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## **Going public: good scientific conduct**

*Abstract:* The paper addresses issues of scientific conduct regarding relations between science and the media, relations between scientists and journalists, and attitudes towards the public at large. In the large and increasing body of literature on scientific conduct and misconduct, these issues seem underexposed as ethical challenges. Consequently, individual scientists here tend to be left alone with problems and dilemmas, with no guidance for good conduct. Ideas are presented about how to make up for this omission.

Using a practical, ethical approach, the paper attempts to identify ways scientists might deal with ethical public relations issues, guided by a norm or maxim of openness. Drawing on and re-thinking the CUDOS codification of the scientific ethos, as it was worked out by Robert K. Merton in 1942, we propose that this, which is echoed in current codifications of norms for good scientific conduct, contains a tacit maxim of openness which may naturally be extended to cover the public relations of science.

Discussing openness as access, accountability, transparency and receptiveness, the argumentation concentrates on the possible prevention of misconduct with respect to, on the one hand, sins of omission – withholding important information from the public – and, on the other hand, abuses of the authority of science in order to gain publicity. Statements from interviews with scientists are used to illustrate how scientists might view the relevance of the issues raised.

*Key words:* Science communication; scientific integrity; good scientific conduct; openness; cudos.

### **I. ETHICS AND THE PUBLIC RELATIONS OF SCIENCE**

Effective treatment of a whole range of cancers and various genetic diseases: this prospect was presented to the general public in the mid-1990s as the outcome to be expected in a few years time from the development of gene therapy. To the public eye, the success stories were waiting just around the corner. Gene therapy was promoted as a technology of great promise, providing opportunities to influence life and health more fundamentally than any prior approaches to treatment. The general public had every reason to share the faith of the visionaries, appearing in the shape of scientists, journalists, representatives of patient groups, ethicists and politicians in all sorts of public documents, not only in the mass media, but also, for instance, in parliamentary reports and in press releases from public research institutions (Århus Amt et al. 1995; Committee on the Ethics of Gene Therapy 1992; Moore 1993).

Today, the gene therapy craze has largely died out; and present reality clearly has not lived up to former expectations. However, this chapter of the history of science communication now provides us with pertinent questions for much needed ethical reflection on the public relations of science. Is it about PR, or is it about public debate? Is it acceptable to overstate possible outcomes of research projects? What should be regarded as being in accordance with good scientific conduct, and what should be considered harmful to scientific integrity – and why?

#### **A concern that has fallen between stools**

During the most recent decades, changes in the conditions for doing science have been widely recognised as sources of ethical challenges to be faced by the scientific community. The large and increasing body of literature on scientific misconduct and on guidelines for good scientific conduct can be seen as evidence of the recognition. Attempts are being made to face up to challenges relating, in particular, to varieties of growing financial pressure on scientists. Curiously, however,

the conduct of scientists going – or not going – public has gone almost unnoticed as an area of serious, ethical concern.

In the literature on good scientific conduct, the public relations of science, including relations between science and the media, relations between scientists and journalists, and attitudes towards the public at large, are seriously underexposed as ethical challenges. Individual scientists may be concerned about issues like demands for confidentiality in research cooperation, hype in public representations of scientific projects, or uninhibited self-promotion by fellow scientists, but discussions of such concerns seem, as ethical public relations concerns, to be rare in the literature. There is a general proscription against going public until findings have been published in a scientific, peer reviewed journal. And there is a general prescription to “maintain the foundations of the scientific enterprise and its reputations with society” (Committee on Science, Engineering, and Public Policy 2009). The rest is silence.

At the same time, science communication has been made the object of increasing political and academic attention as, on the one hand, a straightforward moral obligation to increase the public understanding of science and, on the other hand, an area of technical challenges. In some European countries – Denmark and Sweden are two examples – academics employed by universities are now under an obligation by law to disseminate their knowledge. The EU framework programmes for research have been marked by growing budgets for ‘science-in-society’ issues, but have also tended to deal with science communication and ethics as separate entities (European Commission 2007 a; European Commission 2007 b). Technical aspects of science communication have been and are still being highlighted. However, the ethics of science communication seems almost to be taken for granted.

Thus, the topic of ethical challenges, relating to the role of science and scientists in public life, appears, by and large, to have fallen between the two stools of research ethics and science communication. Consequently, individual scientists tend to be left alone with problems and dilemmas relating to this area of concern, and some may even assume that considerations about efficacy are all that matter with respect to the public relations of science. Taking this to be an unhelpful state of affairs, the present paper attempts to identify ways of facilitating that scientists may deal with ethical public relations issues as challenges that are shared by the scientific community and may be dealt with in common, guided by a norm or maxim of openness.

The paper concerns the public relations of science in general, including not only the science/media relationship but also, for instance, presentations on personal websites, participation in public meetings, and contributions to parliamentary committees. With respect to the science/media relationship it focuses on the conduct of and the challenges to scientists, and touches only very briefly the subject – less neglected in the literature – of the roles of journalists.

### **A practical, ethical approach**

Viewed from a sociological perspective norms signify standards or patterns of behaviour that are typical of a group and may be observed and described from the outside. When used as a practical, ethical concept, however, a norm or a maxim is a guideline for conduct, open to reflection, interpretation and debate as part of ongoing ethical deliberation. The present paper is an exercise in practical ethics and is primarily concerned with norms viewed from the latter perspective. That should not be taken to imply that we consider the two perspectives be unrelated. Rather, we presuppose that there is a fruitful interaction between the two. Norms or maxims would hardly be of any use if they were completely out of touch with social norms. On the other hand, social norms may be subjected to reflection and debate. We will be using the notions of *norms* and *maxims* intermittently, but refer now and again explicitly to norms viewed from a sociological perspective as social norms.

Our approach is based on practical ethics. This, we take it, relates to the human capacity for reflecting upon what should be considered proper and right conduct, taking the actual conditions for action into account. The aim of the paper is to inspire such reflection – primarily, but not exclusively, within the scientific community – with respect to the issue of the public relations of science.

The approach is also proactive. There is no way of deciding whether or not science – and/or the reputation of science – would be harmed by allowing the public conduct of scientists to remain an area of seeming ethical non-concern. However, it is also difficult to see how science could be harmed by the measures we propose. Moreover, it can be shown that (some) scientists are actually concerned about public relations issues like hype, self-promotion, conflicts of interest and demands for confidentiality in research cooperation. Somehow, those concerns must be responded to.

### **The main argument: bridging the gap with a norm of openness**

Our starting point is that scientists today frequently deal with complex societal questions. They are called upon to give advice to decision-makers and the general public, and they are dependent on funding from a variety of public and private sources. For science as a societal institution there is therefore a need to *incorporate* maxims for relations, not only with fellow scientists but also with other citizens into the scientific ethos. Otherwise, assumptions about a radical science-versus-society divide might come true and provide a breeding-ground for future polarisation.

Moreover, the ever-increasing use of scientific methods should be followed by a corresponding *extension* of the scientific ethos. Scientific methods and the ethos and values of science did not evolve as completely separate entities. Rather, they belong to a shared framework of thought, and can be seen not only as complementary, but perhaps even as constitutive of each other. The widespread application of the methods, but not the values, might impair the whole framework.

Drawing on and re-thinking the codification of the scientific ethos, as it was worked out by Robert K. Merton in 1942 (Merton 1968: 591-615), we will propose that this codification – which is echoed in current codifications of good scientific conduct – contains a tacit maxim of openness which may serve to include the topic of the public relations of science in the field of research ethics. Or, if you like, to bridge the fields of research ethics and science communication.

Discussing openness as access, accountability, transparency and receptiveness, our argumentation will be concentrating on the possible prevention of misconduct with respect to, on the one hand, sins of omission – withholding important information from the public – and, on the other hand, abuses of the authority of science in order to gain publicity. Questions relating to peer review will not be dealt with, as this is a huge issue in itself (Shamoo and Resnik 2009: 110-139).

The initial section of the paper aspires to identify the kind of ethical public relations challenges that today's scientists, and the scientific community as a whole, are confronted with, and to briefly explore some reasons why such challenges tend to be swept under the carpet. The following section aims at providing a framework for reflection on how those challenges may be dealt with in practice. To that end, traditional scientific norms – having been spelt out as maxims and, thereby, rendered open to deliberation – are seen as practical, ethical resources. Statements from interviews with scientists are used to illustrate how scientists may view the relevance of the issues raised.

## **II. IDENTIFYING THE CHALLENGES**

The most recent half-century has been marked by the expansion of scientific methods and frameworks of thought to encompass almost every area of human life. As of today, it would be hard to identify any societal issue that had not somehow been dealt with scientifically.

In political democracies, circling the institution of public discussion, this development would and should prompt increasing public discussion, probing critically into the various answers and solutions proposed by various scientists.

On the other hand, the increasing influence of science at large has been accompanied by increased competition among individual scientists and groups of scientists to gain influence and funding. Thereby, scientists and scientific institutions may be prompted to marketing endeavours that may run counter to the purpose of furthering critical public discussion.

As an institution science has become more powerful, and, thereby, the demand for responsible *public relations* has increased. But at the same time, individual scientists and groups of scientists have become more dependent and may be tempted rather to pursue *Public Relations (PR)* in order to secure their own, particular interests.

In a best case scenario, the net result would amount to a marked increase in serious, public exchanges on science-related issues, accompanied and supported by a cautious approach in individual scientists and scientific institutions going public with research findings and scientific visions.

In a worst case scenario, the conditions for public exchanges to deal critically with substantial aspects of science-related issues would deteriorate as public representations of science became dominated by combinations of hype and concealment. At the end of the day the cynicism of such approaches might even come boomeranging back to undermine, in any sense of the term, the ethos of science.

Attempts to reevaluate the ethics of the public relations of science must take this public relations/PR ambiguity and the consequent ethical challenges into consideration. Moreover, the fact must be acknowledged that the media may play a key role in both respects. Any general demonisation of the media might become self-fulfilling and should therefore be avoided.

### **Dealing with conflicts of interest *within* the world of science**

A wider context of the above challenges, relating to growing financial pressure on scientists, is constituted by inherited assumptions and concerns about the science-society relationship. Crucial among these is the crude understanding of society as an outer world of temptations of money and prestige and downright corruption that scientists and science might fall prey to, and the corresponding ideal that science should be kept pure from influences from the outer world of society (Nowotny et al. 2001; Shapin and Schaffer 1985).

Actually, it has long been recognised – although perhaps not widely so – that commercial aspects and interests have formed part of the history of modern science from its very early days (Butterfield 1965). Due to increases in public funding, science may have experienced plenty in some decades after the second world war, but was never pure, and the idea – and ideal – of science as pure in that sense may easily distort attempts to deal with current ethical challenges: The projection of problems of conduct, relating to the growing financial pressure on scientists, onto alien forces – ‘scientists are being corrupted’ – prevents those problems from being recognised and dealt with as liabilities that have always been present, although not always equally acute, in science.

It has actually become apparent, during the most recent decades, that ethical challenges relating to money and prestige form part, not only of society as an outer world, but of the scientific world itself. Intellectual property rights have gained momentum. Cooperation between public research institutions and private companies has become the order of the day. Competition for private and public funds has increased among the ever-growing number of scientists, dependent upon ever more sophisticated and costly methods and instruments and producing an ever-increasing amount of new questions suited for scientific investigation.

This development has not gone unnoticed in the literature on science ethics and scientific misconduct. In particular, a growing amount of attention has been paid to ethical challenges relating to various financial temptations (Braxton 1999; Committee on Science, Engineering, and Public Policy 2009; Resnik 1999; The Danish Committees on Scientific Dishonesty 2009). Science is, or so it seems, no longer considered an outsider to society, but is acknowledged as a societal institution, complete with social relations and different social interests that must be dealt with in a reasonable and responsible fashion. Thus, for instance, demands that possible conflicts of interest be declared are gradually becoming standard in academic journals.

Generally speaking, there has been a break with the ancient understanding of science as “a self-validating enterprise which was in society, but not of it” (Merton 1968: 605), still present in a motto of the American student movement of the late 1960s, stating that science was and should be “on the world, but not of the world” (Gilcher-Holtey 2005).

In connection with this development, the outcome which society at large may expect from science has been redefined, from ‘reliable knowledge’ (Ziman 1978) to ‘socially robust knowledge’ (Gibbons 1999). Also, a large number of social scientific accounts have been published, analysing the phenomena that we have chosen simply to summarise as ‘the changing conditions for doing science’. Novel conceptualisations like ‘mode 2 science’, ‘post-academic science’, ‘triple helix science’, et cetera have grown out of those accounts. They have described and conceptualised the changing conditions for doing science by describing new ways of doing science. Changes relating to the role of the general public vis-à-vis science have been included in these depictions. However, they have not, as the present paper tries to do, aimed to present ways of dealing with those latter changes as ethical challenges to the scientific community as a whole.

### **Left behind: the public relations of science**

In effect, the above developments have not been accompanied by attempts to (re)think the ethics of science communication or the relations between scientists, the media and the general public: public relations as distinct from PR. Despite its growing importance, the maxims governing this particular field of activity have been kept simple and untouched by the changes that have taken place in other walks of science: Firstly, scientists should avoid going public until after publication in a peer reviewed journal. Secondly, they should take care to maintain the reputation of science. These two maxims seem to be the only ones around. Both of them clearly presuppose the existence of a ‘we’ (the scientific community) confronting a ‘they’ (the general public). Thus, here the old assumption of a science-society divide appears to have been kept in place.

Conventionally, the science-society divide has been taken to be a truth-versus-power divide. This may be illustrated by a much debated statement by Stephen Schneider, the climate scientist, discussing the dilemmas of going public as a scientist. In a 1989 statement Schneider (1996) argued that scientists were faced with the challenge of finding the right balance “between being effective and being honest”. While ‘being honest’ was linked to science, ‘being effective’ was linked to public and political life. As scientists, Schneider argued, “we are ethically bound to the scientific method, in effect promising to tell the truth, the whole truth, and nothing but – which means that we must include all the doubts, the caveats, the ifs, ands, and buts”. However, in order to get through with messages in public, he argued, scientists – like other people – needed to “get some broadbased support, to capture the public’s imagination. That, of course, entails getting loads of media coverage. So we have to offer up scary scenarios, make simplified, dramatic statements, and make little mention of any doubts we might have.” In 1996 a dispute, linked to the statement, related to Schneider having been misquoted as a proponent of ‘stretching the truth’. The assumptions about the natural cynicism of political life that he took for granted in his statement seem, however, not to have been disputed.

On such assumptions about political life, and about the public, individual scientists may of course draw many different conclusions regarding whether to go public – and, if so, how – with statements on issues relating to their field of expertise. However, it would be unwise to ignore the fact that cynical assumptions about public and political life might easily be taken to justify cynical behaviour in public.

Largely similar assumptions, including assumptions about the public at large as basically incapable of dealing with uncertainty, seem to have been a driver behind German scientists' choice in the 1970s of a media strategy regarding the issue of a possible forest dieback. After three decades, in 2003, some of the scientists openly admitted to having chosen, at the time, a strategy that involved dramatisation and the suppression of statements of doubt in public. Doubts were voiced only in internal scientific exchanges – which were easily hidden from the eyes of journalists by the use of bone-dry headlines in academic journals (Faller 2003). Thus, sceptical and critical routines were maintained, but isolated within the specialist scientific community.

In 2009, the so-called 'Climategate' controversy – regarding accusations that prominent climate researchers had been contemplating the possible suppression or manipulation of data – made it evident that disputes about scientific honesty in public have become closely intertwined with disputes about sceptical and critical routines among scientists themselves. The controversy, a product of a science war, has spurred some reflections on the ethics of public advocacy (The Second World Conference on Research Integrity 2010), but seems to a large extent to have been used by participants to continue the warfare (Pearce 2010), rather than as a starting point for self-critical appraisal. To our discussion, the significance of the controversy lies in its combined topicality with respect to internal *and* public relations norms: it can be seen as an indication that dishonesty in public relations may come back to haunt the scientific community itself. The risk of possible boomerang effects may have become more acute and should be taken into account in the development of public relations norms or guidelines for scientists.

### **The science-media relationship: challenges to scientists**

The changing conditions for doing science – not least for having it funded or making it pay off – carry incitements for scientists to make active use of the media in order to get publicity. Changes in this respect have been noted by the science journalist and editor Cornelia Dean of the New York Times. After being away from the paper between 1993 and 1997, she described in 2003 how she had found that the world of science had changed upon her return. She felt less certain that scientists would still make a point of not over-hyping their work. She related this perceived change of attitude to there being "a much shorter line between their work and their bank account than there used to be" (Jones 2003).

The conditions for doing journalism have changed as well, and those changes have coincided with the changes of the conditions for doing science. The notion of 'the press' has been supplanted by the less favourable, more unpleasant and manipulative-sounding notion of 'the media' (Schudson 1995: 156), which may more smoothly than 'the press' be connected to ideas of society as a mere market-place and of politics as mere power-games. There has been a concentration of ownership. And although different media models and varieties of journalism are still around, it can be argued that the journalistic profession has been increasingly standardised (Hallin and Mancini 2004). Standardisation has, it seems, taken place along the lines of a media worker profession, addressing consumers on a media market, rather than citizens in a society. All in all, journalists within this dominant model may be more likely to understand science-related journalism in terms of marketing than in terms of feeding into and stimulating serious, public discussion.

There seems, in other words, to be a push towards marketing behaviour on both sides of the science-media or scientist-journalist relationship. The use of scientific experts to provide almost any

story with authority and credibility, and with pathos and drama, has become a journalistic staple. Correspondingly, PR departments have been established at universities and other research institutions.

As a net result, temptations to oversell, and to conceal or play down possible conflicts of interest and/or aspects of uncertainty or disagreement, should now be considered current ethical challenges to scientists as well as to journalists. Combined with the increasing importance of science to society, the multiplication of media and other communication channels means that those challenges are likely to become increasingly significant. And just as journalists do indeed need norms for working with scientists and for dealing with science-related issues, so scientists need norms for going public, as distinct from advice on how to gain publicity.

The demand that scientists be concerned about the reputation of science does not provide an adequate normative framework. Actually, it may do more harm than good: rather than responding to ethical challenges relating to participation in public life, concerns about reputation tend to come with such challenges. The focus on appearance, if disconnected from other considerations, may serve as an incentive to dishonesty.

In the case of science, the concerns about reputation may be – and probably in most cases are – linked to an understanding of science as a good cause (Resnik 1999). Ethical public relations challenges, however, are not restricted to bad causes. Moreover, the moral certainty that one represents a good cause might even be taken to justify questionable conduct like the overselling of possible outcomes of research projects or the concealment of conflicts of interest or aspects of uncertainty.

Overselling and concealment can be seen as public relations varieties of two of the internal criteria for scientific misconduct: fabrication and falsification, or lying and cheating (Macrina 2005). Lofty promises and the suppression of disturbing information may serve to maintain the reputation of science as long as the messages go down well at the receiving end.

Belief in science as a good cause, the reputation of which should be promoted in the general public, might even foster over-optimism among scientists themselves. The very high degree of technological optimism that characterised public representations of the expected development of gene therapy in the mid-1990s might, as mentioned in the start of this paper, serve as an example; it deserves scrutiny for the purpose of increasing the understanding of the intricacy of the ethical public relations challenges that scientists must now face.

Thus, concerns merely for the reputation of science as a good cause – if appearance and the gaining of trust are all that matter – are unlikely to further and may even prevent reflections on trustworthiness (Meijboom 2008) and truthfulness (Williams 1993) in scientists going (or not going) public.

Publicity-seeking may, as already mentioned, include drivers to keep silent about a whole range of aspects, prominent among which are scientific uncertainty and possible conflicts of interest. Other factors may work against scientists going public at all, even though this may result in them withholding important information or assessments. This may, for instance, be the case – and may affect internal communication between scientists as well as their possibilities for going public – when scientists are contracted to work for public authorities or for commercial companies and confidentiality clauses are included in the contracts.

### **Catching up with the backlog**

In summary: The public relations of science is an area of growing importance and concern. The literature on science ethics and scientific misconduct is evidence of how changing conditions for doing science are being taken into account with respect to internal norms. However, the public relations of science have not been systematically included in those endeavours, and ancient

prejudices about society, and about a science-society divide – including a tendency not to distinguish between society and the market-place – may be guiding the public relations activities of scientists.

Thus, scientists are inadequately equipped for dealing with the *whys* of their public relations. A framework for reflection on what should be regarded as being in accordance with good scientific conduct is needed. The overall challenge amounts to keeping the ladder of the internal values in place, not kicked away (Barnett 2000: 83), while fully acknowledging science as a societal institution. Rather than simply disposing of traditional, scientific norms and values, there is a need for them to be reinterpreted to respond to current conditions.

### III. RETHINKING THE CUDOS NORMS FROM A PRACTICAL, ETHICAL PERSPECTIVE

Robert K. Merton's so-called CUDOS norms from the late 1930s and the early 1940s probably represent the most widely recognised codification of the ethos of science and constitutes, for a number of reasons, a useful starting point for attempts to rethink scientific norms and values from a practical, ethical perspective.

Firstly, most of the norms distilled by Merton still inform core elements of the institution of science. That includes not only the publication and peer review systems, but also the concept of, and the stress – currently very strong – on scientific method.

Secondly, the CUDOS norms combine the qualities of being *descriptive* and *prescriptive*. Most commonly, probably, they are read as no more and no less than a sociological account of social norms, observed and described as a peculiar mechanism behind the workings of the scientific community. However, they may also be seen as a set of maxims which *should* inform the conduct and deliberations of scientists. Each of the norms – Communism, Universalism, Disinterestedness and Organised Scepticism – can easily be understood in the latter sense. This is a distinct feature of Merton's codification and marks it out from, for instance, the more recent acronym PLACE, referring to Proprietary, Local, Authoritarian, Commissioned, Expert and aimed at capturing characteristics of industrial and/or post-industrial science (Ziman 2000: 78-79, 81). Moreover, even though a Mertonian approach may be at odds with some understandings of today's scientific world, it is clearly echoed in current codifications of norms of good scientific conduct (Barcelona Biomedical Research Park 2009; Catalan Agency for Health Technology Assessment and Research 2007; IARC 2008; VSNU 2004).

Merton, as we understand him, acted, at the same time, as a sociologist (describing the norms of the scientific community) *and* as a member of the scientific community (prescribing norms of good conduct). On the basis of years of personal observations, he found that certain norms seemed to be functioning among scientists: "Although the ethos of science has not been codified, it can be inferred from the moral consensus of scientists as expressed in use and wont, in countless writings on the scientific spirit and in moral indignation directed toward contravention of the ethos" (Merton 1968: 605-606). At the same time, he was obviously advocating those norms, took them to be vital to the scientific endeavour and was concerned by harm caused by their violation.

When viewed today – where private money, conflicts of interest and intellectual property rights have gained momentum in the scientific world – the science Merton described may appear somewhat quaint, gentlemanly and out of touch with present reality. However, while the conditions for scientific activity have indeed changed significantly compared to seventy years ago, the basic scientific endeavour of providing truthful descriptions of nature has been maintained, and so have crucial (Mertonian) routines. Furthermore, some of the norms were explicitly formulated in order to facilitate that private interests in science may be coped with.

Following that, we will aim to revise one of the foundations of the Mertonian norms – the assumption of a science versus society dichotomy. Thereby room can be made for the integration of research ethics and science communication ethics and, in more general terms, for re-interpreting the CUDOS norms so as to deal specifically with the issue of what should be considered good practice when scientists aim to address a wider public.

Against the background of the changing conditions for doing science it is possible to ask how the norms might be modified so as to take the changes into account. This discussion, in turn, might feed into sociological enquiries concerning current social norms in science. And that, again, might serve to spur discussions on the interpretational scope of the norms. Here, however, the enquiry is limited to the question of possible modifications of the norms with a view to facilitating the inclusion of ethical public relations concerns in the broader fields of research ethics and concerns about scientific integrity.

### **The CUDOS norms**

CUDOS is an acronym (deviating from Merton's original sequence of the norms) for Communism, Universalism, Disinterestedness and Organised Scepticism: "Four sets of institutional imperatives – universalism, communism, disinterestedness, organized scepticism – comprise the ethos of modern science" (Merton 1968: 607). Other key words emphasised by Merton were "intellectual honesty", "integrity" and "impersonality" (Merton 1968: 596).

The norm of *communism*, according to Merton, related to knowledge as a public good and to science as a collective enterprise depending on cooperation in order to achieve its aim of accumulating knowledge. He argued that communism "in the non-technical and extended sense of common ownership of goods" was an "integral element of the scientific ethos". For science to continue there had to be a "common fund of knowledge". Therefore, he went on, "[p]roperty rights in science are whittled down to a bare minimum by the rationale of the scientific ethic". Accordingly, he saw problems relating to patenting precisely as that: problems. And he pointed to "recognition and esteem as the sole property right of the scientist in his discoveries". Concluding, he related the norm of communism to openness: "The institutional conception of science as part of the public domain is linked with the imperative for communication of findings. Secrecy is the antithesis of this norm, full and open communication its enactment" (Merton 1968: 610-611).

The norm of communism is the only Mertonian norm which has been directly affected – that is: has become difficult to practise – by the changing conditions, during the recent decades, for doing science. On the other hand, the recurrent controversies relating to the issue of intellectual property rights may be taken to indicate the existence of a rather strong commitment among groups of scientists to the norm.

The essence of the norm of *universalism* was explained by Merton as follows: "The acceptance or rejection of claims entering the list of science is not to depend on the personal or social attributes of their protagonist: his race, nationality, religion, class and personal qualities as such are irrelevant" (Merton 1968: 607). Currently, the demand that the authors of papers for peer review remain anonymous to reviewers can be seen as an application of the norm.

The norm of *disinterestedness* is the most vaguely described of the Mertonian norms, but is probably most fairly interpreted as a norm of impersonality or a proscription against allowing personal preferences to enter the process of scientific research. Merton emphasised that disinterestedness should not be confused with altruism. He found that disinterestedness was – and should be – secured by way of peer review processes and other forms of mutual policing (Merton 1968: 613). Currently, the norm appears to inform not only the system of peer review, but also the stress on scientific method.

The norm of *organised scepticism*, presumably the most widely quoted of the norms, entailed a commitment to continuous, open, critical and sceptical exchanges within the scientific community. Merton made the point that “[m]ost institutions demand unqualified faith, but the institution of science makes scepticism a virtue” (Merton 1968: 601). He specified that scepticism in science was about “[t]he suspension of judgment until ‘the facts are at hand’ and the detached scrutiny of beliefs in terms of empirical and logical criteria”. This included the asking of “questions of fact, including potentialities, concerning every aspect of nature and society” (Merton 1968: 614). Currently, the norm informs the publication and peer review systems. Moreover, the commitment to open and critical discussion is widely hailed as the hallmark of science.

### **The CUDOS norms: science and society**

Centuries have passed since science in the Mertonian sense began to evolve. About seven decades have passed since Merton codified the ethos of science, using the CUDOS formula. It is our overall impression that the norms have remained remarkably stable. On the other hand, the argument has been made, during the most recent decades, that the Mertonian norms have now become obsolete (Nowotny et al. 2001). At the root of such reasoning lies the fact that Merton relied heavily on an understanding of science as an outsider to society. That understanding of science, we agree, has become obsolete, and it may, indeed, be considered self-contradictory to combine the Mertonian norms with an understanding of science as a societal institution. This, in our opinion, represents the main obstacle to current uses of his codification, even in a revised form. There is no way around that obstacle. It must be confronted.

Without raising any questions about it, Merton adopted the notion of the layman, inherited by science from the medieval church. The notion of the layman was crucial to his assumption of a radical science-versus-society divide. Actually, the one possible mechanism of destabilisation of the ethos of science that he specified and raised concerns about related to the possible invasion of the inside world of science by the outside world of society.

The scientist, Merton argued, “does not stand vis-à-vis a lay clientele in the same fashion as do the physician and lawyer, for example. The possibility of exploiting the credulity, ignorance and dependence of the layman is thus considerably reduced. Fraud, chicane and irresponsible claims (quackery) are even less likely than among the ‘service’ professions. To the extent that the scientist-layman relation does become paramount, there develop incentives for evading the mores of science. The abuse of expert authority and the creation of pseudo-sciences are called into play when the structure of control exercised by qualified compeers is rendered ineffectual” (Merton 1968: 613-614).

The latter statement is remarkable in a number of ways. Firstly, his observations regarding the almost complete absence of fraud in science do not correspond with current literature on scientific misconduct. But, secondly, his concerns with respect to the making of irresponsible claims and the possible abuses of expert authority may easily be related to current concerns about the public relations of science. Merton saw and pointed to a link between the breaking of *internal norms* (fraud, chicane) and of *public relations norms* (irresponsible claims). However, he appears to have made that link only intuitively and did not go on to question his own assumption about a radical science-versus-society divide.

Against this kind of background, Merton drew the conclusion that “[t]he social stability of science can be ensured only if adequate defences are set up against changes imposed from outside the scientific fraternity itself” (Merton 1968: 596).

At this point, revisions are needed for the ethos of science, as codified by Merton, to be maintained, revised and combined with an understanding of science as a societal institution. In his writings on the ethos of science, Merton seems to have made no distinctions between the notions of

the layman and the consumer or client – or, for that matter, between society and the market-place. A deficit model of the public formed part of his fundamental propositions, and it was not presented to the reader as an outcome of reasoning, open to being questioned, but rather as part of the natural order of things and, thus, as a starting point for reasoning. Now, question time has arrived.

Paraphrasing – and arguing with – Merton we propose that ‘the maintenance of the ethos of science, as viable maxims that respond to and interact with social norms, can be ensured only if adequate revisions are made with respect to widespread assumptions about what we should take the claim that science is a societal institution to mean’.

As science has increasingly become recognised as a societal institution, prejudices about society as the presumed opposite of science may come boomeranging back to the world of science, informing conduct in public that is directly at odds with the values which are inherent to the scientific ethos. If Merton’s assumptions about the *outside* world are maintained, then the erosion of those values appears to be inescapable to science as a societal institution. However, it may be possible to maintain the values if we discard or revise those assumptions – also in relation to the media as the epitome of a societal sphere of darkness. We fully acknowledge the difficulties of revising fundamental assumptions. Nevertheless, that is the point of departure of the following proposals for a revision and update of the CUDOS norms as a set of maxims that may, at the same time, be used as guidelines for conduct and as starting points for ethical reflection.

The argumentation has been inspired and will be supported by real-life illustrations in the shape of statements from two series of qualitative interviews with European scientists from two sub-fields of modern biotechnology: farm animal cloning (Meyer 2005 b) and animal disease genomics (Meyer 2005 c).<sup>1</sup> The statements are meant to serve a purpose of anchoring the ethical reasoning in real-life complexities.

### **A norm of openness and its limitations**

It is our overall proposition that a tacit norm of openness is present in Merton’s codification of the scientific ethos and may become useful in guiding conduct and informing ethical reflection on the public relations of science. It does not take a lot of digging to uncover varieties of a norm of openness in the CUDOS norms. Thus, scientists embracing those norms would be likely also to embrace a norm of openness in public relations. Moreover, the very formulation of a norm of openness might encourage scientists to turn their attention towards the issue of how they may preserve their integrity and be or become trustworthy in public relations, as distinct from attention to trust as a quality which is present or sadly absent in others (Meijboom 2008).

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<sup>1</sup> Together, the two series of interviews, which took place in 2005, encompassed 16 interviews with 18 scientists employed by public research institutions in eight European countries (Denmark, France, Germany, Italy, the Netherlands, Slovenia, Spain and the UK). Both series of interviews were conducted to support ethical reflection within the framework of European biotechnology projects. Thus, the interviewees can be considered picked at random with respect to the topic of the public relations norms of science. The interviews were semi-structured and took place in a conversational atmosphere. The interviewer took notes during the interviews and wrote interview reports which were checked by the interviewees (intersubjective validation). The interviewees were informed in writing that the interviews formed part of a wider research effort and that anonymised statements from the interview reports might be used in publications on the science-society relationship later on. The statements have been selected from the interview reports and anonymised to serve as illustration of the multitude of perspectives and points of view one may have to deal with in real-life encounters. Statements from 13 interviewees appear in the present paper. We take the statements as evidence only that some individual scientists are – or at least were in 2005 – actually concerned about public relations issues. We do not, of course, take the statements in any way to serve as evidence with respect to how widespread such concerns or various attitudes may be, but we consider them useful sources of inspiration for the purpose of identifying basic assumptions, attitudes and issues that should be taken into consideration. The anonymised interview reports can be obtained from the authors.

When compared to the four CUDOS norms, it becomes apparent that a fifth norm of openness, as a public relations norm, would be of immediate relevance to interpretations of the norms of communism, disinterestedness and organised scepticism. Firstly, demands for confidentiality in research cooperation gain significance as a possible transgression of the norm of communism. Secondly, a demand for openness about possible conflicts of interest and about basic assumptions and values, takes the shape of an ethical challenge related to the norm of disinterestedness. Thirdly, the norm of organised scepticism may be rethought as a norm of relevance not only to internal exchanges, but also to public discussions of science-related issues, thereby increasing the opportunities for citizens at large to distinguish “spurious from genuine claims” to scientific authority (Merton 1968: 614).

A norm of openness as a public relations maxim should not be expected to do more than serve as a *prima facie* guidance for careful and reflective action in a messy world, and would be in continuous need of interpretation and of weighing and balancing against other valid concerns. Thus, it should not be expected to give simple guidance on what is and what is not good conduct. Along similar lines, it should not be expected in itself to solve any dilemmas, neither in communication with representatives of the media nor in other public relations, but to ensure that communication dilemmas are considered thoroughly from case to case – rather than simply being bypassed. And it should ensure that the value of openness is included in deliberations about such dilemmas.

Some such dilemmas would be likely to relate to ‘good causes’. Should openness about uncertainties relating to climate models, for instance, be considered socially irresponsible because it could be used to support resistance against climate-friendly policies? Or should such openness rather be considered socially responsible because it might serve to secure a debating climate which is able to appreciate science *and* cope with scientific uncertainties? If the telling of half-truths is not considered an obvious approach to ‘serving the truth’ in internal exchanges between scientists, why should the reasoning be different with respect to public relations? Openness in internal scientific exchanges is valued because it furthers the sharing and advancement of knowledge and the exchange of ideas (Shamoo and Resnik 2009). Are there reasons to believe it would work differently as a public relations norm? Should citizens be regarded autonomous, or should science acknowledge a mild form of paternalism as part of its societal responsibilities (Resnik 1998)? These are examples of questions that a norm of openness in public relations would be likely to bring to the fore in deliberation regarding good scientific conduct.

Other challenges might relate to the execution of discernment on relevance or, if you like, to editing. A norm of openness in public relations would result in informational chaos if it was taken to be a strict rule that any new science-based information should be taken to the public domain. There is no way of circumventing the exercise of personal judgement on the relevance of new information to others, but in exercising this judgement it is important for the scientist not to let her own interest in gaining public visibility prevail.

The integration of public relations norms into the codification of the scientific ethos might serve to support scientists in their attempts to negotiate and combine their twin roles of scientist and citizen. Inclinations of that sort, and difficulties relating to it, have been observed and described as marked by the co-existence of a strong drive among scientists towards blowing their own trumpets in public *and* an equally strong wish that journalists should hamper such blowing of trumpets and make marketing difficult. This might be experienced as a dilemma by individual scientists, but it might even, if left unconflicted, result in a rift of mutual contempt in the scientific community between, on the one hand, very PR-minded scientists and, on the other hand, scientists tending to turn their back on society altogether (Meyer 2005 a). A similar ambivalence has been observed in another study (Folker et al. 2009). Nothing is known about the extent of these experiences and attitudes in Denmark – both studies were Danish – nor, indeed, in a broader context. Nevertheless,

they can be seen as an example of the kind of ethical public relations challenges that scientists may currently have to deal with.

It is an important advantage of the norm of openness that it provides a much needed steppingstone between codes of internal and public conduct. It might seem easier to approach science communication as a special case of communication – only, this would not include the recognition of science communication ethics as an integral element of research ethics and, thus, as a responsibility of the scientific community. One approach, however, does not exclude the other. This is not an argument against the treatment of science communication as a special case of communication, but it is an argument for integrating a norm of openness in public relations in research ethics.

Openness, it should be emphasised, is itself an open concept and may be interpreted in many ways (Meyer 2003). Here, we have given it an interpretation that focuses on transparency, access, truthfulness and receptiveness. We will now try to elaborate on these four aspects of openness. Furthermore, we will try to illustrate, based on interviews with scientists, how each of these aspects of openness may give rise to discussions.

### **Possible conflicts of interest: openness as transparency**

Conflicts of interest, and how they ought to be dealt with, are major topics in the literature on scientific conduct and misconduct, particularly in literature from the most recent decade. Generally, it is recommended that scientists inform about their financial or other engagements which might constitute or be perceived to cause a conflict of interest. Typically, scientists are expected to inform the research institutions employing them and to include the information in submission of papers for journals and in applications for funding. We have not, however, come upon any reference to public appearances in the media (outside the field of academic journals) or otherwise with respect to this demand for transparency. The closest we have got was the statement in National Institutes of Health guidelines that the information should be given “in all written communications and oral presentations” (Macrina 2005). In the latter case, a specific argument would have to be made for excluding media or other public appearances.

The trend towards the commercialisation of science, the consequent rise of possible conflicts of interest – and of a growing amount of hype (Nowotny et al. 2001) – is a source of disagreement among scientists. This kind of disagreement became evident in the interviews with European bioscientists mentioned in the above. Thus, the following critical statements from two of the interviewees should not be taken to represent a majority view. They do, on the other hand, serve to illustrate the kind of concerns that some European scientists are currently struggling with, regarding how possible conflicts of interest might affect relations to the public at large and possibly, at the end of the day, even the identity of scientists.

One interviewee made the claim that “[t]here is much dishonesty in biotechnology” and argued: “You are supposed to claim that, possibly, you will be able to achieve this and that ... Scientists are, along the road, being turned into a kind of petty liar. It happens, you know – just before the deadline for applications for grants expires, some people, who are otherwise reasonable and honest persons, will be making the most golden and lofty promises”. Reflections were made on possible effects on scientists themselves: “Undoubtedly, the large research projects cannot be run only by means of public money. Moreover, public authorities almost send out bulls of excommunication if you do not cooperate with private companies. That sort of cooperation affects you. It influences what you are permitted and not permitted to make public. It also influences your thinking and your attitudes.”

In another interview, the introduction by the interviewer of the issue of hype, was responded to by way of a reference to a ‘platform’, taken by the interviewee to be constituted by scientific and

commercial actors in the area of gene technology: “They are tempted to do so in order to justify the enormous amounts of money they are using ... [...] we see a continuation of the claims that gene technology will be able to solve all sorts of problems. It is because they have to feed the platform”.

To some extent, concerns like these might be dealt with – as distinct from being solved – by way of a demand for transparency about financial and other engagements that might affect the judgements of scientists. Media and other public appearances – like, for instance, scientists presenting themselves to the world on individual or institutional web-sites – would automatically be included, and the norm of openness would provide an obvious starting point for the possible formulations of more specific public relations guidelines.

### **Demands for confidentiality: openness as access**

In some areas of science – biotechnology is presumably a prominent example – demands for confidentiality in research cooperation with commercial companies have become sufficiently widespread in public research institutions to make this an issue that pops up regularly in interviews with scientists employed by such institutions. Demands for confidentiality represent a direct break with a norm of openness as access; they may not only interfere with academic publication routines, but also raise doubts in the wider public about the disinterestedness, integrity and trustworthiness of scientists. Thus, it is a major public relations issue.

In the two series of interviews with European bioscientists, demands for confidentiality became a prominent topic. Most interviewees found that results from research taking place at public research institutions ought to be publicly accessible, but there was no unanimity. We have selected statements that serve to illustrate the variation with respect to points of view.

Some interviewees expressed uneasiness about experiences connected to secrecy in science, as illustrated by this statement: “When you go to scientific meetings these days, you don’t hear anything new. And before you start talking with colleagues, they will ask you to sign a confidentiality agreement”.

Another example refers to similar experiences: “Sometimes at scientific congresses there are contributions from scientists who are employed by the research departments of commercial companies. There are topics that they do not talk about. Because of their attachment to a company they are barred from being open about some aspects of their research. Their contributions end up like a sort of advertising. Afterwards, the rest of us agree that from now on we are not going to invite that kind of person to the meetings. The problem is, however, that frequently they are in possession of something that we need – typically, they have access to far more material for research, to data concerning a far larger number of animals.”

Some were confident that demands for confidentiality could be combined with independence. For instance: “Some confidentiality is needed in order to get sufficient funding for research, but it is still possible to be independent”. Others were less confident: “We have trapped ourselves by cooperating with private companies. Some of us are really publicly oriented, and we want to publish in journals that are open to anybody. But we also want companies to invest in research, and they want some confidentiality.”

These statements did not exhaust the possibilities. On a third occasion confidentiality clauses were discussed as a necessary driver of scientific progress: “Sometimes the common good may be served by the protection of information. Otherwise it might become difficult to get research funding, whether from national or from commercial sources. It is in our interest as a society that research can actually take place. A precondition for this is the existence of risk capital.”

The discrepancies between such statements point to a more basic disagreement about what the claim that knowledge is, or should be, a common good should be taken to mean. One interpretation has it that public access to scientific knowledge is the proper embodiment of the

understanding of knowledge as a common good. Another interpretation, however, takes ‘knowledge’ to be synonymous with ‘scientific progress’. On that interpretation, confidentiality clauses may be defended as necessary means to furthering knowledge – as scientific progress – as a common good.

There is nothing new about these conflicting interpretations. Thus, Merton noted seven decades ago that there was “a tendency for scientists to assume that the social effects of science must be beneficial in the long run”. He also claimed that this assumption involved the confusion of truth and social utility and that “[t]his article of faith performs the function of providing a rationale for scientific research, but it is manifestly not a statement of fact” (Merton 1968: 600). The most important task to be confronted currently seems to be to resume the discussion between these different points of view.

The hampering of access to scientific knowledge may come in other shapes than that of demands for confidentiality in research cooperation with commercial actors. Scientists in the public sector may be subjected to demands for confidentiality, and two other factors, more indirect, but still not without significance, deserve mention. Firstly, access may be hampered when scientific results are published in academic journals demanding payment for access, in practice making it difficult for persons outside the academy to access these results. Secondly, although the dominance of the English language in publications and exchanges on science may facilitate international exchanges between academics, it also creates barriers towards citizens who are less familiar with English.

Again, it is obvious that a norm of openness may provide some degree of guidance and, importantly, may serve to prompt reflection and discussions within the scientific community, but it should not in any way be considered a solution in its own right.

### **Scientific uncertainty and disagreement: openness as truthfulness**

The much debated notion of scientific uncertainty has, when related to science journalism and communication, been equated with the existence of disagreement among scientists (Friedman et al. 1999). With that understanding, uncertainty – rather than being a fundamental feature of the scientific endeavour – should, in public relations contexts, be considered a transient deficiency in the scientific community. Scientific uncertainty is taken to be present when scientists within a more or less well defined field are unable to present a consensus and, thus, to present a united front towards the outer, societal world. Which makes sense if the science-society relationship is assumed to be a we-versus-they relationship, and if the existence of a scientific community as a ‘we’ is taken to be preconditioned by consensus and to be weakened by disagreement or conflict.

Along similar lines, science communication – external as opposed to internal – may be understood as the dissemination or transmission of scientific knowledge to a public of lay consumers of scientific information (Friedman et al. 1986: xvii). Linked to this convention of science transmission is an aim of helping scientists to get “functional information into the public domain” (Friedman et al. 1986: xii) – only, the information cannot be considered functional if there are internal disagreements among scientists as the producers of scientific knowledge. Openness about uncertainty, then, comes to mean no less and no more than openness about transient disagreement among scientists. And such disagreement is seen as an embarrassing mark of weakness.

The adoption of a general norm of openness – pertaining not merely to internal exchanges but also to public relations – would not be compatible with the above scheme; nor, indeed, with the above definition of scientific uncertainty. Rather, it takes as its point of departure the assumption that uncertainty is a fundamental feature of the scientific endeavour. Thus, it is a demand not only for openness about momentary disagreement, but for a wider acknowledgment that scientific

knowledge always comes with some degree of uncertainty and may be subject to different interpretations. Moreover, it is a demand for openness as open-minded reflection on the limitations of science and of individual scientific projects. And this, in turn, includes open-minded reflection – and openness towards such reflection – on the limitations of scientific methods, and on when and how to use or abstain from using such methods.

It has been argued that even critics seem ready to accept “the premise of almost non-existent limits to the influence of science and technology on society” and that science constitutes a “search for any elimination of disagreements” (Stehr 1994: 65, 262). However, presumably – and hopefully – questions relating to uncertainty, interpretation and limits are high on the agendas of everyday, internal exchanges among scientists, taking disagreement to be a healthy response to the complexities of science, and taking a scientific search for truth to be preconditioned by the personal quality of truthfulness (Williams 1993: 200) in scientists. A general norm of openness would take these internal norms of discussion to be valid also to the public relations of science.

In effect, this might prevent the possible growth of mysticism and pseudo-science (Merton 1968: 614) as the citizenry at large would be less likely to confuse science with magic (Stehr 1994: 112) and to ascribe science an unlimited problem-solving capacity. Moreover, the expansion of this variety of openness to cover also the public relations of science might serve to prevent the polarisation of attitudes to science-related issues in pro- and anti-science camps, which might easily be provoked by groups of scientists presenting themselves to the rest of the world as a united front. There is concern among scientists about many of these issues. There is also confusion and a good deal of raw reflection – reflection, that is, which seems not to have been moulded by critical discussion and probing into basic assumptions, but rather to be based primarily on intuitive reactions or the spur of the moment. This is an overall impression from the two series of interviews with European bioscientists. The following statements from these interviews serve only to illustrate the range of responses that a key phrase like ‘openness about uncertainty’ may give rise to.

During one interview the concern was expressed that hype might backfire: “We should try not to over-sell. The point is also to avoid a situation where we are presented with demands for applications about which we are far from certain.”

On the other hand, some might share the fear, expressed in the following statement, that openness about uncertainty might undermine the trust in scientists: “Scientists have become almost victims of the way the media work. Openness about uncertainty could easily end in the conclusion that ‘these people do not know what they are talking about’ ... If I talk to farmers, knowing there is ambiguity to our results – there is much variation in our results as regards resistance to nematoids – I would try to make the advice consistent with the ambiguity. I will say, then, that we believe that this or that works pretty well most of the time.” The question of whether direct reference was made to scientific uncertainty and ambiguity was answered: “I don’t say directly – ‘well, there’s a lot of ambiguity here’.” And the question ‘Why not?’ was answered as follows: “It would be discomfiting and unconvincing, I guess. There should be a clear message. If you started getting mixed messages, support would evaporate rather quickly. As a society, we want quick, simple messages.”

The fear that openness about uncertainty might damage the trust in or reputation of science has been described also in other studies (Folker et al. 2009).

The assumption that the public is incompetent to discuss science-related issues was rather a staple among the interviewees as was the blaming of the media. A typical example: “I don’t think that the public is actually in a position to discuss questions relating to animal cloning. The public is biased, because of the media hype about human cloning. Thus, I would choose instead to try to educate the public on the possible applications of animal cloning.”

Again, however, there was not just one opinion. During another interview the following argument was made: “There is distrust. And the distrust is not without reason ... Compared to ten years ago, we have today, I think, a lot of proof that GMOs are basically healthy, but we should remember that we didn’t have that evidence ten years ago. At that time we said that everything was just fine – but actually we did not know, and people were aware of that.” Later in the interview, a connection was made between distrust and commercialisation: “I also think that distrust has increased because there are today a lot of commercial interests in science”. The media, it was argued “do not help, but they are not the origin of the problems”.

Apart from the rather widespread perception of the public as incompetent to discuss science-related issues, assessments seemed to go in all directions rather than relate to a shared discussion, and there was a curious, overall mix of concern and indifference. This may be taken to indicate a general absence of reflection and discussion on the public relations of science as an ethical challenge that deserves serious and continuous intellectual attention by the scientific community. As regards openness about uncertainty, limitations and disagreement, the adoption of a general norm of openness, unaccompanied by such attention, would be likely to remain a mere formality.

### **Openness as receptiveness**

It is a shared feature of the above interpretations of openness that all of them are connected to acts of providing others with information or assessments. A norm of openness may, however, also work the other way around: it can be seen as a demand for willingness to receive information or assessments from others. In a public relations context this includes openness towards arguments and points of view of a non-scientific nature and, thus, is preconditioned by the acknowledgement that reason and sound judgement may be found outside the province of science, and that scientists might gain from having to consider other perspectives. As this is preconditioned by the ability to actually grasp a point of view which is substantially different from one’s own, it is certainly not the most easy variety of openness to practise.

The interviews with European bioscientists indicated a certain amount of awareness of the usefulness of being confronted with other perspectives. As a rule, references were made to other branches of academia and to scientific cross-, inter- or multi-disciplinarity, but the basic reasoning concerned the appreciation of having to consider a variety of perspectives.

One interviewee explicitly supported the EU’s decision to make it obligatory that ethical aspects of scientific projects should be looked into. This support, it was said, was founded on a conviction of the importance of communication, and the following elaboration was made: “It is also because it gives another dimension to our work. It forces us to think about what we are doing in another way; not only in a scientific way.”

During an interview that included three interviewees at the same time, the following exchange took place:

The case was made by one participant that “societal aspects of research have become more and more important. They relate to questions about animal welfare and to aims of our research – what we are preparing for the future regarding farm animals. But I think that research should be disconnected from societal pressure. It creates difficulties for basic research [...] I mean – it is a problem if research is conducted simply on the basis of some feeling in society...”

Another participant disagreed: “But pressure does not have to be negative. There are also positive aspects of pressure... [...] From the next month onwards we will have a series of seminars at this institute about animal welfare. That is positive [...] it is positive that we at our institute are now pushing multi-disciplinary research ahead. As a research institute we have a special obligation to do these things. Sociologists and philosophers take part in the research, and that multi-disciplinary work will influence the planning of future research projects in our field. It influences the way we

move on as scientists. It is positive. [...] It means that if we want to use transgenesis in relation to domestic animals we will have to provide convincing arguments for doing so.”

A norm of openness as receptiveness may even prove helpful to dealing with the phenomenon of hype: Gilded promises from scientists about the future outcomes of their projects should not be taken necessarily to be informed by cynical speculation, but might just as well be the result of hopeful thinking and lofty visions. In other words: not all scientists may all the time represent the epitome of realism.

As an example, one interviewee appeared unwilling to accept death as a necessary part of life, arguing: “In the long run to swap bodies could be seen as a possible way out of the death of an individual. It might become possible to move into another body – thus confronting us with a somewhat religious question about what a human being is: is it the body or the soul?”

In the context of a public discussion, statements of this kind would be likely not only to inspire fascination in some, but also to prompt down-to-earth exchanges on the limitations of life and, indeed, of the life sciences. To particularly tightly knit and enthusiastic research environments, as well as to hopeful sponsors, this might prove a healthy exercise.

A norm of openness as receptiveness presupposes that contradiction is considered beneficial. That presupposition already forms part of the internal, scientific communication norms. Moreover, it is crucial to the institution of public discussion. As ever more complex societal problems and issues are subjected to scientific enquiry, it has become crucially important to public discussions on science-related issues.

#### **IV. CONCLUSION: SCIENCE’S OBLIGATION TO OPENNESS TOWARDS THE REST OF SOCIETY**

Summing up, we have found that ethical public relations challenges seem to be underexposed in current literature on scientific conduct and misconduct. The changing conditions for doing science – the increasing influence of science as an institution, and the increasing dependence of individual scientists on external funding – have informed guidelines relating to internal affairs, but do not seem to have inspired a systematic rethinking of the public relations of science from an ethical perspective. Scientists are simply being expected to consider the reputation of science, and not to go public until their work has been through a process of peer review. This, we have argued, is inadequate to meet present challenges.

Against that background, we have proposed a slight modification of the Mertonian norms of good scientific conduct, adding a general norm of openness to the public to Robert K. Merton’s CUDOS norms (relating to communism, universalism, disinterestedness and organised scepticism). Relevant aspects of openness include, at least, openness as access, accountability, receptiveness, transparency and truthfulness.

Norms, we take it, cannot simply be imposed from the outside and turned into social norms by way of rules and regulations. It is therefore important to notice that a norm of openness already seems to be present in the Mertonian norms; only, it has not been formulated as a maxim that may cover also the public relations of science. Of equal importance is the actual endorsement within today’s scientific community of the CUDOS norms of good scientific conduct. We have argued that most of those norms currently inform vital elements of the scientific institution, like the publication and peer review systems and the concept of, and stress on, scientific method; and that this indicates a fundamental endorsement of the norms which is also reflected in recent codifications of norms of good scientific conduct. Moreover, some current concerns among scientists – like concerns about demands for confidentiality – may be interpreted as reactions to possible transgressions of the Mertonian norms.

It is our general impression that individual scientists to a great extent are left alone with ethical concerns regarding public relations, and often will have to struggle with them in the light of assumptions that seem, in other walks of science, to have been losing ground during the most recent decades: assumptions, that is, about a radical science-society divide, and a consequent divide between scientists and a general public of lay consumers.

Our proposal for a modification of the Mertonian norms of good scientific conduct (CUDOSO) is intended to further the maintenance, including a continuous process of revision, of traditional scientific values in science as a societal institution – autonomous, but not in a state of, or attempting to achieve, autarchy. We have argued that for the values to be maintained, the assumption of a radical science-society divide – appearing in Merton’s writings as an all-important pillar of the scientific ethos – must be replaced by an understanding of science as a societal institution with an obligation of openness towards the rest of society.

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