

A History on Ethics in Science and Science Journalism

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inspective.

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1 Morality of Science and in Science

“The morality thing is a little confusing to me”, Bill Gates once confessed.¹ He is not alone. To scientists the morality thing seems to be a little confusing, too. Concerning their research scientists agree in the validity and reliability of the methods applied as well as they agree in the overall significance of their results; but there is a rather narrow consensus between them on whether the methods and findings comply with moral and even legal standards.²

So what is so confusing about the morality thing? Is there anything special with morality in science? Rather not from an ethical point of view. On the contrary, what instead might be confusing is the abundant presence of moral questions about science concomitant with its coverage by the media: too many moral demands appear too often in too subjective perspectives. Here an overview might be helpful. We survey, then, two fields of morality. In the first we meet scientists acting in their laboratories, in the second we are confronted with science as an institution and its impacts on society.³

Morality enters the laboratories when scientists experiment with animals, including men, when they shape their lives by manipulating their genes, or even erase them by lethal doses, abortion, or euthanasia. Cloning and stem cell research are recent examples of morally debated questions related to the lives of animals. They affect society in an ambivalent way. Molecular biology menaces and harms existing healthy animals and simultaneously gives hope for relief to the sick ones. And so it is with most scientific work. Nuclear fission led to the martial extinction of hundreds of thousands of Japanese people and to the civil use of nuclear energy. Chemically synthesized pesticides increase crop harvest and put our health at risk. All medicals have a therapeutic effect and adverse effects.

Another thing is morality within science. The morality thing within science regards scientific standards. Betrayal and theft occur in science as well as insults and harassment of colleagues.⁴ But mainly it comprises fraud, fabrication and misrepresenting of data. Such cases lead to society’s moral concern how scientific conduct is controlled, how scarce resources are distributed within science, and how scientific misconduct affects the credibility of research

¹ In: Gray (2002) p.161.

² Hartenstein (1988) p.405; cf. Spinner (1985) p.39.

³ Cf. Mittelstraß (2002) p.901; Roskie (2002) p.21.

⁴ Eisenberg (1994) p.116.

findings.⁵ The last concern will be shown to be central; for ethics in general, not only for science ethics. For science ethics moral values in science are transmitted to the moral values of science. Scientific misconduct then corrupts the value of science for society. This is of unsurpassable importance. Because of science's role in economy – technical as well as agricultural –, in health care, or in military defence stakes are high. If scientific conduct cannot be justified morally then a science based society cannot be either.

The omnipresence of science in our society⁶ indicates already that the moral values of science appeal to society's morality, too. Indeed the moral values in science are the moral values of a free, democratic society.⁷ But before we come to that conclusion and its implications we have to explore the depths of ethics, especially the ethics of science and journalism. Endowed then with the basic moral values we will discuss some practical consequences for scientists, journalists, and society in general thereby dismantling some confusion about the morality thing.

2 The Role of Ethics

What now is the matter of ethics? To begin with ethics is a generalization of moralities. Morality then is the matter of ethics. Ethics discerns what is morally right and what is morally wrong: it discerns the good from the bad. This means that ethics engages in values. As with stem cell research or nuclear energy we always evaluate the events in society, we give a moral value to it. We praise the economic profits of new technologies and despise the entailed accidents, we enjoy living and abhor dying. For example we judge morally the compulsory vaccination during the operation Desert Storm in 1991, especially when it comes out afterwards that many of the soldiers have become sick.⁸ This means we evaluate before taking a decision as well as before judging a taken decision. Evaluation has to be settled before societal questions might be answered. Shall new power plants be built? Where should mobile phone transmitters be installed? Has anybody a right to die? Who – of the many in need – shall get one of the few transplants at hand? And why?⁹

⁵ Jones (2007) p.26.

⁶ Cf. Bethe (1991) p.176.

⁷ Against Lenk (1992) p.19; Bayertz (1994) p.45.

⁸ Pence (2004) p.297.

⁹ Cf. Gray (2002) p.84; Pence (2004) p.337.

To answer these questions ethics provides the basic values and principles. Generally ethics answers the question of good conduct and misconduct respectively. More generally ethics frames the possible justifications of morally evaluated conduct. It enables us to justify good science and good journalism and to object to bad science and bad journalism. This clears already up some confusion. If it is stated for example that science – or journalism – is bad because it is compromised by sexism, power struggle, or political influence then the statement comes down to ‘science is bad because it is bad’, since sexism, power struggle, and political influence surely are morally bad. This view confounds a – presumed – practice of science with the ethics of science. Ethics is not concerned with the description of science but with its norms, that is with how it should be – in order to be good science.

2.1 In Science

Good science, one might say, is science conducted by responsible scientists. Responsible conduct again refers to data acquisition, management, sharing, and ownership according to the Office of Research Integrity (ORI) in the United States. It refers as well to mentor-trainee relationships, to publication practices, to peer review, to collaborations, to experimental practices, and to conflicts of interest.¹⁰ No objections so far. But the references do not reveal the basic values and principles that rule the good data acquisition, management, and so on. The ORI provides a classification for various types of responsible conduct in science. The moral core of scientific responsibility is left open.

More helpful are the principles of science coined by the sociologist Robert K. Merton. That is universalism, communism, disinterestedness, and organized skepticism. Universalism means that the academic work and qualification of a person are assessed independently of individual characteristics such as race, religion, or social status. Universalism is opposed to particularism where the assessment of new findings is based on the reputation and past productivity of a researcher. Communism means that all findings are communicated openly so that the ownership of knowledge is shared by all. Communism is opposed to solitarism where scientists protect their findings to ensure priority in publishing, patenting, or application. Disinterestedness means that research is separated from personal motives and motivated only by curiosity and the altruistic aim for the public welfare of mankind. Disinterestedness is opposed to selfinter-

¹⁰ Jones (2007) p.27.

estedness where scientists compete for funding and recognition. Organized skepticism finally means that scientists rely on a critical review. It is opposed to organized dogmatism where scientists just promote their own findings, theories, or innovations.¹¹

It is remarkable that almost all scientists acknowledge these principles but claim that other scientists, even their colleagues, do not do their research in accordance with these principles.¹² We must conclude that at least some scientists act deliberately against their moral principles. Indeed, the morality thing is a little confusing.

From these principles virtues are derivable which define a good scientist: He or she is impartial, honest, independent, cooperative, altruistic, precise, critical, and else more.¹³ All these are moral characteristics and all these are obviously good ones. They are virtues morally worth acquiring. Before arguing that the four principles start from one basic value, we will have a look at the ethics of journalism and then compare the characteristics.

2.2 In Journalism

First it must be stated that the ORI classification for responsible conduct in science is also applicable to the media. Journalists too acquire data – from investigations or press releases –, they put them together, share them with their readers, and own intellectual property rights on their products. There exists a hierarchical relationship between chief editors and journalists; each media has its own publication practices; there are internal review- or selection-mechanisms; journalists cooperate with other journalists; they have to respect the personal rights of people and they must rule out their vested interests, too.¹⁴

What about the principles? Here we have to go the other way round, start with the virtues and then have a look whether the virtues give a hint to certain principles or basic values. So when it comes to journalistic virtues independence is to be named first. Independence means that journalists gain a neutral distance to either information; they are critical even towards hitherto reliable and trustworthy sources. And journalists are careful with regards to the selection of

¹¹ Merton (1973) p.254-266; Mitroff (1974) p.587f; Blankenagel (1980) p.70; cf. Bernal (1986) p.410; Ströker (1991) p.107.

¹² Jones (2007) p.32.

¹³ Cf. Resnik (1998) p.55ff; Jones (2007) p.36.

¹⁴ Cf. UNESCO Media-Declaration (1978); Teichert (1996) p.761f.

topics and words, especially in medical reports: Responsible journalists do not rouse too high expectations within patients. And journalists are disinterested, they do not fall for public relations – they do fall for the public interest instead. In sum, a journalist is independent, impartial, honest, cooperative, altruistic, precise, and critical just like the scientist.

If both, journalists and scientists, encounter good journalists do not report uncritically from scientific press conferences. But this is exactly what happened in 1989. The media reported enthusiastically that the chemists Stanley Pons and Martin Fleischmann succeeded with the cold fusion, providing an inexhaustible source of energy. Both, the involved journalists and scientists, wanted to be first; to ensure priority they passed on reproductions of the experiment – which then failed.¹⁵ The application of this solitarist principle for sure did not augment the credibility of science and the media. Four years later the news that a human embryo had been cloned made the headlines. The news was taken from the American Fertility Society where the physicians Jerry Hall and Robert Stillmann reported of a fertilized egg which was proliferating, then divided in single cells again which on their own proliferated anew. If it had been taken into account that the egg was fertilized by two sperms and as such not viable the ungrounded media hype could have been avoided.¹⁶

What has gone wrong in these prominent cases is not so much the lack of certain virtues or the neglect of moral principles but the loss of objectivity. The chosen electrolytes do not fuse at room temperature, and a degenerated nonviable cluster of germ cells (gametes) has been cloned, not an embryo. Somehow the loss of objectivity is involved with moral evaluations. More clearly: without objectivity there would be no moral principles and virtues in science and journalism. The principles and virtues serve objectivity.¹⁷ This manifests that objectivity is the basic value for scientists and journalists.¹⁸ Only an objective scientist may be a good scientist. And a good scientist certainly is an objective one. The same counts for journalists.¹⁹

¹⁵ Cf. Resnik (1998) p.115; Collins (1999) p.79ff.

¹⁶ Cf. Resnik (1998) p.8. Consider the media hype in 1920 when the transplantation of testicles from apes to man was celebrated as the key to eternal youth. Cf. Borscheid (1992) p.49.

¹⁷ Cf. Ziman (2000) p.56; Jones (2007) p.37.

¹⁸ Noelle-Neumann (1987) p.75.

¹⁹ Rager (1994) p.5f; Meyer (2006) p.242; cf. Consoli (2006) p.533.

2.3 In Society

If scientists and journalists are sharing the same basic value, the same moral virtues and approximately the same moral principles this suggests already that their validity might be extended ethically to the whole society. At least it seems agreeable that all men should be impartial, honest, independent, cooperative, altruistic, precise, and critical – not only scientists and journalists. It then has to be shown that objectivity accounts for society, since universalism, communism, disinterestedness, and organized skepticism account for objectivity.

Making objectivity central for society means to put science ethics on a new task. Science ethics no longer is concerned exclusively with the guidance for what knowledge should be sought, with the definition of the moral means of acquiring knowledge, and with the prescription of a responsible use of knowledge. Then science ethics reaches for the heart of society, its objective core. It follows that exploring the morality of science implies a morality for society, with a general ethics as its result: a good society is based on good science.²⁰ That is to say, science ethics is far more extensive than it is normally treated in classical textbooks. It dissects the basic moral values and principles for society as a whole.²¹ This is a hard task and it will be seen how far ethics frames objectivity as a moral justification for civil, not only scientific conduct.

3 The Rule of Reason and the rational State

A science ethics confined to science reduces the responsibility of the scientists to a too small section of society. As we have seen scientific conduct affects society generally. And it will turn out that it affects society in a central manner. That has to do with the conception of science. From the ancient world onwards scientific knowledge is conceived as methodologically achieved knowledge. Whereas methods put science in opposition to myth, poetry and tradition; the latter providing less reliable knowledge. A method in Plato's sense is a means to derive knowledge from its foundations. Scientific knowledge, then, is well-founded or justified knowledge – the method being the rationale in the justification.²² In respect of scientific knowledge Plato discerns between φιλοσοφία, ιστορία, and τεχνή. Philosophy means the

²⁰ Cf. Hubig (1995) p.30.

²¹ Broad (1984) p.152.

²² Cf. Ströker (1991) p.90.

permanent criticism of knowledge; history means the detection, fixation, and ordering of knowledge; whereas technics means the application of knowledge.²³ We will deal here primarily with scientific knowledge in the sense of philosophy.

Now what about the moral value of methodologically achieved knowledge? We have already stated that the moral value of science consists in its objectivity. This becomes now more obvious: objectivity is the foundation scientific knowledge is based on. Having applied methods that lead to objectivity scientists can justify their results as scientific knowledge. In other words, scientific knowledge should be objective and the scientist's conduct should be directed to objectivity.²⁴ The value of methods lies in their supply with objectivity. But before extending this minimal ethics we have to say some words concerning values in science, especially concerning a value-free science.

3.1 Value-free Science

Briefly values are bound up with interests. When someone is interested in something, or even wants something this something is valuable for him. For scientists who are interested in bird songs, cell receptors, or elementary particles, for them cadences, molecules, or quarks are valuable things. Non-material things such as verses, intentions, or theories might be valuable, too. For a thing to have a value it is only required that there exists some interest in it. This is most evident in economics where the value of a good is quantified as its price: the interests of buyers and sellers in a washing machine fix its monetary value.

The close connection between interests and values motivates the conception of a value-free science that has incorporated the moral principle of disinterestedness. As Max Weber made clear, value-free science does not mean the absence of values in science.²⁵ It rather means that any remaining value should be treated objectively. That is, even scientists who do their research on values should do it disinterestedly. No value shall enter the examination because any prejudice inevitably will bias the findings. Objective, unbiased knowledge instead is only producible by a value-free science. This conception of a value-free science confirms – nearly

²³ Cf. Hentig (1971) p.864.

²⁴ Without obligatory objectivity science could not claim objectivity and therefore could not provide any base for criticism. Otherwise naturalistic critics contradict themselves like Meisenberg (2007) p.231.

²⁵ Weber (1973) p.263.

paradoxically – objectivity as basic value in science. For objective findings are preferred to biased ones. Weber is interested in disinterested science. He assumes a basic good value to get rid off disturbing bad values: the value-free science is centred on a basic value. This needs some clarification.

The apparent paradoxical implications of a value-free science result from the circumstance that interests always express values. So disinterest becomes an interest, disinterestedness a value. The paradox may be dissolved by a closer inspection of the involved interests. We take it as a matter of fact that all conduct is tied to interests, i.e. submitted to the will. Further we take it for granted that interests need not be conscious, which means that not all actions are taken deliberately nevertheless correspond to the will. If now all conduct is tied to interests then so is scientific conduct. Science cannot be practiced without values. That is not so surprising at all. Scientists deal with interesting problems; some problems are given higher value than others.²⁶ For example a higher value is attributed nowadays to the detection of the Higgs-particle than to the detection of any other elementary particle. Such evaluations finally lead to and are expressed by a selection of research topics.

Furthermore scientists are well aware of their work's value. They regard research to be valuable beyond personal pleasures. And for sure there is a difference in value between the performance of an experiment and a TV-commercial.²⁷ So the value-free science is not value-free at all. What does that mean? First it means that we have to draw a line between the private and the public. Then we can differ private, particular, or vested interests from public interests – and private values from public values accordingly (in analogy to private goods and public goods in economics). Let us exemplify the difference. Someone has a private interest in his education for certain selfish goals but at the same time he may have a public interest in, say, comprehensive education even though he has finished school and is childless. Of course he could maintain this public interest as a schoolboy or as a paterfamilias as well. For a public interest it is only required that it is not biased by private interests.²⁸

Back to science the prohibition of particularism and selfinterestedness on behalf of objectivity concerns the particular, private interests. The principles, then, ban private values from science. In privacy we might be subjective as subjective can be, but if it comes to science we

²⁶ Maslow (1966) p.122; Meyer-Abich (1999) p.62.

²⁷ Maslow (1966) p.127.

²⁸ Cf. Rousseau (1964) IV p.295; Smith (1976) I, I, i p.9; Schudson (1978) p.48.

ought to discard our vested interests. Value-free science is a public value. Freed from private values it gets its public estimation. Objective findings are findings free from subjective goals. This means that the value of a finding depends on its objectivity. Objectivity as a basic value – such as equality, solidarity, or prosperity – does not imply that everything objective is morally biased – objectivity is not a moral construct or the result of morality; in contrast it implies that everything objective has a moral value. Take the two propositions:

- (i) In a lightning an angry goddess darts flashes at disobedient people.
- (ii) In a lightning flashes are the discharge of electricity in the atmosphere.

We prefer the latter to the former because it is rational. That means we have methods at hand with which we can measure electricity in the atmosphere before and after a lightning objectively. In other words: whoever uses the methods will come to the same result – whatever his private intentions may be. Science rules out religion because scientists can justify their propositions on objective grounds. The supremacy of science has two reasons.²⁹ One moral reason and one political reason. Morally one has to justify one's conduct to others objectively. And politically a governmental authority has to be based on objectivity, not on power. Both reasons back the strong public interest in science.³⁰

The public interest in science rests on the absence of private interests in science. But it does not and cannot rest on the absence of public interests as well. On the contrary. Just because scientists reveal objectivity they are directly concerned with the public interest. The public interest is more or less synonymous with the interest in objectivity. From the renaissance onwards runs the tendency to erase arbitrary rule, religious fanaticism, and political intrigues and implant objective governance instead. In the Age of Enlightenment the growth of science was supported in order to erect a free state with a just government. The prevailing expectation has been and still is that rationality will overcome idols and authorities, that objectivity will become the foundation of society.³¹

It meant to misconceive value-free science when all scientists had to refrain from any public interest. Such a misconception led science to a dependency of other interests, presumably not

²⁹ Cf. the following two chapters.

³⁰ Muir (2008) p.43.

³¹ Cf. Nida-Rümelin (1996) p.778; Falkenburg (2001) p.20; Muir (2008) p.40.

equally objective.³² The commitment to objectivity as a moral value in science does not devalue scientific knowledge. It remains the methodologically revealed objectivity. In addition the commitment is moved up against vested interests in society.³³ Objectivity as a moral value turns objectivity in a concurrence with other moral values. Their order and justification is treated in ethics at which we will address now.

3.2 The rational Foundations of Morality

Rationality is what discerns scientific knowledge from other forms of knowledge. Scientific knowledge can be justified because methods had been used to obtain it. And the methods are the means that anybody can use for a check. In a sense methods call on us to find out for ourselves. We do not have to trust authorities any more; we can look for ourselves and see how it works.³⁴ Being able to uncover the objective reality, then, takes away the reliance on authorities. Because we are able to know we do not depend on authorities to justify our conduct. We are able to justify our conduct on objective reasons. This is ethically relevant. For it follows that we should justify our conduct objectively.

A moral justification must be rational. We cannot go back behind rationality in ethics. Consistently we can only declare: 'All we say might be rational or irrational – we do not care.' But we cannot say: 'It is irrational to be rational' because it is self-contradicting. And if we say: 'It is rational to be irrational' then our statement obviously leaves enough room for objective grounds to base our ethical justifications on. So it follows logically that we should behave rationally. Otherwise we could not justify our behaviour. This itself is rational. To become a moral duty, too, the norm must be combined with real interests. In other words we have to show that we care about objectivity. Then we have accomplished a general proposition concerning the morally good that frames our justifications on the morality of any conduct.

We have shown that it is rational to be rational and to act rationally. Then, too, it is rational to provide the conditions for rational acts. We will show that freedom is the condition for rationality. It follows that it is rational to establish freedom. And then we have to go one step fur-

³² Maslow (1966) p.120; cf. Hinz (1971) p.256; against Topitsch (1969) p.11.

³³ Maier-Leibnitz (1983) p.12.

³⁴ Maslow (1966) p.136.

ther to the moral norm of being rational – which is nothing less than the classical *sapere aude*.³⁵

3.3 The Republic of Science

‘Be rational’ is a moral imperative that applies not only to individuals but also to society altogether. Social governance should be backed by reason, not by physical or economical power.³⁶ Be society rational! In return a rational state is needed. For a rational state Marcus T. Cicero coined the term republic.³⁷ He describes the republican state as a state governed by virtuous men who are not concerned with their private advantages but seek the common welfare. In a republic the common welfare is achieved by disinterested, altruistic, brave, and cooperative leaders.³⁸ The leaders’ virtues are already well-known to us: they are identical with the scientists’ virtues described earlier.

Two millennia later chemist Michael Polanyi drafted the republic of science as a model for a free society.³⁹ In his terms the republic of science epitomizes the free cooperation of independent scientists. Their freedom consists in the absence of regulating authorities. Reason alone is the sole governor, objectivity the sole output. The more of objective reality is revealed by science the more enlightened becomes society. And as a consequence more freedom is established for everyone in society. Whereupon freedom is conceived as being free from all external influences. Because external influences basically distort the scientific output. Everything that does not stem from reason is irrational. And everything irrational must be removed or at least kept away from science. Scientific freedom means to think it through oneself and see what it is and how it works. The resulting knowledge, then, helps society to free itself from irrational, i.e. unjustifiable influences.

Taking into account our former discussion we can substantiate this concept of freedom. Free from any influence does not mean free from any interest. Rather scientific freedom means to be free from private interests.⁴⁰ As it comes to objectivity epistemologically, objectivity is

³⁵ Kant (1977a) A481.

³⁶ Nanda (1998) p.305; Muir (2008) p.40.

³⁷ Cicero (1979) I, 25 p.130.

³⁸ Cicero (1979) I, 1 p.88; cf. Montesquieu (1994) IV, 5 p.138.

³⁹ Polanyi (1962) p.54.

⁴⁰ Patzig (1985) p.4.

free from subjective biases. As it comes to objectivity ethically, objectivity is a basic value within the public interest. The public has an interest in common welfare. And this can only be achieved when political decisions are taken objectively.⁴¹ Or, the public has no interest in politicians who serve the subjective aims of a particular few. So with respect to objectivity science is a normative model for society. The altruistic unbiased use of methods ensures objectivity in science. Analogously the altruistic unbiased use of social power shall ensure freedom in society.

The principles of science ethics and its derived virtues are summarized in a social contract between the governed and the governors according to Charles Montesquieu.⁴² The social contract demands the governors to be objective in their decisions, to decide rationally. They shall be impartial, honest, independent, cooperative, altruistic, precise, critical, and so on. The principles of science ethics shall be valid for society, too. It follows that science ethics is not a professional ethics⁴³ but ethics in the full sense of the term: the moral values in science are the moral values of a free, republican society. That reason shall rule to the benefit of the common welfare is the bottom line of the social contract that founds any liberal state.

Vice versa the state contracts with science.⁴⁴ The social contract concerning science focuses on the common welfare, too. The commitment of science to the common welfare not only implies the compliance with its ethical principles. It implies a public interest of science itself in the common welfare. That is, science is committed to common or social problems such as security, justice, diversity, energy, food, health, housing, or mobility.⁴⁵ According to the social contract scientists examine issues of these problems, work out the essential objective traits, propose an impartial solution or parts of it, and predict its impacts on society.⁴⁶ A very extensive task. Science clarifies the societal situation thereby revealing hidden problems (or dissolving apparent problems) such as obscured private interests and at the same time contributes considerably to the future handling of the situation.

Here it must be remembered that science is free in the methodological treatment of a problem; it is not free in the choice of a problem. The choice is left to the public interest. It is a public

⁴¹ Snow (1961) p.55; Schlink (1971) p.250.

⁴² Montesquieu (1994) IV, 5 p.138; V,1 p.141 and VIII, 16 p.197.

⁴³ Cf. Gatzemeier (1994) p.15.

⁴⁴ Meyer (2006) p.240; Jones (2007) p.26; cf. Jonas (1987) p.1002; Meyer-Abich (1999) p.67.

⁴⁵ Maier-Leibnitz (1983) p.6.

⁴⁶ Cf. Resnik (1998) p.41; Weingart (2001) p.27; Meisenberg (2007) p.200.

decision which problems lay in the public interest and which problems should be treated. Here science can only support the decision with objective material – so that the decision is taken objectively. Thus it is society that decides on the development of science and it is science that makes the prediction possible where the development leads to. In sum the public interest is at work when public decisions go round in a full-blown circle from society to science and back to society. This circle moves in the direction of equal freedom. The circle in motion keeps the value of objectivity. For however the social contract will be, it has to be complied objectively.

4 Freedom and its Limits

It has been stated that freedom is one of the most prominent public interests and that objectivity is the means to achieve it. Being so closely knit together we must investigate them a bit farther to supply our ethics with an adequate – that is rational – foundation. Having already examined objectivity we now turn to freedom. In political philosophy in terms of the social contract freedom is a basic right. In moral philosophy (that is ethics) freedom is the prerequisite for morality.⁴⁷ This chapter is concerned with the connection of both.

4.1 Freedom in Ethics

Freedom is the prerequisite of morality because without freedom it would be impossible to judge behaviour as good or bad. If we were not free to do things we could not be held responsible for our deeds. A salto mortale in the gym might be a good performance but in a motor-bike crash it is definitely not. To help others is morally good, not so if the help is given under obligation. Even farther we do not act morally if we do it by custom, are rewarded for our deeds, or feel a pleasure in doing so.⁴⁸ Because then our deeds are no free decision, rather they are forced by the motives. So the obligation does not have to be a physical one. Only acts that go back to a free decision are suitable for moral judgments. Morality enters only into action if we have a free choice. First from the free choice follows the duty to do the good.

⁴⁷ Pieper (1988) II p.24; cf. Markl (1991) p.40.

⁴⁸ Kant (1977b) A232.

Freedom in ethics requires the ability to disengage from whatever obligation, be it physical, social or psychological. It requires the ability to disengage from the natural flow of history which is governed by deterministic laws. It requires the ability to refrain from harmful behaviour, for instance to refrain from the *bellum omnium contra omnes*,⁴⁹ to be critical towards it, reflect its sources as well as consequences, and to propose alternatives to the right of the strongest. When we pause to use our wits and decide after careful reflection for an action, we act morally. Then we jump from obligation to reason. The realm of reason is, so to say, the moral niche in nature. A man freed from his instincts and heteronomous interests adjusts his actions to reason. In other words: Rational acting people are free. And vice versa: Free people are acting rationally.⁵⁰

That reminds us well to the scientific inquiry. To inquire the natural laws the inquirer has to take a position beside the natural laws. He has to escape any determinism in order to reason over it. Put differently, the scientist must be free to do an experiment in order to find out something about objectivity. The scientist adjusts his conduct to reason, because without any reasonable experiment there would be no objective knowledge. So again we meet the parallelism between the epistemology and the ethics of science. Only now it is not so surprising. Having demonstrated that objectivity counts as a moral value it follows quite naturally that the prerequisites of ethics also apply to the scientific enterprise. As far as science is a model for the rational state freedom is an unsurpassable prerequisite. Rationality is applied freedom.

An important result of the foregoing discussion is that freedom has nothing to do with arbitrariness. Instead freedom equals rational behaviour. This must be remembered when we talk of freedom in society as a basic right. Freedom as a basic right means the freedom to pursue one's own interests. It is an everyday-experience that in doing so the interests of different people conflict. Most of the conflicts can only be solved when the freedom of at least one person is restricted. The restriction is according to the social contract supposed to be in a way that the public interest is restored. So the social contract marks the borderline of the individuals' freedom. The point is that the restricting rules, established by the social contract, should be objective in the sense of impartiality. Newly emerging irrationalities make necessary a

⁴⁹ Hobbes (1951) I, 14 p.85.

⁵⁰ Kant (1977b) A235f; cf. Pence (2004) p.17.

steady amendment of the social contract. Most of the amendments materialize in legal laws. The laws in turn are the commitment to the rules of freedom.⁵¹

In summary we have the freedom to give ourselves the rules of freedom in society and we have the freedom to abide to these rules in order to sustain freedom.⁵² As we have seen it is rational to provide the conditions for rational acts. This condition is freedom. So in the end it is rational to preserve freedom. And it is freedom that enables rationality and gives a moral value to objectivity because freedom has to be established objectively, not only apparently. Freedom, then, turns objectivity into a value. It is a kind of recursive function we might define recursively: We want to be free, that is why we want to live in a free state, that is why we want the state to take objective decisions, that is why we want freedom. Or the other way round: We want freedom, because freedom allows objective (reasonable) decisions, because objective decisions constitute a free state, because a free state renders it possible to live freely. The parameters of this value function are determined by the public interests – which includes the interest in being moral people.

4.2 Freedom of Science

As with objectivity the freedom of science has two aspects: a moral and a political one. Objectivity morally meant to justify one's arguments objectively. With freedom as the prerequisite for objectivity the freedom of science refers to the autonomy of reason. Politically objectivity meant the replacement of power by reason. With the social contract as the embodiment of reason in society the freedom of science refers to the public interest. We will start with the first.

The freedom of science in its foremost sense is the freedom to use one's reason. This freedom might be considered as an open space where ideas and arguments float independently until they agglutinate naturally to a convincing chain of reasoning. Such reasoning is for many people worthwhile. It is preferred over a deceptive reasoning like knowledge is preferred over ignorance.⁵³ The freedom of science, then, is the opposition to compulsory thinking. Its appreciation promotes the moral demand that freedom of science shall be. A demand which in

⁵¹ Cf. Häberle (1985) p.343.

⁵² Kant (1977b) A234; cf. Turner (1986) p.33.

⁵³ Wolpert (1999) p.29.

the end says no more nor less as that morality shall be. Since all moral judgements must be justified objectively and for objectivity freedom of reason – that is of science – is necessary.

In sum freedom of science states a prerequisite for knowledge. It does not state a charter for all knowledge. The moral value of objectivity does not entail that everything objective is a good thing; nor does it demand that everything should be known. Some areas of life or of the universe might well be exempt from knowledge – not only for epistemological reasons but for moral reasons as well. The morality of objectivity consists in the norm that all knowledge shall be objective. For objective knowledge there exists a public use and inasmuch a public interest. So freedom of science does not include the persecution of objectivity in every direction for deliberate purposes. This is most important. Since it explains why unfree states might house sciences as well.

An unfree state is constituted by autocratic arbitrariness and not by a social contract. The limits of scientific freedom are in the one demarcated by the will of a few people, in the other by the will of all people. But within these limits reason operates autonomously.⁵⁴ So, reason itself is not affected by the forms of government, though its outcomes might well be suppressed. Take the Soviet Union. Soviet mathematicians and physicists were counted among the leading scientists of their time. They were admitted freedom to develop technologies that were supposed to increase the benefits of labour. Technology suited well for the plan to build up a socialist society whereas random mutation and (social) selection didn't. It simply lacked a controllable purposefulness. Soviet geneticists haven't had the same freedom as their colleagues from other faculties. They had to focus on eugenic research with fixed methods: the adjustment of organisms to their environment through training.

In contrast evolution is a good example for the autonomous operation of reason. It got its evidence from the fact that evolution has been described independently by Charles Darwin and Alfred Wallace at the same time. The right conclusion out of the data available is due to over-individual reason. Such is with the discovery of induction by Joseph Henry and Michael Faraday in 1831, the computation of the then unknown planet Neptune out of the aberrances of Uranus' orbits by Jean-J. Le Verrier and John Adams in 1845, the discovery of geminate genes and chromosomes by Theodor Boveri and Walter Sutton in 1902, the invention of se-

⁵⁴ Cf. Blankenagel (1980) p.44; Turner (1986) p.16.

quencing methods for DNA by Walter Gilbert and Frederick Sanger in 1977, or most recently – in 1988 – the discovery of the GMR-effect by Albert Fert and Peter Grünberg.

Reason establishes itself where it is allowed.⁵⁵ If you pose a problem to students of mathematics, a conjecture for instance, without anticipating the result whether the conjecture is true or false, i.e. without imposing any authority, the students will freely come up with the same result – even on different ways. And if not they will agree on their failings in the subsequent discussion. And so it is or should be in other faculties.⁵⁶ The freedom of science is morally spoken a universal, open, disinterested, and critical discourse.⁵⁷ This must be valid for an ethical meta-discourse, too (because ethics claims to be a science). It has to be assessed freely – and in consequence objectively – what shall be examined and how. The consensus in such a meta-discourse accounts for the corner stones of the social contract. And to this social contract the scientists have to abide.⁵⁸

The duty to abidance is no contradiction to the freedom of science. The argument that duties of science make science impossible is flawed.⁵⁹ The duties to be objective, to argue rationally would pass such critique unseen. And so it is with other duties. If reflections on the impacts of scientific discoveries were part of the social contract with science then scientist could be forced to reflect the impacts of their findings without any threat for the objectivity of the findings – both concerning the findings itself as well as concerning the predicted impacts. The duties do not impose any methods on science nor do they anticipate the results. They are not paternalistic at all. If scientists complain that legal constraints (of the social contract) lead to bureaucratizing and over-regulation of science, what hinders scientific progress, then the argument is hardly objective. It is hardly objective because scientists have a vested interest in a comfortable and unaccountable professional freedom.⁶⁰ Sure, without bureaucracy scientists could spend more time in doing research. But without bureaucracy the public would have no means to survey how their taxes are spent.

⁵⁵ Kant (1977a) A483.

⁵⁶ Cf. Hering (2007) p.61.

⁵⁷ Gatzemeier (1994) p.18.

⁵⁸ Cf. Maslow (1966) p.71; Spinner (1985) p.142; Bayertz (1994) p.49; Jasanoff (2007) p.33; against Hailbroner (1980) p.145.

⁵⁹ Against Losch (1993) p.627.

⁶⁰ Jones (2007) p.33f.

On the contrary. The public has an interest in objective knowledge and therefore supplies money for scientific research. And based on this knowledge – though not exclusively but intentionally – the public decides in which areas objective knowledge is needed the most. So if at all, the blame of paternalism is to be put on science while treating people as irrationals who do not know their own best interests.⁶¹ Reasoning is something everyone is able to. Reason is not reserved for a chosen few.⁶² The knowledge of the ones trained in reasoning should be turned in public knowledge to back the public interest. Again, scientists obliged to objectivity shape the public interest⁶³ instead of restricting to a science out of pure curiosity. Inasmuch as they contribute to a rational state the more reasonable the public support for science will be in return.⁶⁴

Crucial for the freedom of science, then, is the absence of any censorship. If it is agreed (in a social contract) to search for knowledge in a certain area then the arguments and counter-arguments must be left to its own reasonable course – which is a discourse. Objective knowledge is discursive, not prescriptive. Highly debated instead is whether the freedom of science entails academic self-administration. Here the peers' expertise conflicts with the peers' vested interests. The appointment of scientists or the allocation of research and teaching funds is less a moral than a social question. Morally it should be clear that the respective decisions should be taken objectively.

Generally, with respect to the aim of a rational state, scientists should focus on important problems rather than confining themselves to doing only that which they already can do elegantly with the methods available.⁶⁵ These problems include the questioning of the basic moral and legal order of our society. As long as the questioning is critical and not dogmatic it is even desirable, and not merely acceptable when society may alienate from science.⁶⁶ If the basic moral values and legal rules are in order there is nothing to fear from science. And if they are not we are better off exchanging them. Until then it is rational to trust in our basic order and to expect that scientific doubts only corroborate the central cohesion of our society.

⁶¹ Pence (2004) p.385.

⁶² Cf. Bethe (1991) p.179; against Noelle-Neumann (1987) p.82.

⁶³ Patzig (1985) p.7; Nida-Rümelin (1996) p.789; against Meisenberg (2007) p.199.

⁶⁴ Ströker (1991) p.106.

⁶⁵ Maslow (1966) p.16; Jones (2007) p.37.

⁶⁶ Against Roellecke (1974) p.113.

4.3 Freedom in Society

The good in society is named common welfare. In science it is objectivity. We have argued in length that and how both are interrelated. The interface of both is the public interest. Common welfare means the institutionalization of the public interests, and it exists a public interest in objectivity as the moral character of the institutionalization. We cannot institutionalize common welfare without doing it objectively. Any institutionalization of common welfare in the name of private interests would be a contradiction to the intended public interest.

Science is more to society than a base for the institutionalization of common welfare. It is a helping hand in the process, too. It is supposed to neutralize vested interests, to overcome the right of the strongest, to tear down dependencies or even oppression regarding our physical, professional, sexual, or cognitive behaviour. Free movement, free career choice, sexual autonomy, and free opinion shall be warranted by objective measures. Science is expected to contribute to freeing society from all kinds of the common bad: Bondage, hunger, disease, pain, etc.⁶⁷ Science can meet these expectations best while joining the formation of the public interests, that is while defining problems, sketching developments, proposing solutions, and criticizing proposed solutions – and most of all while unveiling vested interests.

Taking part actively in the formation of public interests prevents science from being dominated by external interests.⁶⁸ As a matter of fact science is driven by economics and technology. Resources are scarce and finer technologies allow finer (and faster) findings. Within science this leads to economical behaviour such as the building up of alliances for research or mutual citation.⁶⁹ Then objectivity no longer is the final standard of value in science. At least it is heavily endangered. Consequently the threat for objectivity is a threat for society's basic order, for social freedom. This means that science is for politics more important than for technology, at least if politics is directed towards the public interest. Here the media play an important role. Journalists watch the societal processes and, like the scientists, unveil vested interests that run contrary to the public interest. No need to say that journalists are principally more eligible to do so in terms of science than scientists could be.

⁶⁷ Cf. Noelle-Neumann (1987) p.65.

⁶⁸ Turner (1986) p.22; Bayertz (1994) p. 39; Falkenburg (2001) p.32f.

⁶⁹ Cf. Galjaard (1999) p.75; Sitter-Liver (1999) p.93.

5 Moral Susceptibility and Means of Regulation

It is one thing to establish a moral standard; it is another thing to behave according to this standard. Morality is always faced with societal reality. Obviously trespassing is strongly correlated with the public evaluation of the standards. The stronger a public interest in a standard is the higher it is evaluated. Interests and values run parallel. If particular interests prevail in society then private values are esteemed higher than public values. Society, then, is more or less a private affair. Morality instead is a public affair. Primarily because reason is not a private characteristic, it belongs to everyone. Reason unfolds rationality most easily in public. There more information and arguments are available to base one's judgment on different options for actions. Taking into account that people only act freely when they act rationally we have to conclude that people act freely if their action is based on public feedback. This in turn implies that any regulation of moral susceptibilities falls back to the public.

5.1 Scientific Misconduct

Within society scientific misconduct undermines the means to shape a free state. Scientific misconduct breaches the duty to objectivity and accepts that political decisions will be based on fraudulent data. Thereby it becomes impossible to establish common welfare – because common welfare has to be common welfare objectively, not only intentionally. Objectively scientific misconduct serves the welfare of one single person: the misbehaving scientist. As far as the misconduct is not going to be revealed. Every year the National Institute of Health (NIH) and the Office of Research Integrity (ORI) demand the retraction of about 13 journal articles. Even a quarter of the clinical trials supervised by the Federal Drug Administration (FDA) in the United States show deficiencies in data acquisition and management.⁷⁰ This cannot be in the public interest.

Correspondingly the outrage of the media in case of scientific misconduct is stark. Not so much because the fabrication and misrepresenting of data is still unusual enough but because scientists are supposed to be professionally more honest and altruistic than other people.⁷¹ Scientists are in charge to provide the scaffold of a free society; a poorly constructed scaffold

⁷⁰ Woolf (1988) p.74.

⁷¹ Woolf (1988) p.89.

will inevitably lead to the collapse of objective, that is equal freedom in society. Science's failure to act in the public interest represents a breach of the social contract between science and the community. From the central meaning of science for society follows the duty not only to publish scientific findings but to communicate them comprehensibly to the public. It is not only the scientific community who cares about the findings but the whole society.⁷²

The publication of the results, methods, and premises are no accomplishment in return to the public funding. They are an epistemological consequence of scientific knowledge. In contrast to myths, poetry, or tradition scientific knowledge has to be justified. And the need for justification simply prohibits to enforce the findings dogmatically.⁷³ Scientific knowledge is in need for a critical review. Of course the review must be equally public as the reviewed research. Else the review would be dogmatic. That most reviewers are peers – and not the public in general – is at least partly a consequence of the specialization of disciplines within science.⁷⁴ This again has to do with the concentration of scientific research on elegant routines. More important problems, especially those concerning the public directly, disappear out of sight. So there is not much science left where the general public could do the reviewing.

This is counterintuitive to reason because reason needs public review. That does not mean everyone should review scientific findings, but everyone should have the chance to do so. The broader the discourse the deeper reason might dig, the closer to the objectively right it comes. Science can only disclose the objective if it discloses its findings.⁷⁵ Open access and public discourse are the ingredients of a science concerned with objectivity. What is objective – be it morally or rationally right – must be visible to everyone. Every reasonable person must agree in the end to objectivity after having given a problem plenty of thought. If she does not agree, the disagreement can only be motivated by private interests, not by reason. The extension of the freedom of argument, the way it is or should be practiced in science, to the public facilitates the revelation of such private interests that tend to selfish advantages over the common welfare.

⁷² Nida-Rümelin (1996) p.794; McLaren (1999) p.101.

⁷³ Ströker (1991) p.95.

⁷⁴ Salomon (1999) p.59.

⁷⁵ Maier-Leibnitz (1983) p.7; Noelle-Neumann (1987) p.76.

5.2 Pluralism and the Unity of Science

From the public's point of view science is a comprehensive social enterprise that purges society from irrationalities. It bans irrational forces from social power and insofar establishes freedom on an objective foundation. The comprehensive enterprise is split up into different strands with different disciplines such as ethics, epistemology, and aesthetics in philosophy or evolution, genetics, cytology, histology, physiology, anatomy, ecology, and ethology in biology, and so forth. Further within the disciplines the specialization does not stop.⁷⁶ Indeed some chairs have become an ecological niche ignored or forgotten by the rest. Others are surrounded by a business-like knowledge-factory with many devices and employees. Each of them holds its own particular interest.

This particularism has been especially enforced by the industrialization. For industry – that is industrial interests – some strands of science are more useful than others. First chemists' knowledge has been used to produce fertilizers, then physicists' knowledge has been used in the manufacturing of electrical devices such as light bulbs and motors, and now biology too has entered the stage with the biotechnological production of proteins for example. Their technological success imprinted an economic value on these strands of science. In addition to their moral value for society. Economical values in contrast are liable to private interests, not to the public interest. To meet the expectations of the industry the branches of chemistry, physics, and biology must internalize some particular interests. Not to forget the particular interests that result from the competition for funds, grants, and prestige.

In short, from the comprehensive science movement of the enlightenment only self-sustaining parts have survived. The unity of science is broken up. Instead of treating important comprehensive problems such as aging, health, death, dust, or urbanization⁷⁷ most of the research focuses on specialized and singular problems with elegant solutions. Science still is organized in the name of objectivity, but its connection to the public interest has gone lost. The morality thing has started to be confusing to scientists. Confronted with many interests most of them decided to show no interest at all, not even a public one. Thus particular private interests paved their way to the public interest undisputedly. In this moral vacuum the particular inter-

⁷⁶ Cf. Mittelstraß (1991) p.16; Weingart (2001) p.125.

⁷⁷ Cf. Hentig (1971) p.860.

ests have materialized in an ethical pluralism in which each position is to be justified according to its own standards.

But pluralism runs counter to objectivity.⁷⁸ There is only one λόγος, one objectivity. Or in terms of the social contract: There is only one right way to common welfare. Rationally it cannot be right that God created men and simultaneously men and apes had common ancestors, it cannot be right that capital punishment is allowed in one state while not in another, and it cannot be right to prohibit stem cell research and allow abortion at the same time. In other words, pluralism opens the door for irrationality that science is expected to keep shut. Certainly, within science there exists a plurality of theories too, take for example the theories for the standard model in physics which range from string theory to quantum loop theory and others. But within science plurality is the necessary starting point of a free argumentation; it is not supposed to be the end either; rather the argumentation is supposed to come to one conclusion that is agreeable for every reasonable person.

To circumvent the dead end of pluralism science is urged to take a stand in moral affairs. It must face morality and dissolve the confusion scientifically. Rationality is not supposed to be endemic in science. There exists a dominant public interest in a rational state. To enthrone reason means to dismiss arbitrary rule, religious fanaticism, and political intrigues. All men want to live freely. And to ensure this freedom objectively without privileges should be science's main moral task. It should release scientific freedom into society and extend the neutrality of scientific debates to public discourses.⁷⁹ This can be done with the conjunct power of a unified science which is not alienated to public interests and which incorporates the evaluation of facts and processes of the objective world.⁸⁰ With the unification reason regains its uniqueness and society advances to more and more a rational republic.

This may sound like a plea for a rational totalitarianism. Right so, emphatically! There is no – reasonable – alternative. Each tyranny justifies itself by its presumably culturally authentic standards.⁸¹ What could be opposed to such tyrannies if not reason?! A totalitarian governance of reason meant no oppression. On the contrary, it meant, as we have argued with Immanuel Kant, freedom. Acting in accordance with the laws of reason means acting freely,

⁷⁸ Sokal (1997) p.207.

⁷⁹ Ströker (1991) p.106.

⁸⁰ Cf. Maslow (1966) p.63; Hentig (1971) p.868; Butenandt (1981) p.192f; Mittelstraß (1991) p.25.

⁸¹ Nanda (1998) p.289.

means acting devoid of any external compulsion. Each legal restriction of our freedom then were a rational restriction that is accepted freely because we knew that the restrictions safeguarded equal freedom for everybody in society. And knowing here meant agreeing. But in what we agree, there cannot be any injustice to us⁸², no deprivation of freedom. So what initially sounds totalitarian ends up libertarian.

Realistically we are far away from a rule of reason. There is not one basic public interest but many particular interests competing for satisfaction. This situation depends on the missing criterion for what is reasonable, objective, or in the public interest respectively. The pluralistic situation in society is a kind of rational helplessness. We have no means at hand to decide the issues objectively. This might be constitutional for men, bestowed with poor wits, tentative knowledge and a leaning to comfort instead of doing the hard job of thinking it through thoroughly on their own. How abysmal human knowledge might be, science is our most reliable access to objectivity. A society that dismisses irrational authorities for ethical reasons is asked to find a scientific solution to its problems – even if the solution cannot seemingly be achieved.

The missing of criteria does not necessarily lead to pluralism. Where there is no criterion, the need for a criterion might be replaced by a consensus, and where there is no consensus, the need for a consensus might be replaced by a majority. In other words, the less objective an issue is decidable the more democratic is the decision.⁸³ Then the absence of objectivity leads to democracy, not to pluralism. A democracy is less concerned with the results of a decision – as a republic is – than with the settlement of it. A decision is taken democratically if all participate equally and subsequently the majority rules. Crucial for democracy is the process of the participation. The process should be universal in the sense of science ethics: an equal participation is to be preferred to a hierarchical one.

Finally the ethics of science parallels again that of society. The moral rules that should govern scientific debates and progress are the same that should govern societal perfection. This indicates once more the suggested identity of both. That means in return that science can obtain with the aid of society what society can obtain with the aid of science. The scientification of

⁸² Volentibus non fiat iniuria. Cf. Kant (1977b) A244.

⁸³ Cf. Maslow (1966) p.137; Turner (1986) p.44.

society is accompanied by a democratization of science⁸⁴ whereby paternalistic particularism is replaced by an egalitarian universalism with equal rights to reason. As the public debate must not be dominated by powerful people so the scientific debate must not be dominated by influential scientists. Where objectivity shall be attained all subjective traits are dismantled, including wealth, gender, or reputation; the reigns are abandoned to reason which evolves in freedom. So the truly rational state is a republican democracy or a democratic republic. It is no coincidence that in May 1989 students gathered at Beijing's Tiananmen Square to demand democracy in the name of science.⁸⁵

5.3 The Role of the Media

The media can be considered as the institutionalization of organized skepticism. It encompasses a publicly critical assessment of society.⁸⁶ In its own terms the media has to be current, relevant, objective, and comprehensible.⁸⁷ Currency and comprehensibility put aside the media coincides with science stressing the relevance of the human enterprise.⁸⁸ Shortly, relevant is what lies in the public interest. The media informs the public concurrently evaluating which information is of public interest. This task comprises more than pure reporting. Journalists have to investigate a topic before being able to decide whether it is relevant. The investigation is a kind of journalistic research that is submitted to the ethical principles of scientific research. It follows the independency of the media as a moral prerequisite. This is the epitome of the free press.

In science journalism, pleonastically, the topic is science. But because of the relevance of science for society it definitely is a topic for all editorial departments.⁸⁹ And because of the relevance of science for society the media are especially sensitive for fraud in science. For example the case of the physicist Jan Hendrik Schön has been reported regularly by newspapers from 2002 onwards when the first suspicious facts were made public (cf. table next page). The

⁸⁴ Bernal (1986) p.27; Weingart (2001) p.124; Trute (2005) p.91.

⁸⁵ Nanda (1998) p.294.

⁸⁶ Mooney (2005) p.252.

⁸⁷ Cf. Rager (1994) p.12.

⁸⁸ Meyer (2006) p.242.

⁸⁹ Kohring (2004) p.175.

sensitivity of the media for breaches of science ethics underlines the validity of its principles for society in general.⁹⁰

Not only the abstract principles of science are of moral importance but also its concrete application. So the media has to keep an eye on the occurrences in science with regard to the public interest. A methodologically correctly performed study may as well be against the public interest. When scientists experiment with syphilis on humans, with artificial iodine-fallout in the environment, with radioactivity on pregnant women⁹¹ then journalists have to make these occurrences public as well as when scientists do not help people who are hurt by members of a gang while studying gang-behaviour.⁹² Science journalists are asked to pull together scientific occurrences as well as findings to clarify their connection to society.⁹³ Of course, in such cases, there need not be an antecedent public interest. But for sure they have a public relevance. And with the aid of the media the public may form its interest regarding these cases. Then the media initiates and catalyzes the emergence of a public interest that unbinds and restricts scientific conduct ethically.

media	year	#	headline
Die Welt	2002	7	Führende Nanoforscher sollen Daten manipuliert haben
	2003	1	In den USA gefälscht und in Deutschland nur geschlampt
	2004	1	"Super-Forscher" wird Doktor-Titel aberkannt
	2005	2	Wissenschaftsskandale haben Tradition
	2006	1	Falsche Theorien können tödlich sein
Berliner Zeitung	2002	5	Störendes Rauschen in den Bell Labs
	2005	1	Fälschungen sind so alt wie die Forschung selbst
die tageszeitung	2002	2	Tiefer Fall
	2005	1	Betrug gibt es auch auf anderen Feldern
Der Spiegel	2002	1	Ikarus der Physik
	2006	1	Es war der Höhenrausch
Focus	2002	1	Das Ende der Lasershow
	2004	1	Strafe folgt auf Strafe
Le Figaro	2002	1	Le petit génie 'aux mains magiques' truquait toutes ses expériences

⁹⁰ Cf. Consoli (2006) p.235f; Meyer (2006) p.245.

⁹¹ Resnik (1998) p.137.

⁹² Greitemann (2002) p.572.

⁹³ Spinner (1985) p.88f; Bernal (1986) p.106 and p.266; Felt (1995) p.278; Kohring (2004a) p.283.

In a sense the media is the moral conscience of society. It forces the scientific community to comply with its own ethical standards. Sometimes it even contributes to the revelation of fraud as for example in the case of clone-researcher Hwang Woo Suk. In other cases journalists urge universities to notify funding agencies of a scientific misconduct. And furthermore they urge funding agencies to cut or stop funding in case of misconduct.⁹⁴ This has been accomplished by the media and should be accomplished even better. Then some information might be more current. When the Tuskegee syphilis-study was revealed in 1972 it had been lasting for over 35 years. The ongoing remained hidden from the public though it had been reported repeatedly in medical journals.⁹⁵

6 Ethics of Science and Science Journalism

As we have argued from an ethical perspective, science and society back each other in the name of freedom. A mediator of the backing is the media – in both directions. It mediates democracy to science and rationality to society. And as such the media is a catalyst and contributor to the public interest. The public interest conversely frames the morally good and bad in society (including science and the media). So the public interest shapes society and in turn scientists, journalists, and citizens shape the public interest.⁹⁶ The one direction is deductive, the other inductive. Both are rational. The one deduces common welfare on objective grounds, the other induces common welfare out of conflicting (subjective) positions. This circle is the wheel of progress. It epitomizes the free process in which rational argumentations provide their own foundation.

In a free state, that dismisses irrational authorities for ethical reasons, science strives for the ends democracy sets. This means a steady scientification of democracy and a durable democratization of science. This means objective arguments in political debates and equal weight in scientific argumentation. In a democratized science there is for example no honorary authorship, and the career, reputation, or network of a scientist has no bearing on the approval of a grant. (Universal) objectivity will result from democratic arguments where every argument of every participant is weighed according to its argumentative power and not according to the power of the participant; the resulting argumentation is a sample of rationality and as such in

⁹⁴ Woolf (1988) p.88.

⁹⁵ Resnik (1998) p.136f; Pence (2004) p.289.

⁹⁶ Turner (1986) p.48.

principle graspable for every participant, i.e. a consensus might be obtained. And common welfare will result from the application of – argued for and therefore justified – findings of a democratized science. The free state is identical with the rational state.

What then is the moral of the tale? There is the moral duty to reach a consensus in solving a problem with public concern. (A plurality is no solution, a majority only a compromise.) Such a consensus is only reachable in a free, unbiased discourse. Then the consensus is rational. The rationality represents an objective solution whose constitution constitutes freedom. The constitution of freedom finally is no more nor less than the common welfare.

The duty to reach a consensus is a common duty. It should be pursued by any citizen, any journalist, not only by scientists – though the duty resides ethically in the corpus scientiae. The tenor of science is its duty to objectivity that raises scientists over particular interests. Objectivity raises the scientific enterprise to the public interest which is the moral foundation of the common welfare. As such science epitomizes freedom and humanity: The start and the end of ethics in science and science journalism.

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