This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

On Power and Responsibility in Science and Academia

Beat Sitter-Liver*

A. Introduction

I. Power politics in science and academia

Everybody is familiar with slogans such as 'knowledge is power', 'knowledge is the future', and we live in a 'knowledge-based economy'. Knowledge is always perceived as something positive. Science and academia, the institutions and processes that generate knowledge, help us to cope better with our environment and our lives and, metaphorically speaking 'to subdue the earth'.[1] Science seeks the truth, a miraculous commodity that can be shared by all mankind which can be passed on without loss. Such a commodity becomes more and more valuable the more people share in it. So what should be the relationship between power and knowledge, between power and science and between power and academia, where power is understood as something possessed by only a few, something which cannot be shared without loss, something that is valuable only if others can be excluded from it? Three examples may serve to illustrate the deeper meaning of this question:

1. An economist undertakes research on the relationship between money supply and creation of wealth on the one side and consumption of natural resources on the other. However, his subsequent theory does not fit into any existing frameworks or concepts. His proposal is dismissed as poorly developed and inadequate by the national research council and so his application for funding is turned down. It is now impossible for the economist to show that

---

* Professor of Applied Philosophy, University of Fribourg, Switzerland; Secretary-General, Swiss Academy of Humanities and Social Sciences.

[1] See, for example, F. Mayor, 'Science in the Service of Power: the Responsibility of Scientists' in (F. Mayor and A. Forti (eds)) Science and Power (UNESCO Publishing, Paris, 1995) p. 169. The passage is particularly instructive since it ties knowledge to wisdom and hence a responsibility for mankind as a whole: 'Knowledge is power: power to produce, to foresee, to prevent. To apply that knowledge for the benefit of mankind is wisdom. Knowledge and wisdom are the two main pillars of a better, common future'.

European Journal of Law Reform, Vol. 3, No. 1
© Kluwer Law International 2001.

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

his research is valid and of interest and could contribute to a new understanding of certain issues.

2. The scientific director of a research society examines and critizises the ethical justifications of certain animal experiments. He is attacked by his employers as a traitor and loses his position.
3. Comprehension of the standard terms of molecular biology is taken for granted in the debates of a scientific council. By contrast, terms and theories which are standard in sociology are considered inaccessible by the majority of the members. As a consequence, the possibilities for molecular biologists and sociologists to see their concerns taken up in these debates varies greatly. The social scientists become the victims of a culturally determined power-deficit.

The first example illustrates how power can control scientific theories and trends. The second example illustrates institutionalized power[2] in hierarchically structured scientific or academic bodies. Finally, the third example illustrates what has been called 'definitional power', how one code can displace another within the scientific community. As a consequence, the interests of those speaking for the stronger code prevail over the interests of 'the others' in the Darwinian sense.

What, therefore, is the link between research and teaching, pursuing 'the truth', and 'power'? As the examples show, science and academia are part of society and social practice.[3] They cannot be isolated from areas and conflicts of interest. Those who have specific interests want to pursue them and to be accepted and prevail with them. This, in turn, requires 'power'. Science, research and teaching as social activities cannot be understood and described adequately without reference to 'power'.

---

[2] As Ruth Baumann-Hölzle, formerly at the Institute for Social Ethics, Zurich Theological Faculty, has pointed out, institutional power in science and research has a special meaning from the perspective of women: The vast majority of the relevant institutions are still governed by men and, therefore, adapted to the expectations and life style of men. For women they are often ill-suited, if not repressive. Many things are in the way of a full integration of women in this area: Men, and I apologize for this and subsequent generalizations, often still perceive women mainly in their roles of helper, child rearer, domestic provider, and playmate. They are not keen on seeing these functions endangered by getting their women absorbed into institutional constraints of work schedules and career tracks. And, of course, the additional competition of women in academic institutions is not exactly welcome either. Furthermore, the female way of life is questioning traditional male patterns and structures. Women who want to combine a career with children can only thrive in flexible structures. However, the construction of most scientific institutions is not flexible in this sense and thus not conducive for female careers. At this point I want to thank Ruth Baumann-Hölzle for her comments on an earlier draft of this text. She suggested a number of additional points from the feminist perspective, some of which are now included in the footnotes. Passages which are based on her suggestions, without reproducing them verbatim, are marked with the initials RBH.

[3] 'The relations between science and power reflect the social organization of society': I. Prigogine, in the Preface to *Science and Power*, supra note 1, at p. 5.

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

II. Definitions

Before analyzing their relationship further, the terms 'power', 'responsibility', 'research', 'teaching' and 'science and academia' shall be briefly defined below.

1. Power

'Power', as defined by Max Weber,[4] is:

> '... the chance or ability to enforce one's will or interests in relationships with other human beings or things, if necessary against the will, interests and resistance of those human beings or things'.

As Weber adds, it is irrelevant on what this chance or ability is based. It can be based on knowledge. Thus, research and teaching, aimed at the acquisition and distribution of knowledge, can convey power.

However, Weber's definition is an incomplete understanding of the multiple effects of power in science and academia. Social dependencies are not necessarily limiting, they may also enhance individual opportunities, and those with power can support and promote others.[5] For better or for worse, those who partake in science and academia find themselves in a network of powers and forces which are controlled by individuals, groups, social and mental structures and aesthetic experiences (such as in music and design) as well as by traditional and newly developed languages and codes in the broadest sense.

2. Responsibility

'Responsibility' means individual rather than collective responsibility because even in collective structures the final ethical decisions have to be taken by individuals. 'Responsibility' shall, therefore, be used for a sequence of actions comprising four elements. The subject or bearer of responsibility justifies a specific action towards another with a view to characteristics which both have in common. As a rule, the other, the object of responsibility, shall be entitled to demand accountability. 'Responsibility', the very fact of being accountable, characterizes human beings as rational and reasonable beings who can distinguish characteristics in others and respect those as individuals.

3. Research

'Research' means theory-based, systematic and methodic efforts, which can be controlled and criticized to gain general or specific knowledge of facts or processes.

---

[4] Cf. In Wirtschaft und Gesellschaft, Tübingen 1922, as quoted in B.P. Löwe, 'Macht' in (G. Klaus and M. Buhr (eds)), *Philosophisches Wörterbuch* (Berlin 1976) Vol. II, at p. 734.

[5] Cf. M. Hättich, 'Macht' in *Staatslexikon* (Freiburg/Basel/Wien 1987) Vol. III, col. 979.

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

This kind of research is not limited to universities and public research centres. It can take place in other institutions, including private or commercial centres, as well as public administration.

4. Teaching

'Teaching', on the other hand, means the instruction taking place in universities and similar institutions of higher learning, regardless of the specific form and format.

5. Science and academia

Finally, 'science and academia' represents the combination of research and teaching. However, the term does not just stand for methodical search for knowledge but also for a social sub-system. This social sub-system consists of theories, laws, methods, observations, experiments, but equally of equipment, processes, laboratories, schools, administrations, funding associations. Furthermore, there are traditions, political and economic (inter-) dependencies, relations with other sub-systems and units of society. Finally, there is a multitude of communicative processes within each research unit, between such units, and the rest of the world. In essence, 'science and academia' represents a complex part of social interaction, an object of our quest for meaning. A field of application of 'good' and 'bad' rather than 'true' and 'false'.[6]

B. Ten Hypotheses

At this point, the reflections on power and responsibility in science and academia willl be condensed into ten hypotheses, which will be elaborated on in due course. The reader should be warned, however, that the topic is far too complex and too wide to be fully covered in one short article. By necessity, the following will therefore represent a subjective choice by the author of those aspects which are closest to his heart.[7]

---

[6] B. Sitter-Liver, 'Konstruktive und Destruktive Wechselwirkungen zwischen Wissenschaft und Ethik' in (1988) 35 *Freiburger Zeitschrift für Philosophie und Theologie*, at pp. 379–413 (385–388). These considerations must take differences in the lives of men and women into account. While men are more inclined to seek autonomy, women are more oriented towards service and responsibility. Consequently, direct power is more important for men, and indirect power is more relevant for women. What must also be noted, however, is the fact that indirect power (for example power through service) can easily be instrumentalized and is often integrated by men into their directly exercised power (RBH).

[7] For additional aspects, in particular those connected to the relationship between scientific power on the one side, and the power of the state and the church in past and present, see the contributions in *Science and Power*, supra note 1, above all those of Augusto Forti, Franco Ferrarotti and Gérard Huber.

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

1. Modern science is programmed to generate (more) power and systematically uses the power it already has. (An exception may be found in those social and cultural sciences which are hermeneutic-historic or aiming at emancipation and understanding.)
2. Science possesses and conveys power because human existence and progress depend on its theoretical and practical achievements. This is equally true for our biological and cultural life as for our ethical orientation and the protection of our environment, economics, politics, etc.
3. Science works in generalizations. Generalizations are created via decisions implying values. This, in turn, implies an exercise of power as generalizations do not leave specifics as they are by themselves. The process is ethical as long as it is controlled and open for review. Scientific power must contain the possibility of its revocation if it is to remain responsible power.
4. Members of the scientific community who do not reveal the extent of their power and competence are acting irresponsibly. The same is true for members who use their scientific status – which is conferred upon them by society – for the pursuit of personal or private interests. This is particularly the case for all those who take ethical decisions as part of their profession.
5. As a consequence of its methodology and rigour, science can impair the ability to take correct ethical decisions. The power possessed by science is not conducive to ethical practice.
6. The language and codes of science are authoritarian. Non-scientific language is considered irrelevant when it comes to the interpretation of facts and reality in the quest for knowledge and truth. Scientific language and codes are thus important elements of power. The imperialism which is all too often connected to scientific language has to be broken up if science's claim to universal validity shall be responsible.
7. Direct and implied power in science and academia have to be correctly delineated. Direct power is exercised when values and convictions as to what is correct and relevant in a society are changed. Scientific power becomes visible when it changes the way we conduct our lives. For such processes to be responsible, their directions and goals have to be determined in an open discourse involving all those concerned. On the other hand, scientific power is at its strongest, where it is useful in an economic or political sense. This kind of power is implied. Where science does not serve economic interests, it does not easily flourish. Scientists should be aware of this and should not overestimate their autonomy and influence. Rather, they should pursue enlightenment and prevent any instrumentalization of science for one-sided and particularist interests.
8. Power in science and academia is often exercised via institutional and hierarchical structures – but nevertheless by the scientists and researchers themselves. Decisions taken in and by these structures can never be completely insulated from personal, institutional, economic and political interests. Ultimately, the quality of such a structure, for example an academy

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

of sciences which awards research funds, will depend on the ability of those working within it to recognize their self-interests and their (biased) convictions and to keep them in the background to the advantage of others, in particular the applicants for such funding. While it would be wishful thinking to say that all (funding) decisions can be taken in a strictly objective manner, the institutional structures should ensure via ethical education of the decision-makers and via complaints procedures that the number of prejudiced or partial decisions remains as small as possible.

9. The power held by those in the teaching profession has to be correlated with an obligation to promote the students. The teacher has to pursue the reduction, and ultimately elimination, of his or her lead over the students as far as knowledge and power are concerned. This implies that the teacher has to promote independence in student research, which may go as far as helping a student to disprove the teachers positions. Thus, scientific teaching must be open for controversy. The influence and status of the teacher in the society must be used for the promotion of the education and (professional) progress of the students.
10. Power gained through science and academia and via knowledge is ethically acceptable and responsible only if it is limited in scope and open for review and revision.[8]

C. Modern Science is Oriented Towards Power

When analyzing the relationship between modern science and power, it is helpful to recall the attitudes and aspirations of the pioneers of modern science. The English Lord Chancellor Francis Bacon on the one side and the French philosopher René Descartes on the other can be used as examples. First and foremost both of them sought to protect and improve human existence. They looked upon science as the principal tool. In his *Discourse on Method* (1637) Descartes propagated science as the way for men and women to become '*maîtres et possesseurs de la nature*'.[9] As Bacon expressed in the *Novum Organum* (1620), the most important part of his unfinished work on the reinstatement of science (*Instauratio magna*), humankind wants to 'squeeze out nature, torture it if necessary, to discover her innermost secrets'.[10] Thus,

---

[8] See also F. Mayor's demand that power in science and academia has to be oriented towards the general good, understood in a global sense (compare supra note 1).

[9] R. Descartes, *Discours de la Méthode (*Felix Meiner Verlag, Hamburg, 1960) at p. 100 (translated into German and edited by L. Gäbe).

[10] F. Bacon, *Neues Organ der Wissenschaften* (Wissenschaftliche Buchgesellschaft, Darmstadt 1990) at pp. 25 et seq., 86 (translated and edited by A.T. Brück). See also F. Bacon, *The Works* Vol I (Philosophical Works, New Edition, London, 1889) at p. 141 (collected and

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

the quest for power, the power to survive, the power to create, and the power to dominate, has shaped modern science from its very beginnings. While ancient classical science was based on *Theoria*, hence examination for discovery, the 17th century saw a shift towards *Poiesis*, hence examination for economic and other uses. Today, science has become a teleological and effective 'factor of intervention, triggering immediate effects and instant success'.[11]

D. Power via Generalization is Essential for Science and Therefore for Research and Teaching

A simple epistemological reflection can show how power as a method is essential with regard to science. Science generates discovery and knowledge. To discover something means to place this new thing into the network of existing things and relationships and to define it in general terms. A 'thing' is necessarily discovered and understood as something. By contrast, the qualities which distinguish a 'thing' or a 'being' as unique and individual, are ignored and get lost in the process of generalization known as discovery which produces knowledge. Thus, every act of discovery is at the same time an act of violation and abuse, since it reduces its object to something general and given. Therefore, those in a position to determine how and in which correlations something new will have to be discovered and define, possess a special power: they possess the power of definition and the power of distinguishing the 'important' and the 'unimportant'. There are always several ways of defining and 'knowing' something, but the 'scientific' (i.e., the true and correct way of doing it) will be determined by those having the power of definition and they will always use their power to the best of their own interests.[12]

---

contd.
edited by J. Spedding et al.); F. Bacon, *Translations of the Philosophical Works* Vol IV (New Impression, London, 1901) at p. 29. See also R. Baumann-Hölzle, *Human-Gentechnologie und Moderne Gesellschaft* (Theologischer Verlag, Zürich, 1990) at pp. 170 et seq., with a further reference to H. Rombach, *Substanz System Struktur* (Verlag Alber, Freiburg, 1965–1966).

[11] Translated from B. Mach, 'La Responsabilité du Scientifique dans la Société' in B. Sitter-Liver (ed.), *Wissenschaft in der Verantwortung* (Paul Haupt, Bern, 1985) at p. 96. See also A.K. Treml, 'Neue Grenzziehungen, Zwischen Natur und Mensch. Natur als ethische Kategorie' in *Ethik-Unterricht* Vol II (1991) at pp. 2–10.

[12] A. Kaufmann applied this to the most relevant areas of law and jurisprudence, see A. Kaufmann, *Grundprobleme der Rechtsphilosophie* (Verlag C.H. Beck, München, 1994) at p. 230. In the same context, Kaufmann also points out that this kind of power is indispensible for scientific work: 'We must acknowledge that generalization, equation and abstraction are necessary for all thinking and doing, hence also for rational scientific work. However, we must not limit ourselves to working on that level. Rather we must turn to the concrete, the differentiated, to life as such and its contents' (translation by the author). To the extent

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

The point can be illustrated by a practical, although somewhat drastic, example. In 1971 Ford Motor Company introduced a new model of car, the 'Pinto'. During the design process, a question arose as to whether the gas tank, which was located at the rear, should be protected against damage resulting from a rear-end collision. The designers were aware that a sufficiently strong impact from the rear could rip open the tank, cause fuel to run out and this, in turn, could lead to an explosion, putting the lives of the accident victims in additional jeopardy. Ford applied a scientific cost-benefit-analysis (i.e. reducing the various factors, including the human lives at stake, to monetary values). On the one hand, Ford was planning to build some 12.5 million Pintos. The cost of a sufficiently strong protection was calculated at USD 11 per car. This led to estimated total costs of the measure of USD 137.5 million. On the other hand, the liability for the loss of a human life was estimated at USD 200.000 and, together with existing statistics of car accidents, this suggested a 'benefit' of USD 49.5 million. Consequently, Ford decided not to add the safety appliance and between 1971 and 1977, at least 500 people died in accidents where the tank of a Ford Pinto exploded.[13]

All forms of discovery, even routine orientation, ordering and norming, by necessity include generalization. Generalization, in turn, is an activity where power is exercised: Objects – things, facts, institutions, persons – which are recognized or discovered, are defined according to how we want to interact with them. The Ford Pinto case illustrates that generalization also involves value judgments. In that respect scientific generalization is no exception. The power which is exercised in these cases is ethical and legitimate only if the value judgments which are at the basis of the (scientific) generalization have been approved by those concerned.[14]

E. Aspects of the Power of Science in Society

A person or an institution is said to possess power if their functions are indispensible or seem indispensible to the well-being and success of others. The others, who feel dependent on those functions, are inclined to offer their services to, and be influenced by the persons or institutions when it comes to ideas, ideals and values, and in the struggle to acquire scarce resources in society, to name but two examples.

As human beings we are characterized by the fact that our behaviour is not just

---

contd.

that men and women have different needs and interests on the basis of their different styles and contexts of living, their scientific definitions and generalizations may also differ more or less significantly (RBH). What remains to be examined are the chances of specifically female definitions to be actully applied and recognized in male dominated institutions.

[13] L. Hyde, *The Gift* (Vintage Books, Random House, New York, 1983) at pp. 62-64.

[14] See also A. Kaufmann, supra note 12; ibid.

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

determined by nature and instinct. We have to find our way through life on our own and we need to rely on our experience, knowledge and orientation for that. We cannot exist without the ability to think in terms of 'right' and 'wrong', 'good' and 'bad'. Or, to put it another way, the nature of our very existence is to seek what is right and true. Today the primary source for this discovery is science. Modern science (i.e. research and teaching) was developed and institutionalized by people and has been given power over people. In short science gives humans power over other humans.

Since the 17th century, science has gradually displaced all other authorities on the topic of 'right' and 'true'.[15] And while scepticism of science may be rampant today, all of us constantly confirm this unmitigated dominion of science as we conduct our daily lives. We take for granted the availability of ways and means, structures and processes which have been obtained and are determined by science. Additionally, the power of science is increasingly indirect and covert. Our everyday use of electric and electronic appliances in general, and personal computers in particular, may serve as an example: Our theoretical knowledge and practical behaviour in the operation and use of such appliances is largely determined by science, packaged as technology.

The fact that our economic well-being is increasingly dependent on science is expressed in the recognition that knowledge has become one of the most important factors of production. Large enterprises without their own research facilities are unthinkable today. Small and medium size enterprises enter into joint ventures in order to gain access to the research resources they need to survive in competitive markets. This is also why governments heavily promote and subsidize research, science and technology. Education and training are praised as good investments for future prosperity by all parties in the political debate. Despite the fact that science seems to lose again and again in the struggle for allocation of public funds it does not mean that its value and potential are questioned. It only means that other interests are more successful in this struggle, regardless of their real or perceived value. The power of science is not eliminated in those instances, it is only put in comparative perspective with the power held by other interests.

The third aspect of science's power in society is not about control and possession, but orientation. For a successful and fulfilled life, orientation is indispensible. However, it has become a scarce resource. This can be extrapolated from the media or it can be experienced whenever we find ourselves in complex public or private decision-making processes. Yet it is often science and technology which force these kind of decisions upon us. Examples can be found when we look at new choices concerning pre-natal diagnosis, genetic analysis, therapies for mature and embryonic cells, etc. Since scientifically determined orientation has become so scarce and uncertain, there is

---

[15] This may lead to destructive, even deadly conflicts, compare A. Forti, 'The Birth of Modern Science and Freedom of Thought' in *Science and Power* (supra note 1), at pp. 35–39. See also G. Huber, 'Ideological Deviation and Ethical Provocation' in *Science and Power* (supra note 1), at pp. 119–125.

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

consequently more need for professional counsel in ethics and moral philosophy. In turn, this endows these professionals, scientists and teachers in cultural and social sciences with a form of power which is simultaneously oppressive and enticing. It is oppressive or scary because those professionals know all too well that they cannot fulfill society's quest for direct and straightforward orientation. Their expertise lies not in the dissemination of values but in the critical analysis and development of methods in order to enable those seeking orientation to find their own responsible solutions and decisions. While the contribution of these professionals is indispensible, it is also limited. Since society expects too much, it will become frustrated. Criticism and disapproval of those working in ethics and moral philosophy is inevitable.

The situation also has its temptations. Those researching and teaching ethics and moral philosophy are – contrary to popular belief – not necessarily the best examples of ethical and responsible human beings. They too have their needs and interests and they too are not free from unreflected value judgments and prejudice. An inclination to court those with influence and power, even to serve them outright, in order to gain influence and status in their shadow, has been documented time and again. Ina Prätorius, who has worked in theology, ethics and moral philosophy from a feminist perspective, once claimed that most work in ethics nowadays is 'court ethics'.[16] But even if the possibility of improper motives is disregarded, it has to be acknowledged that those researching, teaching and advising on ethics are ultimately making their decisions on the basis of their own personal convictions. Their value judgments, like everybody else's, are not fully based on rational considerations. Nevertheless, this profession is expected to provide solid legitimation for normatively determined positions. As a result, people dealing professionally with ethics are finding themselves right in the middle of the battle for what is true and correct in society, or, to put it another way, right in the middle of the battle to enforce certain economic and political goals. Their power lies in the control they exercise over the ways and means of legitimation, their ability to justify decisions and actions. This power is burgeoning, since all of us (or at least most of us) existentially depend on this kind of justification and legitimation, regardless of our position in society. People dealing in ethics and moral philosophy can abuse their power, in particular if they disregard requirements of due diligence and truthfulness in order to secure personal advantages. In such cases they really practice 'court ethics' in the sense criticised by Ina Prätorius.

A fourth aspect of science's power in society needs to be examined. The loss of traditional, in particular religious, means of orientation has led to a situation where we have to cope with the existential paradoxes of human existence on our own. In our modern secular societies, people have to redeem themselves. This quest for

---

[16] I. Prätorius, *Skizzen zur Feministischen Ethik* (Matthias Grünewald Verlag, Mainz 1995) at pp. 132–141, 142–158. The reflections of this author are particularly relevant in the present context because she specifically addresses the question of power and discusses it in a clear and pro-active manner. The analysis of the ever present '*Hofethik*' (ibid at p. 151) is contrasted with a proposal for a critical ethic.

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

salvation is, therefore, projected at human abilities and activities and in particular at science. The underlying conviction appears to be that, there are no problems that science cannot solve. This is reinforced when the first results of scientific research are celebrated in the media as break-throughs even though their practical or therapeutic applicability is still completely unclear. Aids research is one example of this. How many times have we been told that this or that approach to block virus cells from attacking healthy cells will provide the key to a cure? Each time the 'news' is served as sensational even if the researchers themselves are cautious and trying to dampen hasty and excessive expectations.[17] This example illustrates an important root of the power of science, namely human frailty and our quest for eternal youth and immortality. Essentially, this is our modern quest for salvation. In many respects this power of science is analogous to the power of sorcery and magic, including their esoteric modern variant, derived from the need to deal with the existential fear of death.[18] As a consequence of this power held by science, certain obligations can be identified and these must be respected if we are to possess dignity and live our lives as enlightened, free and responsible human beings: first, all those working as scientists, researchers and teachers first of all have to acknowledge their power and become aware of the roots of this power and the consequences of their activities. Secondly, as scientists, we have to realize the limits of our power, ability and the responsibility we bear as a result of our activities. Thirdly and finally, we have to unconditionally inform the world around us about the limits of our abilities.

F. Power in Science and Academia as a Threat to Our Capacity to Live and Act Responsibly

The success of science depends to a large extent on its methodic rigour. Science reduces complexity and works with generalizations which are then experimentally

---

[17] 159 *Der Bund*, 10 July 1996, at pp. 1, 2.

[18] Following other authors, Jürg Meier interprets science and technology as forms of the, mainly male, attempt 'to control that which is unpredictable, which determines life and death' and, therefore, as attempts 'to transcend human limitations'. The 'concept of man' is linked to 'the inability to grieve'; the 'destruction of male phantasies of omnipotence produces ... an inner compulsion to take to violence'. At the same time it leads to the attempts 'to become masters over life and death, over the world as a whole, with the help of certain forms of science and technology'. And the former nuclear physicist Brian Easlea is quoted with the following sentence from his book *Väter der Vernichtung* (Reinbek, 1986): 'What makes this male science so dangerous is the fact that for the first time in human history it actually works and gives man power over nature'. See Meier, 'Gewalt macht Männer. Über die Folgen des Versuchs, das Unberechenbare zu kontrollieren' in 50 *Neue Zürcher Zeitung*, 1–2 March 1997, p. 17 (translations by the author). Regarding the 'metabiological illusion' see also G. Huber, supra note 15, at p. 125.

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

tested.[19] The primary criteria applied in scientific research are 'true' and 'false', 'useful' and 'useless', not however, 'responsible' and 'irresponsible', nor 'good' or 'bad'. Science as a method is not, in and of itself, oriented towards responsibility and morality. Science, in its truest sense, has to be free from moral qualifications.[20]

It is this which added to sciences its power in society on the basis of its many achievements, that can impair our capacity to act in a morally and ethically responsible way. What is meant by this? Scientific thinking and scientific method can develop into a general attitude towards life and the problems which confront us in it. The constant practice of exclusion, self-restraint, limitation, reduction, essential for the education and training of researchers, can, however, impair other abilities, namely the ability to see the whole picture, to take into account diverging interests in everyday situations, even if these interests and values are competing or mutually exclusive. This ability is essential for responsible living and working. Decisions of great ethic and moral significance often have to be taken in situations which are not clearly determined by a mere analysis of data and values. Those are precisely the most difficult cases, when we are expected to take clear-cut ethical decisions in the face of diverging or even contradicting demands and interests. If we react by reducing these conflicts in order to deal with them in a scientific manner, we fail in our moral and ethic responsibility. Rather, we have to react and decide in a manner that is more appropriate to the complexity of the situation. However, as has been demonstrated, scientific method is not conducive for a proper response to this challenge. Which means, in turn, that power in science and academia tends to make it harder to act and decide responsibly. It is imperative, therefore, for both junior and experienced scientists to constantly and consciously practice the taking of decisions in complex and conflictual situations of the type that require ethical and moral orientation.

F. Power in Scientific Language

Science and academia exercise power via language. They exercise this power not only in their own field but also in our lives in general. This power is based on the fact that science constructs reality and does so in the name of 'universal truth'. Scientific reality, therefore, claims to be the true reality, above and before any other, more particular realities. However, by way of its definitional power, and its terminological monopoly, scientific power becomes imperialistic: In its own field, it suppresses terminology and perspectives that deviate from dominant usage and it brandmarks what seems to be non-conforming as 'wrong' in the battle between the different

---

[19] Hj. Staudinger, 'Verantwortung und Fortschritt in der Wissenschaft' in (1980) 34 *Merkur*, at p. 8.

[20] B. Sitter-Liver, supra note 6, at p. 396.

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

schools and trends. Towards the rest of society and its languages, there is an insistance of the special rationality of scientific language and a degradation of other languages and their capacity to describe and define relevant realities. Whatever is phrased in other than scientific language risks being degraded as subjective, emotional, irrelevant or simply irritating.

Johannes Anderegg described scientific language as authoritarian. This language cannot be anything but authoritarian. Via terminological rigour it defines which questions may be asked, and which objects may be examined, including which perspective this examination should apply. In a normative manner, it fades-out everything else from the reality to be confronted by the rest of us. This becomes a problem when this reductionist approach is combined with the claim that science alone can generate knowledge and truth. The definitional power and authority possessed by science and academia can be exercised in a responsible manner only if the limits of this power and ability are made public and when practical consequences are drawn from the limitations of all scientific discovery. This acknowledgment of the limitations has to be made, not only within the scientific community but also for society as a whole (i.e. society has a right to know the truth about the extent of proven scientific knowledge on the one hand, areas of uncertainty and ambiguity on the other). What does that mean? It means that we must remind ourselves everyday and in whatever we do, and in particular in the political debate on controversial issues such as genetic engineering, that modern science is constructing an image for us via its own language. We must remind ourselves that the reality constructed in scientific language remains a mere image of a greater reality, in spite of science's claim to total objectivity and knowledge. The image remains image. Science describes reality. It does not construct the complex, diverse and versatile reality in which we are living.[21]

Let me give an example that does not come from modern natural sciences but from the area of law and jurisprudence. On a closer inspection of this field we discover a linguistic imperialism. While people are subjects in law who can have rights and obligations, other creatures, in particular plants and animals, are merely objects, things. The majority of lawyers still find it unacceptable to accord legal rights to plants or animals. Why is this so? By declaring humans to be the sole subjects of law and at the same time the highest value and measure for everything else, human dignity being the highest value on which our constitutions are based, we have lost sight of what makes this dignity and subjectivism possible in the first place, our nature and environment. Instead, we have down graded nature to a mere mean to our ends, something to be exploited for the satisfaction of our ever growing needs and desires. Nature is denied subjectivity by the argument that what we see around

---

[21] J. Anderegg, 'Wissenschaft und Lebenswirklichkeit: Zum autoritären Charakter der Wissenschaftssprache. Eine polemische Skizze' Lecture notes, published in a slightly shortend form in Schweizerische Akademie der Geistes- und Sozialwissenschaften (ed.), Bulletin 3/96, Berne 1996, pp. 28–35.

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

us is essentially cultivated, i.e. man-made nature. However, by devouring nature in the quest for freedom and self-realization, we are on the verge of destroying one of the natural prerequisites of our very freedom and one of the foundations of human dignity. We are not unaware of this process. Year after year we can read about it in easily accessible and comprehensible media and publications. We read it and are appalled by it yet, we do little or nothing in practice, beyond lamenting and debating, to correct the developments. The reason is our dichotomy, our existential division of the world into subjects and objects, where the subjects have all the rights and the objects have none. This division is so deeply rooted in our consciousness, and culture in general that we seem unable to see past it. We overlook the fact that these 'objects' have always possessed a value beyond and independent of the value accorded to them by us, an intrinsic value of their own. Instead, we lock ourselves into the fortress of anthropocentrism and defend it by means of law and jurisprudence. While the debate concerning the rights of whales, trees and nature in general has already begun, the chances for change are slim as long as the argument is made from within the dominant language of jurisprudence and law, since it does not fit into that world. It is almost as if there was a fear that sharing our position as the crown of creation will require some self-restraint on our part. We must not forget, however, that law's imperialistic language is just one variant of a broader imperialism, i.e. human domination of the rest of creation. We have blindly enslaved creation without seeing the damage that we are doing to ourselves in the process. The conclusion to be drawn from this example is that power in science and academia, in this case the language used in law, can turn against man. The subject of science can become its object.[22]

G. Direct and Implied Power in Science and Academia

Scientific discovery and knowledge has penetrated literally everything that concerns and facilitates our existence. Since our lives have become determined and dependent upon the processes and products of science and academia, scientists have gained

---

[22] On this chapter see, representative for many, A.K. Treml, supra note 11; B. Sitter-Liver, 'Natur als Grundlage universaler Ethik' in K. Gloy (ed.), *Natur und Technikbegriffe* (Bouvier Verlag, Bonn, 1996) at pp. 234–265; B. Sitter-Liver, 'Dignitas universalis. Versuch, von der Würde auch nichtmenschlicher Wesen zu sprechen' in H. Holzhey, P. Schaber (eds), *Ethik in der Schweiz* (Pano Verlag, Zurich, 1996) at pp. 135-152; all three articles contain references to further literature. Compare also G. Sessions (ed.), *Deep Ecology for the 21st Century. Readings on the Philosophy and Practice of the New Environmentalism* (Shambala, Boston/London, 1995). E. Katz, A. Light, D. Rothenberg (eds), *Beneath the Surface. Critical Essays in the Philosophy of Deep Ecology* (MIT Press, Cambridge MA/London, 2000). B. Sitter-Liver, 'Tiefenökologie: Kontrapunkt im aktuellen Kulturgeschehen' in (2000) 1:1 *Natur und Kultur. Transdisziplinäre Zeitschrift für ökologische Nachhaltigkeit,* at pp. 70-88.

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

direct power over our lives. Their thinking, their questions, their values and priorities have begun to dominate our own values and ideas.

Our knowledge of hormonal control of female fertility is a good example. This knowledge has led to the development of what amounts to an 'anti-baby' pill. The availability of the pill has not only changed human sexual behaviour all over the world but also the values and rules that determine this behaviour. The pill has modified, at least in those societies that are industrially and culturally highly developed, the self-perception and role of women, their function and tasks in society, the values that are determining their lives.

The impact of scientific discovery and corresponding possibilities in areas such as artificial insemination and molecular genetic engineering, which are providing us with the keys for genetic diagnosis and treatment, may be less obvious but they are no less important and fundamental. Potential human life, which used to be protected absolutely, becomes available and disposable under changing values and goals in society. If it does not conform to the expectations and needs of those who create it, it is not allowed to develop, as in the case of the problematic choice of the sex of one's children. If the embryo is found to be diseased, it is eliminated, as in the case of an embryo genetically diagnosed with chorea huntington or a similar disease. If it is a grown up person with special health risks, they may be excluded from certain work and insurance benefits. While the law is supposed to put limits to this, we may safely assume that employers and insurers will find ways and means to circumvent evolving rules. Moreover, we can already witness how ideals, convictions and values are falling apart when we consider our own and our society's solidarity with its weaker members. Moreover, this would be the first time that knowledge, once available, is not used one way or another. By opening up new possibilities, science is also opening up new responsibilities. Questions that would have been unthinkable not so long ago, are suddenly asked openly. Few examples may suffice: Should parents allow that a child, who will lose its personality at the age of 40 and die a miserable death due to Huntington's Chorea, to be born in the first place? Isn't it irresponsible (irresponsible!) with regard to the benefit of our society as a whole, to give birth to a severly handicapped child who will need great human care and great material resources just to stay alive? Is it not our ethical duty to strive for the continuing improvement and perfection of human life? Are we then acting responsibly, if we exclude genetic engineering from the process of human self-perfection, once it is safely available?[23]

---

[23] The former director general of UNESCO makes interesting remarks in his contribution 'Science and Power Today and Tomorrow'. They seem to leave open even the possibility of cloning human beings: 'For the time being, the scientific community [please note, this is not 'the community of those concerned'!] has agreed that there should be no use of gene therapy on the germ cells ... and that the cloning of human beings should be banned. But is this agreement based on ethical principles, or does it merely indicate that everyone at present considers these techniques to be untimely in view of the current state of technology and the possible associated risks?'; see in F. Mayor, A. Forti (eds), *Science and Power*, supra note 1, at p. 167.

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

Direct power in science and academia manifests itself in the formulation of unexpected questions of social and individual relevance, in the transformation of values, norms and goals. Whenever such transformation is openly intended by scientists, researchers and teachers, does that mean that we can speak of conscious use of power, automatically carried out in a responsible and accountable manner? In spite of positive experience,[24] I hesitate to give an affirmative answer. Science and academia as social subsystems, more often than not, are progressing in a diffuse manner, where it is rarely possible to determine personal responsibility for concrete developments. Another type of responsibility becomes more important: this concerns the duty to inform and evaluate the people concerning the processes which are linked to science that may lead to the transformation of values, norms and goals, i.e. the responsibility to make these processes transparent and accountable. The goal must be not only to inform humanity about what is happening to it but – as far as possible – to allow humanity to take conscious and informed decisions about what *should* happen to it. Those rational and ethically responsible scientists who are concerned about the well-being of those who are affected by their work and who respect the right of the latter to participate in decisions about society and mankind, therefore, must reveal the nature of the power resulting from their work and must not use it in pursuit of their own agendas and interests without prior public debate.

However, we cannot overlook the fact that science and academia are not individual activities but social processes which are increasingly economically determined.[25] This begs the question to what extent can we really demand, as we have just done, individual responsibility and accountability? While science and academia are oriented towards the direct exercise of power, it would be fatal for the cause of matching scientific and ethical responsibility, to overlook that in our society science is often only indirectly involved with power: science is used by individuals for personal interests.[26] Where these individuals and interests are extraneous, turning science into a decisive factor of production, research and academia fall prey to the dictate of economic interests.

This is regularly confirmed by public and private statements concerning research policy all over the world: research policy is largely seen as technology policy. Its

---

[24] R. Jungk and H. J. Mundt (eds), *Das Umstrittene Experiment: der Mensch. Modelle für eine Neue Welt* (Verlag Kurt Desch GmbH, Munich, 1966) (German translation of the English original G. Wolstenholme (ed.), *Man and His Future. A Ciba Foundation Volume* (J.A. Churchill Ltd., London, 1963)).

[25] Economical management of science follows the premise of efficiency. Researchers are integrated into the scientific community because of their economic utility – or excluded from it. See R. Baumann-Hölzle, supra note 10, at pp. 170-172; specifically for ethics as a science also I. Prätorius, supra note 16, at pp. 131 et seq., 139.

[26] Again, considerations by I. Prätorius are useful and stimulating in this context. See for example the sentence 'Only because ethics usually – and mostly without being aware of it – finds itself on the side of the powerful, it can thrive on the illusion of having power of its own' (translation by the author): I. Prätorius, supra note 16, at pp. 139.

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

primary function is to secure the international competitiveness of whichever country sponsors it. And this, in turn, serves the goal of looking after our material well-being. Power in science and academia is subordinated to economic interests; it is most pronounced where it primarily serves a purpose other than purely academic or scientific.

A current example can be found in the debate about the chances and risks, the freedom and limits of genetic engineering. Many scientists are actively involved in this debate and are actively promoting the new technology. Their arguments are based, on the one hand, on the freedom of science, in particular the freedom of basic research. On the other hand, they argue on the potential usage of genetic research in the battle against diseases and epidemics. The utility of the satisfaction of human needs provides the measure, rather than the beauty and excitement of discovery as such. Basic research is defended as a reservoir for as yet unforeseen future uses, rather than being praised in its own right. Genetic engineering is defended because it will supposedly allow us to feed the ever growing population of our planet. This may sound philanthropic but this also conceals other interests which may be found behind the work of researchers and academic teachers, such as the legitimate commercial interests of large multinational enterprises in the production and distribution of new types of seeds and companion substances. Again, it is not the pursuit of discovery as such that energizes the researchers but the potential to exploit the discovery: for production, social prestige and for personal gain. Restrictions on research are not encountered by pointing to the possible loss of knowledge but by pointing out the possible loss of jobs. When carefully reflecting about these phenomena, we realize that scientific work is not pursued with sufficient vigour whenever it is not directly serving material interests. Power in science and academia is indirect and implied power because it is crucially dependent upon the energy, the fuel, which is pumped into it in the form of financial means and organizational support by outsiders, private and public interest groups.

A good example to illustrate this point is taken from molecular biology and has to do with the hope of being able to cure diseases which seem to be caused by defects in a single gene via genetic engineering therapy. Richard Strohmann, who for decades has worked successfully in cellular and molecular biology at the University of California in Berkeley, is rather skeptical about the perspectives of this technology. He criticises the linear approach underlying the idea of this therapy: It is based on the assumption that the neutralization or replacement of the defective gene will eliminate the cause of the disease and cure the patient. Strohmann argues that cellular processes do not follow linear patterns and this reduces the chances of succeeding with linear assumptions, rather the cellular processes are adaptive. They are influenced by stimuli from within the body as well as from the environment, and not determined solely by molecular structures. He cites the example of high blood pressure. Researchers found a gene in rats which causes high blood pressure if it is mutated. Humans with high blood pressure carry the same mutated gene. However, the mutated gene can also be found in humans that do not suffer from high blood pressure. It appears that this defect, in form of the mutation, can be compensated in

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

certain cases. Hence, the linear approach taken in genetic engineering may be of little use for the complicated causes of disease. What should be applied is epigenetic theory, mathematical modelling and non-linear logic. When asked why these kinds of models have not been introduced long ago, Strohmann answered that it is hard to imagine at present how these approaches could be put to profitable uses. According to him, this is one of the main reasons why reductionism has not been given up. Only the simplistic models lead to individual genes, predictions about genes and models for genetic engineering therapy. Only these models can be manipulated, patented, bottled and sold. By contrast, it is clear what discoveries from epigenetic biology could mean for biotechnology. That is why, according to Strohmann, we may well have to live for years to come with unfulfilled promises about new therapies. Once an idea about a simple technology has taken root in our culture, it is very difficult to overcome. There is simply too much money involved.[27]

So far, my examples have been taken mostly from natural and technical sciences. However, the remarks about direct power in science and academia apply just as well to social sciences and humanities. Since the latter may seem irrelevant in the production of material wealth, their fate is a good indicator for the importance of implied power in science. Humanities and liberal arts are constantly under the microscope as regards their usefulness in society. This usefulness is considered insignificant. Hence, private sponsors are reluctant to provide funding for arts and cultural sciences. At the same time, the governments are finding it difficult to maintain previous levels of public support for social sciences and humanities. This is partly due to the lobbying of the business sector for a redirection of research funds to more and more applied sciences, those areas of research which are directly relevant to the economy. For a telling example, compare the EU Commission's Framework Programmes for research policy, and in particular its recent document entitled 'Making a Reality of the European Research Area: Guidelines for EU Research Activities'. Ideally, this should show researchers and academics how much they actually depend on economic recognition and support, which in turn should discourage conceit and lead them to reconsider their real function and position in society. We should (re-)consider whether science fulfills its goal of securing and facilitating human existence if it is centred increasingly on those activities that generate power and wealth. If the answer to this question is no – and I think in all good faith it cannot be yes – scientists and academics, in particular those in social sciences, humanities and liberal arts, have a specific responsibility, namely to use their direct power, which is inherent in their position and activity, for the combat against capture of this power by economic interests.

---

[27] (1995) 46 *WoZ*, at p. 241. Another example how scientific power – or powerlessness – is determined by economic interests, is provided by Arthur Teuscher, 'Zum Beispiel Humaninsulin' in F. Koechlin, D. Ammann (eds), *Materialienband zur Gen-Schutz-Initiative* (Realotopia-Verlagsgenossenschaft, Zürich, 1995) at pp. 44-53.

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

H. Power and Responsibility of the Sponsors of Scientific Work

Nowadays, virtually everyone involved in scientific research is dependent on research funding provided by others. In a university setting the 'others' can be the university administrations, as well as private and public foundations and sponsors. Among the latter are private and public contractors who need specific solutions for their problems; and then there are the foundations and sponsors who promote research as such. An example of the last group is the Swiss National Science Foundation. The following considerations are applicable to all of them but in particular to the last group.

The ideas, proposals and requirements of researchers are invariably far exceeding the funds which are available for scientific work. Hence, there is competition for general research funding, as well as for the contracts for specific solutions for private or public clients. As a direct consequence, there is a dependence of those applying for research funding on those who decide the allocation of this funding. Every institution involved in funding of research work, therefore, possesses structural power. This structural power is personified by the individual men and women in the institution who take the decisions about which projects and applicants are to receive support. In the case of the Swiss National Science Foundation, those are the members of the Research Council, i.e. individuals who are themselves involved in academic research and who are, therefore, deciding the opportunities and limits of the research of their colleagues, with whom they may actually compete as scientists and as users of funds. The structural power of the institution thus becomes a *personal power* of those working for it over their colleagues and competitors. It is evident that this situation requires a high level of responsibility and ethical integrity from the members of the Research Council. Moreover, those indirectly involved in the selection procedures must ensure that the special responsibility of the members of the Research Council is exercised with care, that structural and personal power is matched with fairness, and that pursuit of truth and knowledge will be victorious over personal interests.

There is no shortage of obstacles on the way. The direct competition of the members of the Research Council with the outside applicants for financial support can be largely neutralized by the rule that only a certain amount of money can go to members' projects per year. However, that does not resolve all the issues inherent in scientific competition. Obviously, a member will find it hard to support an application for funding for a project of a colleague which competes with his/her own research plans. Similarly, the Council will not readily approve a project that suggests a direction, method or approach rejected as such by the members. And then there are general and political prejudices or attitudes in society which can stand in the way of an objective evaluation of an application. It was not that long ago when it was difficult for social sciences, history, philosophy, or theology to find open ears for a project which included marxist or feminist ideas and methodology. The fact that

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

such projects did in fact receive support is an indicator of the quality and independence of the experts and Council members. Nevertheless, there are those expert opinions and decisions which prevented projects on the basis of mere ideological or methodological prejudice.

There are also objective obstacles which stand in the way of fair and adequate funding decisions. One condition for financial support is the novelty of the research. But how should a selection committee make a sound evaluation of the novelty of an idea when, by definition, there are no categories and criteria for this evaluation yet? This is precisely why certain trends and schools of thought tend to prevail for a certain time. Conversely, there are always birth-pains with a shift of paradigms. Definitions, theories, methods, which are proven for the resolution of certain obstacles, can themselves become obstacles when new ways of thinking are introduced. This can be observed even in cases where the suggested novel approach clearly provides useful answers to unresolved problems. It is understandable that proven methods are not given up easily, in particular when they conform to given and dominant interests. A controversial example illustrates this point: at this particular moment in time we see an increasingly vehement dispute about the legitimacy and the sensibility of genetic engineering, and in that context, the production of so-called transgenetic animals. Certain grassroots political movements want to prohibit these forms of genetic engineering. However, it is predicted that if such legislation should be introduced, certain medical and biochemical research would simply move elsewhere. A national or governmental research fund, such as the Swiss National Science Foundation, has to promote a broad spectrum of research with total freedom. Nevertheless, its members will oppose attempts to restrict research in the area of genetic engineering, in particular if they see their own research in danger of being restricted. Realistically, what would be an application's chances of success for funding a project examining the dignitiy and inviolability of animals from philosophical, theological and legal perspectives and thus, potentially, threatening the legal and moral acceptance of the production of transgenetic animals? In this context, we must not forget that many constitutions protect *inter alia* animals against wanton killing or destruction, and genetic engineering is not exempt from this *per se*.[28]

Whether there is a solution to this dilemma or not will have to remain unanswered. However, these examples should suffice to illustrate how the work of research funding institutions does not occur in a vacuum but rather is embedded in and interdependent on moral values, as well as political, economic and other interests in society.

This much is undisputed, scientific research has to seek truth and knowledge, even when it directly responds to demands in society. This triggers special responsibilities of those building up and working for research and funding institutions, namely to recognize the dangers and to create safety mechanisms to counter them, both on the

---

[28] Compare Art 120, para. 2 of the Swiss Federal Constitution.

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

institutional level – via complaint procedures and legal remedies – and on the level of the employees and experts – via specific instruction and Education in Ethics. This applies to all those involved, not only the scientists who work for the institutions. The administrative staff has to be included since it is often the first contact for the applicants and since the administrative staff also exercise power via the design and management of the selection procedures. The staff is, therefore, just as responsible for fair and objective procedures and decisions, even if the practical implications of this responsibility differ somewhat from those of the experts and scientists who take the decisions.

Many countries have larger and longer-term research programmes or co-ordinated national research objectives which support a multitude of researchers in a loose co-operation. The selection of a topic and the allocation of an overall budget in these cases is a political process but also with the participation of scientists and experts. However, once the topic is fixed and the budget is approved, the scientific community can develop and select the individual projects largely without outside interference. Through their decisions, the members of the selection committees determine which specific research methods, ideas and proposals will get the chance to contribute to the solution of the more general overall questions. In this way, they give substance and relevance to abstract problems in society. In this respect, the decisions of the selection committee members of such a larger research programme will be influenced by open-mindedness on a broad range of concerns as well as their own personal values. As a result of this, their responsibility towards society as a whole, by which they are endowed with the decision-making authority, becomes even more pronounced. Their choices have to become more self-critical and careful if they are to be responsible both towards the scientific community and society at large. Only with great care and prudence, combined with an openness for unconventional ideas and unfamiliar values, will they be able to do justice to project proposals that run contrary to their own experience and preferences.

Institutionally, this implies that those who are responsible for the composition of expert groups and research councils deliberately seek to include members from different disciplinary backgrounds, with different methodological approaches, and with different political, ideological and social convictions. Last but not least, the distribution of votes in these groupings has to be such that each position has a fair hearing and the chance to prevail in the decision-making process.

I. Power in Teaching

It should be obvious, after all that has been said, that academic teaching can weild power in a multitude of ways. Furthermore, it implies a social relationship with specific constellations of power. I will limit my elaborations to a few points; most of the issues are well-known, not least since the characteristics of the realtionship between student and teacher are not limited to academic education.

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

Within a structured programme, leading to specific qualifications and degrees, already the selection of the topics to be dealt with and the material to be covered is an exercise of power. The term 'power' is not used lightly, since the selection of topics and materials is binding upon the students and leaves them hardly any choices or alternatives. The subsequent binding effect results from the fact that only those who have mastered the selected topics and materials will be certified to have the desired qualification. The responsibility inherent in the power of defining the topics and materials is evident: those who select and those who teach have, at the very least, to point out alternative topics and materials related to the subject. The selectors have to permit other perspectives and approaches to compete with their own. Also they have to inform students about any problems related to their particular selection, method and approach and be willing to discuss them. To give a personal example, I cannot support a natural law position during a course on philosophy of law, without also describing the critique of natural law in past and present. Also I have to clearly admit that the confessional character is as inherent in a natural law approach as it is in positivist convictions, as well as the difficulties inherent in my argument by which I try to make my normative choice persuasive. By selecting topics and materials, the teacher takes decisions on behalf of the students. This act of patronage is responsible and justifiable only if the teacher simultaneously points out the alternatives.

Another imbalance of power between teachers and students is the broader and deeper knowledge of the former. The guidance and supervision of students based on this lead in knowledge, in turn, creates dependence. If it is an important goal of education to enable the students to think independently and overcome unreflected mental abilities, then teachers have a specific responsibility to show students not only that are they dependent but to show them the ways and means to reduce and ultimately overcome this dependency. This may require a conscious use of the power conferred upon the teachers by their institution and by their knowledge: when determining the substantive and personal demands that have to be met before a qualification is certified by a degree, independence of thinking must be among them.

It is safe to presume that there are no interest-free leads in knowledge. However, responsible teachers who take their pedagogical duties seriously, will not only allow but actually promote research topics and methods which are contrary to their own interests and values. It would be an abuse of power to deny a scientific qualification to a student merely because she does not want to participate in a certain experiment or discourse for moral or ethical reasons. The responsibility towards the students firstly requires that the professor enables them to successfully conduct independent research and communicate the results to their scientific peers; furthermore it requires that the professor encourages and enables the students to take independent moral and normative decisions, regardless of which direction they may take.

Examinations are a particularly important source of power, as they form the final and narrowest gate on the way to the desired qualification. I personally consider

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

examinations to be indispensible as an instrument of substantive control and as an opportunity for personal qualification; furthermore, examinations are merely a specific form of a general condition of human existence. Nevertheless, examinations only allow a momentary control, an impetus for correction. It is unfair to use them primarily as a means of selection. This would run contrary to the task of the teachers. The teachers' responsibility, rooted in their power to examine, thus requires that they design the exams in such a way that they can actually be completed successfully on the basis of the material covered in the educational programme and the previously communicated requirements. Programmes, such as medicine, which suffer from excessive demand, are no exceptions in this respect.

Another aspect of power, in the context of university level teaching, has so far been largely ignored. Scientists who are involved in research and teaching are themselves part of a network of relationships with colleagues, funding organisations, publishers and others, which supports and facilitates their work. They wield this power in a way which assures them that they will be heard and recognized by the scientific community. However, it would be contrary to the public interest and the character of science to guard this power like a personal treasure. Rather, the power has to be put to use specifically for the promotion of qualified young scientists. Institutional power in the world of science, therefore, is always linked to the responsibility to use it for the benefit of others, and to share it in particular with younger researchers and teachers.

J. Summary

This '*tour d'horizon*' on power and responsibility in science and academia – however selective and fragmentary – concludes with an even more pointed final remark.

Science, that is research and teaching, is part of social life – the life of human beings as sensible and intelligent creatures. However, scientific practice can only be called sensible if it seeks not only truth and utility but also the common good of mankind.[29]

Science implies power. Power is exercised in science. However, the exercise of power in and through science can only be called sensible and morally justified if it explicitly and constantly recognizes its responsibility towards justice and the benefit of those subjected to it. And this responsibility cannot be satisfied by mere declarations, for example when scientists assure politicians that they will take the responsibility for a certain event. Such declarations are paternalistic at best, often mainly a sign of conceit. Responsibility taken seriously has to provide answers in a

---

[29] The notion of the common good, however, can only be used as the ultimate measure where male and female life styles and contexts are no longer insulated from each other but have become common practice (RBH).

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

discourse[30] on criticism of science, balancing of interests, and social compromise. And it must be possible, if the process of communication truly seeks the benefit of all interested parties, that a given power can be renounced and not exercised.

Research and teaching are linked to power in many ways, are therefore only ethical and responsible if they accept limitation and control, and if they remain receptive to decisions in which their power is restricted or even discontinued.

---

[30] Special strategies and precautionary measures are required in order to allow women to participate fully in this discourse. One problem is that in the opening of the 21st century, relatively few women are actively using the Internet (inspite of considerable efforts and encouragement, compare S. Rottmann, 'Viele Frauen können in der Sache noch keinen Sinn sehen' in (1997) 44 *Der Bund*, at p. 8; FrauenUmweltNetz (ed.), *Computervernetzung für Frauen* (eFeF-Verlag, Bern/Dortmund, 1995). The reluctance of women to use technology, including the Internet, is not exactly encouraging, when looking at the perspective of future common life styles and experiences, a real sharing of power in scientific contexts, and joint responsibility of men and women (RBH).

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

Annex: Proposals for Safeguarding Good Scientific Practice – Recommendations of the Commission on Professional Self-Regulation in Science established by the Deutsche Forschungsgemeinschaft DFG*

Recommendation 1
Rules of good scientific practice shall include principles for the following matters (in general, and specified for individual disciplines as necessary):

- *fundamentals of scientific work; such as*
- *observing professional standards;*
- *documenting results;*
- *consistently questioning one's own findings;*
- *practising strict honesty with regard to the contributions of partners, competitors, and predecessors;*
- *co-operation and leadership responsibility in working groups (recommendation 3);*
- *mentorship for young scientists and scholars (recommendation 4);*
- *securing and storing primary data (recommendation 7);*
- *scientific publications (recommendation 11).*

Recommendation 2
Universities and independent research institutes shall formulate rules of good scientific practice in a discussion and decision process involving their academic members. These rules shall be made known to, and shall be binding for, all members of each institution. They shall be a constituent part of teaching curricula and of the education of young scientists and scholars.

Recommendation 3
Heads of universities and research institutes are responsible for an adequate organizational structure. Taking into account the size of each scientific unit, the responsibilities for direction, supervision, conflict resolution, and quality assurance must be clearly allocated, and their effective fulfilment must be verifiable.

Recommendation 4
The education and development of young scientists and scholars needs special attention. Universities and research institutes shall develop standards for mentorship and make them binding for the heads of the individual scientific working units.

---

* In 1997, a case of serious academic dishonesty became widely known in Germany. A well-respected, even famous scientist had falsified the results of scientific experiments over a longer period of time and had 'reaped' academic fame, prestigious appointments, and significant financial support, *inter alia* from the DFG. This raised the question whether the existing mechanisms to protect the scientific community and the general public from fraud and to safeguard the highest standards both of quality and of ethical responsibility in scientific research and publications were adequate. In response, the DFG appointed a Commission consisting of 12 national and international experts with different disciplinary backgrounds and requested them to develop a set of guidelines, the main findings of which are reproduced in this annex. The full text with extensive commentary in English and German has been published by Wiley-VCH Verlag GmbH, D-69469 Weinheim, Germany and can also be obtained from the DFG.

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

Recommendation 5
Universities and research institutes shall appoint independent mediators to whom their members may turn situations of conflict, including cases of suspected scientific misconduct.

Recommendation 6
Universities and research institutes shall always give originality and quality precedence before quantity in their criteria for performance evaluation. This applies to academic degrees, to career advancement, appointments and the allocation of resources.

Recommendation 7
Primary data as the basis for publications shall be securely stored for ten years in a durable form in the institution of their origin.

Recommendation 8
Universities and research institutes shall establish procedures for dealing with allegations of scientific misconduct. They must be approved by the responsible corporate body. Taking account of relevant legal regulations including the law on disciplinary actions, they should include the following elements:

- *a definition of categories of action which seriously deviate from good scientific practice (Recommendation 1) and are held to be scientific misconduct, for instance the fabrication of data, plagiarism, or breach of confidence as a reviewer or superior;*
- *jurisdiction, rules of procedure (including rules for the burden of proof), and time limits for inquiries and investigations conducted to ascertain the facts;*
- *the rights of the involved parties to be heard and to discretion, and rules for the exclusion of conflicts of interest;*
- *sanctions depending on the seriousness of proven misconduct;*
- *the jurisdiction for determining sanctions.*

Recommendation 9
Research institutes independent of the universities not legally part of a larger organization may be well advised to provide for common rules, in particular with regard to the procedure for dealing with allegations of scientific misconduct (Recommendation 8).

Recommendation 10
Learned Societies should work out principles of good scientific practice for their area of work, make them binding for their members, and publish them.

Recommendation 11
Authors of scientific publications are always jointly responsible for their content. A so-called 'honorary authorship' is inadmissible.

Recommendation 12
Scientific journals shall make it clear in their guidelines for authors that they are committed to best international practice with regard to the originality of submitted papers and the criteria for authorship.

Reviewers of submitted manuscripts shall be bound to respect confidentiality and to disclose conflicts of interest.

This article from European Journal of Law Reform is published by Eleven international publishing and made available to anonieme bezoeker

Recommendation 13

Research funding agencies shall, in conformity with their individual legal status, issue clear guidelines on their requirements for information to be provided in research proposals on (i) the proposers' previous work and (ii) other work and information relevant to the proposal. The consequences of incorrect statements should be pointed out.

Recommendation 14

In the rules for the use of funds granted, the principal investigator shall be obliged to adhere to good scientific practice. When a university or a research institute is the sole or joint grantee, it must have rules of good scientific practice (Recommendation 1) and procedures for handling allegations of scientific misconduct (Recommendation 8).

Institutions which do not conform to recommendations 1 to 8 above shall not be eligible to receive grants.

Recommendation 15

Funding organizations shall oblige their honorary reviewers to treat proposals submitted to them confidentially and to disclose conflicts of interest. They shall specify the criteria which they wish reviewers to apply. Quantitative indicators of scientific performance, e.g. so-called impact factors, shall not by themselves serve as the basis for funding decisions.

Recommendation 16

The Deutsche Forschungsgemeinschaft should appoint an independent authority in the form of an Ombudsman (or a small committee) and equip it with the necessary resources for exercising its functions. Its mandate should be to advise and assist scientists and scholars in questions of good scientific practice and its impairment through scientific dishonesty, and to give an annual report on its work.