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TRUST AND CONFIDENCE IN SCIENTIFIC RESEARCH

Trust and Confidence in Scientific Research

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Abstract

There is empirical evidence indicating that trust in research is decreasing. If distrust is justified, this is a good thing; if not, it is a cause of concern. A basic question concerns the reasons for, and the causes of, distrust. Which are they, what do they mean, and how reliable are they?

The papers and presentations in this volume focus on external and internal factors contributing to distrust of science. The identification of such factors will help to understand better why trust is declining, whether this is justified and what should be done about it.

The book contains essays by an international group of researchers. Some contributions discuss more general questions as what can be learnt from the history of science, contemporary threats to faculties of letters, and controversies over criteria of quality. Other contributions discuss more specific issues such as publication for sale, ghostwriting and "Spin", and the role of media.

Keywords

Trust, confidence, quality assurance, scientific research, images of science, scientific integrity, creativity, creative environments

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Introduction

Göran Hermerén

Trust is an elusive notion. It takes time and effort to earn, and it can quickly be lost. Trust ties past actions and events to present expectations and to a predictable future. As has been pointed out by several researchers, it is usually accompanied by a disposition, in those who trust, to react negatively if their expectations are not met. Sometimes trust is unjustified and distrust justified, which complicates the picture and raises epistemic questions about the grounds for trust and distrust.

There is empirical evidence, at least from my own country, Sweden, indicating that public trust in researchers and in research is decreasing. If the distrust is justified, this is a good thing; if not, it is a cause for concern. But a basic question concerns the reasons for, and the causes of, the distrust. What are they, what do they mean, and how reliable are they? This conference focuses on external and internal factors contributing to distrust of science.

Scientific research is understood in a wide sense, and thus is not limited to the natural sciences; and the focus here is on issues of principle – not on blaming individual researchers, institutions or governments. If we are able to identify factors in distrust, we will be in a position to understand better why public trust is declining, whether this is justified, and what should be done about it.

We want to avoid generalities. That is why we have chosen to discuss a number of specific issues, such as ghostwriting, salami publications, misconduct and distrust, and to look at these in particular from the journal editor's point of view – as well examining the situation in different areas of research. By focusing on specific issues and the factors contributing to changes in attitudes of trust, and by deepening the examination of these issues, it should be possible to advance discussion further. External and internal threats – as well as possibilities to regain trust – will, we hope, be identified.

Other specific issues could have been chosen. We discussed a few of these possibi-

lities in the organizing committee, but the program is full as it is. There will be an opportunity for follow-up, and we hope that further topics, like the controversy over the reliability of findings and methods in diet and climate research, will be discussed in future conferences like this one.

Needless to say, the problems are international, and both the OECD and the European Science Foundation have discussed some of them. An international perspective is essential in view of the increasing amount of research collaboration across national borders and disciplinary boundaries. An important reason for the symposium is that successful collaboration between researchers in different countries presupposes consensus on the basic issues covered by this symposium.

The main theme will be to discuss and clarify criteria and grey zones defining quality in research, unethical research, and pseudoscience. The criteria can be discussed from various points of view: from the perspective of those who carry out research, those who evaluate research, or those who finance research. We will discuss the ways in which factors affecting distrust and trust, including criteria of quality, are identified, measured and dealt with by universities and other institutions, and in particular by public and private funding organizations.

The role of media and science editors should not be forgotten in this context. Of course, the media are very important: what they write – or do not write – will probably have more impact on people's attitudes to science than the scientific reports themselves. The same goes for movies. That is why we included sessions dealing with communications and reportage.

But we do not want to end on a negative note. The final part of the conference will be devoted to a discussion of what is currently being done, and what could and should be done, to deal with the problems. At this point we will focus on methods of quality assurance; and we will look at some examples to see what, if anything, we can learn from them.

Since this symposium took place, interesting reports have been published showing an alarming increase in the number of papers retracted in recent years in the life sciences. In a detailed review of over 2000 biomedical and life-science research articles indexed by PubMed as retracted, Fang et al. (2012)[1] found that the "percentage of scientific articles retracted because of fraud has increased (roughly) tenfold since 1975", and that "67,4 % of retractions were attributable to misconduct".

The paper is relevant to the theme of this conference, since one of the things that can undermine trust and confidence in science is fraud, plagiarism and other forms of

1 Fang, F.C., Steen, R.G. & Casadevall, A., 2012, "Misconduct accounts for the majority of retracted scientific publications", *Proceedings of the National Academy of Sciences*. http://www.pnas.org/content/109/42/17028

misconduct. Incidentally, Fang et al. also show that the retractions "exhibit distinctive temporal and geographic patterns that may reveal underlying causes".

Last but not least, on behalf of the organizing committee – the other members of which are Kerstin Sahlin and Nils-Eric Sahlin – I want to thank the Royal Swedish Academy of Letters, History and Antiquities and its President for their support of this conference, and to express the hope that this volume captures something of the vitality and urgency of the issues discussed during our meeting.

Science – Walking a Tightrope

Heinrich Rohrer

We are here to reflect on "Aspects of Trust and Confidence in Scientific Research". In his invitation letter Nils-Eric Sahlin expressed this more bluntly as "a meeting on Science, Quality, Fraud, and Ghost-writing". A Google [or whatever the search engine was] search on "scientific misconduct" retrieved approximately 1.5 million results. Browsing through the first few hundred of them, I concluded that most dealt with the same, roughly 30, cases – although I admit that I am not versed in web use. Thus, scientific misconduct appears to occur in numbers that are relatively tiny when compared to all the millions of busy lawyers and thousands of court rooms filled every day treating "misconduct" in areas outside science.

After reading the 12 Wikipedia pages on "Scientific Misconduct", the 10-page minutes of the 2003 IUPAP workshop on "Scientific Misconduct and the Role of Physics Journals in its Investigation and Prevention", and a synopsis by David Goodstein in AAUP, I thought that the field was covered – in fact, over-covered.

Most of the reports reiterate competition, pressure, and other trivial excuses for scientific misconduct. Adding yet another catalogue of similar items – what happens, why, and where, and the remedies available – will not provide anything new. So let me make some general remarks on the way we deal with science. I consider these wider problems much more detrimental to science in general – and not just to "Aspects of Trust and Confidence in Scientific Research" – than scientific misconduct. Many of the thoughts I have already expressed on other occasions, and I have not taken the trouble to dress them up in different words, so please excuse a degree of self-plagiarism.

It is my contention that scientific misconduct *per se* is not yet a relevant and critical factor of the kind that might have a tangible impact on trust and confidence in scientific research and science in general, or seriously impede scientific progress, or divert science from its noble mission to serve the benefit of humankind. Fraud and cheating

are not the norm in scientific research; they are a rare exception. They are mostly detected at a very early stage by the scientists themselves. But whatever limited misconduct might still be occurring in science, it is still too much. We scientists are no angels, and we have to accept that we are caught between the ideals of science and a world full of expectations, of demands, and of its own survival rules. Nevertheless, scientists are expected to act as shiny examples, and they should be sufficiently clever not to gamble on getting away with misconduct in the scientific arena. Sufficient preventative mechanisms operate against misconduct, but they have to be enforced seriously by all involved. Authors will do much better if they always understand reasonably well what they are publishing with their co-authors. Authorship means responsibility, not just profile decoration. It appears to me that many author accreditations today are not much more than lists of acknowledgements moved from the back of the publication to its front. Nor do academic and professional institutions, agency heads, science managers and editors do very well in dealing with the problems at hand. They often hesitate when they should be handling misconduct cases rigorously. This is gross negligence, since the reputation of science as a whole is at stake, and not just that of one person, institution or journal – or even that of a national scientific community.

Ironically, those caught blame competition, pressure to publish, the accumulation of recognition and prizes and the like, saying that these force them to indulge in "misconduct". They blame the very practices and incentives they themselves introduced into science – practices that they encourage and support together with the scientific community. But while the menace of misconduct has been grossly overblown so far, we nevertheless have to rethink what science is about – its values, virtues, beliefs and shortcomings. We have to look again at how best to conduct science for the prosperity of humankind without scientific misconduct.

It appears that the "hard" sciences and engineering, with mathematics and physics at the top end, are less prone to misconduct than extensively covered scientific disciplines like medicine, and humanities subjects such as philosophy, economics, and the social and political science. In the former "right or wrong" can be transparently formulated and established, whereas in the latter the "truth" is entangled in an intricate and complex manner and is often based more on personal opinions than strict scientific criteria. The "hard" sciences are perhaps hard to learn, but in return they offer ready protection against misconduct. Second, "soft" sciences also have to perform under the impact of more outside interference and external expectations that there will be immediate deliverables. This should not be seen as a classification of science disciplines *per se*, but we must always question what the scientific content really is when we hear the term "scientific". Like "sustainable", this word is well on its way to becoming a meaningless alibi expression. We have to be aware that the word "scientific" is at present undergoing damaging inflationary devaluation. Politicians, bureaucrats, opinion ma-

kers, and whoever else wants to get a nontrivial message across, all believe that "scientific" gives their statements an appreciable ring of credibility. In any case, scientific misconduct disqualifies anyone who practices it as scientist. Such a person would therefore have been better off choosing to work somewhere where the honesty grapes hang less high.

Scientific research is about novelty, discovery, and sheer curiosity. Science is a road to new shores and into unknown territory and the Promised Land might lie behind many mountains and hills. The path to follow is not scientifically predefined; it requires decisions at every important step. Whether one is right or wrong becomes clear in retrospect. Thus errors are unavoidable, but they should not be left uncorrected for long. Science always requires us to walk a tightrope between faithful belief and the impulse to question, between common knowledge and creativity, between the defence of old territory and the decision to leave established grounds, between bias and impartiality, between expertise and fresh minds, between ambition and passion, between arrogance and self-confident conviction – in short, between human weaknesses (and that of the scientist in particular) and scientific standards, between today and tomorrow. On the tightrope, one has to deal with all of these and maintain the balance. The most important thing is awareness of the constant, unavoidable background noise of a bias towards oneself.

Unfortunately, science has lost and is still losing quite a bit of its spirit, and the charm, the great passion, the devotion and the enthusiasm, which pushes the frontiers back and takes science and technology into new lands along the paths of curiosity. Science operates increasingly in a context of competition, financial and recognition incentives, abundant prizes and distinctions – and with claims, vain promises and assurances, and other personal promotion schemes. None of these make science and scientists any better. None makes the scientific researcher think more deeply or act more progressively. I am not aware of any breakthrough born out of competition. All of these practices are on loan from the business world, and we should give them back as fast as we can. They all impair freedom of thinking, which is the most precious asset in science. They suffocate adventurous minds and encourage people to follow worn and obvious paths. They divert attention away from what you think it is most worthwhile to do, from your own capabilities, and from the very high global standards of science based on creativity, novelty, openness, truth, and honesty. We have to understand that incorruptible selection of people, proposals, topics, and methods has nothing to do with competition between those who select or those selected. In science, as everywhere else, insight and wisdom count, and not just sheer knowledge, know-how and skills. Remember the two beautiful lines in the opening stanza of "Choruses from the Rock" by T.S. Eliot:

> Where is the wisdom we have lost in knowledge?
> Where is the knowledge we have lost in information?

And today one could add: Where is the information we have lost in Bits?

As to the young generation, I believe that we underestimate them. Of late the science community has been concerned about not being able anymore to attract brilliant minds. I am not that pessimistic. We have heard, over recent decades, a steady stream of complaints about losing this or that many brilliant brains to the financial sector. I consider it a stroke of luck for science that these "brilliant brains" made a big mess elsewhere. The young scientists are not that different from us at that age. Still, many of the gifted ones see hard work as the challenge of becoming a profiled member of society. Hard work is still a strong, inherent driving force for human beings, enabling them to meet tough challenges successfully. Young scientists see this, and science needs them to do so. But we have to be very careful not to corrupt them during their education from childhood to university, with all the questionable practices we have adapted in recent years, in society at large and in science as well.

The young scientists are the ones who can sort out the mess we old ones have made. But we have to help them and encourage them; we have to leave our reigning kingdoms and become their mentors. I used to address them with **five wishes**:

(1) My first wish is that you retain an unbiased mind and that you control information and knowledge, not vice versa. You do not create anything new except when you venture into new and untouched lands beyond accepted knowledge, skills, ability, and thinking. Being impartial also about your own thoughts is often very tough, but it is indispensable.

(2) My second wish is that you become proud and courageous scientists. Be proud that you are the key to the prosperity and wellbeing of society – more than ever. This is the most precious recognition of your "passion for science" and your scientific performance. It brings you a noble satisfaction which makes broad performer applause redundant. Be courageous in standing up for your convictions, for what you think is worthwhile. You have to be your own measure and standard. On the question "What should be done in science?" there are so many others who believe that they know better, and believe they can do better.

(3) My third wish is that you are both lucky and skilful in selecting research collaborators and research topics. I know that luck is not part of the scientific vocabulary. Intellectual

mastery, bottomless knowledge, and scientific expertise rank much higher. Nevertheless, luck is a crucial driver of scientific progress. The first question should always be: "What would I change, if I could do so?" You will not always find a good answer, but without a question, there would be none at all. You can then approach the question – "How can I do it?" – in a different state of mind. And only after this can you turn to questions about sustainability, hazards, environmental aspects, ethics, finances, and so on. This is just a temporal sequence, not an order of importance *per se*.

(4) My fourth wish is that you live in relaxed and fruitful symbiosis with society. Society has to trust you as one of its members; then it might also trust and appreciate more deeply your scientific intentions.

(5) My final wish is that you will be one of the scientists who are paid for what they are doing and not someone who does what they are paid for. Then you will bring the future to the present with your visions, passion, and devotion, and the present will simply fade away.

These are wishes simple enough to understand. I refrain from preaching honesty, virtue, and the like. For those who do not have these advantages, that would in any case be in vain.*

* On April 15, 2008 I was giving a lecture in Gothenborg, Sweden with the title *Luck and Chances,* at an event for young scientists on "Mind Power, Science, and Leadership". This lecture already contained the "Five Wishes for young scientists", which are more or less my credo.

The "Five Wishes" are an important part of the Stockholm lecture *Science – Walking a Tightrope* from 2012. The wishes will also appear in this year's Lindau meeting of Nobellaureates (Lindauer Tagung der Nobelpreisträger), 30th of June 2013, although I cannot go to Lindau for the meeting.

Scientific Truth, Copernicus, and the Case of an Unwelcome Preface

Jürgen Mittelstrass

Let me start with some general remarks about scientific truth, a notion which was once taken for granted in science and philosophy of science, and about the ethos of the scientist, a notion which also seems to be losing its grip on scientific practice. Science is the expression of universal claims to validity, and this is true both in the sense that it is a special form of knowledge formation, that is to say of the scientific production of knowledge, and in the sense that there is a specifically scientific ethos, which is also the moral form of science. The orientation towards truth typical of the former follows the orientation towards truthfulness of the latter. This is to say, quite simply, that *truth* determines the scientific form of knowledge, whereas *truthfulness* determines the moral form of science, which as a result belongs to the form of life of the scientist, to his ethos.

Where the notion of scientific truth leads into philosophy of science, becoming more and more subject to a relativistic view – although it should, as a guiding *idea*, play an essential role – the notion of a scientific ethos leads to ethics: in this case, to the ethics of science. This ethics deals 1) with research-focused ethical problems and principles – for example, problems arising within stem cell research and reproductive medicine; 2) with application-focused ethical problems and principles – for example, research in nuclear physics which leads to products whose manufacture and use creates serious ethical problems; and 3) with ethos-focused ethical problems and principles since, as in other areas of human practice, falsehood and deceit also have their place in science. It is the third type of problem which will be discussed here. Both in the history of science and today, there are many examples – recall the scandal that took place in stem cell research in a South Korean institute in 2005, or the faking of research results by a German physicist at the Bell Laboratories in 2002 – of methods and results being manipulated, or plagiarized, and of publications being tampered with. If there

exists an ethos of the scientist and the scientific system, it is sometimes corrupted.

With that, everything seems to have been said about falsehood and deceit in science. Wherever they occur, both the ethos of the scientist and scientific truth are violated. But is that really all? Could there not be something like the "cunning of reason" which, on devious paths, serves the scientific truth, as a science-promoting deception? Let us consider an example from the history of science.

In 1543 Copernicus' crucial treatise, *De revolutionibus orbium coelestium libri VI*, was published in Nuremberg. The heliocentric system replaced the geocentric system, that is, the system in which the centre of the world is also the centre of the earth which had been valid till then. Copernicus had previously tried to mathematically represent the eccentric and compensatory movements of the planets in the (geocentric) Ptolemaic system using two uniformly rotating epicycles (*De hypothesibus motuum coelestium commentariolus*, c. 1510). When this did not work, he proceeded to develop a model in which some of the irregularities of the planetary motions could be explained as effects of the motion of the earth. He replaced the first epicycle and its concentric deferent with a kinematically equivalent eccentric deferent, which, however, also moves the sun from the centre of the system to an eccentric position. It was from this moment onwards that heliocentrism became the starting point of all further astronomic developments.

Copernican astronomy is thus the classic example of a scientific revolution – and not just one we see with hindsight, and so in a sense "discovered" by historians of science, but also one of which Copernicus' contemporaries were conscious. Galileo used it to agitate against the Aristotelian system of natural science, and Kant likens his radical conversion of epistemological perspectives to a "Copernican revolution"[1]. Indeed, even Copernicus' own assessment corresponds to this view. For him, the heliocentric model in the way he has presented it is the true model of the world. For instance, the Wittenberg mathematician, Rheticus, who had stayed in Frombork from spring 1539 until the autumn of 1541 to learn about the Copernican system, emphasizes in his *Narratio prima* (1540, 2nd edition 1541)[2], which contains the first short description of the Copernican system in print (even before *De revolutionibus*) that Copernicus has restored the "astronomical truth" and set out the 'true system of the world' (*systema mundi*)[3]. And Copernicus himself underlines this claim with his remark that he has shown the 'true form of the world' (*forma mundi*)[4].

In stark contrast to this, and to the customary classification of Copernican astronomy as a scientific revolution, stands the preface to the 1543 Nuremberg edition, written not by Copernicus himself, but by Andreas Osiander, a Lutheran theologian. Osiander prepared the first edition after Rheticus passed the duty of overseeing the printing on to him in November 1542. At the time he was taking up a professorship in mathematics in Leipzig. Against the Copernican self-understanding and its propagan-

dist representation by Rheticus, Osiander explicitly emphasises the *hypothetical* nature of the Copernican system.

Thus Osiander writes: "It is the duty of an astronomer to compose the history of the celestial motions through careful and expert study. Then he must conceive and devise the causes of these motions or hypotheses about them. Since he cannot in any way attain to the true causes, he will adopt whatever suppositions enable the motions to be computed correctly from the principles of geometry for the future as well as for the past. The present author has performed both these duties excellently. For these hypotheses need be neither true nor even probable. On the contrary, if they provide a calculus consistent with the observations, that alone is enough." He concludes: "Therefore alongside the ancient hypotheses, which are no more probable, let us permit these new hypotheses also to become known, especially since they are admirable as well as simple and bring with them a huge treasure of very skilful observations. So far as hypotheses are concerned, let no one expect anything certain from astronomy, which cannot furnish it, lest he accept as the truth ideas conceived for another purpose, and depart from this study a greater fool than when he entered it."[5] According to Osiander, then, Copernicus' achievement does not consist in having shown the 'true form of the world' (the *forma mundi*), but in having formulated an hypothesis which, like previous hypotheses, was suitable to represent the planetary system – just better, and more successfully.

Is this a betrayal of Copernicus? Is it possible to detect here complicity with the printer, Johannes Petreius, and the erstwhile abbot of the cloister of St. Giles, Friedrich Pistorius, who, after retiring from office, worked as editor at the printing office?[6] In effect, the interests of the church might have influenced the classification of the Copernican system. But that is rather unlikely. Osiander did not work in secret, after all. In a letter dated April 20, 1541[7] he writes to Copernicus (whose preceding letter from July 1, 1540 is now lost[8]), that he might want to address the hypothetical character of the kinematic astronomical models in the introduction: "For in this way you would mollify the peripatetics and theologians, whose opposition you fear."[9] On the same day, to Rheticus: "The peripatetics and theologians will be readily placated if they hear that there can be different hypotheses for the same apparent motion; that the present hypotheses are brought forward, not because they are in reality true, but because they regulate the computation of the apparent and combined motion as conveniently as may be; that it is possible for someone else to devise different hypotheses; that one man may conceive a suitable system, and another a more suitable."[10] Copernicus had been warned, but he did not respond to the warning. Although he also makes use of the term "hypothesis" in describing his system, he does not use it (as is common) to refer to hypothetical assumptions that could be falsified, but rather to refer to *principles* in a fundamental, or axiomatic, sense.[11]

Deceit of the reader? Perhaps, at first sight; the author of Osiander's preface remains anonymous. But Osiander repeatedly refers to "the author" in his preface *Ad lectorem*, and also to the original preface of Copernicus, the *Praefatio Auctoris*, which the book also contains. In turn, the author of Osiander's preface might be anonymous simply because an open intervention by a well-known Lutheran would have caused further commotion, possibly hindering the reception of the work.[12] Besides, Osiander enjoyed a scientific reputation of his own, despite the fact that he was not a scientist and had received no scientific education. Kepler, for example, referring to astronomical research, described him as "most expert on these matters"[13].

The history of science vindicates Osiander. Since antiquity (as a cosmological consequence of Aristotelian physics) a distinction had been drawn between mathematical astronomy (which is kinematic, i.e. force-free) and physical astronomy (which is dynamic). According to Simplicius of Cilicia, a commentator on Aristotle, it is the job of physical astronomy to discover the nature of the heavens and the celestial bodies (for which Aristotelian physics provided unrivalled conditions) and the job of mathematical astronomy to prove that the planetary world really is a cosmos – that is, a system ordered according to geometric rules (which might be shown using various, even heliocentric, assumptions).[14] Indeed, arguments based on physics that one could have adduced against an Aristotelian physics, which supported the geocentric system, are missing from Copernicus' writings, which is why the Copernican system belongs, following the remarks of Osiander, to the history of mathematical astronomy, not (yet) to the history of physical astronomy.

It is only Kepler who – on the basis of a new, and truly revolutionary approach, with which he overturns all of previous astronomy – strives for a new kind of physical argument. His formulation of a mutual attraction between two bodies, with its strength depending on their distance[15], already points to the direction in which Galileo's kinematics is going to be extended by Newton's dynamics. Kepler's second law (the radius vector sun – planet sweeps out equal areas during equal intervals of time) is explained by Newton dynamically, by assuming a central acceleration towards the sun, the size of which can be determined approximately by Kepler's third law (the square of the orbital period of a planet is directly proportional to the cube of the semi-major axis of its orbit). Speaking purely kinematically, the Copernican model is equivalent to the Ptolemaic one. The geocentric planetary movements result from vector-sums of the apparent movement of the sun to the heliocentric planetary movements.

In other words: Copernicus could not support with physics his claim to represent the true *forma mundi*, and as a result his system remained an hypothesis in the sense given by the astronomical tradition, and moreover one that was explicitly intended to rehabilitate the principles of the "old", that is, Greek, astronomy – the emphasis was on circular motions and motions of constant angular velocity. Copernicus believed

that these principles had been violated by the previous constructions of kinematic models following the example of Ptolemaic astronomy; his efforts were intended to restore the original principles in astronomy, but on the basis of a heliocentric hypothesis.

So the Copernican "revolution" turns out to be surprisingly conservative: with the intention of changing things in astronomy, Copernicus returns to the Greek beginnings of astronomy, methodologically speaking. This is also why the Copernican propaganda of Giordano Bruno, which stylises Copernicus, not as the founder of a new, but rather as the renovator of an "old philosophy", is not that far off the mark.[16] When examined soberly, through the eyes of the history of science, the later and still common presentation of Copernican astronomy in the history of ideas proves to be a misunderstanding. What Copernicus claimed – namely, the correspondence of his hypotheses with the cosmological order of the world, or true *forma mundi* – he could not support, for he lacked the physical arguments. And his methodological aims, his strict application of the principles of Greek astronomy, do not lead into a new era, but rather into the past.

In light of these considerations one has to ask again: Was Osiander's heresy a betrayal? Probably, only if one keeps in mind that Copernicus rightly considered himself to have been deceived by the preface he had not authorised. With this preface, Osiander foils the author's self-conceptions and aspirations, stabbing him in the back, so to speak. But this attempt – one may be justified in saying – is on the side of scientific truth. It defends truth against exaggerated claims, and it resolves a situation before it becomes pure fiction – one, by the way, that the history of ideas will continue working with, staking interpretative claims rather than looking at the scientific facts soberly. This is deception (of the author), then, on behalf of, or in the name of, (scientific) truth. A remarkable opposition.

What does this example from the history of science teach us? Certainly not that deception is in some sense normal in science, or capable of being justified on a case-by-case basis; nor that the boundary between scientific truth and scientific deception is fluid. My intention has merely been to show that science is, in theory and practice, more various, more colourful, more complex than even scientific reason itself sometimes imagines. We have reason to insist on an ethos, the ethos of the scientist, which protects science from deception of any kind, and perhaps also from unjustifiable claims to truth.

NOTES

1 *Critique of Pure Reason* B XVI.

2 Reprinted in: *Johannes Kepler. Gesammelte Werke*, ed. W. v. Dyck/M. Caspar/F. Hammer, Munich 1937ff., vol. I, pp. 81–126. The second edition of *De revolutionibus* (Basel 1566) contains the *Narratio prima*; a *Narratio secunda* had become redundant after the Copernican work had been published.

3 *Ibid*., p. 97, *cf*. p. 101.

4 In his dedication to Pope Paul III., *Nicolaus Copernicus. Gesamtausgabe*, vol. II (*De revolutionibus libri sex*), ed. H.M. Nobis/B. Sticker, Hildesheim 1984, p. 4 (English edition: *Nicholas Copernicus. On the Revolutions*, Translation and Commentary by Edward Rosen, London 1978, p. XVI).

5 *Ad lectorem de hypothesibus huius operis*, *Gesamtausgabe*, vol. II (appendix IV), p. 537 (English edition: p. XVI).

6 Cf. E. Zinner, *Entstehung und Ausbreitung der copernicanischen Lehre*, 2nd edition, Munich 1988, pp. 253f.. See also H. Blumenberg, who ascribes a theological motive to Osiander: *Die kopernikanische Wende*, Frankfurt 1965, pp. 92–99 ("It becomes apparent that the contentious preface by Osiander must be understood as a principled objection against any rational claim to truth, and not just against the special case of the Copernican oeuvre", p. 92, translation JM).

7 *Apologia Tychonis contra Ursum*, in: J. Kepler, *Opera omnia*, vols. I–VIII, ed. Ch. Frisch, Frankfurt 1858–1871, vol. I, p. 246.

8 Mentioned in Kepler, *Apologia*, *loc. cit*., pp. 245f..

9 Translation following E. Rosen, *Three Copernican Treatises*, New York 1959, p. 23.

10 At Kepler, *Apologia, loc. cit*., p. 246 (Translation following E. Rosen, *ibid*.). The later intervention of Robert Bellarmine adressed to Galileo, who simply adopts the claims to truth of Copernicus and Rheticus in his advocacy of Copernican astronomy, needs to be understood in the same way (letter dated April 12, 1615 to the Carmelite Paolo Antonio Foscarini, *Le opere di Galileo Galilei*. *Edizione Nazionale*, vols. I–XX, Florenz 1890–1909, vol. XII, pp. 171f.).

11 Cf. *Gesamtausgabe,* vol. II, pp. 4 (Praefatio ad Pontificem), 487 (English edition: pp. 4,7).

12 Cf. B. Wrightsman, "Andreas Osiander's Contribution to the Copernican Achievement", in: R.S. Westman (ed.), *The Copernican Achievement*, Berkeley/Los Angeles/London 1975, p. 234; J. Hamel, *Nicolaus Copernicus. Leben, Werk und Wirkung*, Heidelberg/Berlin/Oxford 1994, pp. 230f..

13 *Apologia, loc. cit*., p. 246.

14 Cf. Simplikios (Simplicius of Cilicia), *In Aristotelis physica commentaria*, vols. I–II, ed. H. Diels, Berlin 1882/1895 (*Commentaria in Aristotelem Graeca,* vols.

IX/X), vol. II, pp. 290f.. See also J. Mittelstrass, *Die Rettung der Phänomene. Ursprung und Geschichte eines antiken Forschungsprinzips*, Berlin 1962, pp. 140–197. And *idem*, "Die Kosmologie der Griechen", in: J. Audretsch/K. Mainzer (eds.), *Vom Anfang der Welt. Wissenschaft, Philosophie, Religion, Mythos*, Munich 1989, pp. 40–65, pp. 208–210.

15 *Astronomia nova*, *Gesammelte Werke*, vol. III, p. 25.

16 *La cena de le ceneri* I, *Le opere italiane di Giordano Bruno*, vols. I–II, ed. P. de Lagarde, Goettingen 1888, vol. I, p. 125.

How to Destroy a European Faculty of Letters

Twenty Five Easy Steps

Kevin Mulligan

There is now a large literature, empirical, opinionated and often catastrophist, about the state of the humanities in the United States and in Great Britain. As far as I can see, the state of the humanities in Europe has provoked much less commentary and investigation. I know of nothing comparable to

> Ginsberg, Benjamin, 2011, *The Fall of the Faculty: The Rise of the All-Administrative University and Why it Matters*

for Europe[1] but have found useful:

> Collini, Stefan, 2012, *What are Universities for?*
> Compagnon, Antoine, 1998, *Le démon de la théorie. Littérature et sens commun*
> Ferraris, Maurizio, 2009 (first edition 2001), *Una ikea di università. Alla prova dei fatti*
> Gally, Michèle, 2006, *Le bûcher des humanités. Le sacrifice des langues anciennes et des lettres est un crime de civilisation !*
> Hass, Ulrike & Müller-Schöll, Nikolaus (eds.), 2009, *Was ist eine Universität? Schlaglichter auf eine ruinierte Institution*
> Keisinger, F. et al. (eds.), 2003, *Wozu Geisteswissenschaften? Kontroverse Argumente für eine überfällige Debatte*
> Schaeffer, Jean-Marie, 2011, *Petite écologie des études littéraires. Pourquoi et comment étudier la littérature?*
> Sokal, Alan & Bricmont, Jean, 1997, *Impostures intellectuelles* (*Fashionable Nonsense*, 1999)

1 Some information can be gleaned from: van den Doel et al. 2012;
http://ec.europa.eu/education/lifelong-learning-policy/higher_en.htm;
http://cordis.europa.eu/documents/documentlibrary/124376641EN6.pdf;
http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Tertiary_education_statistics;
http://www.acadeuro.org/fileadmin/user_upload/publications/press_releases/Humanities_and_Social_Sciences_paper_to_the_Commission_Jan_2012_Fin_..pdf;
http://www.esf.org/research-areas/humanities.html

I suspect I would find extremely useful

> Halldén, Sören, 1989, *Humbugslandet: Vägvisare i kulturlandskapet*

were I able to read it.

By "Europe" I mean what is sometimes called the continent of Europe. By "Faculties of Letters" I mean Faculties of "lettres", of "lettere", of "humanities", "arts", the "Geisteswissenschaften", and what is sometimes called a "Philosophisch-historische Fakultät".

At the core of such institutional entities, which differ in very many ways, are the disciplines which study literature, art and music, language (linguistics), history and archaeology, and my own discipline, philosophy. Just what the relation is between this core and the over 90 different subjects listed under the heading "Geisteswissenschaften" in Germany I have no idea – because of the already noted relative absence of empirical studies of the humanities in Europe.

The striking absence of investigations, especially thorough empirical investigations, into the state of the humanities in Europe parallels the inability of European universities and institutions to create a publishing house which displays some of the qualities for which Oxford University Press, Cambridge University Press and the major American university presses are well known.

I begin (§1) by sketching some 25 steps in the gradual destruction of a Faculty of Letters, which I shall call "FL", over a period of some 25 years. FL is a composite entity bearing some resemblance to Faculties I have known. I then consider, in a very speculative fashion, some of the possible roots and consequences of such changes (§§2–3).

§1 Twenty Five Steps

Once upon a time the University to which FL belonged appointed a full professor only after a meeting between the Rector and two *external experts from the relevant discipline* approved the choice of the appointments committee. This procedure was abolished. Some twenty years later a *student sits on every (small) appointment committee – and votes*. *Internal appointments* become normal and quickly transform what was once a very cosmopolitan Faculty. More and more *full professors are appointed who are incapable of lecturing* on a topic they have studied for over twenty years without the help of a prepared text. *Political pressure* is exerted to ensure the appointments of female professors. The Bologna process ensures the complete *spagghettification* of all curricula. (Understandably enough our Italian colleagues refer not to the Bologna process but to the "protocol of the Sorbonne"). More and more positions in pseudo-disciplines

are created. Some of these disciplines are foreign-bodies – positions in *pedagogy* and *educational science*. Others are home-grown – *Lacanian psychoanalysis*, *postmodernist "philosophy"*, *psychoanalytic clinical sexology, Gender Studies* and *Cultural Studies*. There is a gradual *oophorectomy (emasculation) of full professors*. The *incompetent* and *the inexperienced* are appointed to positions of power. *Academic freedom diminishes* – professors are not allowed to use their university titles when propounding their left-wing and right-wing opinions. *Foundations* outside the University play an increasingly important indirect role in appointments. *Administrators* take over and *paperwork* smothers teaching and research. Increasingly the central role of FL comes to be seen as the promotion of various *good-works*, from sustainable development and the ramifications of the universal care and benevolence industry ("mentoring") to the promotion of women and "human rights" (once called "les droits de l'homme" in the French-speaking world and now, it seems, "les droits humains"). This role is not played to the same extent by other Faculties in European Universities.

Just how typical are such developments? Just how prejudiced are the epithets employed in my jaundiced sketch? In the absence of empirical research one is obliged to rely on the judgments of those best qualified to express an opinion. Here, for example, is the considered verdict of one of the great explainers of ancient philosophy, after a long and distinguished career in Oxford, Geneva and the Sorbonne, on two disciplines at the heart of the humanities:

> Ancient philosophy is in a bad way. Like all other academic disciplines, it is crushed by the embrace of bureaucracy. Like other parts of philosophy, it is infected by faddishness. And in addition it suffers cruelly from the decline in classical philology. There is no cure for this disease.
>
> You can't do anything at all in ancient philosophy unless you know a bit of Greek and Latin, and you can't do anything worthwhile in ancient philosophy unless you are a semi-decent classical scholar. But *classical scholarship is a dying art: there aren't as many scholars as there used to be, and their grasp of the ancient languages and the ancient world weakens and trembles.* What's more, fewer and fewer of them care to take up the philosophy of Greece and Rome ... *As far as philologically informed work on ancient philosophy is concerned, things were better fifty years ago*.[2]

And on the bureaucratic dead-hand behind the humanities in Europe:

> There is in France an organization called the *Centre National de Recherche Scientifique* which dispenses unimaginably large sums of public money and is dedicated to the task of stifling research in the arts and sciences. It stifles with paper, and it stifles with electronic messages. It communicates in jargon and in acronyms. It does not use one sentence where two pages will suffice. It is peremptory in its commands. It is as pervasive as a London smog and as solid as blancmange. It is, as the bard put it, a whoreson zed, an unnecessary French letter. Every-

2 Barnes 2006, emphases mine – KM.

> where has its CNRS – under different names but smelling as rank. They waste time and energy – and oodles of cash. What is worse, far worse, they destroy professional standards and professional judgements.[3]

§2 Distrust

Where does the bureaucracy come from? Why has it exploded since the 1990s? There are many explanations and they vary from country to country and from region to region. Thus many of the features of the excruciating torture to which British colleagues have been subjected, from the Research Assessment Exercises (RAEs), to the Research Excellence Framework (REF) and its astonishing and grotesque Impact Factor,[4] are by and large – and for the moment – peculiar to Great Britain.

But there is, I suggest, I hope uncontroversially, one common element. Bureaucrats and politicians do not trust academics. Rectors, Vice-Chancellors, Magnificences and their like do not trust their fellow-academics. On many matters such distrust is justified. The allocation of the resources of a University is a matter for Rectors and their ilk. Perhaps the same is true of decisions about research priorities. But once the decision has been to taken to create a position in some discipline then, in an ideal world, it is surely the specialists in that discipline who should be trusted to exercise their professional judgment. But this is not what happens, certainly not in FL. Instead the powers, privileges and authority of those erstwhile Gods, the full professors, *Ordinarien* and other mandarins shrink from year to year. In Sweden, I am told, only one University has avoided this fate – Uppsala. As in the EU and the Catholic Church, the virtues of subsidiarity are preached but not practised.

In FL this distrust lies behind internal appointments and their inevitable consequence – full professors who cannot lecture without a prepared text. It is behind political pressure to create Gender Studies, the introduction of positions in pedagogy, the rôle of foundations in circumventing normal appointments procedures and the rôle students play in academic appointments.

In part this distrust is a product of so-called *democratisation* – the view that every difference is an example of inequality. Many full professors believe in or are not prepared to oppose democratisation, which they think has something to do with democracy. Like Rectors, administrators and politicians, they do not believe in full professors or the *mandarinat* either. The political prostitution of Universities, like prostitution *tout court*, invariably attracts pimps.

Is there an alternative? Is it possible to have something like the situation which used to prevail in the US and is still so rare in Europe – where every member of a De-

3 Barnes 2006, emphases mine – KM.

4 Cf. Collini 2012.

partment wants to belong to a very good (perhaps even the best) department, where subsidiarity is practised? Let the full professors and only the full professors in a discipline be responsible for appointments and take the credit and the blame for mistakes. Let Faculties and Rectors decide whether a Department may make an appointment. Let experts in the discipline have the final word. As used to be the case in FL.

§3 Disbelief & Foolishness

Disbelief and distrust are two quite different things. To believe in God is to take her to exist. But very often to believe in something or someone – the American Way, capitalism, deconstruction, democratisation, a professor – is to take it or him to exemplify some positive value. Similarly, to disbelieve in something or someone is often to take it or her to exemplify some negative value.

Universities are in principle places where – more than anywhere else – one type of value is held aloft: the value of knowledge, its acquisition, its transmission and its preservation. In Universities the opposition between cognitive values and virtues – the values of truth, knowledge, clarity, justification, argument – and cognitive disvalues and vices – bullshit, charlatanry, obscurity, obscurantism, illusion and error – is alive.[5] In principle, academics believe in knowledge.

It is a strange feature of the contemporary University and of the contemporary world that although ethicists and ethics – medical ethics, the ethics of banking, ecological ethics, even ethical fashion and ethical coffee – are omnipresent, next to no attention is paid to the theory and understanding of intellectual and cognitive vices (except in Departments of Philosophy). Pharisees, who believe strongly in ethics and the ethical, are not interested in the intellectual virtues.

An even stranger feature of Faculties of Letters in general, and of FL in particular, is that the belief in knowledge and in truth is there heavily qualified or even the object of suspicion. Who in the contemporary University has not at some time come across a humanist who pronounces "verità" or "Objektivität" or "justification" or "clarté" while gesturing with his hands towards the equivalent of scare-quotes? The sneering gestures or intonation which accompany such words often go hand in hand with a quite reverential attitude towards such words as "Kritik", "critique", "criticism" and "unmasking". And of course the inconsistency goes unremarked.

A recent writer notes the phenomenon in passing, as though it were a platitude:

5 Just how causally effective the belief in cognitive values is, in particular in hard science, is an interesting empirical question (cf. Hull 1988).

> To say academic freedom is necessary for the expression of truth seems problematic inasmuch as *many scholars, particularly within the humanities, would not characterize the purpose of their teaching and research as truth-seeking*.[6]

In order to understand this phenomenon it is, I suggest, essential to bear in mind one of the most distinctive features of enquiry in Faculties of Letters – its relation to value and values.

The acquisition of cognitive virtues is an integral part of a university education. Cognitive virtues are acquired both by the student of physics or biology and by the student in the humanities. But only in the latter case is the object of the exercise of cognitive virtues the everyday human world (the *Lebenswelt*, the natural world-view), the world of values and norms – ethical, economic, political and aesthetic. History, literary criticism and the criticism of art and music, as well as practical philosophy and normative philosophy, are concerned with values and norms. Faculties of Letters differ from other Faculties in that their members are expected, and so allowed, to make value judgements about ethical, practical and political matters, past and present. This is true of philosophers when they go in for normative theories, political and ethical. It is also true of critics, for example, of literary critics. But it is not true of empirical psychologists, neuroscientists, physicists or chemists. We expect a physicist to evaluate the work of his colleagues and students. We do not expect him to invoke the authority of physics to condemn corruption.

Properly understood, this claim is not, I think, controversial. It is not a very common claim, since the language of values is not much used outside Departments of Philosophy and certain types of political cant. I shall return to it. But it is worth noting that, if true, it suggests that students of empirical science and mathematics, unlike students of the humanities, do not, as such, learn to think hard about questions of ethical, political and aesthetic value.

This difference between the "two cultures" lies behind the claim, rarely heard nowadays, that an education in the humanities contributes to a person's *Bildung*, inner freedom and critical spirit, where "critical" refers to what was once called the criticism of life. It goes without saying that numerous cognitive virtues, in particular those of critical thinking, are in principle acquired both by students outside the humanities and by those in the humanities.

The value judgments of literary critics include judgments about the political and ethical questions at the heart of literary works of art, but also of course aesthetic judgments. The terminology of "value judgments" is not popular within literary criticism. But that is not important. There can be no doubt that political, ethical and aesthetic judgments are at the heart of literary criticism – however they are dressed up. And that is as it should be. Consider, for example,

6 Douglas 2012.

> When I think of the most important works of postwar criticism, I think of Frye's *Anatomy*, Kermode's *The Sense of an Ending*, Stanley Fish's *Surprised by Sin*, Paul de Man's *Blindness and Insight*, Said's *Orientalism*, Sandra M. Gilbert and Susan Gubar's *The Madwoman in the Attic*, Stephen Greenblatt's *Renaissance Self-Fashioning*, Fredric Jameson's *The Political Unconscious*, and Eve Sedgwick's *Between Men* – books that launched or largely defined, respectively, myth criticism, narratology, reader-response criticism, *deconstruction*, *postcolonial criticism*, *feminist criticism*, New Historicism, *contemporary Marxist criticism*, and *queer studies*.[7]

Or this, from an influential handbook:

> Current intellectual discourse in the humanities and human science ... is ***engagé*** in ways that might have made even Sartre uncomfortable, because of its restless *concern for the excluded and marginalised* ...[8]

Many of these value judgments are victimological,[9] and are formulated with the help of oppositions and distinctions such as

> male–female, heterosexual–homosexual, white–black, white–yellow, imperial–oppressed, capitalism–oppressed, the included–the excluded, the orientalism of the West–the Middle East

Even Deconstructionism, originally a philosophy devised by the immensely popular French philosopher, the late Jacques Derrida, is victimological. According to this philosophy,

> differences/the marginal/contingent/context/intertext
> are/is oppressed by and are/is to be preferred to
> the centre/identities/essentialism/the canon

Of course the term "victimological" is generally used only by a conservative critic of what she sees as the leftist or progressive tendencies in literary criticism. According to such a critic, victimology yields at best merely cartoon-strip evaluations. But for present purposes this is beside the point. What is important is that both the conservative critic and the critics he disagrees with are concerned with questions of value.

On the one hand, then, there is the scepticism about cognitive values within Faculties of Letters. On the other hand, there is the crucial role in many of the disciplines within such Faculties of the practice of aesthetic, ethical and political judgment. There is an obvious a tension here. How on earth can one make evaluative judgements and simultaneously scorn truth, knowledge, clarity and justification?

The peculiar combination of vociferous value judgments and the denial that one is

7 Deresiewicz 2011. Emphases mine – KM.

8 Payne & Barbera (eds.) 2010 (1997).

9 Cf. Bawer 2012.

in the business of truth-seeking is, it often seems, at the heart of the humanities. It is a combination which, like much else in Faculties of Letters, goes back to Nietzsche, who, often on the same page, proclaims that the value of life is higher than the value of truth and that value judgments are not true or false. We must, Nietzsche tells us, learn to live without truth.

There are (analytic) philosophers who argue that no incompatibility is involved here. But debates about "quasi-realism" play little role outside philosophy departments. A quasi-realist may be cognitively virtuous. In Faculties of Letters cognitive vice is proudly proclaimed and exemplified.

In between Nietzsche and current literary and cultural "theory" there lies Continental Philosophy, which, like the Belgian Empire, is a Franco-German creation. In nearly all the intellectual communities which owe their existence to Continental Philosophy words such as "truth", "justification", "knowledge" and "objectivity" are rarely used. They are, as we have noted, merely mentioned and the object of gesticulation and sneers. This is particularly true of those marked by the postmodernisms of Lyotard and Rorty, the anti-realism of Foucault, Vattimo and Rorty, and the deconstructionism of Derrida and his ilk – three very implausible types of philosophy. My discipline, philosophy, then, must take some of the blame for the state of Faculties of Letters. Keynes famously wrote:

> ... the ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed the world is ruled by little else. Practical men, who believe themselves to be exempt from any intellectual influences, are usually the slaves of some defunct economist. Madmen in authority, who hear voices in the air, are distilling their frenzy from some academic scribbler of a few years back.[10]

Whether or not Keynes was right about the influence of economists and philosophers his words apply marvellously well to the influence of a handful of French and German philosophers on the humanities. The philosophers of postmodernism and deconstruction now enjoy an extraordinary "impact factor". Indeed, as has been often recognised, the political philosophy of the Belgian Empire is now postmodernist.

The symptoms of scepticism about cognitive values include obscurantist language, the belief that one can change the world without seeking the truth, axiological simplifications in which there are only goodies and baddies, and the lack of interest in any criticism of such fashionable simplifications.[11] As the editor of an already quoted handbook in what is called "Cultural Theory" puts it:

10 Keynes, John Maynard, 1973 (1936) *The General Theory of Employment, Interest and Money*, Book 6, ch. 24, p. 383 (Volume VII, *The Collected Writings of John Maynard Keynes*, Cambridge: Macmillan, St. Martin's Press).

11 For specimens of such criticism see the remarkable nosological investigations of literary criticism by Brian Vickers (e.g. Vickers 1993), and Elster 2012.

> Current intellectual discourse in the humanities and human science is often messy, difficult, … its language has occasionally seemed far too difficult, tortured, or obscure.[12]

The home of obscurantism within the humanities is what was and, indeed, still is, often called "Theory" – unlike biological or logical theory, a proudly unadorned noun. Theory, long at home in FL, is or was characterised by the fact that it invariably made use of bad science or pseudo-science – psychoanalysis, Marxism, structuralism, semiotics. There is of course room for *theories* of literature, that is to say, for *general* and systematically connected truths about literature, its nature and structure, and about knowledge of literature, even though literary criticism is also concerned with understanding *individual* works of arts and traditions. But pseudo-science is not the right way to go about things.

It is, I suggest, *because* the humanities are sceptical of cognitive values that their political and ethical projects are so badly conceived and "defended".

Antoine Compagnon lets the cat out of the bag when he notes just how tempting it is to think that *theory* is, in fact, *just literature*:

> Ainsi, la théorie littéraire ressemble par bien des côtés à une fiction. On n'y croit pas positivement, mais négativement, comme à l'illusion poétique, suivant Coleridge. Du coup, on me reprochera peut-être de la prendre excessivement au sérieux et de l'interpréter trop littéralement. La mort de l'auteur? Mais ce n'est qu'une métaphore, dont les effets furent d'ailleurs stimulants. La prendre au pied de la lettre et pousser ses raisonnements à leur limite, comme dans le mythe du singe dactylographe, c'est faire preuve d'une extravagante myopie ou d'une singulière surdité poétique, comme de s'arrêter aux fautes de langue dans une lettre d'amour. L'effet de réel? Mais c'est une jolie fable, ou un haïku, car il y manque la morale. Qui a jamais cru qu'il fallait scruter la théorie à la loupe? Elle n'est pas applicable, elle n'est donc pas "falsifiable", elle doit être regardée elle-même comme de la littérature. Il n'y a pas à lui demander compte de ses fondements épistémologiques ni de ses conséquences logiques. Ainsi, il n'y a pas de différence entre un essai de théorie littéraire et une fiction de Borges ou une nouvelle de Henry James, comme "La leçon du maître" ou "L'image dans le tapis", ces contes au sens indécidable.[13]

His suspicions are widely shared:

> Current intellectual discourse in the humanities and human science … crosses the traditional boundaries that once (always uncertainly) separated the creative from the critical …[14]

12 Payne & Barbera (eds.) 2010.
13 Compagnon 1998 p. 307.
14 Payne & Barbera 2010.

Suppose that, as I have suggested, there is a deep tension in many Literature Departments between scepticism about cognitive values, on the one hand, and the practice of evaluation, on the other hand. One way out of the tension is to assimilate evaluation to its object, to creation, to reject their difference. Freedom – with one bound.

One striking feature of FL is the extent to which its Departments of Literature are increasingly attracted by such subjects as travel literature (the more minor, the better), the history of texts, editions and manuscript production, Lacanian clinical sexology, rap music, global French, the history of medicine and psychiatry, cognitive science fiction and even Tintinology. Whatever one may think of the intrinsic value of research in these areas one may wonder whether, once concentration on such areas has reached a certain level, this does not amount to what might be called a flight from the centre, from a canon in which one no longer believes. In a recent very positive review of a book on the material dimensions of medieval religious art, Gabriel Josipovici comments on the reproduction of a sculpture by the author:

> ... her main interest in it is that there is a hole at the back where relics could be inserted. No doubt this is important, but focusing on it ignores the primary effect of the work. It is an effect that Ruskin and Proust understood to be central to much medieval art, and they found the words to convey it. A critic and scholar who could combine the learning and sophistication of the modern medievalist and Proust's sense of the wonder of medieval art – now that would be something.[15]

What relation, if any, is there between distrust and disbelief, between the types of distrust and disbelief identified so far? Trust is a species of belief in and distrust of a species of disbelief in. To believe in something is to believe it to have some value and to identify with that value. To trust someone is to believe him to be trustworthy and to believe in his trustworthiness. The distrust of full professors mentioned above, which is shared by so many Rectors, politicians and bureaucrats, is in fact a species of disbelief. In the humanities, it seems, there is disbelief in cognitive values and in the disciplines at the heart of the humanities. To the extent that this is the case, distrust of professors of the humanities is in fact wholly justified.

There is a name for disbelief in cognitive values – foolishness (*stultitia, sottise*). Foolishness is not stupidity. Stupidity is no vice but a defect. Foolishness is a vice at the heart of which there is an indifference, or hostility, to the value of knowledge and connected values. An immediate consequence of this definition is that postmodernists are foolish.[16] The vice of FL and of those Faculties of Letters which resemble it is foolishness. It is disbelief in what Universities stand for.

Knowledge is an achievement. To come to know that something is the case is to

15 Josipovici 2012 p. 5.

16 Cf. Mulligan 2009.

make one's own something which is quite complex. It is typically to come to see why something is the case, to see how some fact is related to many other facts. It is above all to come to be able to reply coherently to the question: *How* do you know that? And to the question: *Why* do you believe that? It is a resource to be drawn upon, one which is permanently available. I do not know what the causal relationship is between attachment to cognitive values and the acquisition of knowledge. The question is largely empirical.[17] But it seems that aversion to cognitive values is unlikely to lead to knowledge, other things being equal.

Knowledge is not information. The flow and circulation of information is not the flow and circulation of knowledge.[18] Knowledge is an individual achievement, unlike the activity of absorbing information. Our macrocosm is now the world of information. But one little microcosm, European Faculties of Letters, mimics the features of the macrocosm very thoroughly and does this wittingly. In the humanities, for over thirty years, an immense number of different "discourses" (*discorsi, Diskurse*) have circulated and flowed – semiological, structuralist, post-structuralist, Marxist, feminist, cultural, deconstructionist ... But to participate in the flux and circulation of such "discourses" is not to come to know. Indeed it is by no means obvious that such "discourses" even count as information.

If even part of what I have suggested is plausible, parts of the humanities are in the process of destroying themselves. Since they no longer believe in themselves they are distrusted. Since they are distrusted they will either disappear or their functions will be transformed. One such transformation is already apparent. For in at least one respect the humanities are trusted. They can be relied on to play the role of useful clowns. In the modern European University someone has to promote – and be seen to promote – the already mentioned good works. Who better than the full professor of the humanities? After all, she is more likely than anyone else to believe in the usefulness and intrinsic value of such good works, especially if she has victimological inclinations. The rôle of useful clown complements in many ways one by now traditional function of the "discourses" of European humanities and philosophy – intellectual titillation. The cheap intellectual thrills provided by the ever changing fashions in Theory and its ilk are a sociological factor that few Rectors can afford to ignore. How else can one explain the strange phenomenon of Rectors and Provosts who, after a distinguished career in one or another hard science, hasten to hand out honorary doctorates to charlatans and invite psychoanalysts to address their Universities?

Whether or not these gloomy prognoses and suggestions are plausible parts of the humanities are increasingly coming under attack not from the handful of critics of fashionable nonsense but from naturalistically minded philosophers and cognitive

17 Cf. note 5 above.

18 For a recent eloquent defence of this view, cf. Engel 2007.

scientists. And they are ill-prepared to deal with this attack. The philosopher of biology, Alexander Rosenberg, recently had this to say:

> Once you recognize that there is no way to take seriously both what neuroscience tells us about the springs of human action in the brain and what introspection tells us about it, you have to choose. Take one fork and seek interpretation of human affairs in the plans, purposes, designs, ideologies, myths, or meanings that consciousness claims actually move us. *Take the other fork, the one that scientism signposts, and you must treat all the humanities as the endlessly entertaining elaborations of an illusion*. They are all enterprises with no right answers, not even coming closer to approximating our understanding of anything. You cannot treat the interpretation of behavior in terms of purposes and meaning as conveying real understanding ... It's obvious why most people have chosen the interpretative culture of the humanities, the path of embroidering on illusion, even after science hit its stride. To begin with, there was selection for the theory-of-mind ability, which carried along conscious thoughts that seem to be about the conspiracies behind people's behavior. The ability still works, up to limits that social and behavioral science has discovered.[19]

A more modest but potentially no less damaging point is made by the philosopher Greg Currie:

> But *the idea that we learn nothing, of any kind, in any way, about the mind from literature would surely be rejected by most serious readers with no theoretical axe to grind* ... Is the practice of fiction one we can reasonably expect to give us the insight we hope for? Are serious fiction writers well equipped to give us that insight? Finally and most radically, is what I'm supposed to be learning consistent with or supported by the best science? ... Most of the work I have in mind operates at the psychological and not at the neurological level, and represents no radical break with our ordinary talk of belief, desire, feeling, imagery and the rest. Some of it – the work on character and situation reported below is a perfect example – requires no conceptual shifting at all, but merely a revision of romantic prejudice. It is the outcome of careful and thoughtful observation of people's actions, with attention to comparison with controls, and the elimination of confounding factors. How could that not be relevant to understanding the kinds of agents we are? ... Take that staple of literary psychology: character; character explanations are top predators in the hunt for meaning: show that someone's action flows, not just from their wishes but from their character, and you have the best example there is, short of invoking the deity, of behaviour found to be meaningful. *But a lot of evidence suggests that character plays a surprisingly insignificant role in human behaviour, which is highly sensitive to small, even trivial changes in circumstances*.
>
> So: our natural inclination to focus on the maximization of meaning leaves us vulnerable to bad errors in thinking about the mind, errors which systematic experimental work has done something to expose. *The institutions of fiction, and the psychology of the creative artist, do nothing to keep us on track, and so literature's filling in the detail of an already mistaken picture just makes things worse. That's the message at its most pessimistic*.
>
> At most, I am urging a clarification, a recognition that when we engage seriously with great literature we do not come away with more knowledge, better abilities, clarified emo-

19 Rosenberg 2011 pp. 211ff. Emphases mine – KM.

> tions or deeper human sympathies. We do exercise capacities that let us explore a fascinating, demanding conception of what human beings are like – *probably a wrong one*.[20]

I believe that Currie and Rosenberg are wrong about literature and that the study of literature, art and music lies at the heart of a Faculty of Letters. But is there any point in defending adults who have decided, very deliberately, to commit suicide?

Let me conclude as I began, with Jonathan Barnes:

> Apocalypse next year, and three horsemen: the *White Knight of Unlearning*, the *Cream-faced Count Charlatan*, and the *Black Baron Bureaucracy*. The *Count* is perhaps the least menacing of the three. After all, philosophy is nothing if not a thing of fads and fashions. Fifty years ago the phrase "continental philosophy" meant nothing. And no doubt fifty years hence the continental drift will have stopped. Except in France. The Knight is the most dangerous. There is no unhorsing him. He is there for keeps. Classics will continue to decline. In a few decades, the study of Greek will match the study of Coptic or of Akkadian. And there's nothing anyone can do about that ... As for the Baron, we could unseat him. By "we" I mean those of us whose careers are not still on the line, who have more memories than hopes – though perhaps a few hopes still ... *But will we resist? Yes – when Hell freezes*. That's why the Baron is the most infuriating of the horsemen –and he knows it.[21]

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20 Currie 2011. Emphases mine – KM.

21 Barnes 2006. Emphases mine – KM. One of the many things to note in this passage, as literary critics used to say, is the casual elegance and precision of the prose, a prose most of us in the humanities are no longer capable of writing or appreciating.

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Academia, Trust and the Media

Lars Engwall

Introduction

Trust is highly significant for human cooperation of all kinds (Kramer & Tyler 1996). For academic institutions it is even more important. For them it is fundamental. The reason for this is the very high degree of uncertainty associated with the two basic activities of such institutions: higher education and research. In terms of education we can note that students in choosing an education have to rely on trust for three reasons. (1) By definition, they should not know the content of an education in advance; otherwise they would not take it. (2) They will never take a specific education twice, even if they liked it very much. And (3) they will have difficulty obtaining negative information about an education, since alumni obviously have a vested interest in honouring their own education. Similarly, research should, by definition, be characterized by a high degree of uncertainty. If the outcome was known, its delivery would not be considered research.

Thus trust is significant for the survival of all institutions, but particularly in academia. The degree of trust in an institution seems to depend highly on its performance in society. This in turn is closely related to its behaviour towards vital governors. Therefore, in order to put the trust in academic institutions into context we will, in the following, first provide a theoretical background to the governance of modern institutions. This will show how media have become increasingly significant in today's democracies. Against this background we will then turn to two specific issues regarding trust in academic institutions: (a) academic institutions as communicators, and (b) the media as governors. Conclusions are presented at the end of the discussion.

Politics, Markets and the Media

Governance of Institutions

In modern democracies there are two basic ways in which citizens can express their preferences: either through politics in general elections or through the market by spending, from their resources, on various goods and services (Lindblom 1977). There is therefore continual debate about the appropriate mix between the two – i.e. about the extent to which the state, which is governed on the basis on the political preferences, should intervene in the market, and the extent to which market solutions should be used for resource allocation. It is obvious that recent decades have involved a strong bent towards the market through the deregulation of financial markets as well as the marketization of services earlier provided almost exclusively by the state. However, the same decades have also involved another substantial change, through the increasing role of the media. In the shape of newspapers, the media have since long been characterized as the fourth branch of government (Siebert et al. 1956). Although the printed papers are in trouble today, this important governance role is even truer in our times, since the media industry has become more and more significant. Behind this we can see an expansion of the whole industry, as well as a professionalization of journalism (Engwall 2010).

Given these circumstances, we can identify three significant forces of governance in modern institutions (Figure 1): politics, markets and the media. Some institutions, like state agencies, are more subject to the political governance, while others, like corporations, are more subject to market governance. However, irrespective of the degree of political or market governance at work, all institutions in modern democracies are subject to strong scrutiny by the media.

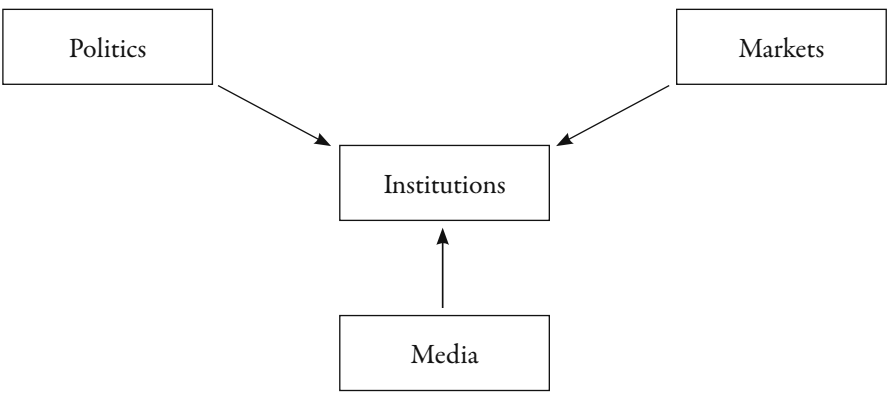

Figure 1. The Governance of Institutions.

Institutions as Communicators

In parallel with the expansion of the media industry, modern societies have also seen the emergence and growth of a communication industry. This field is populated by public relations officers, press secretaries, spokesmen, communication consultants, media coaches, and the like, many of whom have had earlier careers in the media industry. In this way, a great many of the individuals in the two industries are closely related through similar educational background and work experience; they therefore constitute a community of practice (Wenger 1998). However, while the actors in the media industry are part of the governance of institutions, those in the communication industry work for their specific institutions. In this role, their task is to counterbalance scrutiny by the media industry, as well as to improve the conditions and public image of the institution for which they work. This means that institutions are talking back to governors (Figure 2). They communicate with politicians and policy makers in order to create desirable conditions for themselves (lobbying), they communicate with markets to attract more resources (marketing), and they communicate with media to present their institution in a favourable way (promoting).

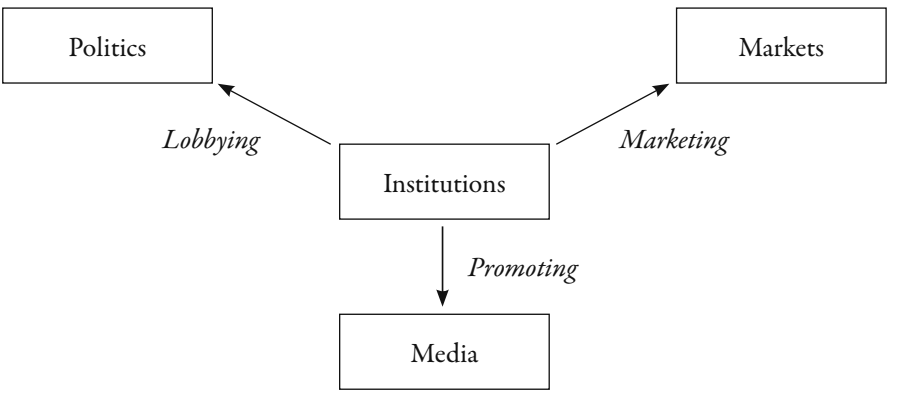

Figure 2. Institutions as Communicators.

Academic Institutions

Let us now apply the above reasoning to the academic world. In many countries, particularly in Europe, politics has traditionally played an important role in governance of academic institutions. Governments here have regulated the operations of these

institutions more or less tightly. In the past couple of decades, in the wake of the general trend of deregulation, academic institutions have experienced more freedom from political interference. To a certain extent, in fact, it is fair to say that politicians in many countries have delegated, to the market, decisions they earlier took themselves: decisions regarding resource allocation, governance, and so forth. As a result, more and more resources are now distributed on the basis of applications for project grants and claims to be Centers of Excellence, as well as on the basis of evaluations of other kinds. At the same time there has been increasing competition for students at a time when the rankings of academic institutions have become a significant feature of academia. Both these circumstances have implied that academic institutions tend, more and more, to devote resources to lobbying, marketing and promoting.

Academic Institutions as Communicators

Evidence of the increasing focus on communication in academic institutions was found in an earlier study of media relations in Swedish universities (Engwall 2008). This study showed clearly that information activities in academic institutions have expanded and developed considerably. The number of employees involved in communication has thus increased. At the same time, these employees are more professionalized and have higher status than their predecessors. While Swedish universities in the 1960s occasionally sent out press releases, today they have advanced communication departments headed by communication directors working closely with their vice-chancellors. Their work is devoted to both protecting and promoting their university, i.e. they handle upcoming negative news and spread positive news, primarily about significant research results, awards, and so on.

A more recent study (Drori et al. 2013) shows that academic institutions now also put a lot of effort into branding. A common element in this process is the redesigning of institutional logos in an effort to look more attractive and modern. Likewise academic institutions use more and more neon signs to highlight their existence. In this way they are aping corporations and public agencies with the aspiration of looking like "normal organizations". Figure 3 provides three examples from Stockholm University and Uppsala University.

Another increasingly common way of communicating is through various types of advertisement in the media, or even on billboards. Figure 4 provides three examples. The first one is a magazine distributed as a supplement to the Stockholm daily newspapers. It carries information about Lund University; it claims the university has an excellent research environment under the English slogan "Research for the Future". In order to attract students, Stockholm University posted an advertisement (shown at

Figure 3. Examples of University Signs (from websites).

the bottom of Figure 4) on the Stockholm underground system with the Swedish slogan "Hur långt vill du nå?" (How far do you want to go?). Finally, a more general example of branding is shown to the right in Figure 4. This is a full-page ad, in English, which has been run several times in Stockholm daily papers by Luleå Technical University, located in Northern Sweden. It tells readers that "Great ideas grow better below zero". There can be no doubt that all three examples aim to promote the institutions they describe in order to make them look more attractive. In other words: they seek to foster trust.

Needless to say, academic establishments, like most other institutions, have moved into the modern information society by creating and maintaining web-pages. Today these constitute important channels of communication. In addition to presenting the web-pages of university departments, and various types of news, several of the Swedish vice-chancellors have chosen to have a blog in which they comment on events they judge to be significant for academia and communicate what they are doing in their daily work (Figure 5).

Figure 4. Examples of University Promotion.

Figure 5. Examples of Blogging Vice-Chancellors (from websites).

Media as Governors

The extensive and steadily growing engagement of academic institutions in communication presents both advantages and challenges for the media. On the one hand, they will be provided with information from academic institutions in a professional way from colleagues they may know. In this way their work on academic reporting is facilitated. However, on the other hand, the modern communication strategies of academic institutions may make it more difficult to see through the window-dressing and the rhetoric of these institutions. And at present, the chances of doing this seem to be further constrained by economic pressures within the media industry leading to the reduction of the resources devoted to reporting from the academic world.

Irrespective of the resources available, it is also important to note that the interaction between journalists and researchers is complicated by the fact that the tasks and the working conditions of these two groups differ in vital ways (Figure 6). If we use what sociologists, following Max Weber, call "ideal types", we can note, first, that journalists and researchers differ in terms of their *main audience*. While journalists are writing for the general public, researchers mainly address scientific elites. This difference can be expected to widen further when researchers, despite the rules and the rhetoric regarding the need for researchers to appear in popular forums, are rewarded primarily for publication in high-prestige journals. The rationale behind this is the increasing pressure of "Publish or Perish" on individual researchers, fuelled by citation figures, impact factors, research evaluations and rankings. In some circles it may even be considered dubious to be too active in the media, particularly if one's scholarly contributions are considered weak. Needless to say, there are, of course, examples of researchers who are able to combine scholarly and popular writing.

Variable	*Journalists*	*Researchers*
Main audience	General public	Scientific elites
Time horizon	Immediate answers	Long processes
Uncertainty	Definite answers	Reservations
Complexity	Need to simplify	Complex reasoning

Figure 6. Differences between Journalists and Researchers.

Another difference between the journalists and the researchers concerns the *time horizon*. While most journalists are eager to receive immediate answers for a broadcast or publication within much less than twenty four hours, most researchers have time perspectives far beyond the three years of the standard research grant today. In this way the two ideal types differ somewhat in the way a sprinter and a marathon runner do.

Another dimension in which the two ideal types differ is *uncertainty*. While journalists need and like definitive answers to their questions, researchers often want to express reservations. Thus most researchers dislike making cocksure statements, since they have been trained to consider that all research results are preliminary, and that their research may not have dealt with all aspects of the problem they are addressing. This may cause problems for journalists who have a limited space in which to present news, and particularly for copy-editors who are responsible for headlines and newsflashes.

This last difference is connected with a fourth variable: *complexity*. Again, we may note the need for the media to simplify because they have limited space, but also because they are addressing the general public. This contrasts, of course, with the often complex theories or reasoning of researchers. It has even been argued that the popularization of research is in principle impossible for this very reason (Öhman 1993).

These four differences may lead to researchers feeling uncomfortable with journalists – they may even complain after an interview that they have not been properly treated. However, the differences also cause problems for the journalists in their work, in terms of the restrictions on the provision of information. In addition, difficulties may arise in the form of researchers who try to crosscut the normal peer review process of scientific journals by going directly to the media. The best known example of this is the case of cold fusion at the University of Utah in 1989, where the two chemists, Stanley Pons and Martin Fleischman, with the support of their vice-chancellor, gave a press conference at a very early stage on a finding that was strongly challenged and dismissed

by physicists later on (for the press conference, see http://www.youtube.com/watch?v=6CfHaeQo6oU&feature=related; see also Gieryn 1999, Chapter 4, and Beaudette 2002).

Conclusions

The point of departure of this paper has been the notion that academic institutions, like other institutions in modern democracies, are governed by politics, markets and the media, all in interplay. The past two decades or so have generally witnessed a wave of deregulation, and this has strengthened the influence of markets at the expense of politics. At the same time the media has become more influential as a governor. This in turn has led to the expansion of a communication industry that is devoted to the lobbying, marketing and promoting of institutions. Academic institutions have definitely taken an active role in this process, and there is considerable evidence of their growing focus on communication, and their efforts to earn our trust. This has both facilitated reporting from academia and made it more difficult: information is being made more readily available, but it may be harder for journalists to see through promotion efforts. These difficulties are reinforced by the fact that the tasks and working conditions of journalists and researchers differ in terms of main audience, time horizon, uncertainty and complexity.

All in all, this implies that academic institutions and the media are living in a kind of symbiosis. Academic institutions have a strong interest in media coverage. Such coverage allows them to communicate their achievements, which in turn is very important in shaping attitudes within the public at large and promoting societal trust in scientific work. The media, for its part, needs access to information and researchers if it is to prepare its coverage, but at the same time it has to maintain its critical function in order to reveal illicit and fraudulent behavior. Another way to express this relationship would be: modern academic institutions are embedded in the media.

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Medical Research and Publication for Sale

Ghostwriting, Ghost Management and "Spin"

Tore Scherstén

Believe those who are seeking the truth.
Doubt those who have found it.
André Gide[1]

Few fields of societal activity have such a high standing as science and research. And there are good reasons for this high level of confidence in the universities and in research institutions' ability to generate new knowledge and move the research frontline continually forward. One important part of clinical medical research is interaction and cooperation with the pharmaceutical industry, the "big pharma".

This collaboration between academic researchers and industry has, in fact, a long and successful history in many Western countries – in the US, the UK, and not least in Sweden. Both parties have benefitted from the collaboration, but there is a fundamental clash of cultures at the interface between the two.

The flow of knowledge and technology between universities and industry to the "Statem Civitatis" has been of great importance for the health and welfare of the people and the community at large. But the interaction has not been without problems. The high level of confidence and the good reputation of science, especially medical science, have become somewhat tarnished recent decades (1, 2, 3). The reason is the disclosure of many inappropriate reports of medical research results, especially concerning randomized controlled trials, or RCTs, to assess the effectiveness and safety of drugs (4). This is serious because RCTs have been looked upon as the gold standard of evidence-based medicine.

Health care has many categories, each with quite different assignments. The patients have to seek help from the health care system and doctors for relief of their problems. Doctors have two main roles: to give advice and to be the patient's attorney. They have to make the right diagnosis and to find the most appropriate treatment for the disease in question (and not just the symptoms).

Industry does what it must. The big pharma makes a profit or goes under, so the

1 Göran Schildt, i *Gide och människan*, Helsingfors 1946.

main mission of the pharmaceutical and medical equipment industries is to make as much money as possible for their shareholders. Of course, this is best done by producing cost-effective drugs or useful equipment – something they have done rather frequently.

Another important way in which a company can secure competitive advantage is through effective marketing to doctors and decision makers about the superiority of its drugs over those made by others. The most successful marketing strategy is to convince doctors, who are the key opinion formers and academic leaders, and the decision-making authorities, of the effectiveness of a drug and its freedom from troublesome side effects (or, at least, its limited association with few such effects). This can be done by inviting prestigious doctors who are leaders in their field to conferences located in attractive places around the world. The visiting doctors will then have access to privileged information on new drugs, which they can recommend their colleagues at home to prescribe. Their intentions are good and their faith is rather genuine. They have fallen victim to the effect described by Machiavelli when he said: "it is of the nature of men to be bound by benefits they confer as much as those they receive"(5). Or, as expressed by Upton Sinclair: "It is difficult to get a man to understand something when his salary depends upon his not understanding it."

An even better marketing method involves the publication of clinical trials in prestigious medical journals. Indeed what has happened is just what the editor of the *British Medical Journal,* Fiona Godlee, recently bemoaned in a *Panorama* programme: "At the moment we have got the industry controlling the design of the studies, controlling the data and controlling the reporting of those studies."

Obviously it has become, to a greater or lesser extent, the *modus operandi* of the big pharmaceutical companies to plan, carry out, and analyse the results of clinical trials (*ghost management*), and then to use professionals (or *ghostwriters*) to write the article under the name of well-known academic researchers, or so-called KOLs (Key Opinion Leaders), who have in fact played little or no role in the research or writing process. Sometimes drug companies pay for trials to be performed by contract research organizations (CROs), which, not infrequently, are academic institutions.

Scientific articles are not simply reports of fact. Authors, ghosts or true researchers, have many opportunities to consciously or subconsciously shape the impression given by their results on readers: to add "spin" to their scientific report (4). *Spin* has been defined as a specific way of reporting that can distort the interpretation of results and mislead readers. In an article published in the *Journal of the American Medical Association* (*JAMA*) 616 reports of RCTs were examined. Spin was identified in 18% of titles, 38% of abstracts of results, and 58% in the abstracts of conclusions. In the main text, the sections presenting results, the discussion and the conclusion had 29%, 43% and 50% spin, respectively. The prevalence of spin in the abstracts was highlighted. This

spin has important implications, because readers often base their information and clinical decisions on abstracts alone. They are freely available. The spin phenomenon does not inspire confidence in the channels through which facts of evidence-based medicine are communicated.

According to a report published by Sergio Sismondo, a professor of philosophy at Queen's University, Canada, the bulk of the research funding from the pharmaceutical companies (70%) goes to CROs (6, 7). In its nature, CRO research tends to be ghostly.

Owing to its covert nature, the prevalence of ghostwriting is difficult to determine. According to a study released by the editors of *JAMA* under the lead of Joseph S. Wislar and published in the *New York Times* a significant number of articles in six of the top medical journals were written by ghostwriters. The journal with the highest rate of ghostwritten published articles in 2008 (10.9%) was found to be *The New England Journal of Medicine* (*NEJM*). The study also reported ghostwriting rates of 7.9% in *JAMA*, 7.6% in *The Lancet*, 7.6% in *PloS Medicine*, 4.9% in *The Annals of Internal Medicine*, and 3% in *Nature Medicine*.

Most pharmaceutical companies have in-house publications managers who either manage the writing of publications by employed medical writers or contract this work out to medical communication companies. It has been estimated that in the US alone there are more than 50 such firms that offer their service to the big pharmas. One of the most prominent companies is Complete Healthcare Communication (CHC). This firm claims to have written and submitted over 500 manuscripts with an acceptance rate of 80%. CHC can achieve such a rate by deploying resources lying far beyond the reach of most researchers. Its advisors know how to lay the stress on the beneficial effects of the studied drug, and how to downplay its negative side effects. They also know that articles appearing in distinguished medical journals have substantial impact on physicians' prescription behaviour.

The medical fields that tend to be subject to ghost management and ghost writing are the most profitable – namely, those involving life-long forms of treatment such as hormone treatment of women in menopause, and the medication of rheumatic diseases, cardiovascular diseases and other chronic afflictions (4, 7, 8).

Preventive medicine – which often entails life-long treatment – is one of the most profitable fields for ghosting. It usually involves treatment of so-called risk factors, and this generally means treatment of laboratory values rather than established diseases. The pattern case is well exemplified by the lowering of blood lipids (mainly cholesterol) with statins, which currently has a market of US $20–30 billion per annum (9). This is a substantial portion of the global pharmaceutical market, which has been estimated at US $840 billion.

For obvious reasons, the ghost activities have led to serious medical consequences (8, 9, 10). As was pointed out by the Women's Health Initiative, hormonal treatment

of women in menopause resulted in a substantial rise in the incidence of breast cancer, stroke and dementia. Again, during the period 1999–2004 about 25 million patients were treated with the anti-inflammatory drug Vioxx. Recommendations to use the drug were based on a substantial number of ghostwritten articles published in prestigious medical journals, but according to the FDA in the US the treatment caused more than 100 000 myocardial infarctions, of which 30% were fatal. The drug was taken off the market in 2004.

In an excellent unmasking article, the French cardiologist Michel de Lorgeril and Patricia Salen review and discuss the cholesterol-lowering drug trials published before and after the Vioxx scandal broke in 2005 (10). Their revelations resulted in new clinical research regulations. Before the revelations, the predominant published statin trials were highly positive, especially in the secondary prevention trials; but since 2005 most studies have been either negative or obviously biased.

Apart from its humanitarian implications, ghosting also has financial consequences for society and patients. It is difficult to determine, but in Sweden alone the total cost for pharmaceuticals is about SEK 34 billion per annum. The state accounts for around 22 billion of this figure. Further, costs associated with the side effects of drugs are estimated at SEK 3 billion per annum.

Various measures have been taken to prevent fraud and the misuse of medical research and publication. Thus the US Institute of Medicine recommends that all medical faculties and research institutes ban ghostwriting and ghost management. The European Medical Writers Association has adopted guidelines for medical writers that address ghostwriting.

An insistence on declarations of interest and commitment has been in place for many years in many medical journals. However, these declarations are rarely complete, as recently reported in *NEMJ*. They are incomplete despite the clearly expressed view of the International Committee of Medical Journal Editors, namely: "Published articles and letters should include a description of all financial support and any conflict of interest that, in the editors judgment, readers should know about."

Following the proposal of Senator Chuck Grassley (Iowa), a new law has been passed in the US called the *Physician Payment Sunshine Act*. This legislation means makes it mandatory for all drug companies and manufacturers of medical equipment to hold databases with all payments of more than US $100 to physicians and research institutes. The databases will be used to enforce stricter disclosure requirements designed to make companies more transparent. The *Physician Payment Sunshine Act* has now been included in the final version of the *Patient Protection and Affordable Care Act*.

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The Vulnerability of University Culture and Individual Integrity

Inge-Bert Täljedal

Today's university researchers are subject to a dilemma – a genuine dilemma from which, unfortunately, I can see no simple escape. In order to secure sufficient financial support for high-quality work, scientists and scholars may have to compromise on methodological rigour. This dilemma can be sensed at all administrative levels of a university, by individual researchers as well as by vice chancellors. I think the situation is deeply problematic. Unable to propose any obvious solution, I can only highlight the reality of the problem, and hope that I foster invigorated and wider discussion of it.

What could it mean to have trust in scientific research? Of course, it depends on what one takes to be the aim of research. I have the impression that there is increasing uncertainty in society as to how to rank the importance of various aims. This uncertainty is to be found both outside the universities and to a significant degree in the research institutions themselves.

The values and norms of conduct that characterize university culture are not static; they are more or less responsive to political and other forces in society. The individual scientist cannot be expected to have unshakable intellectual and moral integrity in the midst of cultural change. University culture and the integrity of individual researchers are vulnerable things that interact with each other. It is a moot question whether, and if so to what extent, they are presently being compromised.

I guess I am fairly typical of my generation of scientists inasmuch as I take it for granted that the utmost aim of science is to seek non-trivial, new truths about the world. Time does not permit me to dwell on the question of how to understand the concept of truth. I am aware of its philosophical intricacies. Suffice it here to say that I believe that science, as a practical enterprise, must accommodate the common-sense idea that there is an objective reality, whatever it might be, and the notion that truth involves some kind of correspondence with that reality.

Non-trivial truth is rarely overt. It is often elusive and difficult to come by. Over the years, I have taught my students to view the social machinery of science as a gigantic spiritual threshing mill – a machine that separates intellectual wheat from chaff through relentlessly critical discourse, most importantly in the form of published texts. This threshing mill is expressive of a supreme norm that cannot be overridden by any other norm, or purpose, without loss of the whole idea of science proper – that is to say, the norm of truth as the final value, or end, of scientific endeavour *qua* science. Science is certainly of instrumental value in other important ways. For example, politics, business, art, or health care can gain from it. However, in my old fashioned view, such things as power, profit, promotion, beauty, or even health, can never, without self-contradiction, justify any compromise on the truth-seeking aim of science. Indeed, the much-discussed perversion of so-called scientific fraud has to be understood as a kind of oxymoron, applying to persons who are merely posing as scientists.

It is because of the elusive nature of non-trivial truth that some basic methodological rules have evolved to ensure as far as possible that research is in fact directed and geared toward its supreme aim. A cardinal methodological principle here is to shun sources of bias. In other words, one should stay away from interests, or interest groups, that can interfere unduly with the research process. Bias has to be carefully avoided simply because it deflects from the very aim of science. If by "scientific research" one understands the most effective pursuit of truth possible, and bias makes this pursuit less effective, then for logical reasons biased researchers must necessarily lose in trustworthiness – more or less.

Bias can influence the direction of research, and this can mean that scientifically suboptimal problems are attacked instead of more fruitful ones. It can also influence the evaluation of results. Within the scientific community it is well known – or at least it used to be – that expectations, hopes and fears on the part of an experimenter are liable to introduce error in the interpretation of data. For example, that is the reason why so-called double-blinding is a *sine qua non* in the testing of new medical drugs. That unconscious bias is always a threat to the reliability of results is a very basic insight in all kinds of experimental science. Because our subconscious psychology functions as it does, one may very well be seriously biased without being consciously dishonest. One need not be a deliberate liar to be disqualified as a witness to truth.

What I have just said may seem self-evident, especially in a context like the present one. However, my life at the university has gradually led to a degree of disillusionment about the general understanding of these matters, both in society at large and in universities. I certainly do not wish to imply that lecturers and researchers are not usually honest. We probably are, at least to the same extent as people in general. Yet, with time I have begun to worry over the apparent growth of complacency, in the academic world, about the risks associated with bias. These risks threaten both the very quality of university research and the general public's confidence in it.

What I have in mind is this. Outside the academic world, public and civil administration is governed by legal as well as informal rules of conduct that serve to prevent various types of bias in decision-making. For example, civil servants are disqualified by law from making decisions on matters that involve their own personal interests and those of close relatives or friends. Section 7 of the Swedish Law of Public Employment (*Lag om offentlig anställning*) is a general statement of the importance of preserving trust in the impartiality of civil servants:

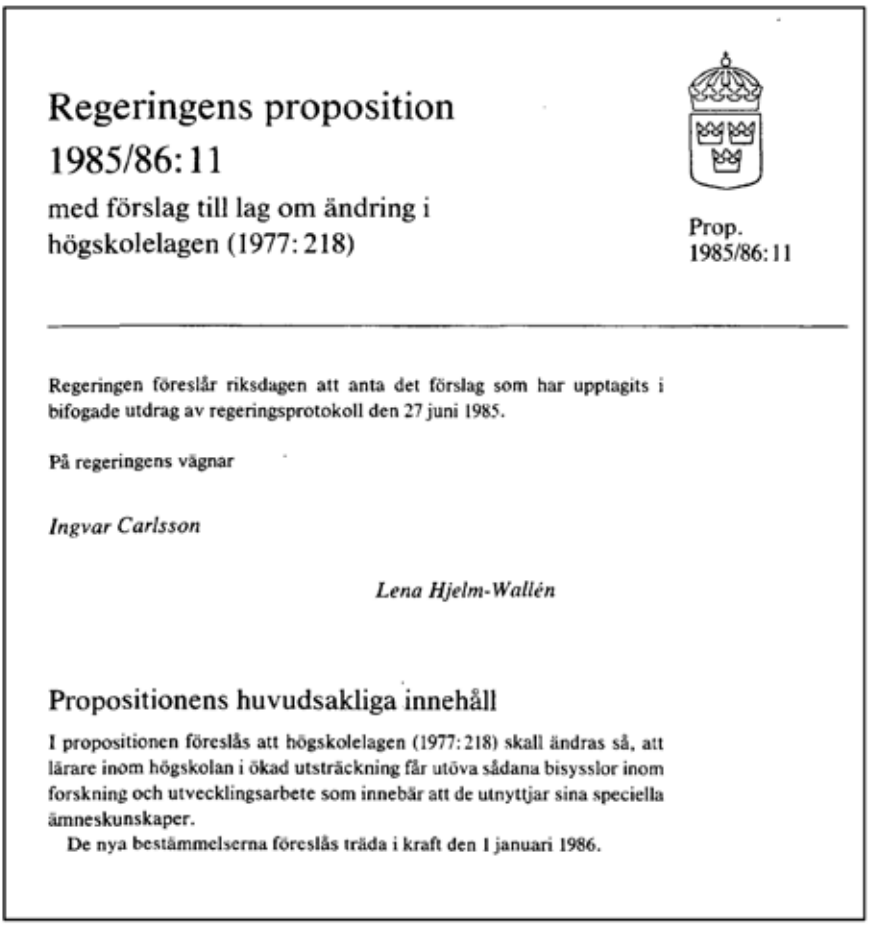
> An employee may not have any employment or any assignment or exercise any activities that may adversely affect confidence in his or any other employee's impartiality in the work or that may harm the reputation of the authority. (English translation of the law provided by the website of the Government Offices of Sweden.)

In Sweden most university lecturers are state employees. Until a quarter of a century ago the legal prohibition against bias set out above applied with equal force to all public servants alike, professors and other university lecturers included. In those days a professor could not combine his or her academic research with remunerated similar work for a commercial firm without running a serious risk of breaking the law. Not only could such behaviour be illegal because it might involve partiality disadvantaging other firms. In those days, for reasons of scientific method, university researchers generally looked with some suspicion upon parallel, or secondary, employment in the private sector, simply because commercial interests may be a real source of bias in one's research.

A fairly radical breach with this way of looking at things occurred in 1985. The change was ushered in by the publicised case of a professor and a research engineer who had collaborated closely with a private company of their own while at the same time being employed by a university. A commercial competitor filed an official complaint. As a result, the university chancellor ruled that the commercial collaboration was illegal. The minister of education, on behalf of the government, was forced to draw the same conclusion in an official decision, but in a separate statement also expressed concern that the law appeared to be unduly restrictive given national interest in industrial and economic development.

So, in 1985 the Swedish parliament, the *Riksdagen*, enacted into law an amendment of the Swedish Higher Education Act (*Högskolelag*). Figure 1 shows the front page of the government's bill. This bill was meant to encourage collaboration between university academics and commercial firms. Generally speaking, such collaboration can take many forms – for example, contracts between firms and the university as an organization – in which no additional remuneration of the researchers is involved. However, by means of the 1985 bill the government wanted to encourage university scientists to combine their work for the university with a side-line in work as consultants or cont-

ractors, or as the employees of other employers. The explicit purpose expressed in the bill was to stimulate industrial development and Sweden's international economic competitiveness. What had previously been forbidden by law as destructive was now encouraged as constructive.



Regeringens proposition
1985/86:11
med förslag till lag om ändring i högskolelagen (1977:218)

Prop.
1985/86:11

Regeringen föreslår riksdagen att anta det förslag som har upptagits i bifogade utdrag av regeringsprotokoll den 27 juni 1985.

På regeringens vägnar

Ingvar Carlsson

Lena Hjelm-Wallén

Propositionens huvudsakliga innehåll

I propositionen föreslås att högskolelagen (1977:218) skall ändras så, att lärare inom högskolan i ökad utsträckning får utöva sådana bisysslor inom forskning och utvecklingsarbete som innebär att de utnyttjar sina speciella ämneskunskaper.

De nya bestämmelserna föreslås träda i kraft den 1 januari 1986.

Figure 1. First page of the Swedish government's epoch-making bill amending the Higher Education Act. The bill relaxed the previous prohibition of commercial bias in academic scientific research. At the bottom of this page the purpose of the 53-page bill is stated as that of extending the right of university lecturers to exploit their expert knowledge in secondary employment for research and developmental work.

In the national interest of economic development scientists should no longer be restricted by the general prohibition of bias. However, the commercially induced bias that was now being encouraged only pertained to research and related work. It did not apply to any other decisions that the scientist may have to make, for example, in his or her role as examiner of students. To stress that the new license given to commercially justified bias was limited to research, the bill prescribed that the secondary employment must not damage trust. The wording of the new legal clause (Chapter 3, Section 7) is as follows:

> In parallel with their teaching posts, teachers at higher education institutions may undertake employment or assignments or pursue activities relating to research and development work within the subject area of their posts, if in doing so they do not undermine the confidence of the general public in the higher education institution. (English translation provided by the website of *Högskoleverket*, the Swedish National Agency for Higher Education.)

The bill, and the resulting change in the law, set an additional official aim for university research. It did so by deliberately weakening the legal demand for objectivity and impartiality in science. Of course, the two goals – i.e. non-trivial new truths, on one hand, and industrial international competitiveness, on the other – are not formally, or necessarily, contradictory. However, the legislation backing the second goal certainly plays down the risks of bias in a way that could well be counterproductive vis-à-vis the first.

The law makers assumed that removing a legal barrier to bias in science would not necessarily damage the general public's confidence in universities. This assumption was a daring one. Why should the general public trust scientists who make themselves vulnerable to sources of bias that would make other public servants patently unreliable? Indeed, the Swedish Chancellor of Justice had strongly advised the government against proposing the bill precisely because it is important to maintain trust in university research, and because the proposed reform would weaken the defence of that trust. In response to this objection, the then minister of education argued that the demand for objectivity and impartiality in research does not need legal protection because it is a characteristic of the scientific community itself. I am inclined to think that this argument disclosed either naivety or a certain hypocrisy on the part of the government. It fails to take into account the fact that university culture is vulnerable to external political and economic pressure. As a result, the actual clause of law came to seem a bit confusing, or fuzzy – if not actually contradictory. On the one hand, it permits secondary employment, which is normally forbidden as trust-damaging. On the other, the secondary work must not damage trust!

Confusing or not, the law has been successful in the sense that today many university researchers undertake commercial work of a kind that would have been illegal, or

for other reasons atypical, just a quarter of a century ago. In preparation for this lecture I wrote to the vice chancellors of seven well established, prominent universities in Sweden, asking how many of the lecturers in science and medicine have a side-line in work for other employers. I also asked how often the university prevented, or counselled against, such a secondary employment in order to preserve the public confidence. Finally, I wondered aloud whether the vice chancellors considered the 1985 legislation lucid, contradictory, helpful or harmful for research, and helpful or harmful to confidence. Briefly, the answers can be summarized as follows:

1. Secondary employment is a common phenomenon. Expressed as median values for these prominent universities, one-fifth of academics in science and technology have a second employer. In medical faculties the corresponding figure is as high as four in ten. In some departments, the figures are, of course, substantially higher.
2. Vice chancellors and their representatives do not in general feel unhappy about the legal regulations on secondary employment. Four universities expressed sympathy with the law, and one believed it was okay, while two thought the rules are none too clear. In general, the vice chancellors declined to give detailed answers to the questions about lucidity and the impact on research and trust.
3. It very rarely happens that any secondary employment is forbidden or actively advised against.

The results suggest the following conclusion. Either university leaders do not think that the many secondary employments represent any threat to confidence, or, more probably, they are willing to accept a certain loss of trust in return for something else. The idea of a kind of trade-off between confidence and more material gains was neatly summarised by a senior manager at one vice chancellor's office: "It creates problems when a university employee owns a company and wants it to collaborate with the owner's university department. Such collaboration entails a considerable risk of damage to confidence, while at the same time benefiting the innovation process greatly."

In two vice chancellor's offices it was pointed out that confidence is not threatened by ancillary employment alone. Long-term research support (*i.e.* funding) from industry to certain individual researchers, teams, and departments may be even more damaging. In response to my inquiry, it was stated that such relationships, which are sometimes maintained for many years, certainly raise questions of dependence and partiality.

Clearly, in today's university culture the emphasis on commercial success is felt by many to create a dilemma of confidence. If not flatly denying it, scientists and university leaders seem to handle the dilemma by accepting a certain loss of confidence, pre-

sumably while hoping that the encouragement of bias will not also influence the actual quality of research. Whether or not that hope is realistic is an interesting and important question deserving analysis and discussion. As much as science is about truth and hard facts, this question, too, is factual and not merely about laudable aims, or wishes, and opinions.

It seems likely that the gravity of the problem varies, differing from one project, or area of research, to another, depending on the specifics of the collaboration – its transparency, the nature of the products aimed at, and the money involved. For example, research supporting the production and sales of goods for the mass market, notably food and pharmaceuticals, may have greater bearing on the confidence of the general public than collaboration with firms operating in narrow niche markets with expert users. However, in general terms, there seems to be no ground for blind optimism about the innocence of the bias associated with collaboration driven by commercial purposes.

Images of (Some) Scientists in (Some) Movies

Inez de Beaufort

Some Introductory remarks: Why fiction?

> Literature does not merely hold up the mirror to nature and express more eloquently what is already well known and understood; it allows the exploration of what is perceived only dimly, if at all, the subversive anxieties that cannot be directly stated, because they challenge too vigorously the mores and taboos of society. (Roslynn Haynes 1994.)

People have all kind of ideas about scientists and scientific research, and about the consequences of research for societies and individuals. Those ideas are formed through popularized information from the research world, talks on television, articles in magazines, the modern mass media, scandals and incidents, and also by images provided by fictional forms such as novels and films.

I have always been impressed and intrigued by the impact of imaginary persons, worlds and scenarios on people's thinking, and by the influence the imaginary realm has on moral arguments about technological and scientific developments. However hard philosophers try, the unfortunate and unfair truth is that most of their cherished and profound writings are usually not read by wide audiences – with a few exceptions, such as Peter Singer. The general public knows Michael Crichton and Robin Cook.

Fiction plays a role in societal debate over the ethical questions raised by scientific developments and/or the behaviour of scientists. Fiction may intrigue or scare people. Sometimes it is loaded with a predictive meaning, sketching dystopian scenarios and warning of scientific developments. The role of fiction is interesting in relation to ethical analysis in various ways. It can "translate" abstract ideas and hard to envisage possibilities into images and cases that are more familiar and "accessible", and therefore make people wonder. Fiction can raise questions. It can confront us with the complexity and tragedy of human choices and deliver a warning sign: do not think you can morally dissect everything. Life is too complicated and too tragic.

The positive role of fiction has to do with the following:

- Fiction may provide thick stories that allow understanding and empathy, as following a story you can "crawl into someone's head" (the best example may be Dostoyevsky's *Crime and Punishment*.)
- Fiction creates awareness of certain problems and developments.
- Fiction may make ethical arguments "come alive", as they are embodied by a person or discussed in a concrete situation.

On the other hand, fiction may also have what I consider a negative role:

- Fiction may reinforce unrealistic prejudices created by fictional characters.
- Fiction may scare people to such an extent that reasonable debate becomes very difficult if not impossible.
- Fiction may ridicule scientists, making it hard for scientists to be taken seriously and redress the balance.

In fact the images created in fiction sometimes function more as debate-stoppers than as enhancers of ethical debate. The fictional scenarios sketched may be too farfetched, the views too dystopian, the landscapes too apocalyptic. They do not do justice to what is actually going on, and therefore they only confirm people's misgivings. So instead of encouraging people to discuss science, fiction makes them stop talking about it, because it paralyzes them. It has the opposite effect, causing a lot of trouble for serious scientists who then have to spend their precious time explaining to the public what is going on. I once heard a geneticist sigh: "I wish they'd stop making films about genetic issues, I have to undo all the misunderstandings."

Caricatures would not work if there was no recognition at all. They feed on sentiments that have to do with a moral conception we have of a profession. Other professional groups – doctors, bankers, businessmen, and in particular psychiatrists – have also been subject to such "caricaturization", if that is of any consolation to you ... To be fair I have looked for caricatures of philosophers. They are somewhat hard to find. I quote from the novel *The Hitchhiker's Guide to the Galaxy*, written by Douglas Adams:

> 'I'm Vroomfondel, and that is not a demand, that is a solid fact! What we demand is solid facts!'
>
> 'No we don't' exclaimed Majikthise in irritation. 'That is precisely what we do not demand!'
>
> Scarcely pausing for breath, Vroomfondel shouted, 'We don't demand solid facts! What we demand is a total absence of solid facts! I demand that I may or may not be Vroomfondel!'
>
> 'But who are you?' exclaimed an outraged Fook.

> 'We' said Majikthise, 'are Philosophers.'
>
> 'Though we may not be,' said Vroomfondel waving a warning finger at the programmers.
>
> 'Yes we are,' insisted Majikthise. 'We are quite definitely here as representatives of the Amalgamated Union of Philosophers, Sages, Luminaries and Other Thinking Persons, and we want this machine off, and we want it off now!'
>
> 'What's the problem?' said Lunkwill.
>
> 'I'll tell you what the problem is mate', said Majikthise, 'demarcation, that's the problem!' 'We demand,' yelled Vroomfondel, 'that demarcation may or may not be the problem!'
>
> (Douglas Adams 1979.)

One might argue that this kind of caricaturization pollutes moral debate, and that the use made of fiction is rhetorical rather than a serious contribution to a debate over important issues.

There is also – one has to admit – a lot of rubbish, even "rubbishissimo", fiction. One should probably distinguish between "good" fiction (quality fiction) and "bad" fiction. I will not try to do that, at least not here. There certainly is a lot of bad fiction around, but probably even bad fiction can be used in the moral debate.

Integrity and scientists

In the context of a short presentation it is quite hard to choose examples of the image of scientists. I certainly cannot do justice to the very different images that in fact exist in fiction. I can only show some examples. My choices were based on the notion that these examples are interesting "archetypes". Of course, some movies provide highly exaggerated caricatures.

In movies that in some way have to do with integrity, the scientists are often bioscientists (and of course geneticists play a big role), nuclear physicists, or computer scientists; there is the incidental chemist (the Nutty professor). Only rarely do we see historians or linguists. There are some examples in novels, of course, such as Prof. Dr. Moritz-Maria von Igelfield (fictional author of *Irregular Portuguese Verbs*) and his hilarious adventures in the trilogy by Alexander McCall Smith; but integrity is not a major theme there. Interesting exceptions are the archaeologist Henry Walton – Indiana Jones in the Indiana Jones movies and "symbologist" Robert Langdon in *The Da Vinci Code*. The emphasis on "hard science" is not surprising: the scientific projects of linguists, or of philosophers for that matter, do not tickle the fantasy in the same way.

What do scientists do in movies?

Usually they develop technologies that can destroy the world – and usually these are of either a nuclear or viral nature. Alternatively, they work on drugs which can provide eternal life or health (for themselves and others) or which can control humanity (e.g. turning us all into docile zombies or reading our minds even before we think of something). They develop computers far more intelligent than mankind, and then take over, or take power, and are involved in developing many more devices and techniques. Very popular themes are cloning, genetic modification, robotics/half robotics, transplantation, viruses, and medical research.

The motives driving scientists to "juggle" with the ethical expectations of their respected branch of academic work, and to breach integrity, vary. I have categorized them as what I shall call the "Seven Ps":

> Personal loss, Pride, Pressure (academic, societal), Political reasons, Pecunia (the Latin term used of course to have another p), Power, Playing God.

I will show some examples of all these motives. Of course, they are often combined.

Some examples

The classic Frankenstein notion of scientific research getting out of hand as the scientists, in their hubris, create a monster can be seen in many films. One is the movie *Metropolis* by Fritz Lang where the scientist (yes, with the mad hair and the waving hands) explains how he creates the Machine-Man. Again, *Frankenstein* (2007), a modern version of Frankenstein pictures a female researcher whose son is dying from heart disease, and her attempts to create a heart for him, bypassing all the ethical rules and regulations and ending with the creation of a monster that kills. Her son has died. The movie combines the personal loss and hubris motives.

Personal loss also plays a role in *The Creator*. In this story a Nobel Prize winning biologist is doing research in a private laboratory to "reproduce" his wife, who has died years ago. (An interesting detail is that he has moved most of the laboratory equipment from the university to his own backyard.)

The Island of Dr. Moreau tells the story of Dr. Moreau, who combines humans with animals in order to create new beings. There are two versions of the film. In the more recent version, in which Marlon Brando plays Moreau, genetic techniques are used. In the older version, in which Burt Lancaster is Moreau, some sort of injection is used. Moreau is dissatisfied with the academic world and the fact that he was not appreciated and bound by rules. Therefore he has withdrawn to an island. Of course, things end

badly. The suggestion is that scientists should work in an environment in which there is a form of social control.

The fact that the Creator and Dr. Moreau work in "splendid isolation" also suggests that secrecy is very dangerous. Often bad scientists work on islands (e.g. the movie *The Island* and the James Bond movie *Goldeneye*).

Isolation is also a theme of *Planet of the Apes*, of which there are again two versions. Here there are some interesting dialogues on the relation between religion and science. The head of the science-ape thinks that if the findings of science do not fit those of religion, then religion should prevail. And scientific evidence of the previous civilization – that of mankind, of course – is destroyed. The message is that mankind brought destruction upon itself with its scientific and technological developments.

The Boys from Brazil, based on the Ira Levin novel, has influenced many people's thinking on cloning. When I was involved in the Dutch ethical debate on cloning in the 1990s, I was struck by the fact that many people declared themselves stern opponents of cloning "because you see what happens in *The Boys from Brazil*". Of course, political motives are a central idea in this movie.

Cloning is also the technique used in the film *The Island,* where clones are kept as a "spare part bank" in case their "originals" need an organ. In *Replikate,* which is also about cloning, there is a technique that turns out to be wonderfully easy to perform with a machine called the Replicator. The huge pressure on academics is portrayed, and this pressure affects the younger as well as the older scientists. The young are pressured by the senior scientists, who in their turn are pressured by their deans, who in their turn are pressured by the boards, who in their turn are pressured by sponsors. It is a chain of pressure mainly based on the goals of money and the scientific "miracles" to be performed. Even though the movie has an almost slapstick character, this I found to be quite interesting.

In *Torn Curtain*, a Hitchcock movie, a physicist travels to East Berlin as a spy to get hold of some secrets that only a colleague scientist has access to. The East German colleague divulges the secrets, letting his pride run away with him. The film raises quite interesting questions on freedom to publish research results; and the vanity of some scientists, in particular vis-à-vis their colleagues, is interestingly portrayed.

A classic movie on the atomic bomb is of course *Dr. Strangelove.* Here it is obvious that hubris and political motives are playing an important role. The American president takes the arguments of the scientist quite seriously.

I also want to draw your attention to two movies based on real life events. The first of these, *The Band Played On,* describes the history of the AIDS epidemic, and includes some very interesting scenes on the discovery of the virus and the dispute between French and US researchers. It is interesting to see how power games are played out, how complicated scientific cooperation may be, also from the point of view of inte-

grity, if the stakes are very high – that is, Nobel Prize high, with one of the "stakes" being the discovery of a cure for a terrible disease.

The second biopic, *Lorenzo's oil*, describes the parents of a very sick boy developing a possible treatment for their son. It focuses on the problems they face when they want to test the treatment and researchers want to do everything properly, which may take a lot of time. These movies are very different from those mentioned above in the sense that in them there is no caricaturization (at least, not to the extent that there is in completely fictional movies).

Finally, I have chosen a fragment of the movie *Wit*. This is a very beautiful and subtle film about a female professor suffering from cancer and participating in a clinical trial. It shows how her physicians do not see her as a person, but only as a research subject. Their integrity as doctors is definitely at stake, but I would also argue that their integrity as researchers working with patients is as well. It is, in a way, also a film about obsession with research. The film is interesting, as the borderline between obsession and passion and dedication is so complex.

There are more interesting movies, of course – many more than I can deal with in a short time. For more information, I would refer you to the books by R. Haynes and C. Frayling listed in the bibliography.

Concluding remarks

Of course, scientists are often, to put it mildly, not altogether happy with movies that cast doubt their endeavours, question their integrity, ridicule them, or depict total nonsense. They feel they are being treated unjustly, or that their work is hampered by irrational fears fuelled by fiction. On the other hand, real life and the scandals of the scientific world are sometimes very close, or similar, to the scenarios presented in films. The good suffer from the bad. Altogether, this is a reason to promote and support strategies that promote scientific integrity.

It is also true that some movies of a science fiction nature that are considered absurd when they are first shown may in fact become more realistic (think of the movie *Jurassic Park* and the current, serious plans to clone the mammoth). Fuelling the debate by showing cases in which there are breaches of integrity, and sometimes going into the reasons for such breaches (money, reputation, and so forth) may, I think, still be important given the present academic climate. It seems to me to be important that people in universities, particularly scientists, are aware of the way they are portrayed, if only to show that in real life they are quite different (not raving maniacs with wild grey hair, hiding their most recent monsters in the fridge or under the bed). It is important for scientists to be transparent about their work, so that the public is informed.

It is sad that scandals often tarnish the reputation of scientists for whom scientific integrity is the guiding principle.

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Quality and Trust in Science

Kerstin Sahlin

Quality control, trust and distrust

Quality and quality control are essential for the maintenance of trust in science and research. Quality control forms a fundamental and integral part of the collegiate collegial system that has become something of a backbone of the modern research organization. I will start this talk with a brief review of quality control measures in the collegial system, and I will conclude this review by stating that this form of quality control aims at building trust, but is also built on trust and on shared belief in cognitive values.

In contrast, I claim that much of recently introduced quality assurance in universities has other roots. It springs from the *audit society*. The concept audit society was coined by the British accounting professor – also trained as a philosopher – Michael Power. His studies showed not only that were audits proliferating – and encroaching into areas way beyond traditional financial audits – but also that organizations, and operations, are built to be auditable. Audit society builds on distrust and drives distrust. Michael Power describes this as a distrust spiral.

Collegiality and trust

Quality control is a fundamental part of the collegial system that has become something somewhat of a backbone of the modern research organization. The control of quality forms an integral part of the research process, research schooling and the research organization. Collegiality, as an organizing principle, ideally includes a management structure with elected leaders (elected as *primus inter pares*). In such a system the elected leaders are accountable to their peers, to the scholarly community and to science. Moreover, the collegial research process develops through processes of peer re-

view, on-going and critical seminars, and continual, critical dialogue among academics – all based on the belief that knowledge should be continually tested and reviewed. It is through peer review and critical dialogue that high-quality teaching and research can be ensured. To avoid personal conflicts and dependencies peer review transcends organizational boundaries and thus limits management control within organizations. We can thus talk of a collegial culture, with seminars, peers, faculties and faculty boards, where the argument and the dialogue serve to secure quality, to deliver truth, and to find the most rational way forward.

Such a collegial culture is aimed at controlling quality, and hence at building and maintaining trust in research and science. It also builds on trust and on shared cognitive values and standards defining what constitutes good quality.

Quality assurance, audits and distrust

The current trend of quality assurance has other roots: it springs from the audit society.

Many recent quality assurance models – in universities, in national university systems, and in transnational university associations – establish audits, assessments and evaluation procedures inspired more by industry than collegiality. This development goes hand in hand with the more general corporatization and marketization of universities. These tools of quality assurance are typically formed as specific models and include measurements. Unlike the collegial model, with its critical seminar, these quality models emphasize the importance of a distance between practice and audit. Quality assurance is separated from daily academic practice. Evaluations are carried out by specific quality assurance agencies or evaluation professionals, sometimes specific professionals, and in specific evaluative procedures.

Swedish universities, and indeed most European universities, now have special quality assurance units. They are typically part of the university administration. The Swedish national agency for higher education is just about to be reorganized so that a special inspectorate – or quality assurance agency – is created and separated from what, in the motivation for the reorganization, is termed the more service-oriented functions. Hence, it is seen as important to separate support and scrutiny functions. Not only does the national agency for higher education assess universities – a number of overlapping scrutinizing bodies are active in the field, and to the extent that these form what can be characterized as a market for audits, assessments and evaluations. For example, the national audit office is nowadays very active when it comes to auditing universities – and not just their use of resources, but also the academic work.

These assessments and evaluations typically form along an "audit logic" and build on a basic principle of distrust. Studies of audit society, with its expanded monitoring

and auditing activities, show that this kind of society is associated with a decline in trust. Auditing and monitoring reveal and make transparent. And auditors hate uncertainty. Clearly, audits are built to find faults, mistakes, misconduct – not to be part of a continuous search for understanding and truth. In this way, rather than building trust, this kind of scrutiny may undermine it further, leading to still more requests for auditing and monitoring. So we can expect the very popular and proliferating quality assurance systems – with their audits, evaluations and assessments – to undermine trust in science, in universities and in scientists, researchers and professors. They may even give rise to a culture of fear where the main ambition is to avoid uncertainty. And evaluations give rise to demands for further evaluations.

In short, the introduction of new measurements, assessments, and performance criteria has important consequences for the organization, management, and governance of universities, and hence also for the way in which research is performed – and in fact for knowledge generation as such.

Ways forward?

What can we do? Much of this was said yesterday [at the symposium], by Heinrich Rohrer, Inge-Bert Täljedal and others. I would add that we need to fight the so commonly heard descriptions of universities, and of scientific organizations, as kinds of corporation. Most official white and green papers on universities embark upon their characterizations of universities with an ideal type of corporation or public agency in mind. At best, they then say that universities are not exactly like that – they are exceptions. Universities are not exceptions. They form an organizational species of their own, with their own logic – the logic of scholarly work and science. We should stop describing universities in terms of what they are not. There is a desperate need for well-articulated and broadly spread normative and cognitive models of the university, and of scholarly and scientific work.

When we analyse the recent proliferation of rankings and other forms of assessment and evaluation in university systems throughout Europe, it becomes clear that these trends do not originate in policies for higher education and research. They emerge from a more general societal trend of organizing and scrutinizing, and this trend in turn impacts on the reformulation of research and higher education policies at both the national and transnational level. As such, the proliferating audits, assessments and evaluations challenge what could be described as more traditional modes of governing, organizing and leading universities.

Studies specifically of trust in research and science, and in universities, describe a decline. This decline in trust may be a result of audit-society inspired scrutiny. I briefly mentioned that studies of audit society have identified distrust spirals. Hence, an im-

portant task for university leaders in the audit society is to seek to build and maintain trust in higher education and research, and in the organizational setups in which these activities are performed.

Following on the proliferation of audit-society inspired forms of quality control sketched above, I also see a need to restore and repair collegial systems of quality control – and to restore trust in the collegial systems themselves. It goes without saying that the background and rationale of collegial decision-making and collegial bodies is that scientific knowledge and the scientific discourse must be given space. But it is also important to keep in mind that the representatives of these bodies represent the scientific community and professional life in general – they are not representatives of special interests. In practice this is, of course, often confused. In practice many members of collegial bodies see themselves as representatives of a particular group, not as academic representatives who should draw the appropriate conclusions from critical discussions regardless of whether "their own group" benefits or loses.

Collegial organizing, of course, like all organizing, is rarely perfect, and in many places it has been criticised. Certainly it is legitimate to criticize, and critically examine, collegial bodies, elected leaders and seminar cultures. But I believe that the criticism frequently develops into objections to the underlying principle. If this is indeed the case – if much of the criticism of individual leaders, bodies and procedures does in fact spill over and evolve into a critique of the organizing and governing principle – it is important that we also let this principle, as such, have a say in the on-going debate over how to lead and organize universities, research and science.

I would like to conclude by suggesting that many of the problems attributed to university organizations of today can be caused by too little, rather than too much, collegiality. The strengthening of collegiality – the election of leaders, peer review, critical dialogue and argumentation – can serve to protect against the problems pointed out above. Well functioning collegiality may restore trust in science, protect decision making from being too fast and biased, and a well functioning collegial system supports a quality culture in universities. In other words, the medicine for poorly functioning collegial organizations may not at all be more business-like management or more regulation, but more collegiality.

Trust in Science, but Keep Your Powder Dry

Pieter J.D. Drenth

1. Introduction

Not too long ago universities, academies and research institutes could bask comfortably in the warm sunlight of science. Science, as an instrument of the Enlightenment, was respected, and so were the institutes where this instrument was promoted, or where the next generation was equipped to cultivate science or to practice a scientific profession. Transparency and an understanding of what science and scientists are about were not prerequisites of this general respect, and neither was there a demand for a close public control of the whole scientific enterprise. Universities, academies and national funding organisations were well provided with necessary governmental funds, and they could do their work in relative freedom and independence. For the politically right-wing, science was a motor of economic development; for the left, it was a means of securing more democracy and equality; and for the individual citizen, it was an appealing arena of success in the careers of their sons and daughters.

Since a few decades ago, however, we have seen a notable swing in public opinion. Science is no longer taken for granted. The widespread reverence for science and the public admiration of its achievements that were evident until the middle of the twentieth century have been replaced by doubts, scepticism, distrust and sometimes even plain enmity. Why did this occur? What brought about the change in attitudes? Let us try to explore some of the causes of the transition.

2. Religion

Of course, the positive appraisal of science referred to in the introduction has not always been enjoyed. Quite often science has been under, sometimes severe, attack. One of the strongest antagonists has always been, and in certain regions still is, religion.

Throughout history the relationship between the scientific *ratio* and religious belief has been a recurrent source of conflict, and in many faiths – particularly in their more orthodox variants – science and religion have been at daggers drawn. The actions of religious leaders in this conflict have been fierce and merciless at times. Discussions of "heretical" scientific findings have been forbidden, books and manuscripts have been burned, scientists and scholars themselves have been silenced, isolated, imprisoned and put to death. Western Christendom has made its victims: Galileo, Spinoza, Giordano Bruno, Thomas Moore, and many others with names we mostly never knew.

It is only since the Enlightenment that science has liberated itself from its subordination to church and religion. Science became autonomous, only accepting logic and empirical or experimental validation. It refused to be overruled by "truths" as they are revealed in holy scriptures or interpreted by religious leaders.

This is not to say that religious resistance has evaporated. In today's civilised society, stakes and gallows have disappeared, but forms of repression still exist. The aggressive campaign of fundamentalist Christians in the USA (and some countries in Europe) against the teaching of evolution in biology, and their propagandist agitation for the teaching of the neo-creationist "intelligent design", is a case in point.

Personally, I feel most comfortable with Stephen Gould's (1999) concept of NOMA – that is, Non-Overlapping Magisteria. Neither world should hamper the other. The Bible, the Torah, the Qur'an and similar works are not historical, geological or biological textbooks. They do not intend to provide a scientific explanation of physical or social phenomena. They are imaginative texts that attempt to help people to understand the meaning of life, to guide and inspire them, and to provide hope and comfort. Science is the world of falsifiable knowledge, of logical consistency, and of verification and validation on the basis of facts or observations. These two worlds cannot be at variance any more than a poem can be at variance with experimental physics.

3. The long battle against anti-science attitudes in the Muslim world

At this point I cannot turn down the opportunity to say something about the Muslim scientific world, referring back to an earlier paper of mine on the subject (Drenth 2011). In spite of its glorious history – with scholarly celebrities such as Al-Kindi and Ibn-Sina (Avicenna) in the golden period of Arab science at the end of the first millennium (Abulafia 1979; Saliba 2007; Cohen 2008), and Al-Haytham (Alhazen) and Ibn Rushd (Averroes) a few centuries later in Spanish al-Andalus – the influential position of Muslim science has declined dramatically in the modern period (Segal 1996; Slomp 2004; Cohen 2008). Hardly any of the universities in the Muslim world are centres of excellence. Today, scientific achievements, as measured by international quality criteria, are scarce. Among the top 200 universities in the world, according to the *Times*

Higher Education Supplement ranking (2011), only three are located in a country with a majority Muslim population: two in Turkey (Bilkent University [no. 112] and the Middle East Technical University [no. 183]) and one in Egypt (Alexandria University [no. 147]).

Of course, the causes of this backsliding are multifarious. Determining factors include demographics, insufficient mastery of English, poor learning objectives and practices (rote learning being a legacy in many Qur'anic madrasas), lack of research capabilities and resources, authoritarian regimes that deny freedom of enquiry and crush dissent, state-owned corporations that grossly neglect research and development, and the damaging indifference of Arab countries towards research in science and technology (Segal 1996; Badran 2005).

But there is little doubt that the intolerant, anti-scientific attitude of some Islamic clergy bears responsibility for the backward state of science in many Muslim countries as well. Like Christendom, the Muslim world has known its controversies and fights between religious leaders on the one hand and writers and scientists on the other. The attacks of Al-Ghazali and Abu Ala al-Maari on the rational and tolerant views of philosophers like Al-Kindi and Avicenna are a case in point. Averroes had to defend himself against orthodox repression. After an extended study, Bürgel (1991) concludes that orthodox Muslim theology has always tried to dominate rather than inspire science. The Muslim world has not had an Enlightenment; nor has it recognised the European Renaissance. As a consequence, many ulamas (Muslim religious scholars) expect science to become Islamised and subservient to the Qur'an, claim the "otherness" of the Muslim experience, resist the universality of science, and proclaim contemporary science to be Western, and thus rejectable. Buruma and Margalit (2004) make it clear that this anti-Western attitude, for which they use the term "Occidentalism", refers to more than political or scientific rivalry. It involves a kind of defiance of idolatry and moral decadence.

Of course, there are enlightened Muslim scientists and scholars such as the Pakistan physicist Hoodbhoy (1991), the Nobel laureate Abdus Salam (preface in Hoodbhoy 1991), the director of the Library of Alexandria Serageldin (2006), officers of the Islamic World Academy of Sciences (A. Badran, Moneef R. Zou'bi [2005]), the young professor of physics and astronomy at the University of Sharjah, UAE, Nidhal Guessoum (2011), and the well-known dissident Sadik J. Al-Azm (2004, 2007). All vigorously oppose the claim of the "otherness" of Muslim experience and reject the notion that they should develop an "Islamic" science. They adhere to the universal scientific norms of honesty, freedom of thought, freedom of speech, the use of critical reason, validation on the basis of facts and observations, and tolerance of divergent views. Serageldin (2006) and Zewail (2010) even maintain that these values are profoundly Islamic, entirely in the tradition of the Qur'an and the Sunna of the Prophet. However,

given the popularity of fundamentalist, anti-Western Internet sites, like Islamonline and Yahya, and the persistent dominance of religious dogma also in educated circles (e.g. Thompson [2008] reports that less than 10% of Muslim students in the UK accept the theory of evolution), these may as yet be voices crying out in the wilderness – but they do bear fruits of hope.

4. Anti-science and anti-intellectual attitudes in the Western world

In addition to resistance from orthodox religious circles there are other reasons and motives for the undermining of trust in science in the Western world. This is unfortunate, since trust is the most important pillar on which science rests. This applies, of course, in the first place, to the scientific community itself. Colleagues should be able to rely on the honesty of a researcher – honesty in describing the phenomena (s)he observes, in reporting how these have been analysed and interpreted, and in proper referral to other publications in the field. I will come back to this point later. But at this moment we focus on trust within the society in general. Users and interested parties (clients, patients, businesses, and social institutions) are far less able to verify the correctness and the quality of the conclusions and insights that the scientific researcher presents than fellow researchers, and therefore the user's acceptance of scientific insights must rest to an even greater degree on trust.

Unfortunately we have witnessed a growing anti-science attitude lately – one that is often encouraged by public media. This manifests itself in the increasing interest in various pseudo-scientific theories, such as astrology, psychokinesis , neuro-linguistic programming and telepathy, as well as in the growing popularity of unscientific, sometimes occult, practices such as reincarnation therapy, homeopathy, the laying on of hands and hypnosis. Alarmingly, paranormal observations of UFOs, aliens and extraterrestrials, corn-circle makers and voices of the dead, too, are taken seriously by many. In some gross attacks scientific researchers are even depicted as sly Mephistos or Frankensteins who eagerly and disrespectfully tinker with the secrets of life through their cloning or genetic manipulation.

But even if it is not a question of anti-science sentiments, many individuals, including governmental and industrial decision makers, join the populist and anti-academic mood, and show an unfortunate aversion to scientific and logical argumentation. All too often we see facts being exchanged for dogmas, logical reasoning for populist opportunism, and scientific findings for prejudices and gut feelings. Some years ago, Taverne had already warned against this development in his well-written book *The March of unreason* (2005). Too many people nowadays reveal an unfortunate aversion to scientific and logical argumentation, and are inclined to accept all sorts of illogical views and claims (see also Drenth 2008).

5. Explanations

In an attempt to explain these anti-science or, less extremely, indifferent and impassive attitudes the following factors can be brought to the fore:

- In the first place we have to acknowledge that the social position of science has changed. Like many other social institutions (jurisdiction, politics, the church) science is no longer taken for granted. Today it must meet the demand for public justification. Through the openness and disclosure that this justification entails inadequacies, weaknesses, uncertainties come to light: vulnerability is the price of transparency.
- Secondly, the general public does not yet sufficiently appreciate that science is a dynamic, evolving process of knowledge-building. Improvements and the adaptation of insights, the adjustment of early conclusions, and the continual specification of contingencies, are all part of normal practice. Therefore, scientists may disagree and conclusions may be contentious, but that is not a sign of confusion or arbitrariness.
- Thirdly, scientific assertions based on empirical research often have a probabilistic character – either ontic (random variation in the object) or epistemic (gaps or contingencies in our knowledge, unreliable measures) in nature. Governmental, industrial or political users of science do not always appreciate this, and want solid indisputable truths, preferably wrapped in short statements, or rather one-liners.
- Fourthly, reckoning with scientific findings often requires giving up pet theories and beliefs. People find it difficult to abandon their prejudices, their ethnic, geographic or gender stereotypes. They do not want to believe that common sense is often an invalid measure of judgement, that handwriting does not reveal personality characteristics, that some people are not driven by financial incentives, that interviews are bad predictors, that women can be excellent managers, and so on.
- Fifthly, there is laziness and a love of ease. Taking full account of scientific research in political or industrial decision-making requires an investment of time and energy. In this respect Dawes (2001) has made an interesting distinction between two types of person. On the one hand, there are people who like to think coherently and rationally. For them, a lack of sustaining evidence, data supporting an opposite view, or outright contradictions, are serious elements in the evaluation of arguments. Of course, this takes pains and time, both of which are costs they are willing to pay. The other type of person likes to think in an intuitive mode – an approach which is swift, effortless and associative. The distinction here bears some resemblance to the one Kahneman (2011) recently made between system 1 and

system 2 (fast and slow thinking). Dawes ascertains that, unfortunately, this latter category is on the increase, and he strongly urges education to develop the rational mode and to fend off this intuitive mode.

6. Legitimate concerns

A negative attitude to science can also be prompted by honest concerns or even fear. Knowledge is power indeed; it is a major determinant of the march of events. In ancient times it was an omniscient God who was seen as the main source, and exerciser, of that power. But secularised science has taken away that power from divine sources and has placed it in the hands of scientists and scholars.

Both ancient and more recent writers have cautioned against the dangers of this power. We are told that the first human beings were expelled from Paradise for eating from the tree of knowledge. The medieval cleric Bonaventura warned against the *superbia* of scientific knowledge. Faust was punished for wanting to know too much. And many concerned citizens ask: Can the scientists and scholars handle this power? Are they dealing with it in a responsible manner? Are they aware of the moral implications of their scientific discoveries?

This concern also emerges in recent European surveys of public attitudes and opinion. For instance in the Eurobarometer of 2005 people expressed a fear of scientists, regarding them as individuals whose greater knowledge could make them too powerful, and whose research could cross ethical boundaries – all of which is difficult to control. Interestingly enough ignorance cannot be blamed for this fear; there was a zero-correlation between knowledge of and (dis)trust in science.

In any case, some of the fear seems justified. Scientists do not always seem to be capable of controlling the harmful effects of scientific developments: the exponential growth of the arms industry, the usurpation of natural resources, nuclear waste, environmental deprivation, the unwanted effects of genetic modification, the emergence of dangerous viruses and bacteria, loss of individual liberty and privacy through ICT developments, great inequalities between those parts of the world that benefit from economic-technological developments and those parts that do not ... Of course, not for all these developments can scientists – and certainly not scientists alone – be held responsible. However, it is clear that we are dealing here with the direct or indirect consequences of scientific-technological developments that have not always been sufficiently foreseen, controlled or intercepted by scientists.

An interesting question in this respect is whether the scientific authorities, or professional bodies and organisations, should take the liberty of opting for "no go" decisions with respect to research in subjects, or fields, where the most dangerous consequences are apparent. As I have argued before (Drenth 1999), in discussing possible

limits to be imposed on science, we need to stress that, in general, it would be inappropriate to refrain from doing research for fear that it might be abused or irresponsibly applied. This would almost certainly mean the end of all research, because nearly all scientific results are, in principle, open to wilful abuse.

Moreover, any discussion of the limits to be imposed on research is fraught with danger. History abounds with examples of science having been repressed because its conclusions did not find favour with the ruling authorities, or did not serve the prevailing economic, or political, interests.

Of course, there are cases for which "no go" decisions would be regarded as incontestable by all scientists and scholars. Think of cases in which unacceptable damage is inflicted upon the object of research (people, animals, nature, culture), and cases in which the nature or impact of the research would infringe basic human values (human rights, human dignity, equality and non-discrimination).

Perhaps some room has to be made for "slow go" decisions. These would apply in cases where scientific or technological developments are taking place at a more rapid pace than the necessary social, political or ethical reflection on their consequences. In such circumstances, research could be suspended temporarily until its implications have been the subject of a proper public debate, and after a reasonable consensus has been reached – as, for instance, is proposed by McLaren (1999) for a number of controversial developments in medicine.

7. Scientists to be blamed

To an extent that cannot be neglected this anti-scientific trend can also be blamed on the scientific researchers themselves. We will discuss a few categories of such deplorable, self-defeating behaviour.

First of all, some researchers refer too pointedly to the policy implications and practical importance of their research, and they do so when this is not warranted. Other scientists give their verdict on political and social issues, incorrectly suggesting that their opinions are scientifically justified, while in actual fact there may be no empirical evidence available, or they may have no evidence at their disposal (e.g. because it is not their field of expertise). Others, again, claim too much success and promise excessively quick results in order to attract funding for their research, or to secure an appointment or promotion.

Secondly, scientists allow themselves to be misused for political purposes or permit their activities to be dictated by the interests of sponsors. There is a great deal of sponsored work in research institutes and universities nowadays. In principle there is nothing wrong with contract research, but the essential question is always: is the research truly independent of sponsors, employers, potential users and other interested parties,

and are its results sufficiently objective and unbiased? Contract research does not automatically entail an encroachment upon the freedom and autonomy of research, but the temptation not to bite the hand that feeds you is all too prevalent. The former president of Harvard University, Derek Bok, expressed the same fear in his observation that the intrusion of the market place into the university is eroding fundamental academic values (Bok 2003).

Thirdly, scientists communicate poorly, or not at all, with the public media. We saw above that some researchers claim too much success, or present too optimistic predictions, and are not careful enough in stressing caveats and provisos vis-à-vis the usefulness of their findings. Particularly in communicating with the public press, or mass media, which are often more interested in spectacular results than they are in modest and carefully worded reports, precise communication is important. In fact, inaccurate reporting of research is always harmful. It creates too much hope (particularly in connection with medical research), or unjust fear (of technological and information developments). And, if the research results fall short and ultimately fail to fulfil the early claims, there is come-back on science in general.

Fourthly, sadly not all researchers take the norms of scientific integrity and proper research practice seriously. Some are careless in their management of animal experiments, or with human research subjects, cite incorrectly, handle and keep their data poorly or, most harmful of all, violate the norms of scientific integrity. Too many cases of swindling – fabrication, falsification and plagiarism – have made headlines recently, including in my own country. The harm that each of these cases does to science cannot easily be overestimated (Drenth 2010). It damages science itself, because it results in bogus "knowledge", and may create false leads for other scientists. It damages individuals and society, since it may result in deficient products, dangerous drugs, inadequate instruments or erroneous procedures. But, above all, damage is done to public trust in science. The credibility of science, and trust in the scientific enterprise as a dependable basis of advice and decision-making, is seriously subverted by such fraudulent behaviour.

8. Conclusion

The English military and political leader, Oliver Cromwell, who was both devout and pragmatic, impressed upon his soldiery: "... trust in God, but keep your powder dry". In this paper we have recognised that science is endangered nowadays, which is a pity since this could lead to a serious undervaluation of the preeminent contribution of science to individual and societal welfare. Many external factors can be held responsible for this decline of status, but I hope to have made it clear that the scientists themselves are not wholly blameless. That is why I have entitled this lecture, with a wink at Cromwell, "trust in science, but keep your powder dry".

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Creating Creative Environments

Nils-Eric Sahlin

All scientific creativity is problem solving, but not all problem solving is creative – assuming, of course, that "creativity" involves the generation of a truly novel idea, a scientific breakthrough, a new solution to a hard problem involving an ingenious conceptual reformulation of a theory, or an amendment of that theory's fundamental laws.

Science needs good problem solvers. It needs people who can unravel difficult problems both with and within a theory. The Nobel laureates Francis Crick and James D. Watson are probably the best and most renowned *un*creative problem solvers. They were jointly awarded the 1962 Nobel Prize for Physiology or Medicine. By contrast, their colleague Barbara McClintock, who was given the same prize in 1983, is an example of a creative problem solver. Unravelling the DNA molecule, Crick and Watson revolutionised genetics, biology, medicine and many other sciences. But they did not change the existing conceptual framework, nor did they break away from, or change, any of the fundamental rules of the sciences they used to solve the puzzle. McClintock, on the other hand, solved her problem by expanding our conceptual framework of genetics, by making a rather static system dynamic.

These are examples of first-rate problem solving, and in the McClintock case creativity as well. How do we promote creativity and problem solving? Is there a simple recipe for establishing creative research environments? Can we identify negative factors that hamper creativity and the formation of innovative environments? Refurbishing old ideas – inviting the charge of self-plagiarism, I realise, though I plead in mitigation that a recipe is a recipe! – I will first present a simple recipe describing how to establish a creative research environment. Then I'll swiftly explain why you and I are unlikely to follow the prescription successfully even if we try and try hard.[1]

1 The recipe is presented and discussed in Sahlin, N.-E. (2001), *Kreativitetens filosofi*. Nya Doxa, Stockholm; the English version on which this essay is based can be found here: http://www.nilsericsahlin.se/kreativitet/index.html.

Creative environments

What is it that creative environments possess that uncreative environments don't? In asking this, my ambition is limited. I want to home in on a few of the factors that make the academy work – and make it fail. My recipe is stark. It involves nine simple ingredients.

1. Generosity. Creative environments are generous environments. In them knowledge and experience is shared. In the light of this feature the structure of scientific careers looks far from conducive to creativity. The young PhD student fiercely clutches on to his ideas so that no one else will pip him to the post. Many academics do likewise. And so it goes on. The quest for higher, and more prestigious, positions makes the researcher unwilling to impart any of his as yet partially developed ideas. He is more than happy to discuss what he has already done, and what he has published, but reluctant to reveal anything about work in progress. Generosity is counterproductive. Better say: "I will help you if and only if I find my name among the authors."

This behaviour is completely understandable and rational in the conditions under which so much research is now undertaken. It is nonetheless a serious impediment to creativity. Unfortunately, it is extremely difficult to do anything about the mechanisms that encourage the behaviour in the first place.

2. A sense of community. A creative environment without a true sense of community would presumably be impossible to build. A colleague once told me the story of two interdisciplinary research projects he had taken part in.

He described the first in the following way. On day one, the project leader called together the research group and went through all the formalities, allocating rooms, giving out keys and security passes, and then wishing everyone the best of luck with their work. The project never achieved the results it was set up to produce. The researchers spent most of their days in their offices. They carried on doing the research they had previously done at home, without making anything of their opportunity to be with their new colleagues.

The second project started off in a slightly different fashion. On day one, the project leader called together the researchers, maintenance men, assistants and secretaries and took all of them off on a week-long bus trip. The official purpose of the trip was to visit renowned medieval German churches, but since the project was on the foundations and the history of statistics and probability, the researchers' interest in that was likely to be somewhat limited. After a couple of days on the road, and too many churches already, some were ready to quit the project. Others had turned to mutiny and were discussing how to get rid of the project leader. But the real purpose of the trip was

obviously not to enhance the historical knowledge of the researchers, but rather to generate a sense of belonging in the group – to create a community. And the bus trip did that job. According to my colleague, the project is one of the most successful, productive and creative experiences he has had.

It's a commonplace that it takes time to get to know someone from a different background. It's no less true that it takes time to get to know someone with a different academic background. Scientists can share the same mother tongue, but nonetheless speak very different languages. My experience has taught me that genuinely creative environments are somehow able to overcome the differences that carve up the world of science without sacrificing any individual's sense of his own identity.

3. Qualifications. One thing characterising the creative environments I have been party to is the solid scientific qualifications of the researchers. Researchers display awareness both of what they do know and what they do not know. One thing that most definitely does not promote scientific creativity is a lack of scientific qualifications. Secure knowledge of your own specialist area equips you to step out into unfamiliar territory.

4. Diversity. While uniformity can serve to promote productivity, it seldom promotes creativity. In one sense, then, all universities and institutes of higher education are organised in completely the wrong way. For the purposes of education, it is important to have separate departments of philosophy, mathematics and psychology. This facilitates the passing on of knowledge. But from the point of view of research, this kind of organisation tends to favour repetitive, unimaginative work. We let scientific space be determined by artificial boundaries governed by disciplinary frontiers, and as a result we become entrenched in mechanical research in isolated subject areas. The result is a fruitless departmentalisation of work.

Much has been written about cultural differences, and the awkward behaviour of Westerners in unfamiliar cultures is a popular theme in literature and film. A similar sense of dislocation can be felt by the scientist, but this needn't be a bad thing. I have occasionally worked with psychologists and lawyers, and researchers from other disciplines, faculties and scientific cultures. My experience is that it takes both a long time and plenty of goodwill to achieve an understanding of one another's scientific idiosyncrasies, but that it is well worth the trouble. When we enter into other traditions or activities with a little open-mindedness, we nearly always find that it promotes our own work. A measure of dislocation can be an indispensable ingredient in the creative environment.

5. Trust and tolerance. Psychologists have shown that trust is an important commodity – particularly when issues requiring effective risk communication and risk management are at stake. Among other things, it has been found that it takes time to win someone's trust, and even then it is very easily eradicated by one, or just a few, foolhardy acts.[2]

There is also evidence that events eroding trust tend to be more "explicit" than the factors that create and maintain it, and this is quite simply due to our all-too-human readiness to spot another's mistakes and frequent tardiness in appreciating others' achievements. We can carry out a hundred good deeds without anyone noticing them; a single mistake is always eagerly noted. The argument concludes that one trust-breaking occurrence carries more weight than the trust-creating process itself. Given that bad news is considered more reliable than good news, the bad news carries enormous weight when it comes to the breakdown of trust. If you have been untrustworthy on one occasion, then, fairly or unfairly, you will be marked with the same untrustworthiness on another.

A creative environment must be built on foundations of reciprocal trust and tolerance. Trust-breaking mechanisms have to be controlled and their effects neutralised. If ideas are the bearers of creativity, then it is important to cultivate an environment in which people are receptive to alien thoughts and courageous enough to break the rules.

To generate trust is to safeguard against ridicule. With this security, a person can afford to be bold.

6. Equality. Another prerequisite of creativity is equality. This does not, of course, mean equality in its naïve sense, in which the need for a boss, a treasurer, a secretary or a maintenance man is denied. On the contrary, the creative environments I have experienced have had very well defined structures of responsibility. A researcher's time should be spent doing research and not making photocopies, attending to administration and fixing computers – for the very obvious reason that more often than not there are others who are far better trained to do this kind of work. A creative environment cannot afford the waste of resources that an "all do all" workplace requires. In any case, equalising does not necessarily produce equality.

In the creative environments I have in mind, no one has ever been elevated to the status of a guru. Everyone has worked with the same status, generosity, enthusiasm and power towards a common research goal.

The environments in which I have seen a guru, on the other hand, have shown signs of stagnation. The reason for this is very simple. A great deal of energy in such institu-

2 Slovic, P. (1999). "Trust, Emotion, Sex, Politics, and Science: Surveying the Risk-Assessment Battlefield", *Risk Analysis,* Vol. 19, 689–701.

tions is spent on tributes to the guru. And in places with a guru at their head other people in the environment tend to be little more than poor imitators. What you will be listening to is but a choir of epigons.

7. Curiosity. Can an environment be curious? Of course not, but it is possible to generate an atmosphere in which curiosity between colleagues and co-workers is really encouraged. In the best creative environments every kind of curiosity between heaven and earth will be given full rein. It is impossible to underestimate the stimulation that radiates from colleagues who share a wealth of different interests. A genuine interest in film, cooking or animals, for instance, gives a greater scope of experience, which is extremely important for creativity and problem solving.

One striking difference between the creative and uncreative environments I have visited is the intellectual acuity and curiosity about life in general displayed in the former. In the creative environment, a traditional research seminar on human decision-making can quite easily end with an animated political discussion or the analysis of a film shown on TV the night before.

8. Freedom of spirit. There is a story of a Finnish long-distance runner who applied for supplementary funding in anticipation of a European championship. His letter of application was as simple as this: "I intend to win both the 5000m and the 10000m races at the European championship." He received the funding and duly fulfilled his promise.

A creative environment does not define the finer details of an activity. There is a goal. The precise way to it is not determined in advance – the means to the end are willed but not diarized. The very idea of finding a creative solution to a problem implies that one has the freedom to reach that solution in unanticipated ways, to take the road less travelled. One must be entitled to solve a problem with methods that have yet to be invented and tested.

A common complaint here is that one cannot simply dish out research resources or funding so haphazardly. But why not? If you want to reach a goal, win victories, or gain new skills, you have to be willing to take risks. If you back the wrong horse and fall short of your own or others' expectations, you are under no obligation to back the same horse the next time.

Funds that require the researcher to describe the route to the goal in detail, to say how the scientific problems are to be solved, to set out in what ways exactly the training will be approached, or to show how the experiments will be carried out, do not encourage creativity. Such a system may give some assurance in advance, but sadly it also guarantees repetition and lack of imagination.

9. Small scale. A creative environment should not be too large. My experience suggests that a group of between 10 and 15 people is perfect – say, 12. The environment must be substantial enough to have critical mass, but not so big that the colleagues lose contact with each other. This is why a university, or a larger company, can never generate a creative environment across the board. It is possible, however, to create small, relatively autonomous, islands of creativity within large organisations.

For obvious reasons, it is difficult to pursue research on creative environments. At least, it is hard to undertake the type of research that delivers not only indirect knowledge but direct knowledge based on well-designed experiments. In trying to characterize creative environments, we must rely largely on comparative historical studies, anecdotal evidence, and past experience.

However, studies directly or indirectly supporting my observations do exist. Evolutionary psychologists have found that grooming is an important cement of society. The function of grooming is to strengthen social bonds – bonds that are crucial for survival and reproduction. We see this clearly in primates, but all social animals groom. However, grooming takes time, and that means that the groups cannot be too large. There must be time for other activities – for example, the finding and eating of food. And there is a limit to what you can accomplish with a beak and a couple of claws, or two feet and two hands.

Among monkeys and apes, social grooming is known to be used to strengthen individual relationships, and the amount of time devoted to it is proportional to group size. That means that in small groups you have time for other activities. In larger groups (50 animals or more) individual members must spend as much as a quarter of their day grooming. In practice this makes it hard to maintain groups of around 80 individuals. Cohesive groups of 150 are pretty much out of the question, because in them a typical individual will need to spend half his waking hours grooming his fellows.

Humans live and function in much larger groups. 150 individuals is not an unusual group size. It is well known, for example, that companies of between 150 and 200 employees have an optimal size, and that problems start to emerge when they grow larger. Evolutionary psychologists such as Robin Dunbar argue that we can operate in larger groups (despite our limited physical resources: two feet and two hands) because we differ from other animals in possessing language. Language is a very efficient grooming tool.[3]

Creativity is a demanding activity, a special type of problem solving, requiring us to be, among other things, imaginative, ready to take risks and willing to break rules. To be creative, we need an environment offering trust, tolerance, generosity and fellowship, and one that allows for mistakes. This, in turn, necessitates a special kind of grooming. The grooming mechanisms have to be extra sturdy, creating at one and the

3 Dunbar R. (1996). *Grooming, Gossip and the Evolution of Language*. Faber and Faber, London.

same time pliant and hard-wearing ties between individuals. My guess that in creative environments there is an upper threshold of around 12 individuals seems to be both supported and explained by evolutionary psychology.

*

The observations above are based on my own personal experience of universities and research institutes. This raises the question whether there are any important differences between the way in which creative *research* environments function and the way in which creative environments function in other areas. As far as I can see, there is no evidence to suggest that there are.

It is also easy to see that a creative environment is fragile – fragile, in the sense that even the smallest change can lead to the collapse of its structure. To maintain its structure, a creative environment needs to recruit people who will "fit in". Recruitment should therefore be carried out on a holistic basis, rather than by allowing publication lists and CVs to dictate decisions on their own.

*

Why are there so few creative environments? In effect I've offered a kind of recipe for them. The ingredients are as simple as they are self-explanatory. Yet despite the artlessness of the recipe, there are very few genuinely creative environments. Why is this?

The answer is not very pleasant: we are driven by pride, greed, gluttony, envy, lust and anger, shot through with an arrow of sloth. We have all met them, the *peccata mortalia* hooligans. They act among us, but still worse, they act for and within us.

*

Ghost-writing, salami publications, misconduct and distrust are all symptoms of a system that is none too healthy. Do we find unethical, low quality research and pseudoscience in truly creative environments? Probably not. If you want to solve really difficult problems, do something that has not been done before, as Crick, McClintock and Watson did. Then there is no time for bullshit.

We encounter all these problems because we have confused the issues. Creativity and serious scientific problem solving is not the same as productivity. The academy is not a market – not an industry.

A few years ago I had a graduate student from the Faculty of Engineering who wanted to take a course in philosophy of science. She hadn't thought about this field before, but during the course she realised she could construct an experiment that falsified

her hypothesis (theory). It was a simple but ingenious experiment. She told her supervisor about it. He said: "Don't falsify anything. You only have four years to complete your thesis. Falsifying gives you nothing – make sure you verify the hypothesis."

Another student of mine, this time a young professor, came to my class and told me that he had just been awarded a substantial research grant. He was very happy, but at the same time worried. He had to sign a contract saying that he promised not to do science for the sake of science.

These examples are genuinely worrying. If we mistake productivity for creativity, if we believe that what matters is the number of papers we write, or the number of students we produce, or the size of the grants we have, if we think that creativity is measurable – well then, as sure as fate, we will find ourselves supporting ghost-writing, salami publications, scholarly misconduct. We shall do nothing but promote distrust.

Today very few large scientific projects fail. Isn't that odd? Isn't science all about taking a leap into the unknown? We should formulate new and bold hypotheses, try them, fail, and then start all over again. Good science is as much about failure as success. History teaches us that successful failures have been the impetus of science. But a scientific system based on productivity does not allow for failure. For failure – however much serious research, problem solving and creativity you put into the flop – you never get brownie points.

If we need creativity, but the research environment we have created tends to stamp it out, what shall we do? With luck volcanic islands of creativity will emerge from the sea. Universities might even follow the example of some multi-national companies and outsource creativity. Another student of mine, Kristofer Jansson, thinks the solution is open source research – an interesting hypothesis and an idea worth thinking about.

PROGRAMME

Symposium 16–17 February 2012

Aspects of Trust and Confidence in Scientific Research

at The Royal Swedish Academy of Letters, History and Antiquities, Stockholm
Organizers: Göran Hermerén, Kerstin Sahlin & Nils-Eric Sahlin

Thursday 16 February

12.50	Welcome and Opening remarks *Gunnel Engwall*, the President of the Academy and *Göran Hermerén*
13.00	General Concerns *Chair*: *Nils-Eric Sahlin*
	Heinrich Rohrer, Science, walking a tightrope
	Jürgen Mittelstraß, Scientific truth, Copernicus, and the case of the Unwelcome Foreword
	Kevin Mulligan, How to destroy a European faculty of letters. Twenty-five easy steps
14.15	Comments and questions from participants
14.45	COFFEE
15.15	Panel on the role of media *Ulrika Björkstén*, *Joanna Rose*, *Olof Kleberg*, *Lars Engwall*
16.15	Comments and questions from participants
16.45	Specific Issues *Chair*: *Kerstin Sahlin*
	Tore Scherstén, Medical research and publication for sale – ghostwriting, ghostmanagement and "spin"

Martha Garrett, Publication issues – How editors see the issues

Inge-Bert Täljedal, The vulnerability of university culture and individual integrity

Nina Rehnqvist, SBU work on quality assurance

18.05 Comments and questions from participants

18.45 CONFERENCE DINNER AT THE ACADEMY

Friday 17 February

9.00 *Chair*: *Göran Hermerén*
The image of science in movies and fiction
Inez de Beaufort

9.25 Panel on criteria and measurement of quality in different fields
Janken Myrdal, Kerstin Sahlin, Nils-Eric Sahlin, Marianne Thormählen and *Arne Jarrick*

10.40 Comments and questions from participants

11.00 COFFEE

11.15 Light in the Tunnel? What is done? What should be done?
Pieter Drenth, Trust in science, and keep your powder dry

11.35 General Discussion
Chair: Göran Hermerén

12.30 LUNCH AND DEPARTURE

Authors

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