of scientific progress in a particular field— is even more unethical. The fact that such suggestions exist shows that belief in scientific progress not as a *fact* (what kind of fact this is I will discuss later on) but as a *value*, which implies the superiority of that value over others, is an idea that undermines the ethical ideas a self-responsible public should preserve.

Now, here's something for you to think about: Are you familiar with the name Edward Jenner? This was the man who invented the smallpox vaccine. What did he do? He heard that an infection with cowpox made people immune to smallpox. So he infected a child with the liquid from the pustules of a sick cow. He waited a while and then infected the child with the liquid from the pustules of a human being who had smallpox. The child didn't get smallpox. Jenner was right. Was he? I would prefer to say: His intuition, or, to use a less pretentious term, his guess was successful. The outcome could have been different. Then he would have murdered the child — or let's put it in a more moderate way: He risked the possible death of the child in the name of medical progress.

Jenner's work saved the lives of millions of people. But no one would consider the way he conducted his work acceptable nowadays. Thus we all agree that scientific or medical progress can't justify everything.

But you might argue that the Jenner example shows why we need experiments on animals. You wouldn't be right in doing so. This is, in fact, not the appropriate conclusion. It *might be* the conclusion. But whether it is or not depends on much more. For example, on religion. A traditionally-oriented, morally muscular Christian would agree that (maybe any) animal experimentation that could perhaps save human lives should not only be allowed but in fact considered imperative, as he is equally convinced that any abortion performed from the moment of conception is a sin and a crime. A Buddhist would reason differently. A more secularly oriented person would reason this way: The way cultures or societies define what is right or wrong, what is tolerable and what is cruel differs — over space and time. What was once considered quite acceptable, indeed, was regarded as necessary, is no longer acceptable — for example, executing people by breaking their limbs and letting them slowly die over a period of days in public — for example, cutting people's hands off to punish them for not working fast enough on rubber plantations — for example, whipping horses to death when they broke down from too much hard work — for example, eating the brains directly out of the open skulls of monkeys that are still alive. Most people on the planet think that capital punishment executed by burning people alive, crucifying them or beheading them with a sword is barbarism — a lot of people think that capital punishment that uses the electric chair or gas chambers is barbarism — some people think that capital punishment per se is barbarism. Sometime in the 1960s or 1970s, the practice of skinning baby seals alive came to be considered revolting. More and more people think that a good meal of frog legs isn't worth having to rip off a frog's legs while it is still alive. David Foster Wallace wrote a thoughtful essay titled "Consider the Lobster". You may say "The times they are a-changing" — they are, for better or worse, as we can see from history — but we are in these times and part of the way they change.

Just to ensure that I am not misunderstood: I am not making propaganda for the radical animal welfare movement. Whether I would share the views of some of the non-radicals who suggest some modifications of the laws on experimentation would depend on the discussion I listen to. My intention is not to be a party in this debate today. What I want to do *here* is to clarify what kind of discussion we are engaging in. This is not a discussion about science and "non-scientific" (that is, "irrational") arguments. As we know — again from David Hume — morality is not "rational" and it is not "irrational". If something can be called "irrational" in some way, then it means that someone is reasoning without knowing what they are doing. "Irrational" or "dogmatic" should be used to refer to evidence that doesn't exist. Referring to the Holy Bible and the word of Genesis, which asserts

that human beings should subjugate the world to their will, is as dogmatic and irrational as the assumption that scientific progress is a moral value.

Let me change topics but stick to the catchword “scientific progress”. There is a temptation to mix up scientific progress, that is, the advancement of knowledge, and technical progress in managing humankind’s affairs. The temptation to mix the two things up is fueled by the fact that scientists’ work requires money — from public and/or private sources. If a company needs scientists for developing specific products, the scientists are employees of the company. Nothing is wrong with that — they have their contracts and should know what they have to do for the money they earn, just like other employees. To work on a scientific project in an academic environment creates a different case. It depends what you have to offer for the money you receive — not as an employee but as an independent scientist. But being independent doesn’t mean that you don’t need money. You have to say what you will use the money for. So you promise to deliver results — possible results — possible results of one kind or another. For example, a possible result might be: In ten years I should know a little bit more about how some phenomenon works or how something develops or what it depends on or... whatever. Nothing is wrong with that. But looking around you will find that all this takes place in an environment in which the people who decide whether your work is worth funding have no concept of the logic of scientific research. They think research is about finding a more or less straightforward way of achieving tangible results. They think scientific progress, that is, the advancement of knowledge, means finding answers. But the advancement of knowledge means revising your questions. Of course we know a lot more — amazingly more — than people did one hundred years ago — more than they could even imagine. But we also know a lot more about what we don’t know. So it isn’t totally absurd to say, we know less (compared to what we seem to know). Scientific progress means opening a door that was closed for years, or maybe centuries. But beyond that door you don’t find the room you longed to enter when you tried to open the door. Instead you discover a room that very often only contains a lot of closed doors along its walls. That’s what science is about. In the course of this advancement of knowledge, much has been discovered: vaccines, computers, computer-based medical diagnosis, machine guns, nuclear plants, nuclear bombs, spaceships that can discover conditions on other planets, smartphones and the enhanced technologies for analyzing the original color of Michelangelo’s or Rembrandt’s paintings. Of course, achieving such results or improving on them are beneficial aims for research — but you should not confuse technological progress and progress in science. And you should not mix up the two when considering the reasons for allocating proper funding — or, worse still, selling your work to the public by promising technological outcomes that you cannot guarantee your professional activities will ever produce.

Some years ago I listened to a recording of a lecture that a professor of physics gave to an audience of non-professionals. He had a coin in his hands, which he presented with the words: “The energy stored in this coin, set free and used adequately, could make the Sahara green.” And he promised that this would be the case in perhaps ten or at most twenty years. That was in the 1950s. In the 1980s I heard a lot of geneticists promise that in ten years or so there would be no more hereditary diseases and the genes for most diseases of the mind would be found. What kind of scientists were they? Did they make promises they knew they couldn’t keep? If so, then they betrayed the public. Or didn’t they know the way knowledge advances? Of course, the geneticists couldn’t foresee that — in a very short time — evidence for phenomena would emerge that are now studied in the field called epigenetics, and which have changed the concept of “a gene” and of “identifying a gene” fundamentally. But every scientist — at least those who aren’t frightfully narrow-minded — knows that things like this not only happen but that this is what progress in science is all about..

I once attended a dinner that Chancellor Merkel gave for the members of the Wissenschaftsrat (the German Council of Science and Humanities, which advises the federal and state governments). In her dinner speech the chancellor said that it’s absolutely understandable that academics and scientists argue that more money is needed for universities and other research institutions. But funds are limited, and she and all the other politicians who appreciate the needs of science need good arguments to convince those who are more doubtful. Tell me, she said, about the contribution science can make to meet the great challenges our society faces. The day before, the council had had a major debate about a paper called “Great Challenges” Indeed, “Great Challenges” is a catchword for acquiring money from the government and from big foundations. So you say “climate change”, you say “demographic transition”, you say “migration” — and it is not wrong to do so. There are many academics and scientists dealing with these problems — just as they deal with other problems. But academic research is not the answer to the challenges modern societies face. It can make a contribution, of course. But science is, all in all, an anarchistic undertaking. Of course everyone who gives money wants to know what he personally or humanity will get in return. But it’s no use producing illusions.

The advisory papers of the council often start with sentences like “A strong and well-financed culture of research is essential for Germany’s economy” — and of course that’s true somehow. But that isn’t the point. Science transcend nations But it is nationally financed. So you have to deal with that. But a lot of stuff which has nothing to do with a flourishing economy is part of a flourishing academic culture. The importance of German archeology — as you can read somewhere — lies in its contribution to the dialog between cultures (for example between Europe and the Near and Middle East). Maybe there is such a contribution — yes, of course, archeologists can tell fighting soldiers in

Iraq which ruin is five thousand years old — and may have been ruined a lot more by the war criminals of the “Islamic State” — and which ruin is five years old — and that they can take the latter under fire and stay away from the former. And that is not a bad thing. And maybe this helps “to improve understanding between cultures”. But it is primarily about preserving the objects of archeological and historical interest. And what is the purpose of that? People want to know where they came from. In fact, this is an idea which emerged from our Western culture, and to “improve understanding between cultures” means, in this respect, to tell other people that this was a good, indeed, a fascinating idea. Whether preserving cultural history is successful or not — it is part of our culture and if and when we do not want to ruin our intellectual culture bit by bit, we have to spend money to finance archeology, improve dictionaries of languages no one speaks besides a handful of philologists worldwide, or do spectral analysis of the atmosphere of planets no human will ever set foot on, or send a small spaceship to a comet to find out a little bit more about the origins of the environment of our planet that we call “Earth”. — So to reduce the role of academic research to some contributions to improving the functioning of other sectors of society — instead of merely mentioning that such contributions exist, of course — is irresponsible towards our culture of curiosity and the accumulation of knowledge — or, as I mentioned before, the accumulation of a wealth of new and better questions.

One last remark on responsibility. Stay away from offering junk information to the public. One can read every now and then in the newspapers that some form of human behavior can be “explained” by elucidating under what circumstances it developed and why it made sense in the evolutionary process. Very often this is about behavior that makes no sense in our world — at least at first sight. Well, every behavior is in the world because it developed — that’s a tautology. “Making sense in the process of evolution” — that is an extremely fuzzy concept. Is something in the world because it contributed to the survival of greater numbers of those who had that something? A lot of things, like the deer’s antlers haven’t been explained in that way yet — in a satisfying way. But the picture changes completely if you say that, when something, once it developed, stays in the world, that just means that it is not an evolutionary disadvantage. A species doesn’t become extinct because of it. If you call that “an explanation” — fine. In the end, it is once again a tautology: the species didn’t become extinct because it didn’t for that reason (and for a lot of other reasons) — the species didn’t disappear because, well — why should they have? They just didn’t.

A number of newspapers reported in short texts on an article published in a serious scientific periodical. We’re told that male and female humans behave differently in supermarkets. Male try to find what they need — if they don’t find it, they try in another corner of the supermarket. Female look around and find the promising area. This was tested thoroughly. You may say that females are more trained in finding things in supermarkets because they spend more time there. But that

wouldn't be a serious scientific explanation. So the authors of the article told the world that this was part of human evolutionary heritage. Male were hunters, so they developed the habit of fixing their sights on whatever they want to get; females were collectors, so they let their eyes wander. What you learn from all this is that the authors don't know anything about hunting, nor about collecting food in the wilderness. They don't even have adequate fantasies about it.

Furthermore, they have no idea what an "explanation" might be. Nothing is "explained" if you show that it fits the theory of evolution. (Even if it fits better than the nonsense I referred to.) The theory of evolution in nature and — in a quite different way — in culture is a hypothesis, like all theories are. We mustn't be as radical as Sir Karl Popper who said the only correct and responsible behavior for a scientist is to try to falsify a hypothesis. There's a less radical way to approach it: If we think we should stick to this hypothesis, then we should indeed find ways to demonstrate that it is compatible with what we observe. But this is neither a verification of a hypothesis (which is impossible anyway — as Popper learned from — once again — David Hume) nor it is an "explanation", because saying that something fits a theory just means that it does not disprove it — and the notion of "fit" can be interpreted in a very wide range of different ways (as I have implied cautiously above).

So, please, do not feed the public with statements of the "Now I really know!" variety and in fact offer false notions of what scientific reasoning is about.

Those who want to engage in serious discourse — whether with other professionals or with the non-professional public — especially if they want to influence important decisions — should know the proper place of their arguments. This may sound either trivial or sensible but unrealistic. Of course, it is unrealistic to assume that this would normally be the case— but that is all the more reason for me to emphasize that it is sensible or reasonable — and perhaps essential for the use of reason. So it isn't trivial. I think it isn't trivial, especially for scientists.

Scientists are not expected to be experts in philosophical reasoning and the history of that kind of reasoning — they can't be experts in it. But they can be expected to be familiar with it. Not to know the limits of one's expertise is an intellectual vice that is not limited to a special profession. That was the point in Socrates's statement that he knew nothing. A good shoemaker is an expert in shoemaking and as such he is to be respected. But if he pretends to be an expert in medicine or politics, he is ridiculous, as Socrates said. I'm not an expert in any profession, said Socrates (in fact he was a sculptor but not a rattling good one), but I know that and so I am not ridiculous. Socrates's conclusion (or, in fact, Plato's, who used the mask of Socrates for his own intellectual purposes) was that politics should be executed by professionals, too — and he thought that philosophers (i.e. philosophers like Plato) should be those professionals or experts. This was a ridiculous idea. What is more, it was totalitarian, because according to Plato the professional job of the philosophers was to

define each and everyone's proper (and unchangeable) place in society. Plato was not a democrat (understandable in his time, in view of the strange and also sometimes totalitarian aspects of Athenian democracy). Our view on democracy is that it does not need experts in political reasoning but it does require the rule of law, functioning institutions which are controlled, and the separation of powers. For the different jobs which are needed in democratic institutions — the judicial system, police, finance and so on — we need experts. Not for political reasoning as such. We agree that this can't be delegated. Nevertheless, we think it reasonable to elect a group of people — we call this body parliament — to reason vicariously within a certain timeframe. This implies that no argument is privileged in any way in political debates — the borderline is only drawn by the constitution and a few laws.

We consider all this to be reasonable not because we have blind trust in the wisdom of the people in general or in the members of parliaments. We think this is reasonable just because we know what happens under the regime of dictators.

All of this should be known well. People who forget tend to be anti-democratic or ridiculous, and sometimes both. Everyone has her or his own responsibility with respect to the possibility of behaving ridiculously. But perhaps there is a specific responsibility of scientists towards their community to not act ridiculously towards the educated public and to not fool the rest.

Let me summarize:

- Thou shalt do your job well.
- Thou shalt not mix up what is a fact and what ought-to-be.
- Thou shalt not assume that scientific research justifies everything.
- Thou shalt know that the legal, political and moral limits of your professional activities are not defined in and by your profession.
- Thou shalt not hope that your professionalism is the source of any ethical standards beyond the commandment "Thou shalt do your job well!"
- Thou shalt not make promises you can't keep in the name of your profession.
- Thou shalt not fool the people by producing illusions about science as a reliable form of problem-solving for society.
- Thou shalt not disseminate junk information.
- Thou shalt not prove ridiculous by assuming that your professionalism qualifies you to do more than doing your job well.

Those were nine commandments. And here's one more for free: Never, never get involved in philosophical debates if you haven't studied the history of philosophical thinking intensively — and you haven't got the time for that.

Thank you!