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Journal of Unsolved Questions

The Opportunities and Risks of Social Media in Science Communication

Changing the Way Researchers Communicate -
Interview with ResearchGate Founder Ijad Madisch

Teaching Good Scientific Practice:
Results from a Survey and Observations from Two Hundred Courses

#SCIENCE

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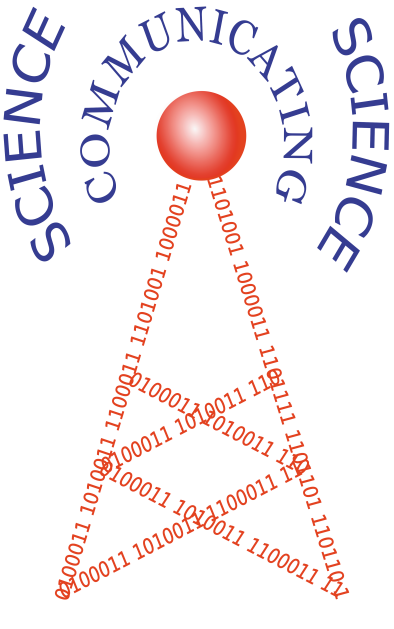

Preface

Editorial Note

Dear Reader,

I have the honor to present to you the second issue of the fifth volume of JUnQ, which is in fact the tenth overall issue. So the issue – #science – is kind of a #jubilee. We want to celebrate it with you by having a look into the communication of science – eventually, that is what the publication of articles and journals is all about. In this issue, you will find interviews and articles about the communication of science between researchers as well as the mediation of scientific topics to a broader audience. Both subjects have changed over the past years and are also under constant debate.

Researchers are not only faced with finding answers to (unsolved) questions on a daily basis, but also have to take care that their findings do not lead to a misunderstanding by non-experts. This is nicely explained in an essay by A. Fischer from the Helmholtz Association. He writes about the role of science communication and its importance to avoid emotionally loaded debates for the benefit of fact-based discussions. The Helmholtz Association is the umbrella organization for several research centers and their science communication is also split up into several channels. In some of them, researchers themselves communicate with the public, e.g. via blogs.

In Germany there is also an organization for science communication: Wissenschaft im Dialog. In his article, Thorsten Witt provides insights into how science communication has changed over the last years. Of course social media plays a very important role and opens up new ways for researchers to distribute their knowledge. More possibilities, however, cause the problem that you have to make an effort in order to stay up to date on important developments. So #science can also be interpreted as a challenge scientists have to face. Besides these articles, in this issue you will also find several interviews. Kurzgesagt uses a YouTube channel to share educational videos for the general public. In this manner, they want to raise awareness and interest for scientific research in an entertaining kind of way.

The topic of researchers communicating with other researchers is covered in an interview with Dr. Madisch, the founder of ResearchGate. The platform stands for the connection of researchers and at the same time, it wants to open up science to everyone. It also promotes open review, which in turn leads to a faster feedback for scientists. This is linked to Dr. Madisch's comments on the conventional, and still mostly used, publishing system that stems from a time before social media and internet availability.

In a scientific article, M. Gommel presents and discusses data of a survey conducted among doctoral students of German universities and research facilities regarding good scientific practice. Miscommunication in this case can lead to scientific misconduct. At this point, we have come full circle: Scientific misconduct questions the integrity of science and there is no possible way for researchers to compensate for this mistrust. Without trust, science communication is destined to fail.

Speaking of scientific integrity, a "Positionspapier" of the German "Wissenschaftsrat" on this topic has recently been published (April 2015). They not only state that the publication of negative results is important for the integrity of science but they also mention JUnQ by name as an example of a publication medium that should be used for the publication of negative results.[1]

This intention of JUnQ does not change but our editorial board does on a regular basis. We once again have a new member, Soham Roy, who has designed the cover page of this issue. But we also have to announce that this will be the last issue with David Huesmann, Stephan Köhler and Thomas Spura as editors since they have finished their PhDs. I hope by reading this issue, we are able to raise or increase your awareness and your interest in #scicomm and maybe afterwards, you will also be willing to have a look at some of the platforms for science communication presented in this issue.

—Nicola Reusch

[1] Wissenschaftsrat, Empfehlungen zu wissenschaftlicher Integrität, 2015.

The Opportunities and Risks of Social Media in Science Communication

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1 The Opportunities and Risks of Social Media in Science Communication

In the space of a few years, the internet has radically altered our media consumption. The average internet usage in Germany increased from 17 minutes per week in 2000 to 111 minutes per week in 2014, making the internet the third most popular media type after television and radio. Every day the internet is used for twice as long as print media. Among 14–19 year olds, who use the internet for an average of 233 minutes per day, the internet is the medium of choice, well ahead of all other media.[2] Social media accounts for a significant proportion of internet use: 24% of 14–19 year olds spend over two hours a day on Twitter, Facebook, etc.; another 28% spend over an hour.[3] Social media have also brought about major changes in our usage behavior – we are no longer merely recipients and consumers of information but have become active users and even creators.

Science communication has also changed as a result of these developments. According to a recent study,[4] 45% of Germans use the internet as a source of information on scientific issues; among the under-30s, this figure is currently at 68%. Statistics from the USA and UK suggest that these percentages are likely to rise sharply in the coming years and that the internet is increasingly replacing classical media as a source of information.[5]

What are the implications of these changes for one of the main players in science communication, namely the scientists themselves? In the following pages, we will explore this and related questions, including how scientists' communication with the public has changed as a result of social media, and the opportunities and risks involved.

2 What Sort of Science Communication are We Talking About?

There are many views on what science communication is and what it is not, and many definitions have been attempted. Thus it seems sensible to start by explaining the concept of science communication on which this article is based. We view the term as covering the communication of all academic disciplines – not only the natural sciences but also the arts, humanities and social sciences. It can apply both to communication within the scientific community and to external communication outside professional circles. Owing to the large number of participants, objectives and formats, we think it is inappropriate to over-specify the term. We have therefore adopted the broadly worded definition of Schäfer, Kristiansen and Bonfadelli, who define science communication as "all forms of communication focused on scientific knowledge or scientific work, both within and outside institutionalized science, including the production, content, use and effects of such communication".[6] In this article, however, we will focus exclusively on external communication. Specifically, we will consider the opportunities that social media offer to scientists themselves rather than to other science communicators such as press officers or science journalists.

3 "Classical" Science Communication

To understand what the rise of the internet and social media implies for science communication in the present and the future, let us first cast a glance backwards. In Germany, the move towards direct communication between science and the public was triggered by the PUSH (Public Understanding of Science and Humanities) memorandum signed by the major German scientific organizations in 1999. The aim was to open up the "ivory tower" through activities such as the "Long Night of the Sciences" and Children's Universities and give the general public an opportunity to experience science and research first hand. The mass media with their unrivaled reach among broad sections of the population naturally played a fundamental part in this process. The tasks assigned to the various players were clearly defined: Communication and press office staff in scientific institutions were responsible for media communication, press releases and organizing events and exhibitions; scientists supplied the findings and took part in official events such

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[2] http://www.ard-zdf-onlinestudie.de/?id=483
[3] http://www.bitkom.org/files/documents/SozialeNetzwerke_2013.pdf
[4] Hacker/Köcher (eds.) (2015): *Die Synthetische Biologie in der öffentlichen Meinungsbildung*; http://www.leopoldina.org/uploads/tx_leopublication/2015_Synthetische_Biologie_DE.pdf
[5] It is of course important to remember that much of the material on the internet and in social media is derived from classical media.
[6] Mike S. Schäfer, Silje Kristiansen, Heinz Bonfadelli (2015): *Wissenschaftskommunikation im Wandel*, p.13. Herbert von Hallem Verlag.

as the "long nights"; journalists translated scientific results into a language accessible to the general public and explained their significance; and the public obtained information about about science from events and mass media.

4 The Emergence of Social Media: The System Changes

With increasing digitalization and the emergence of social media, this classical division of roles began to change fundamentally.[7] One of the key factors in comparison with classical media is the low entry barrier to social media: everyone can get involved, everyone can write content, post, "like", share and comment. Social media channels are usually easy to use and inexpensive. This means that, unlike classical media, any individual or company can generate multimedia content quickly and without assistance. The distinction between media creators and consumers is removed.

The democratic nature of social media enlarges the scope of action for science and science communication. Its multimedia nature enables scientific material to be presented interactively in a variety of ways[8] – including videos, games and pictures – and hence to reach new target groups and interact with new audiences. The changed media habits of the younger generation also mean that this group is now difficult to reach through classical media. Futhermore, social media makes interactive and participative methods that were formerly confined to relatively small groups of people easier to apply.

Institutional science communicators (press spokespeople) and journalists naturally also use social media for their own ends, both for marketing purposes and research for their own purposes, both for marketing and to research stories. But while these professional groups once held the main responsibility for science communication, digital media now enables scientists to communicate and to enter into direct contact with the public themselves. In communication matters, scientists have thus become more independent of institutions, press offices and journalists.

5 Opportunities and Risks for Scientists

There is no longer any question whether scientists should communicate with the public – they must! Building trust, performing your democratic duty by justifying tax revenue spent on public research and the need to recruit a new generation of specialists are just some of the arguments that demonstrate the need for science communication. However, these considerations apply more to the scientific system than to the individual scientist. As we shall show, there are also good reasons for individuals to talk about their research with the help of social media – provided that they also consider the risks.

Through social media, scientists can provide information about their research directly, without needing to convince a journalist or press officer of the importance of their news first.[9] This enables them to forestall possible errors or misunderstandings in reports written by others, and to correct any such errors themselves through their own channels. Scientists with a wide communication range can sometimes exercise a direct influence on political and social debates; indeed, they may even be able to introduce issues of their own into this debate. Provided that it is conducted with professionalism, regular long-term communication enhances the visibility, reputation and credibility of researchers in the eyes of the public. This may in turn affect future financial support and career opportunities.[10] For example, direct interaction with blog readers or Twitter followers can lead to interesting professional discussions and thus help improve one's work. Last but not least, researchers may publicize their work via social media because they enjoy the variety that communication and dialogue bring to their daily routine

In spite of these benefits, there are concerns and obstacles to social media use. Blogs in particular are time-consuming to maintain:[11] authors must not only write posts, but also respond to readers' comments. Taking a public stand on controversial issues may lay scientists open to attack, personally and as a scientist, from opponents of their views. This, too, is time-consuming and sometimes calls for a thick skin. In addition, scientists may receive criticism rather than support for their communication activities from colleagues, university management or even their own group leader or supervisor. This attitude may be based on anxiety about loss of control or fear that time spent blogging or tweeting is time that is not being spent on research. Because of the potential for opposition from those around them, scientists should not expect communication with the public to yield quick and easy benefits. It is a long and tedious process, but one that can certainly bring long-term gains.

6 What Does the Emergence of Social Media Mean for Science Communication?

Social media allows scientists to communicate their work directly with the public. This brings with it an increased

[7] Of course there were also other influences that changed the system of science communication. For example, the trend towards greater participation in society encourages the use of social media but also the use of other dialogue-focused formats.

[8] See also Neuberger (2014): *Social Media in der Wissenschaftsöffentlichkeit. Forschungsstand und Empfehlungen*; in Weingart/Schulz (eds.): Wissen – Nachricht – Sensation. Velsbrück Wissenschaft.

[9] For a brief overview of social media tools see http://backreaction.blogspot.de/2015/06/social-media-for-scientists.html?m=1

[10] For evidence that tweeting can enhance one's scientific career, see e.g. Liang *et al.* (2014) *Building Buzz: (Scientists) Communicating Science in New Media; Journalism & Mass Communication Quarterly*; published online 12 September 2014.

[11] Könneker (2012): *Wie viel Zeit das Bloggen kostet (Scilogs-Studie Teil 2)*; in: Scilogs: Gute Stube; http://www.scilogs.de/gute-stube/zeit/

responsibility when communicating about serious and socially relevant issues. With the emergence of blogs, Facebook and Twitter, journalists and science communicators have lost their gatekeeper function. They no longer control exclusively which topics are publicized and which are not. Instead, scientists hold the responsibility for choosing both "what" to communicate and how to communicate it. This responsibility now lies with the scientists themselves: They communicate the material they produce themselves. The neutral position of journalists as assessors and classifiers has disappeared.

This sounds more dramatic than it is at present because social media predominantly reaches a younger audience. Despite the fact that blogs and YouTube are attracting ever more users, television, radio and print still lead the way at present in terms of the information sources used by the population as a whole. It is true that scientific subjects are losing ground in the classical media and that the overall quality of reporting is declining, but it still has some advantages. Its linear nature ensures that people whose work or lifestyle does not bring them into contact with science are more likely to encounter these subjects there, even if only in passing, than via the selective and personalized form of media consumption that is the internet.

7 Conclusion

Social media is an established part of our media landscape. It is therefore no longer a question of whether science should communicate via these channels – it is essential that it does so. There are many ways of doing this, offering many opportunities and very real benefits. But expectations should not be raised unduly. Social media is an important tool for science communication and broadens the spectrum of channels and formats. However, it has not replaced the classical media (yet?). To ensure that scientific issues reach the largest and widest audience possible, a diversified spectrum of media must be used by a variety of players. The potential for cross-media linking is far from being fully exploited and provides plenty of scope for improvement.

For scientists themselves, social media unlocks fascinating new opportunities for direct communication with the public. Direct feedback and unfiltered discussion are time-consuming, but at the same time, they represent a real opportunity for everyone involved. With these new and varied opportunities come increased responsibility for individuals: the responsibility to be truthful and credible, both online and offline.

Communicating Science *via* Television Programmes – Interview with Georg Graffe from TerraX

Georg Graffe is commissioning editor and head of department of the TV program TerraX for the TV broadcaster ZDF. JUnQ interviewed him to get insights in the process of communicating scientific information to a broader public via a TV program.

JUnQ: How many people work for "TerraX"?

Graffe: We are approximately 30 people in our editorial team. This includes secretaries and everybody else. By the way: One third of our team is male and two thirds are female. And not everybody here is working in a full-time job. A number of our staff works part-time.

JUnQ: What is your personal educational background? How did you get interested in science?

Graffe: (*smiling*)... The question should rather be: How did it come to pass that I am working for a TV broadcaster? Well, I studied History and Philosophy to become a teacher. But in the end I did not want to become a teacher anymore and so I applied here and there. And then I got a job as a driver at a TV production company, more or less accidentally. This was my first job at TV. Many years later, I started to make films for TerraX. First in a production company as author and director, and in 2009 I became part of the TerraX-Team at ZDF.

JUnQ: How is your team put together? What is the educational background of your staff?

Graffe: Well, the average age in our whole television network is approx. 47 years, which is similar to the average age of the Germans by the way.
The subjects of expertise are widely spread from politology and german philology over history all the way to biology. Media as a subject is rather an exception. Maybe somebody completed a postgraduate course. And I think we do not have anybody from a film academy. TerraX requires special knowledge. We have two basic areas of focus: The content that we want to bring into our TV program is one. The other one is *how* to bring it there. This is what makes up TerraX. To bring these two things together is really awkward. And because you need to know about both of these sides it is difficult to find new blood.

JUnQ: What topics do you focus on? Who has the ideas?

Graffe: We focus on history, nature and science. The ideas for our films are either born in the editorial team or suggested by a production company. About 80% of our films are from production companies.

JUnQ: What are the main concepts behind the weekly TV-program?

Graffe: We want to make a program that informs the viewer. Simultaneously we have high aesthetic aspirations. So we want to create an entertaining informative-program. This should address a broad audience and be credible at the same time.

JUnQ: How long do you typically need to create a program? What are the major steps?

Graffe: We need about 1-2 years. That depends a bit on the topic and the pictures that we need. If we want to make a movie about nature during the seasons it can easily happen that you need two springs and summers to complete the film.
We have an average budget of 270 000 Euro per program with which we have to make due. And of course, it is very unpleasant if the production time is extended.

JUnQ: Does the production company have to compensate for it, if their expenses are exceeded due to such delays?

Graffe: Well, the production company has more than one project at once. So they do not have one person that is focused on our movie only and if it comes to delays this person has other things to do than to wait for one year. Nevertheless the company has a certain amount of money at its disposal and have to cope with it.

JUnQ: What are the main steps that such a production consists of?

Graffe: The main steps towards a program are proposal development, script, costing, budget, and production.
As I said before, the proposals can come from inside or outside, from our editorial team or a production company.
And we have a huge spectrum that we cover. You must consider that we make 50 programs in one year. 50 programs in one year is quite a quantity.

JUnQ: What audience do you want to address?

Graffe: Of course we want to reach everybody. But in fact our program is predominantly watched by elderly people and people with university education or Abitur. But com-

pared with the average of the station (ZDF) we do a little bit better among the people aged under 49 (which are called "young audience").

JUnQ: What other platforms do you use to reach people?

Graffe: We do not have a YouTube channel – yet. We will extend our online appearance during this year. To some extent even with daily contributions. But we do have a Facebook page – of course. We have about 100 000 likes – and increasing.

JUnQ: Is TerraX successful?

Graffe: Yes! We are 33 years old. Which other TV-program can say this? But your rivals never rest. Rivals are the programs that are aired at the same time as our program. As a science-program with a historic as well as nature-focused content we are a very well established brand in German television.

JUnQ: Why is TerraX successful?

Graffe: That is a good question. It is quite hard to tell. Maybe perhaps TerraX never stood still. During all those years the colleagues constantly changed and widened the content and the design of the program. It never became old fashioned. Sometimes we fear that a new program won't make a hit. Maybe because we fear that it is too new. That is always exciting. Sometimes we did fall flat on our face with this. There is no definite formula for success. But change makes all the difference. It is important that the viewer stays curious and that the program has to be of high quality.

JUnQ: What is so important about communicating science to a broader public?

Graffe: Education in my opinion is one of the state's key duties. And the public service television shares this responibility. Our goal should be to reach or to attract our audience with information and content that the viewer would otherwise perhaps never be interested in. But since we wrap this content in an entertaining and attractive form, people may become curious. And to make people curious is the challenge and the goal of our program.

JUnQ: Thank you for this interview.

—Katharina Stockhofe

Communicating Science in the Digital Age – Interview with Peter Wich

Peter R. Wich[1] is an Assistant Professor (Juniorprofessor, W1) of Medicinal and Pharmaceutical Chemistry at the University of Mainz (Germany) – Institute of Pharmacy and Biochemistry. His primary research interests are in the fields of bioorganic chemistry and the interface between nanotechnology and biomolecular materials (for more information: www.wichlab.com). His internet presence is always up to date, he is informing his followers about the latest ongoings in his lab and we were interested in his motivations in doing so, as well as his experiences in the field of communicating science.

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JUnQ: How many people work in your research group?

Wich: Our team currently consists of 5 PhD students, two Bachelor students and one visiting PhD exchange student. In addition we usually have 1-2 interns during each semester.

JUnQ: What is your personal educational background? How did you get interested in science?

Wich: I studied chemistry in Würzburg (Germany), where I also did my PhD in the field of organic chemistry. In 2009, I started my postdoc at UC Berkeley (USA) in the lab of Jean Fréchet where I expanded my scope of research to material science. Since 2012, I'm back in Germany and work as Juniorprofessor on my independent research in the field of biopolymer-based nanomaterials for biomedical applications. Natural sciences fascinated me since my earliest childhood. But it wasn't chemistry that started it all. My own telescope let me explore our solar system and the stars and was my initial driving force to learn more about our universe and the neighboring natural sciences such as geology, physics and chemistry. Facing the decision what to study at the university, I quickly decided on chemistry, since for me it represents the most applicable and experimental-based discipline to understand and manipulate the building blocks of life and materials.

JUnQ: How is your team put together? What is the educational background of your staff?

Wich: The common background of our team is chemistry, since it is always the starting point of our research projects. Depending on the personal preference, projects can quickly evolve towards more analytical and technological areas, or into biochemistry and biological applications. Hence, we have an interdisciplinary team of pharmacists, organic chemists and biomedical chemists.

JUnQ: What topics do you focus on and how do you come up with them?

Wich: In our communication efforts, we share a large range of research and science related content across various types of media and information platforms. Topics cover mainly lab related news, like exciting research results, scientific achievements and awards, new publications, conference reports and announcements of new team members. At the same time we also report about fun activities, like our annual group trips, our latest TV appearances, or we report fun facts like the winner of the "Nerd Cookie Contest" of last year's department Christmas party. Similarly the internet provides plenty of inspiration for scientific discussion or someone digs up the latest science meme just waiting to be shared.

JUnQ: What are the main concepts behind your (social/online) media activities?

Wich: Our website (wichlab.com) represents the unifying hub for all our research activities and provides information about the group, as well as different ways to get in contact with us. In addition, various online platforms provide the possibility to connect with us. For research and work related information we prefer ResearchGate and LinkedIn, whereas for fun and picture related content Twitter, Instagram and Flickr is our go-to destination. Probably the best way to reach a broad audience is with our TV clips, our YouTube channel and increasingly with our Facebook website.

JUnQ: How regularly do you create for example a new blog post or a tweet?

Wich: New content varies from week to week. Sometimes many exciting and "news worthy" things happen in our lab, resulting in 2-3 blog posts per week. Whereas other times we are busy with teaching and research. But it also doesn't always have to be the big and comprehensive story, like an announcement of a new grant, novel research results or a conference visit. Often also small and fun remarks, an interesting online article, a science related video or the pictures from our last group trip are a welcome addition to the

news around our research lab. These notes are usually short and concise, and can be quickly published on the go. It also depends on the type of media account. A quick Twitter message or Instagram photo can be published within minutes or seconds from the phone. Whereas blog posts on our website or on Facebook need more time depending on the amount of content and whether pictures are added or not.

JUnQ: Who else is included in the maintenance of the website and the different media accounts?

Wich: Currently, basically all communication activities, the website and social media accounts are maintained by myself. In the future, when the group is growing, I would be more than happy to include some of my students who are interested to participate and help with the content.

JUnQ: What audience do you want to address? What are your goals?

Wich: First of all, it's fun and engaging to interact and communicate with colleagues, students and people who are interested in chemistry or science in general. Our communication efforts help to spread the word about our research, but also lower the barrier to contact us and help to attract new team members. Of course, science communication doesn't stop there. The more "classical" way, giving talks and attending conferences, is still the essential building block to shape an active scientific network. However, modern means of online interaction become increasingly important to initiate and strengthen these interactions in a global scientific community. The long-term aim of our efforts is a fruitful exchange with peers, friends and a broad audience to initiate inspiration and creativeness in a mutual interaction from which everyone is benefiting.

JUnQ: How do you succeed in communicating science to a broader public? Can you estimate how many people are reached?

Wich: It is not easy to estimate how many people view or read our content. Different means of metrics, like Twitter followers, Facebook likes or YouTube views can only give an indication on the public reach, let alone the actual impact and benefit for our visitors. Our lab website has currently on average 100 visitors per day. However, the aim here is not to reach as many people as possible, but rather provide a central go-to place, like an online "business card". A good example that chemistry can be interesting for a broader public is my website www.experimentalchemie.de. Running since 2001, with over 5 million total visitors and an average of 2000 visitors per day, it represents one of the largest online platforms for chemical experiments, demonstrations and teaching resources in the German speaking area.

JUnQ: Why do you think communicating science to a broader public is important?

Wich: Scientific communication was and always will be one of the key elements in doing research. Every scientist knows that his "product" are research results, that have to be "sold", that means communicated in form of publications in order to make progress in the respective field. However, many of these discoveries are hidden within scientific communities or behind publication paywalls. Open source journals and online research networks slowly change the way we access scientific information. Modern media allows us to share research results not only to fellow scientists, but also to a broader more diverse audience. This is becoming increasingly important, especially for a positive public reception in supporting science and technology. Some research areas like gene and nanotechnology are still perceived as a "mixed bag" in society. Therefore, in order to keep growing and be accepted, it is important to continuously develop a dialogue with people and enhance our credibility. Sure, many research results might be too specialized for a broad audience, but a dissemination, in both visually appealing and easy-to-comprehend ways, will improve the understanding and support of the public. In the end, choosing a mix of communication methods appears to be the most effective way to connect with various audiences in order to share our fascination for chemistry, education and science in general.

JUnQ: Thank you very much for the interview!

—Katharina Stockhofe

A Question of Mediation

Dr. Andreas Fischer[1]
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Science is not always clear. Take for example the robust climate change debate: "A big threat for humankind" says the one side, "Complete nonsense" says the other. How many meters is the sea level actually rising? And what about the extreme weather events, are they becoming more frequent or not? These are all questions both experts and laypeople are arguing about. After all, scientists agree about the existence of climate change itself, whereas its impact still splits the scientific community. But when even science has no clear opinion, how is the broader populace supposed to have one? Over time, doubts creep into both public perception and our trust in science.

It is precisely at this point that disseminating science communication is needed. Its role is to draw the broader public into the debate and to put the current status of research into the public domain. After all: Science isn't black and white, there isn't always a clear right or wrong. It must be clearly communicated that a model derived from climate data can look completely different due to tiny changes in the input data. It is essential therefore to thoroughly and rigorously research these conditions before projecting them to the future. But when the scientific community neglects to enlighten society about an explosive research topic early enough, and refuses a mutual debate, this can quickly lead to opposition. There are plenty of examples for this – whether it's gene technology, fracking or the use of laboratory animals. Possible risks and ethical reservations about these examples must be discussed vigorously – there's no question about that. And yet these cases also show that an emotionally rather than scientifically-charged communication can quickly add negativity to whole areas of research.

No research institution today can manage without effective communication to society. On the one hand, it's about allowing the population to have a share in the research. On the other, the public also has a right to find out how their tax money is being spent, as public research is financed to a great extent from taxation. And so it should communicate to its prime founder – society – what it is working on, transparently and intelligibly. However, science communication should not be a justification. It should educate, inspire enthusiasm, entertain. A one-sided flow of information stopped being enough long ago. Media have changed dramatically in recent years: Many new communication channels have emerged offering the option for dialogue, and it is now hard to imagine science communication without this.

The Helmholtz Association also follows this approach in its communication which is geared both towards interested laypeople and to scientists with interdisciplinary interests, and expressly invites joint discussion. Large and complex – that may be the first impression of the Helmholtz Association. With more than 38 000 employees in 18 research centers and an annual budget of around four billion euros, it is Germany's largest research organization. But the name is only vaguely familiar among the public. One reason for this is the decentralized structure of the association: The member centers are independent and carry out their own communications. Seven of them don't even bear the name Helmholtz and some are even better known than their umbrella organization (itself only 20 years old): for example the German Aerospace Center, the Forschungszentrum Jülich or the German Cancer Research Center.

The science at Helmholtz is just as varied as its member centers: It is geared towards basic research and organized into programmes which are oriented to research-political principles. It focusses on six areas: Energy, Earth and Environment, Health, Matter, Key Technologies as well as Aeronautics, Space and Transport. Some centers are only involved in one research area, while others deal with several. At first glance, therefore, there seems to be no simple starting point for communication to the broader public.

But on closer examination, this apparent complexity is a science communication treasure trove. Where a great deal is happening, there's also a great deal to tell! This diversity makes Helmholtz what it is, with its huge store of interesting stories which communicate scientific content to the layperson in an easily digestible way: An example is the Helmholtz Perspektiven, a modern, printed free magazine (regularly in German, once a year in English) that has enjoyed increasing popularity in the past two years. It picks up current topics from research, research policy and education in reports, interviews, commentaries and profiles – introducing the people behind them. Many of the articles are linked on our website www.helmholtz.de (also in English). Readers can find much more there, for example podcasts, videos and graphics. The magazine is purely topic-oriented and does not restrict itself to the world of Helmholtz. It's also not about emphasizing the role of Helmholtz in the articles. Quite the contrary: The ability to take the broader view is an important factor when communicating a topic in an objective and yet critical manner. For this reason, controversial topics are addressed in guest commentaries and

[1] e-mail: andreas.fischer@helmholtz.de

opinion articles that are meant to provoke discussion.

As well as this, the Helmholtz website includes current stories on research and education topics updated daily. The website is also topic-oriented. With multimedia content and a comments facility, it invites the user to enter into dialogue. Using the channels of our Social Media Newsroom (http://social.helmholtz.de; in German) the Helmholtz Association once again brings users a big step closer to researchers: It is not just podcasts, videos and comics which communicate an entertaining insight into the researcher's everyday work; the researchers themselves take an active role by sharing their work with the broader public on blogs.

The days when scientists did their research unnoticed in their ivory towers are long gone. The desire for participation and having a say has grown ever greater in recent years among the wider population – especially on controversial topics. The event series Fokus@Helmholtz brings debates directly to the stage: It brings representatives from the scientific, business, political and civilian area together for public discussion on a controversial research or education topic – for example climate change and fracking. Anyone can participate, anyone can talk.

Research can impress and inspire, but can also make a person insecure. By communicating scientific topics in a transparent and easily understandable way, people's fears can be allayed with reasoned argument. Only the well informed can form a well-founded opinion. The role of science communication is to give the broader public this solid grounding, to educate them and also to respond to possible objections. Because it's better to research for society rather than against it.

Communicating Science *via* YouTube – Interview with Kurzgesagt

"Kurzgesagt" is an educational YouTube channel[1] of a Munich based design studio founded by two German graphic design students which features short movies about different scientific topics. "Kurzgesagt" is a good example for various informative YouTube channels created by professionals and non-professionals during the last years. These channels depict a new possibility of communicating science to the general public in a popular scientific way by using the internet as medium. They attract a great deal of interest as the featured videos are watched by millions of people. The popularity certainly comes from the fact that the short movie format allows to break complex topics down into easily understandable and entertaining narrations which can be complemented by illustrations. "Kurzgesagt", for example, uses entirely animated videos which illustrate explanations about a certain topic spoken by a narrator. We had the opportunity to interview the team of "Kurzgesagt" about their project.

JUnQ: How did you come up with the idea for "Kurzgesagt"?

Kurzgesagt: We both studied Graphic Design in Munich and after university we did not really know what to do exactly. We are interested in a lot of different things and we wanted to do something that is not only interesting for other designers. A few years ago, there was a revolution happening on YouTube and a lot of educational channels appeared. We were fascinated by channels like "CGP-Grey", "VSauce" and the "vlogbrothers". We realized that there is the opportunity to combine our work as designers and our visual standards with something that has an added value for other people and is entertaining and fun, too.

JUnQ: How many people work for your design studio? Is it a full time job? Did it start as a hobby?

Kurzgesagt: "Kurzgesagt" is a team of seven people and everybody has his own profession. For example design, music or animation. Even though we started doing this for fun, it became a full time job and we are putting a lot of work, energy and love into our work.

JUnQ: What is your personal educational background? How did you get interested in science?

Kurzgesagt: We were not very satisfied from school, because often very boring things were taught over and over again or the amazing things were taught in a very boring way. After school, we started to check out what is happening around the world and started to educate ourselves with books, documentaries and with the internet. We recognized that there are a lot of crazy and amazing things going on around us all the time. So we tried to go deeper into everything that interested us.

JUnQ: What are your goals with the project? What was your motivation for starting it?

Kurzgesagt: Our goal is to show the people how interesting and versatile the world we are living in is. We do not want to make our audience experts in specific topics, but we want to trigger interest and we hope that maybe some of them start to dive deeper into the topics we present.

JUnQ: What audience do you want to address?

Kurzgesagt: We want to address people like you and me.

JUnQ: What are the main concepts behind the videos of your YouTube channel?

Kurzgesagt: We want to show the people how amazing the world is and we want to trigger awareness and interest into our habitat.

JUnQ: What topics do you focus on and how do you come up with them?

Kurzgesagt: We focus on topics from science, history and space. Every time we read or see something which might be interesting, we keep it in mind as a possible topic. It is important that it is amazing, special and that it touches people in their lives.

JUnQ: Can you estimate how many people are reached by your YouTube channel?

Kurzgesagt: We have around 700 000 followers on YouTube and 1-2 million views per month.

JUnQ: What factors do you think contribute to the success of your videos?

Kurzgesagt: Mainly quality, continuity and our topics. Besides that, also the little Easter eggs.

JUnQ: How long do you typically need to create a video

[1] https://www.youtube.com/user/Kurzgesagt

about a certain topic? What major steps does the process of creating such a video involve?

Kurzgesagt: For one 5-6 minutes video we need around 200 hours. The steps are research -> script writing -> storyboarding -> design -> narration -> animation -> music composing and sound design.

JUnQ: Why do you think communicating science to a broader public is important?

Kurzgesagt: Because we live in an amazing and beautiful universe and everybody should be aware of this!

—Philipp Heller

Science for the Masses – An Interview with Two Biohackers

Science for the Masses was a biotech grinding think-tank, aimed towards altering the human condition in the pursuit of new abilities and leveraging pre-existing technologies for accessibility. Prior projects include mammalian near infra-red vision, next generation functional implant coating technologies and techniques, as well as bacterial modifications for the human and environmental microbiome. Both Jeffrey and Gabriel continue to biohack independently since its dissolution in 2015.

JUnQ: Firstly, could you tell us something about yourselves and your background to our readers?

SfM: Gabriel Licina has a degree in Molecular Biology from the University of Washington. Jeffrey Tibbets is a registered nurse and works during the day at the hospital. We both have done research before we started this.

JUnQ: What is biohacking and how does it relate to citizen science in your opinion?

SfM: Biohacking is a really broad term. On one end of the spectrum, you have people drinking coconut oil and experimenting with sleep cycles and exercise regimes, the body hackers. On the other end you have pure biohackers, people making proteins in their garages. In the middle you have Grinders, people dealing with human hardware interfaces and smart supplements. The one thing they all have in common is that they are doing things that were originally the realm of university and industry and they are opening it up to the public.

JUnQ: If my impression is correct, traditional (i.e. computer) hackers often have quite strong communities (anonymous, chaos computer club). How big and tight knit is the biohacking community? What is the make up like?

SfM: Just like the above explanation, there are a lot of different groups. You do get a lot of bleed and cross collaboration between the groups though. Like I said, collaboration is super important. Obviously, you get a little stratification. Body hacking is something anyone can do provided you have access to decent food and the time to sleep properly. Some people don't have that. Try going gluten free when you go to the food bank. Most Grinder projects are accessible, but require access to the internet for tutorials and support. Now, protein synthesis is no joke, so certain groups have easier access to that education. But biohacking is about education outside of those issues, building a way to break down the barriers of accessibility.

JUnQ: Who would you attribute your funding source to? How has been the process of getting funds?

SfM: Most of the money we have, we get through co working with other biohackers and experimenters. Dangerous Things sells a magnet whose coating process we developed. Other people send us projects or devices for stress or biocoating testing. It's not actually a lot of cash, but we make do. Seriously, we may be internet famous for a few days, but no one is banging down our door to give us money. We are going to be starting a crowdfunding campaign for a cool piece of hardware we are designing, so we'll see how that goes.

JUnQ: What was it like to perform the first biohack?

SfM: Biohack is such a broad term. Some people will tell you that going into ketosis is biohacking. That is really just dieting. Now, cold thermogenesis is a little more worthy of the term hack. We needed to really reduce a lot of body fat fast for a project and so we were trying all sorts of things. When you get down to the really low body fat ($<10\%$), you start to feel pretty awesome :) The cold thermogenesis was rough though. Bathtub full of ice water for 15 minutes. . . :/

JUnQ: What others have you been part of? Any one in particular that stands out?

SfM: Jeffrey and I both have magnets and rfids implanted. It's pretty standard with the people we know. We developed the coating process for the magnets so we get pretty excited about that. Most people get excited about having a new sense, being able to feel magnetic fields. I personally think that the fact that people can do their research and improve on things that have come before, that's where you start talking about "potential". There's no potential in something that doesn't change.

JUnQ: Do you feel like someone might take you for anarchists, eg. the post at Transhumanity, given the extremes of your work?

SfM: That's an interesting question. I guess if it's rebellious to suggest that people need to work for the things they want and learn as much as they can and apply that knowledge, then I guess so. It definitely is not the norm. We're taught from a young age that some people are the only people al-

lowed to do things. Especially with degrees and things like that. Once you start looking at it that way, you realize that that comes back to money and access. Then it's a form of class-ism. Now, we can't change the money aspect, but we can do our part to increase access to tools and information.

JUnQ: Are you facing any sort of resistance say from Media, the Government or even the Science fraternity? And is it affecting you?

SfM: We have two big problems. One is poor reporting. Reports that are sensationalistic, don't cite sources, use the word inject instead of drop – stuff like that. The other issue is, sadly, Transhumanists. That's usually ok, but we're not a huge fan of talkers that don't do things. And because these people are generally older and more well connected, it really depreciates what we are working for when they decide to have issues.

JUnQ: Has the Grinder movement been a support base or something else entirely?

SfM: Well, I can't really speak for other people, but everyone on the forum was really excited about the project and we did just have a party where people flew in from all over the world to hang out and work. So that seems supportive :)

JUnQ: Given the exciting work you are part of, are you getting support from any non-conventional groups?

SfM: Nope. Do you know any? Seriously, we're so broke...

JUnQ: Moving forward, what can one expect from Science for the Masses?

SfM: Well, as I mentioned, we are working more on getting our hard data for this current experiment and we are designing some hardware that we are going to try to crowdfund. There is a transdermal project we are working on. Also, some neuro muscular integration hardware for a cybernetics project.

JUnQ: One thing that you feel should be out there as your biggest motivation?

SfM: Because it's cool :D Because we can. Because even if we come up with one thing that allows others to find and explore more, then we are doing our job.

JUnQ: Do you do community outreach (eg. public talks, lab tours, introductory courses)?

SfM: Sure :) We are a bit out in the middle of nowhere, but we do have people come up and learn and work with us on a regular basis. We also come to places to talk about the work we are doing, the philosophy behind it, and how important it is to get involved. Many of the things we do can be set up in kits and brought to locations. Of course, one of the most important parts of science is reading, and you can do that anywhere ;)

JUnQ: How is the citizen science part going? How many non-scientists are trying to reproduce your experiments? Are they collaborating on research projects? Using the facilities to perform their own experiments?

SfM: If you are doing science, writing down your results, and following protocol, you are not a "non scientist". Science is a methodology, not a degree. We know personally about a dozen people who are playing around with the things we are looking into. I am sure there are more. Not everyone talks about what they are doing. We have lots of people that we collaborate with, both when we are doing our own projects, and to help out with others. Sometimes people come to visit, sometimes they mail us samples. Collaboration is super important.

JUnQ: What is the story behind the name? How did you come up with it? What meaning does it hold for you?

SfM: We kinda jumped into this feet first eyes shut, so we grabbed the first thing that kind of sounded right to us. One of the things that is really important to us is getting information, protocols, and techniques into an area where everyone has access to them. Science has an odd and unfortunate history of being cagey with information. This leads to things like 2014 being the year where the most journal papers were redacted because they didn't pass peer review.

JUnQ: Are you afraid that laymen replicating your experiments might harm themselves due to a lack of knowledge? Like not sounding morbid, has it come to your notice any incidents involving your base of followers that something has gone awry?

SfM: With every experiment, there is always a little bit of risk. The Grinding community has existed for quite some time and so far, there have been nothing worse than rejected implants. Nothing a little antibac and some heal time doesn't fix. We try to make sure that we document the risks and side effects. At the end of the day, everyone is allowed to make their own calls on what they want to do with their body and that's really not something we like to curtail. Education is always the best protection :)

JUnQ: We wish you the best of luck in the future and thank you for this interview.

— Soham Roy

Changing the Way Researchers Communicate – Interview with ResearchGate Founder Ijad Madisch

ResearchGate was founded in 2008 to support scientific collaboration and grew rapidly. Today it has more than 7 million members according to its website. The platform offers ways to share published and unpublished data, participate in open-review, and ask and answer questions.
To put ResearchGate simply as a social networking site, for researchers and others involved in the pursuit of independent research, would be an understatement. Not only has it enabled researchers connect across economic and cultural barriers and work towards a collaborative and global realm of sharing knowledge from Stockholm to Santiago and from Hokkaido to Hawaii but also enabled the labs in developing nations to get access to surplus equipment which would otherwise be an impediment to cutting-edge research for so many talented individuals.
We talked to Dr. Ijad Madisch, co-founder of ResearchGate and asked him about his motivations, the challenges he had to face and prominent examples of how ResearchGate influenced the scientific landscape.

JUnQ: Dr. Madisch, you founded ResearchGate in 2008 with two of your colleagues. What were your intentions going into this project and did you imagine that it would be as successful as it is today?

Madisch: I was still working as a researcher in 2008 and had repeatedly run into problems I couldn't find solutions to on my own. My colleagues couldn't help me and I couldn't find anyone online either. That's when I had the idea for ResearchGate. The intention I had back then is still the same today: we want to connect the world of science and make research open for all. Of course I didn't know that we would be seven million members strong seven years later, but I knew that we were on to something with ResearchGate that was desperately needed.

JUnQ: A popular anecdote about your attempts in starting the network is that your idea had been called "Firlefanz" (non-sense) by a professor in the beginning. Were there times you had doubts your project would succeed? What problems have been the most challenging ones?

Madisch: We faced opposition on all fronts. It came from my professor who said my idea was "Firlefanz" when I asked him if I could work less to devote more time to ResearchGate, and from many other people. But I never doubted my idea and didn't think about giving up. On the contrary, I still feel that you're on the right track when people challenge you. It shows that you're changing things.

JUnQ: ResearchGate is often called "Facebook for researchers". Do you think that is an accurate description?

Madisch: I don't think "Facebook for researchers" is an accurate description for what we do. Facebook is all about fostering existent connections. ResearchGate is about making the right connections between researchers and their research.

JUnQ: With ResearchGate being "for scientists" the network somehow excludes non-scientists. Is there some direct relevance of ResearchGate for the "general" public and what is it to your opinion?

Madisch: ResearchGate makes research accessible for the general public and it has relevance because the work researchers do on the network has impact on people's lives and livelihoods.
Even though only researchers (with an accredited email address or in an individual process) can sign up to the network, everything they make public on the network is accessible to anyone. In adherence to the idea of Open Science (like open source, just for science) you don't need to be signed up to read.
And there's more and more to read: in the first four years of ResearchGate members uploaded two million publications to their profiles in total. Now they upload two million publications every month.
There are also examples from almost any field where researchers' work on the network has changed the lives of others. There's the biologist who helps farmers raise fish in the Brazilian savannah – in pools filled with wastewater from desalination systems. She reached out on the network to learn from peers in countries that have more experience with desalination, like Australia and Israel, and learned from them.
In another case a Serbian traffic engineer worked together with other researchers worldwide to hear how they made their public transportation infrastructure accessible for everyone in their countries. Now he's presenting his learnings to relevant agencies and companies to make sure that everyone, no matter their age and abilities, can get from A to

B in Serbia, too.

JUnQ: You were quoted with "the way we discover knowledge is so broken" what do you mean by this?

Madisch: I say that knowledge discovery in science is broken because it is. Our publishing system comes from another, pre-web era. It's broken in a way that it doesn't fit our needs today.
I turn to the open source movement in information technology for a solution. Here engineers make their code public for others to work on and advance it. I imagine a similar, more iterative, work process in science.
Very often we don't need to stick to the "abstract, introduction, methods, results, discussion, conclusion" cookie-cutter approach to scientific articles. The most important part of a study may simply be a graph or a figure. Why not publish that first?
You still have to put it into context, and this is our strength. On ResearchGate you can connect every bit (literally) of knowledge – and because it's embedded in a network of experts – present it to the people who need to see it.

JUnQ: Last year a big scientific fraud shook the biomedical community when researchers claimed to be able to create stem cells by a simple acid wash. What role did ResearchGate play in the exposure of this fraud and what impact has this scandal had on the platform?

Madisch: Kenneth Lee was the first to publish proof that the experiments didn't work – and he published it on ResearchGate. He tried to replicate the study following the researchers' protocols to turn adult cells into stem cells by washing them in acid step-by-step. He later posted his results on ResearchGate and even live-blogged parts of the process on the network.
This showed that ResearchGate enables transparency and real-time communication in science. Later an independent official investigation confirmed that the study was fraudulent.

JUnQ: You ask users to upload their research in order to make it available to everyone. How do publishers react to seeing the articles being removed from behind their paywalls?

Madisch: Most publishers allow for certain versions of articles to be shared on researchers' private websites, and researchers' profiles on the network are private websites.

JUnQ: As you possibly know, our journal is dedicated to the publication of negative and null results. In which way can ResearchGate contribute to avoid the repetition of experiments that someone else already carried out with a negative result? Can you estimate how big the portion of negative results on your platform is?

Madisch: Researchers ask hundreds of questions and get thousands of answers daily on ResearchGate. It's here that they also share what works and what doesn't, so knowledge that's usually not shared, except in journals like yours. This also applies to datasets. Here we see researchers are sharing more and more. In the beginning they uploaded 100 datasets daily, now they upload 700.
In one case an asthma researcher ran into problems with his samples. They were infected with bacteria that couldn't be easily treated. So he reached out on ResearchGate for advice and got help from other researchers who saved him months of work. This knowledge exchange about something that didn't work out as planned is now documented and easy to find for someone who might run into the same problem in the future.
I don't know what percentage of "negative results" we have on the network. We also want to help researchers let go of the notion that there is such a thing as a "negative result". Researchers can upload anything that pertains to their work to their profiles and show a comprehensive picture of what they do. Most of which, and this I know from experience, ends up being unexpected.

JUnQ: There are several possible ways to be "active" on your platform/network. In your opinion, what is the most important feature of ResearchGate?

Madisch: All products and functions on ResearchGate tie in together and center around researchers sharing their work and getting feedback for it in real-time and discovering research of others. They present their findings on their profile, and products like Open Review and the RG Format help authors get feedback from peers without delay, stats provide quantitative feedback. This immediate feedback helps researchers build reputation from day one. In the end there's no part of the network that would work without the other, so they each play an important role – alone and in context of the bigger picture.

JUnQ: ResearchGate has been criticized for automatically sending e-mails to your co-authors that seem to be written by you personally when you join the network. Did you think about abolishing this automatic function? For what reasons do you keep it up?

Madisch: Our co-author invitations are a very useful feature. They help you to easily keep track of what your co-authors are working on. It's something the vast majority of our members appreciate and so we've never considered abolishing this feature.
However, researchers have full control over who they invite; and recipients have full control over signing up to the network. Besides that, invitations can be switched off by both inviters and recipients at any time.
We take personal data and Anti-SPAM-policies very seriously and therefore have our processes audited on a regular basis. They are compliant with European and U.S. regulations.

JUnQ: How do you feel ResearchGate has changed the communication by and between scientists?

Madisch: One physicist said: "I would compare it to when we first got email, just now we can reach many more people at the same time." This approach to making new professional connections has led to many successful collaborations across all fields.
Recently a team of three researchers from three different countries got together to investigate the strange sleeping behaviors of lemurs on Madagascar. These primates can choose whether they want to be awake during the night or day. The team found that this ability is much older than previously thought and may have even been an evolutionary benefit. The researchers did the study in their free time, and on the network. They never met in person because they didn't have to.

JUnQ: What are your plans for the future of ResearchGate?

Madisch: We're working hard on creating even smarter solutions for our members to easily follow and discover the research they need to see.

JUnQ: Thank you for the interview and good luck in the future.

—David Huesmann

Questions of the Week

The Journal of Unsolved Questions presents a "Question of the Week" on its homepage every week. Set up and formulated by the members of the editorial board, or guest writers, the main purpose of the "Question of the Week" consists in intriguing the reader by presenting topics of ongoing research. "Questions of the Week" published so far cover a wide variety of scientific fields, but share the feature to be of certain interest to several disciplines.
In the following, we present selected "Questions of the Week" from the last six months.

Why do Men Show Pregnancy Symptoms?

by David Huesmann

Couvade syndrome can be defined as a psychosomatic phenomenon with little or no recognized physiological basis that affects male partners mainly during the first and third trimester of pregnancy and disappears early after the birth of the children. Determining the incidence rates of Couvade syndrome has been problematic, since rates as low as 11% or as high as 97% have been reported which is in part attributed to a "Macho" culture in which men do not admit to symptoms to not appear weak. Also socio-demographic factors have been a matter of debate, as studies have reported a greater occurrence of the syndrome in men under 30, men over 30 and highly educated or working class men by different studies respectively. The matter is further complicated by the fact that different studies focused on different symptoms, physiological and psychological.

Infant holding fathers hand by Clarence Goss. [1]

Psychoanalytic, psychosocial as well as paternal theories have been put forward to explain the origins of Couvade syndrome. From psychoanalytic theories comes the idea that the man is envious of the ability of the woman to conceive children. The unconscious need to experience the woman's pregnancy then manifests in psychosomatic pregnancy symptoms. Another view argues that the man fears to lose his partner to the baby and this might reactivate old sibling rivalry for the love of the mother. Psychosocial theories point out that men are often marginalized during pregnancy and birth, which might adversely affect the father's health. Another theory postulates, that the pregnancy symptoms help the man prepare for his new father role in reinforcing the reality of the pregnancy. Paternal theories suggest that the emotional closeness to the unborn child is the cause of Couvade syndrome. However, studies investigating the connection between Couvade syndrome and either the involvement of the father in the pregnancy or anxiety levels in fathers have not shown clear results.
Physiological mechanisms underlying the syndrome might be connected to hormones, as men reporting Couvade symptoms showed higher prolactin and lower cortisol and testosterone levels.
But human males don't seem to be the only ones experiencing pregnancy symptoms. Males in two species of monkeys (common marmosets and cotton-top tamarins), who are monogamous and caretakers of children gain up to 20% of their body weight during the pregnancy of their partners. While it is thought that the extra weight prepares the fathers for exhausting sleepless nights or carrying small children, it is not yet understood how the monkeys manage to gain weight.
Although numerous studies exist on how, where and why Couvade syndrome occurs, there is still not much we really know. Many of the studies are contradictory and the syndrome seems to be hard to pin down. We know that we are dealing with psychosomatic symptoms occurring during pregnancy, but for a deeper understanding, studies with large sample sizes investigating a multitude of physiological as well as psychological factors are needed.

Read more:

- Brennan A, Ayers S, Ahmed H, Marshall-Lucette S. A critical review of the Couvade syndrome: The pregnant male. *Journal of Reproductive and Infant Psychology*, **2007**, *25*, 173–189.
- Ziegler TE, Prudom SL, Schultz-Darken NJ, Kurian AV, Snowdon CT. Pregnancy weight gain: marmoset and tamarin dads show it too. *Biology Letters*, **2006**, *2*, 181–183.
- http://theconversation.com/couvade-syndrome-why-some-men-develop-signs-of-pregnancy-31881
- http://www.spektrum.de/news/wenn-maenner-schwanger-werden/1316542

[1] downloaded from https://upload.wikimedia.org/wikipedia/commons

Why Do Germans Love Their DIN Norms So Much?

by Kristina Klinker

All over the world, Germans are known to be very order-loving and well-organized people. Even if this might not be true for everyone, there is a standard for almost everything in Germany. At the moment, there are about 32 500 DIN standards and the number is ever growing.[1] We all know our DIN A4 notebooks from school and we know that a sheet of DIN A4 paper will fit into most printers. We also know that when we buy screws with the right thread standard, we will be able to put together anything without problems. But standards are not only limited to physical things, there is a plethora of other cases where standards are important, which are non-physical as for example the DIN 1505 which regulates title details in documents.[2] So what else is there to know about DIN norms? DIN stands for "Deutsches Institut für Normung", which means "German Institute for Standardization"and was already founded in 1917 in Berlin as "Standardization Committee of German Industry".[3] Despite what many may think, DIN norms are not obligatory and are only to be understood as guidelines. Nevertheless, they can influence jurisprudence even if they are not laws in the common sense. As soon as they are cited in contracts, laws or regulations, they become binding. So what is it that we Germans like so much about DIN standards? Well, a very simple explanation would be that it makes life a lot easier most of the time. In addition, DIN standards contribute roughly 17 billion Euros[1] to Germany's gross domestic product, because they remove trade restrictions and the proverbial quality of German workmanship ("Deutsche Wertarbeit") has helped build the good reputation of Germany after the two world wars. Something "Made in Germany" stands for something with high quality and value. Also, the world known bavarian purity law ("Reinheitsgebot") concerning the production of beer in Germany established in 1516 fits into this context. But do we really like DIN standards so much because they make life easier or because we simply like making them? To strengthen the latter: there is even a DIN norm for the term "norm": DIN EN 45020.[1]

DIN Logo "Deutsches Institut für Normung" [2]

Read more:

[1] http://www.planet-wissen.de/politik_geschichte/wirtschaft_und_finanzen/normen/index.jsp
[2] http://de.wikipedia.org/wiki/DIN-Norm
[3] http://www.din.de
[4] http://www.faz.net/aktuell/wissen/din-normen-die-ordnung-der-dinge-11925078.html
[5] http://www.arbeitsratgeber.com/die-din-normen-standards-fuer-die-wirtschaft/

Do Smartphone Users Get Sick More Often?

by Andreas Neidlinger

A lot of people do have a cold at the moment. Most likely it is because of the chilly temperatures we have been experiencing the last few weeks. Or is it? I have been watching it, while walking around in the streets, going on some bus or train, or even at the dinner table. Everywhere they are present: Smartphones! I myself own such a fine piece of 21st century electronics and do not want to miss it. But what I have been wondering about is: Will people who use their smartphones very intensely become sick more regularly?

What comes to mind in the beginning is the filthy screen. Just grab it out of your pocket or pick it up off the table and take a look at it. I bet you, it is not stainless. So basically what you do is, using it with dirty hands, hopefully wash them at some time, but do you also clean your phone? NO! And directly after sanitizing your hands, you touch it again, getting germs and whatnot directly back on your fingers, which will soon after, believe me, touch your face. Or think about it differently: When walking around, does it happen to you? All around you, people who look slightly down on their screens while crossing roads, doing grocery shopping, or walking their dog. They must bump into other people more frequently than the open-eyed pedestrian. Does that mean they are "attacked" by more germs because of their numerous contacts to each and every sick person than more careful people? Do they get sick more often?

Well, I cannot really answer this question, since I wasn't able to find any study on this. It must be a great View on Life for JUnQ for that matter. I could just find some tricks on how your smartphone can survive cold weather.[1] And some article from Sueddeutsche Zeitung from 2012 where they tell you about developers planning to bring out an app which allows you, after snotting on your phone, to detect

[2] downloaded from https://upload.wikimedia.org/wikipedia/commons/4/4c/DIN-Logo.svg

which kind of cold you have.[2] I am so looking forward to everybody smearing their sputum on their smartphones! Anyhow, since our civilization hasn't broken down, yet, I think we're more or less off the hook. Maybe even the opposite is the case. I mean, your immune system has to be trained and might even develop allergies if not subjected to enough "real" enemies. So, do smartphone users, due to their increased exposure to germs, become more healthy and resistant? I neither can answer this question. Maybe they have more traffic accidents? So many open questions...

Read more:

[1] http://edition.cnn.com/2013/12/13/tech/mobile/cold-weather-phones/

[2] http://www.sueddeutsche.de/gesundheit/technik-fuer-die-erkaeltungszeit-dem-smartphone-was-husten-1.1265829

Why Do Children Become Overweight in School?

by Stephan Köhler

An increase in obesity in the population is one of the problems many industrialized nations face today. Along with rising levels of obesity come many other health concerns such as heart disease that are frequent causes of death. Often the rise in obesity is attributed to the sedentary lifestyle many people in the afflicted societies have adopted. Fewer people have physically demanding jobs or exercise on a regular basis while the access to food high in calories has become easy and cheap. But obesity does not just afflict adults, but children as well. Interestingly children younger than five years of age have a slightly lower chance of being overweight than they did twenty years ago. This changes as they get older and with eight years the rate of overweight children has nearly doubled compared to the past. The sharp increase in weight happens right around the time when children start school. So what is it about this time in their life that leads to the increase in weight?

Read more:

S. Hoffmann, R. Ulrich, P. Simon: "Refined Analysis of the Critical Age Ranges of Childhood Overweight: Implications for Primary Prevention", *Obesity*, **2012**, *20*, 2151.

Why Isn't Anyone Able to Label Notes?

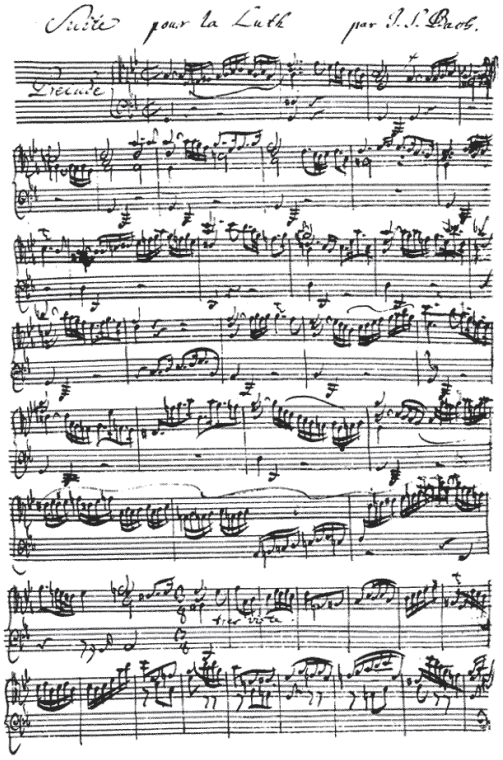
by Nicola Reusch

Have you ever wondered why most people can tell which color they see but they most likely cannot label a note they hear without having a reference note? The second ability is known as absolute pitch (AP) or perfect pitch and is rather rare in Europe and North America. Only one of 10 000 people possess this ability, e.g. some popular musicians such as Mozart.[1]

There already has been considerable interest and research about where AP stems from but it still is an unanswered question. By searching the internet you will find several websites telling you that they can teach you to get AP. But from a scientific perspective it is not proven that this is possible: Only one study has shown that a learning process of about 60 hours led to some kind of success.[2] This seems much of an effort compared to the essentially unconscious learning of AP in childhood.

There are basically three different explanations for the genesis of AP:

- training makes it possible (this is what the websites mentioned above will tell you)
- genes are responsible
- learning is feasible but only if you start at a young age



First page of the manuscript of Bach's lute suite in G Minor. [3]

[3] downloaded from https://upload.wikimedia.org/wikipedia/commons/d/d3/Bachlut1.png

The genetic origin of AP is supported by the fact that young children already possess it and are more likely to have AP if there are other family members with AP. Of course in the latter case it is possible that young children get "trained" by these family members and do not just have it in their genes. But in fact there is some scientific evidence that a specific part of the genome could "at least partly" be the reason.[3]
There are also reports about the benefit of an early start of musical training. Another distinctive feature is the linkage to the acquisition of speech in infancy. There are differences between speakers of non-tone languages like English and tone languages, e.g. Mandarin or Vietnamese. Tone language speakers seem to have an advantage, which is possible due to some kind of training effect in tone languages: The meaning of some words changes if you use another pitch. So children that are speakers of a non-tone language have to learn more about pitches when they start musical training.

Up to now we can only speculate that the right composition of these requirements could be the clue to gain AP.

If you want to test yourself, you should have a look at http://www.absolutepitchstudy.com/index.html.

Read more:

[1] Deutsch, D. Absolute pitch. In D. Deutsch (Ed.). *The psychology of music*, 3rd Edition, **2013**, 141–182, San Diego: Elsevier.
[2] Brady, P. T. Fixed scale mechanism of absolute pitch. *Journal of the Acoustical Society of America* , **1970**, *48*, 883–887.
[3] Elizabeth Theusch, Analabha Basu, Jane Gitschier, Genome-wide Study of Families with Absolute Pitch Reveals Linkage to 8q24.21 and Locus Heterogeneity, *The American Journal of Human Genetics* **2009**, *85*, 112–119.

Why We Do Not Feel Dizzy From the Earth-Rotation?

by Katharina Stockhofe

Have you ever felt vertigo after a ride on a merry-go-round? Why can we feel this acceleration so intensively, while we do not notice at all that our very world does rotate around itself and revolves around the sun the entire time? This seems odd, considering that the Earth is travelling around the sun with a speed of approx. 30 km/s[1], while a merry-go-round is comparably slow with 8 m/s.

First of all: What is "vertigo"? It is the perception of a (mock-)motion of oneself against the environment. Responsible for such cognition is the vestibular system which is able to recognise acceleration. In the labyrinth of this organ in the inner ear tiny hairs are arranged in two planes: horizontal and vertical. It is embedded in a heavy matrix, which remains as it is in case of linear acceleration. Thus the hair experiences deflection and it comes to a sensory stimulus.

Rotatory acceleration is also recognized by sensory hairs, which are arranged in semi-circular canals which are filled with lymphatic fluid. If it comes to a rotation, this fluid remains mobile (due to inertia) in contrast to the cranial bone. Thus the sensory hair is deflected and again we have a sensory stimulus.

So, now as we know about that, we need to clarify how the movement of the Earth is affecting us. The Earth carries out two kinds of movement: It rotates around the sun and around itself. If we assume a speed of 30 km/s (which is quite fast) and 365 days as a time period the Earth needs to travel around the sun, we can calculate an acceleration of approx. 1 mm/s^2, which is very small, indeed. (For this calculation we neglect the fact that the speed is fluctuating.) For the rotation of the Earth around itself we assume a perimeter of 40 000 km. Since the rotation of the Earth around itself takes one entire day we have a speed of approx. 0.5 m/s and an acceleration of 5 µm/s^2, respectively. This figure is even smaller than the one we calculated for the orbit around the sun.
If we assume a merry-go-round with a diameter of 15 m and a velocity of 30 km/h the acceleration which the body experiences is 9.25 m/s^2. This value is much higher than the acceleration of the Earth that is resulting from the travel around the sun and the rotation around itself.
I don't know if I considered all effects that are somehow important to answer the question why we do not feel dizzy on our planet. But I think if one keeps in mind that it is not the speed but the acceleration that causes dizziness, the answer that I can give sounds reasonable.

Read more:

[1] http://www.sternenhimmel-aktuell.de/Erde_Geschwindigkeit.htm

Did an Asteroid Impact Cause the Younger Dryas Event?

by Stephan Köhler

The Younger Dryas Event (YDE) is a climatological phenomenon that happened roughly 13 000 years ago. In a span of a few years, the temperature in Western Europe and North America dropped sharply and stayed low for over a millennium. The effect was more diffuse in northern America and less pronounced in the southern hemisphere. Nonetheless, the YDE is associated with the mass extinction of large mammals in North America. At this time, humans had already spread around the globe and started civilizations. One of these civilizations was the so called Clovis culture that also vanished during the YDE. It is entirely possible that the extinctions coinciding with the YDE are not

due to climatological changes, but rather human overkill.[1] The decline in mammal population in turn led to the decline of the Clovis. But as life is complicated, the activity of humans likely conspired with the changing climate to cause the extinction and the downfall of the Clovis. In contrast to our current civilization, the people 13 000 years ago did not have the means to affect such dramatic climatic changes (going far beyond even our current level of climate change). The question now is: What caused the YDE in the first place? A widely held belief is that the melting of the North American ice caps disrupted the thermohaline circulation (the ocean circulation that nowadays brings warm water from the Gulf of Mexico to Western Europe), by dumping large quantities of fresh water into the north Atlantic. In 2007 Firestone *et al.* proposed an interesting trigger for the melting of the ice caps [2]: An impact of an asteroid, or rather the explosion of an asteroid in the atmosphere. This would have been a much stronger version of the 2013 Chelyabinsk meteor. Support for this hypothesis comes from the presence of nanodiamonds in the geological layers associated with the YDE. The only other strata where these diamonds are present is the K-T boundary that marks the global extinction event that killed the dinosaurs.[3]

The impact hypothesis is however hotly debated.[4] Many of the original markers used to determine that an impact took place have later been discredited, as it turned out they can also be produced by earthly phenomena, e.g. volcanism. The markers left over on the other hand could not be consistently reproduced by other research groups. One problem is that different groups include different kinds of nanodiamonds in their analysis or use different calibration scales for the dating of samples. The uncertainty in the dating is often several hundreds of years so that it is not clear if potential impact markers have been deposited at the same time or in independent events. Additionally the uncertainty in the age of the samples makes it hard to pin them to the relatively narrow time frame for the beginning of the YDE. The impact event might thus have happened significantly before or after the onset of the YDE, or it might not have happened at all. After all new climate models suggest that the melting of the North American ice sheets could have occurred without a specific trigger such as the proposed impact.

So where are we left if the impact is not necessary to explain the behavior of the climate and the evidence for an impact is disputed? There is certainly the possibility that an impact took place without changing the climate, but the main question seems to be if the impact ever occurred.

Read more:

[1] Samdom *et al.*, Proceedings of the Royal Society B 281, 20133254 (2014).
[2] Firestone *et al.*, PNAS 104(41), 16016-16021 (2007).
[3] Kinzie *et al.*, Journal of Geology 122(5), 475-505 (2014).
[4] van Hoesel *et al.*, Quaternary Science Reviews 83, 95-114 (2014).

Who First Said or Wrote: "You Read the Wrong Newspaper"?

by Wolter Seuntjens

He chuckled. "That old line. You're reading the wrong newspaper![1]

The statement "You read the wrong newspaper!" is an exclamation of exasperation and pity. When was the first time this statement was recorded in print or in any other medium? In which language was it stated? By whom? And why?

The first time I heard someone say "You Read the Wrong Newspaper" in Dutch must have been in the early nineteen-seventies. This was more an exclamation of exasperation and pity than a simple statement of fact. It was said because the speaker felt exasperation and pity for the reader of a liberal-conservative newspaper.[2] Later I heard and read the same phrase many more times. Mostly in the same unmistakably condescending way. The phrase was always deliberately used as a rhetorical device: a debate-stopper. Recently, in an ironic or a dialectic twist of history, I heard the same phrase spoken, this time by a liberal-conservative speaker to someone who ostensibly challenged his opinions and "facts".[3] First I thought "*The Times They Are a-Changin'*" once again, then I started wondering: from where does this phrase actually originate? When was it first recorded? In which language? By whom? And why?

Thus the Open Question became: Who First Said or Wrote: "You Read the Wrong Newspaper"?

Firstly, I conducted a quantitative Google search in three languages (English, German, Dutch). The results of the Google search (Germany, 20 December 2014, between 11:15 and 11:20 CET) are thus:

phrasing	**Google hits**
"you read the wrong newspaper"	3 460
"you read a wrong newspaper"	0
"you're reading the wrong newspaper"	796
"you're reading a wrong newspaper"	7
"you are reading the wrong newspaper"	261
"you are reading a wrong newspaper"	0
"Sie lesen die falsche Zeitung"	44
"Sie lesen eine falsche Zeitung"	0
"du liest die falsche Zeitung"	834
"du liest eine falsche Zeitung"	0
"U leest de verkeerde krant"	6
"U leest een verkeerde krant"	0
"je leest de verkeerde krant"	102
"je leest een verkeerde krant"	0

In all three languages the versions with the definite article ("the", "die", "de") are more frequent than the versions with the indefinite article ("a", "eine", "een") . Most of the time the versions with the definite article are the only versions. In both German and Dutch the informal versions ("du", "je")

are more popular than the formal versions (“Sie”, “U”). Apart from the very basic quantitative results the Google search did not provide qualitative data that could answer any of the four questions (where, when, by whom and why).

Spot the “wrong” newspaper.[7]

When it became apparent that the Google search had not yielded any answers, I consulted two relevant professors in Germany (University of Bamberg; Technical University of Dortmund) and one in the Netherlands (University of Groningen). I also contacted the Internationales Zeitungsmuseum in Aachen (Aix-La-Chapelle). Only the Dutch professor replied and he frankly admitted that, although he, too, had heard the phrase often been uttered, he did not know from where it originates.

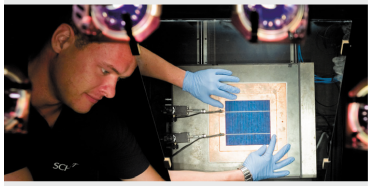
Finally, as a last desperate measure, I contacted Dr Garson O’Toole of Quote Investigator[4] and put the question to him. I have not received his answer yet.

The phrase “You read the wrong newspaper” may be connected with the Marxist term “false consciousness”. This term was introduced in print by Friedrich Engels.[5] Even though it was never clearly defined it meant something like “the material, ideological and institutional processes in capitalist society [that] mislead members of the proletariat”.[6] In the end it boils down to the idea that someone who does not share your opinions has a false consciousness. The idea is as old as mankind but the phrasing was new and sounded more scientific and with more revolutionary engagement than the flippantly relativistic “Well, that is what you think”. The relation between the phrase and the term may be via the German adjective “falsch”: “falsches Bewustsein” (false consciousness), “falsche Ideologie” (false ideology), and “Sie lesen die falsche Zeitung” (you read the wrong newspaper). If these were true that would mean that the origin of the phrase lies in the German language and probably in Germany itself.

Read more:

[1] Sophie King, The Supper Club. London: Hodder & Stoughton, 2008, p. 414.
[2] This label “liberal-conservative” for what it is worth.
[3] https://youtu.be/9MHmsb17TH4?t=12m30s
[4] http://quoteinvestigator.com/
[5] http://www.marxists.org/archive/marx/works/1893/letters/93_07_14.htm
[6] http://en.wikipedia.org/wiki/False_consciousness
[7] “2003 newsagent England 1205519685” by Dan Brady from Newcastle upon Tyne, UK “Toppling of Saddam” newspapers. Licensed under CC BY 2.0 via Wikimedia Commons http://commons.wikimedia.org/wiki/File:2003_newsagent_England_1205519685.jpg

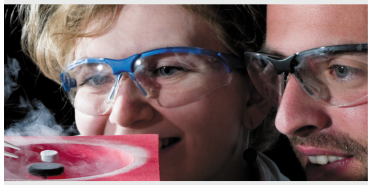
Graduate School Materials Science in Mainz - Germany



CONCEPT

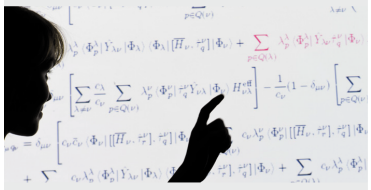
The Graduate School of Excellence "MAterials Science IN MainZ" (MAINZ) offers innovative scientific, technical and complementary PhD training combined with excellent research in materials science. MAINZ bridges previously disjoint fields of materials research. This allows MAINZ members to develop a common language, to foster interdisciplinary transfer of knowledge, and to gain insight into systems traditionally seen as separate.

Scientists from Johannes Gutenberg University Mainz, the Max Planck Institute for Polymer Research (MPI-P) and the University of Kaiserslautern (TUKL) have joined to form MAINZ. MAINZ has been selected as one of the few PhD programmes in the interdisciplinary area of Chemistry, Physics and Biology as part of the Excellence Initiative.



RESEARCH AREAS

- Model Systems and Correlated Matter
- Functional Polymers
- Hybrid Structures
- Bio-Related Materials



TRAINING

The main goal of the Graduate School Materials Science in Mainz (MAINZ) is to provide excellent scientific training for PhD students while they conduct high-quality research. Our programme is committed to offering excellent training opportunities in a most flexible and individualized manner to kick-start the future career of our PhD students in academia, industry and beyond. This requires both: excellent training within materials science research (Training through Research) and complementary business, leadership, cultural, and other skills (Training for Life).

SUPERVISION AND MENTORING

PhD Students of MAINZ are expected to finish their thesis within three years. Therefore, they require excellent supervision. Hence, our PhD students benefit from more attention throughout their PhD studies, and receive individual supervision and mentoring. A fundamental characteristic of our supervision approach is that it is carried out under the guidance of two or more academic supervisors and one mentor. Our mentoring concept is very successful in opening new avenues for a career (in industry or academia) after completing the PhD degree. Details of our supervision policy, the duties of our supervisors and co-supervisors, and the tasks of the Thesis Committee are given on our website and are listed in our Training and Policy Manual (download via MAINZ website).

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MATERIALS IN MAINZ SCIENCE

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Articles

Teaching Good Scientific Practice: Results from a Survey and Observations from Two Hundred Courses

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In 2009, a good scientific practice curriculum was developed and published on behalf of the "Ombudsman für die Wissenschaft". Soon after we had started giving courses for doctoral students that follow this curriculum, we listened to many stories about scientific misconduct – related by the participants. Since these stories were far more numerous than we had expected from the published literature, we decided to ask the participants about their experience with malpractice with the help of a short explorative survey.
387 doctoral students returned our questionnaire after participating in a two-day good scientific practice course between November 2011 and December 2012. 76 students – about one in five – admitted to have been involved in one of six forms of severe scientific misconduct with consequences upon their work: plagiarism; data manipulation, fabrication or theft; honorary authorship; duplicate publication.
More than half of the respondents stated that they were involved in, or had witnessed problems with unclear data ownership or honorary authorship. In the courses, many participants told us that data management and authorship issues had never been addressed thoroughly prior to the course, although they are important aspects of the scientific process. This leads to several unsolved questions concerning the supervisors' role in the fostering of good scientific practice, and to an assumption of "inherited unawareness" and systematic non-communication. We suggest that the issue should be tackled by educating all members of the scientific institutions, accompanied by structural changes.

1 Introduction

In 1997, a case of misconduct in biomedical research rocked the German scientific community.[1] In its aftermath, the Executive Board of the Deutsche Forschungsgemeinschaft (DFG), Germany's largest public funding organization, appointed an international commission with "the mandate, to explore causes of dishonesty in the science system, to discuss preventive measures, to examine the existing mechanisms of professional self regulation in science and to make recommendations on how to safeguard them."[2] One of the outcomes of their efforts was a set of sixteen recommendations, which, if consciously observed, should be "the best preventive measure against dishonesty."[2] A particularly important recommendation states that rules of good scientific practice (GSP) "shall be made known to, and shall be binding for, all members of each institution. They shall be a constituent part of teaching curricula and of the education of young scientists and scholars."[2] Consequently, the DFG insisted on the implementation of GSP rules and regulations for dealing with scientific misconduct in those public German research institutions that wished to apply for DFG funding.[3] In 2009, the 'Curriculum "Good Scientific Practice" for Courses in Science and Medicine' was developed and published on behalf of the "Ombudsmann für die Wissenschaft", an English translation followed in 2011.[20] A new version of the curriculum that applies to all fields of

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science was published in 2012. One year later the DFG issued a second edition of the recommendations that contains a chapter about whistleblowing.[6]

Since 2009, we gave more than two hundred GSP courses for doctoral students that follow this curriculum. Their structure and method are mainly based on our experience with similar seminars in bioethics, research, medical and nursing ethics that we (GS and MG) had been conducting and evaluating since the late 1980s at Ulm University and other institutions. Real-life case studies, in which the participants reflect and discuss ethical aspects, are at the core of these seminars.[13, 19]

After we had started conducting and evaluating the GSP courses, we realized that more and more participants reported their experience with scientific misconduct. As we always ask the participants to remain strictly confidential about everything they hear in the course, many of them confessed their own troubles. The narrated stories appeared to be far more numerous than we had expected from the published literature.[9] Also, most surveys reported findings from the US, and none focused exclusively on doctoral students at the beginning of a possible research career. The extent of misconduct that young scientists, especially those at the beginning of their research career, are confronted with in Germany, is yet unknown. We therefore decided to ask the participants of our courses anonymously about their involvement in various forms of misconduct in science. The survey was designed as exploratory, so no hypothesis was to be tested.

2 Materials and Methods

Between November 2011 and December 2012, we conducted thirty-five two-day GSP courses at sixteen universities and research facilities in Germany that were attended by 411 doctoral students. 387 questionnaires were returned (94%). Table 1 and 2 give more information about the respondents.

To simplify completion after an exhausting GSP course, we presented only ten forms of scientific malpractice with three degrees of involvement to choose from on the reverse side of our standard evaluation questionnaire. The quality of these forms listed in Table 3 ranges from minor misdemeanors to severe research misconduct.[8, 15, 16] In choosing these ten forms we took into account what the participants of about twenty courses had told us prior to the start of the survey, particularly concerning severe misconduct. To create awareness for the seriousness of these transgressions, all six forms of severe misconduct included in the questionnaire were discussed in the workshops. Inventing and manipulating data was the subject of two case studies, and several examples were given for data theft. Plagiarism was always a topic due to the highly publicized cases involving several politicians. From the vast field of publication misconduct, we decided to include only two forms: duplicate publication, as the undisclosed re-publication of a scientific text with the sole intention to extend one's publication list; and "honorary" authorship. The latter encompasses all forms of fake authorships (guest authors, authorship cartels, author doping, default authors) that are among the most harmful distortions of the scientific record and are therefore "generally not considered to be acceptable under any circumstances." (DFG Recommendation, p. 83).

The purpose of our survey (obtaining information about doctoral students' experience with scientific misconduct and publishing anonymous results) was explained to all participants prior to distributing the questionnaires. We always underlined that completing it would be voluntary and anonymous, and implicit consent was therefore assumed by returning a completed questionnaire. No identifying information was requested, and we asked the participants to make sure that they did not add any information on the questionnaire that would give away their identity.

Table 1: Information about our course participants and the respondents.

Number of participants	411
Returned questionnaires	387 (94%)
Female	190 (49%)
Male	193 (50%)
No answer	4 (1%)
Years of experience in scientific research	Mean: 2.9 years Median: 3 years (Range: 0-30 years)

Table 2: Information about the fields of graduation of the respondents.

Field of graduation	Number of questionnaires
Science	269
Engineering	46
Medicine	34
Humanities/Art	24
Other	13
No answer	1

Table 3: Absolute numbers of positive answers for every item of misconduct

Item	I have been involved (e. g. as a victim) with consequences upon my work	I have been a witness without any direct consequences upon my work	My colleagues told me about it
Sloppy work	126	142	121
Bad mentoring	99	85	151
"Honorary" authorship*	57	121	120
Data manipulation	21	45	113
Salami publication	12	53	119
Data theft*	8	13	105
Data fabrication*	6	9	67
Plagiarism	6	36	105

*The six forms of misconduct that we assumed to be severe are marked with an asterisk. The instruction given on the form was: "Have you ever had any experience with the following forms of questionable research practice/scientific misconduct, and if yes, to which extent? Multiple answers in one line are possible." The positive answers were collected from 387 questionnaires.

All participants who returned a questionnaire complied. The only voluntary personal information we asked was about gender, scientific background and research experience. Institutional review board (IRB) approval was not necessary because surveys of this kind do not require IRB consultation or approval in Germany. The directors or coordinators of all sixteen graduate programs gave us their permission to use the data for publication, provided we do not disclose their origin.

3 Results

76 out of 387 doctoral students (= 19,6%) admitted to have been involved in at least one of six severe forms of scientific misconduct with consequences upon their work: plagiarism; data manipulation, fabrication or theft; honorary authorship; duplicate publication. Honorary authorship was by far the most prominent form, followed by data manipulation (see Table 3). One in four doctoral students admitted to have been involved in bad mentoring. More than half of the students (198 = 51,2%) experienced any kind of misconduct with consequences upon their work.

Why did our survey yield so many positive answers? One possible reason could be that our participants had a clearer understanding of the meaning of the wrongdoing because we had discussed it thoroughly in the two preceding days. For them, "data manipulation","honorary authorship" and "data fabrication" were not expressions with half-guessed meanings, but concrete scientific practices for which they had heard and discussed numerous examples in real-life case studies.

Since our course groups were usually small (3 to 18 participants, mean 11), and many stories of malpractice were shared, we excluded questions of self-confession ("have you ever fabricated data?"). Also, our chosen statements pointed to a more passive experience: have you witnessed, been told or involved? without the need to admit one's own wrongdoing. This might also have lead to more students giving positive answers. Other factors lowering or raising admission rates, like social expectation, forgetfulness, representativeness or anonymity are discussed in literature.[9]

Almost 51% of the respondents indicated that they had witnessed or been involved in "honorary" authorship and/or unclear data ownership. This mirrors an observation from our courses: numerous students reported that these two central aspects of the research process – ownership, storage and retention of data, materials and sources; the question who can and who cannot be an author – had not yet been addressed thoroughly during their undergraduate studies and their dissertation research. This is alarming because the various recommendations and guidelines clearly state that a data management policy is part of an institution's professional standard, and that authorship issues should be discussed as early as possible in a project.[2, 14, 21] It may or may not be a coincidence that both aspects are directly connected with science's recognition system.

Many students told us that they had not been aware that certain occurrences are considered misconduct, and that they had assumed them to be ordinary scientific practice ("The head of our department is always the last author on every paper, even if he does not know the topic"). Talking about issues of good and bad scientific practice seems to occur rarely in everyday science, and many participants told us that they had never done so before the course. It is also disturbing that only 17 of 118 participants (14%) we asked knew about the existence and the role of ombudspersons.

4 Further Observations and Unanswered Questions

In every single one of our 200 GSP courses we heard a variation of one or more than one of the following questions for which we do not (yet) have answers:

- "Why didn't our supervisors tell us about the GSP regulations?"
- "Do our supervisors also know about the GSP regulations?"
- "Are there GSP workshops for our supervisors?"

The DFG's and the institutions' primary approach is to qualify young researchers. This is stated in the GSP regulations of hundreds of research institutions in Germany. These three questions contain one critical assumption: they indicate that it is not sufficient to educate young researchers about GSP – their supervisors should also be trained.

Since 2009, our focus has been educating young researchers in GSP. The request for our courses increased sharply after several highly publicized cases of plagiarism.[7, 18] We therefore started working on a concept for training GSP teachers. Between 2013 and 2014 we conducted four teachers' trainings for supervisors and senior researchers. Two more trainings were planned for 2014 and 2015, but they had to be cancelled due to low interest. We received informal requests from about a dozen more scientific institutions so far, but without further consequence. Two trainings are scheduled in 2016.

Coming back to the first and second of the unanswered questions, we can imagine several answers:

- Supervisors know about the GSP regulations and the topics covered in them, and they assume that the doctoral students know them as well, so they never discuss them.
- Supervisors know about the GSP regulations and the topics covered in them, and they assume that the young researchers will learn them implicitly without discussing them.
- Supervisors are not aware of the existence of GSP regulations and/or the topics covered in them, so they are never discussed.
- Supervisors know about the GSP regulations, but they do not think them important, helpful, or necessary, so they are never discussed.
- Supervisors experience so much stress (writing applications, publishing articles, lecturing, etc.) that they have no time to discuss GSP issues with young researchers.
- Supervisors know about the GSP regulations, but they are oblivious to their importance.
- Supervisors know about the GSP regulations, but they do not want to discuss them with young researchers.

Although we can only speculate, we strongly believe that the reason for many doctoral students' unfamiliarity with the GSP regulations is "inherited unawareness" or systematic non-communication, rather than the consequence of malign neglect or deception.

Discussing these issues with doctoral students and coordinators of graduate schools and programs, we are often confronted with insinuations of reluctance, as though it were unnecessary or shameful to get GSP training as a supervisor or senior faculty. A major problem appears to be the time load for further education: participants of our teachers' trainings tell us how difficult it is to free six days for the three modules within one semester. Some of our program coordinators ask us occasionally if the GSP course cannot be done in one day because the supervisors do not want the doctoral students to be "out of the lab" for too long (the workload of the minimum curriculum for empirical/experimental researchers is 16 academic hours which can be managed in one and a half days). Course participants tell us frequently that there is very little time to discuss anything beyond how long it will take to get the necessary results for the next publication, and some participants told us that they have hardly anyone at all for discussion. We sometimes hear that talking about GSP or other ethical considerations is too time consuming or even useless, or an impediment to research, usually with a reference to the alleged freedom that science needs to function properly.

The solution for overcoming these constraints can certainly not be to force all supervisors and senior faculty into GSP trainings. We have experienced that obligatory GSP workshops for doctoral students are not always met with enthusiasm, and we can safely assume the same for senior researchers. Besides, there are not nearly enough GSP teachers available for qualifying several hundred thousand researchers.

There are more issues to consider. The feedback at the end of our courses and the graduate programs' evaluations indicate that the courses' content is considered relevant, important and useful. Yet we do not know if the acquired insight into good practices survives a transfer into everyday science. To encourage young researchers to engage in good scientific practice, the research environment must allow, foster and reward these practices. Good scientific practice needs time and occasions for reflection, doubt and self-criticism. In a culture of competition for money, of deadlines and publication pressure, this seems hard to achieve. On the contrary: our current system of evaluating scientific "output" in a highly competitive environment tends to reward questionable practices and even severe misconduct.[17]

At the beginning of our courses we have the participants collect values, norms and principles of what they think is good scientific practice. These collections show that young researchers have a keen sense of what is good scientific practice. Our survey and the countless stories about their own experience show that they also grasp what misconduct in science is – and that far too many young scientists are involved in it (we assume more often as victims than as perpetrators). We also learned from the stories that they are very much aware of the dilemma they are facing: should they fight, leave, look away or comply?

We do not clearly know how we can foster good practice in the different realms of science, but we know that we have to try – at least for the sake of science's credibility and the researchers' integrity. The more scandals science experiences, the more difficult will it be to uphold society's (and the taxpayers') confidence in the self control of science.[12] When we look at the recent explosion of retractions and exposures, it is likely that the worst is yet to come.[10] Science may understand its independence as one of its innate and indispensable pillars, but we should never take it for granted.

Independence is a privilege that we must not squander. It comes with the obligation for professional self-regulation, and that means that no one is permitted to engage in scientific misconduct and can get away with it. Those who give us their money and let us work with it as we see fit have the right to expect that we do our best to ensure that it is invested into real science – and not into science fiction.

The GSP regulations of the German research institutions and universities may show us a way to achieve this high degree of scientific integrity: supervisors and academic teachers have to create an environment that makes it easy to engage in good scientific practice and act as role models. Young researchers must become acquainted early in their studies with values and norms of good scientific practice, and be educated continually in a way that allows integration into their everyday work. The necessary competencies have to be trained. Knowledge concerning the role of ombudspersons must be disseminated. A growing number of mandatory dissertation agreements and graduate programs try to give more structure and reassurance to the young scientists' education. To prevent questionable practices from developing into serious misconduct, early intervention systems may be useful.[1]

Structural changes are also necessary, particularly concerning rewarding systems and quality assessment.[17] Some efforts were made in the past years, namely by the DFG, after a scandal involving fabricated citations.[4] In an attempt to check the "publish or perish" madness, the number of publications that can be listed in funding submissions is now limited to a few.[5]

It is likely that none of these steps alone will guarantee immediate success. We think it reasonable that the problem of scientific misconduct should be tackled on the structural, the institutional and the personal level.

Acknowledgments

We wish to thank the participants of our courses on good scientific practice for their trust and their willingness to share their experience with misconduct in science with us.

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[5] Deutsche Forschungsgemeinschaft. Pressemitteilung Nr. 7, 23 October 2010. "Qualität statt Quantität" – DFG setzt Regeln gegen Publikationsflut in der Wissenschaft. Retrieved from http://www.dfg.de/service/presse/pressemitteilungen/2010/pressemitteilung_nr_07/index.html. Accessed 27 May 2015.

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Views on Life, the Universe, and Everything

Do Germans Have a Predilection for the Nebulous?

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Collections of quotations are popular because they serve wisdom and wit in condensed form. Sometimes, though, their selected quotations are not quite understandable. Especially quotations from some German authors in a particular German collection seem to suffer from this false air of deep thinking and great intelligence. Is this an incidental one-off or is this a symptom of a general phenomenon?

1 Introduction

Quotation dictionaries – and quotation websites – enjoy considerable popularity. Why are these collections popular? A plausible answer is that they give us literary, philosophical, and scientific sensations in concentrated form. Highly condensed wisdom and wit are, indeed, served by quotation dictionaries.[1] They are gossip of the highest sort. Might there be different reasons for their popularity in different countries and in different languages? Supposed wisdom for some peoples and certain wit for others?[2]

For the German language there are more than a few such collections. The most famous German collection is probably Georg Büchmann's *Geflügelte Wörter* (*Winged Words*). This book has seen many editions with many additions and revisions since 1864. Lately, I read a more recent German book of quotations: *What is Man. . . ? 1111 Quotations give 1111 Answers*.[3] While reading this collection I became aware of something that alternately puzzled, troubled, and amused me. In this collection there are several quotations that are unintelligible. At least they are for me.[4] This View on Life then developed from 'Why include unintelligible quotations in a collection?' over 'Are Germans particularly prone to include incomprehensible quotations in such dictionaries?' into the sweepingly general 'Do Germans have a predilection for the nebulous?' These are fascinating and intricate questions to which I will give some preliminary answers.

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2 Quotations

Let us then have a look at the most incomprehensible quotations in this collection. What to think, for instance, of this one:

> Der Mensch ist zu Zeiten wagender als das Wagnis, seiender als das Sein des Seienden.[5]

> Man at times risks more than the risk, is more being than the being of beings.[6]

> A human being at times risks more than the risk, is more being than the being of beings.[7]

This looks like the sentence of a man who takes more words than is necessary to tell more than he knows. Evidently, this series of words is taken out of context. On closer inspection, however, the context and, in fact, the entire book appeared to be similar gobbledygook.[8] But then we may remind ourselves that we are discussing a line and a work of the man who wrote: 'Making itself intelligible is suicide for philosophy.'[9]
And what about this quotation:

> Der Mensch ist in seinem Wesen Aktbewegung, eben weil er erst durch jeweilige Begrenzung zu seinem Wesen kommt. [10]

> A human being is essentially Aktbewegung, precisely because he / she only reaches his / her essence through such a restriction.[11]

And another one:

> Die Welt ist die Weltlichkeit des Menschen. Und der Mensch ist seine Weltlichkeit.[12]

> The world is the worldiness of the human being. And the human being is its worldiness.[13]

This oracle requires an explanation. Can one perhaps simplify these two sentences, via substitution, by saying: 'The world is the human being of human being' ("Die Welt ist der Mensch des Menschen")? Or is it rather 'The world is the worldiness of its worldiness' ("Die Welt ist die Weltlichkeit seiner Weltlichkeit")?

And yet one more:

> Der Mensch ist so gut Nichtich, als ich.[14]

> A human being is both not-I and I.

The collection of quotations that I recently read contains many hard sentences. The above is a picking of the worst cases. Fortunately, the book also contains many intelligible quotations. Regrettably, more than a few of these intelligible ones have lost in content what they have gained in clarity.

For example:

> Mensch ist Mensch.[15]

> Human being is human being.[16]

And again, with some stress added:

> Mensch ist Mensch. Nichts weiter![17]

> Human being is human being. Nothing more!

Did the author – Max Frisch – lament the fact that a human being cannot be, for example, an ass? Or did he, on the contrary, regret that a human being may also be an ass? Or is it simply a statement of fact: a human being is nothing more than a human being, and he or she certainly cannot also be an ass? One does wonder.

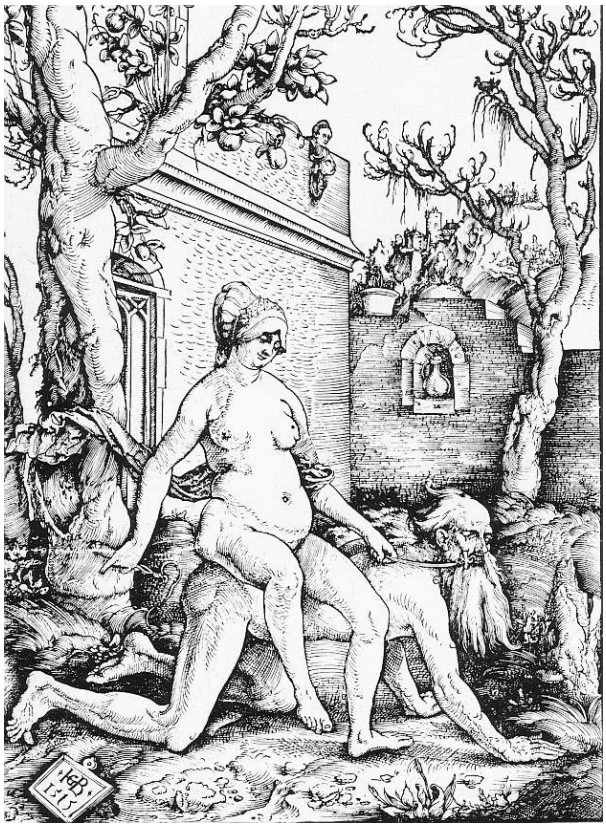

Figure 1: Hans Baldung Grien, *Aristotle and Phyllis* (1515, Germanisches Nationalmuseum)[18]

3 Discussion

The Dutch essayist Karel van het Reve wrote:

> There are libraries and universities full of sociology and social psychology but they have, I believe, until today yielded nothing more than paper and sound. Can someone give me a sociological statement that is not *either* a truism wrapped in pompous haziness *or* nonsense. If ever a sociologist discovered something of interest how can it be that I have turned fifty without ever having noticed it? There should have been something in the newspapers now and then?[19]

Van het Reve used the words 'truism' and 'nonsense'. He might equally have used the term 'fashionable nonsense'[20] or the somewhat rudely direct expression 'bullshit'.[21] The Polish-British sociologist Stanislav Andreski likewise criticised pretentious and nebulous verbosity in the social sciences.[22] Even though the above quoted authors were not social scientists the argument remains the same: why wrap something that can be said in simple words in pretentious and nebulous terms? This looks like a rhetorical question to which the answer is: 'Everything that can be put into words can be put clearly.'[23]

4 Conclusion

Is it possible that the ideas thus wrapped in nebulous and often pompous phrases are not unfathomably deep ones but rather banally shallow ones?[24]
Karel van het Reve wrote:

> If you really have something to say, if you really did discover something, then the discovery presents itself the more strikingly the shorter, the more understandable, the simpler you formulate it. If, however, you do not have something to say, if you really did not discover something, if you only say the totally obvious, then simplicity acts damagingly: in all his poverty the author stands before us. And then you automatically get the attempts to dress up, to wrap in, to use a special vocabulary [...]. [...] Only if you back-translate the words it appears that the message consisted of nothing or, at the most, of very little. You do not understand why it had to be said so drudgingly and in such detail, and, besides, you do not understand why it had to be said *at all*, and you do not understand to the resolution of which problem these detailed and drudgy disquisitions should contribute.[25]

Van het Reve wrote these lines in his ironic attack of 'literary studies' but they equally apply to the humanities in general and to the social sciences.[26] Could it be that the authors of the singled out quotations had actually nothing or little to say but what little they did say they dressed in pseudoprofound verbosity in order to make their statements look deep, weighty, and serious?[27] Yes, it suspiciously looks like that. The selected quotations can indeed be categorized either as truisms wrapped in pompous haziness, as empty tautologies or as blatant nonsense.
Is this nebulosity typical of German intellectual life? I do now let loose my opinion, hold it no longer. No, of course; not only Germans are prone to nebulosity.[28] Yes; a relatively high percentage of German academics write and speak nebulous prose.[29] Is it perhaps a peculiarity of the German language that predisposes it to this nebulosity?[30] Possibly. But that is another question for another day.

Notes and References

[1] Winston Churchill, *My Early Life*. New York: Simon & Schuster, 2010 [1930], p. 116: It is a good thing for an uneducated man to read books of quotations.
[2] Oswald Wiener, *Die Verbesserung von Mitteleuropa, Roman*. Reinbek bei Hamburg: Rowohlt, 1969. p. XIII (redewendungen, phrasen):

> [...], populationen leben den stil der zitate derer sie mächtig sind.
> ([...] populations are living the style of quotations that they can handle.)

[3] Andreas Mäckler & Christiane Schäfers (eds.), *Was ist der Mensch... ? – 1111 Zitate geben 1111 Antworten*. Köln: DuMont Buchverlag, 1989.
[4] And there is another thing. The editors of this collection seem to be either singularly ignorant or, far worse, deliberately misleading their readers. Three examples will suffice.

1. quote 609, on page page 111, reads: "Der Mensch ist eindeutig gut, seinem Nächsten wohlgesinnt, aber die Einrichtung des privaten Eigentums hat seine Natur verdorben." ('Man is wholly good and is well-disposed to his neighbour; but the institution of private property has corrupted his nature.') (Sigmund Freud, 'Das Unbehagen in der Kultur', *Studienausgabe*. Bd. IX, Frankfurt am Main: Fischer Verlag, 1974, p. 241) The complete passage, however, reads: "Die Kommunisten glauben den Weg zur Erlösung vom Übel gefunden zu haben. Der Mensch ist eindeutig gut, seinem Nächsten wohlgesinnt, aber die Einrichtung des privaten Eigentums hat seine Natur verdorben. [...] Wenn man das Privateigentum aufhebt, alle Güter gemeinsam macht und alle Menschen an deren Genuss teilnehmen lässt, werden Übelwollen und Feindseligkeit unter den Menschen verschwinden. [...] Ich habe nicht mit der wirtschaftlichen Kritik des kommunistischen Systems zu tun, ich kann nicht untersuchen, ob die Abschaffung des privaten Eigentums zweckdienlich und vorteilhaft ist. Aber seine psychologische Voraussetzung vermag ich als haltlose Illusion zu erkennen." ('The communists believe that they have found the path to deliverance from our evils. According to them, man is wholly good and is well-disposed to his neighbour; but the institution of private property has corrupted his nature. [...] If private property were abolished, all wealth held in common, and everyone allowed to share in the enjoyment of it, ill-will and hostility would disappear among men. [...] I have no concern with any economic criticisms of the communist system; I cannot inquire into whether the abolition of private property is expedient or advantageous. But I am able to recognize that the psychological premisses on which the system is based are an untenable illusion.' Sigmund Freud, Civilization and Its Discontent [1930]. [Translated by James Strachey], New York: W.W. Norton, 1961, pp. 59–60).
2. quote 873, on page 149, reads: "Der Mensch ist gut, sein Wesen rational, und alle seine Leiden sind hygienisch und sozial bekämpfbar ..." ('Man is good, his being rational, and all his sufferings are surmountable by hygienic and social measures ...') (Gottfried Benn, *Provoziertes Leben* (*Eine Auswahl aus den Prosaschriften*). Darmstadt: Ullstein Verlag, 1962, p. 84). The complete passage, however, reads: "Der Mensch ist gut, sein Wesen rational, und alle seine Leiden sind hygienisch und sozial bekämpfbar, dies einerseits, und andererseits die Schöpfung sei der Wissenschaft zugänglich, aus diesen beiden Ideen kam die Auflösung aller alten Bindungen, die Zerstörung der Substanz, die Nivellierung aller Werte, aus ihnen die innere Lage, die jene Atmosphäre schuf, in der wir alle lebten, von der wir alle bis zur Bitterkeit und bis zur Neige tranken: Nihilismus." (Gottfried Benn, 'Nach dem Nihilismus' [1932], *Sämtliche Werke*. Bd. III, Stuttgart: Klett-Cotta Verlag, 1987, p. 398) ('For one thing, man is good, his being rational, and all his sufferings are surmountable by hygienic and social measures. For another thing, creation is open to scientific scrutiny. From these two ideas came forth the resolution of all old bonds, the destruction of all essential

meaning, the leveling of all values, from them the inner condition which created that atmosphere in which we all lived, and from which we all drank till the bitterness and the dregs: nihilism.')

3. quote 524, on page 100, reads: "Der Mensch ist für den Staat, nicht der Staat für den Menschen geschaffen." ('Man is made for the state and not the state for man.') (Martin Luther King, Jr., *Kraft zum Lieben*. [Translated by Hans-Georg Noack], Konstanz: Friedrich Bahn Verlag, 1964, p. 152) The chapter, from which this sentence was lifted, discusses the flaws of communism as 'Christianity's most formidable rival'. The gist of the original passage becomes immediately unambiguous when we read: 'Let me state clearly the basic premise of this sermon: Communism and Christianity are fundamentally incompatible. A true Christian cannot be a true Communist, for the two philosophies are antithetical and all the dialectics of the logicians cannot reconcile them. Why is this true? [...] Third, Communism attributes ultimate value to the state. Man is made for the state and not the state for man. One may object, saying that in Communist theory the state is an "interim reality," which will "wither away" when the classless society emerges. True – in theory; but it is also true that, while it lasts, the state is the end. Man is a means to that end. Man has no inalienable rights. His only rights are derived from, and conferred by, the state. Under such a system, the fountain of freedom runs dry. Restricted are man's liberties of press and assembly, his freedom to vote, and his freedom to listen and to read. Art, religion, education, music, and science come under the gripping yoke of government control. Man must be a dutiful servant to the omnipotent state.' (Martin Luther King, Jr. *Strength to Love*. Minneapolis: Augsburg Fortress, 2010 [1964], pp. 100–102.)

In all three cases the intentions of the authors, Freud, Benn, and King, have been completely turned around. Paraphrasing Oscar Wilde – a favorite of quotation books – one might remark: 'Fundamentally misquoting one author may be regarded as a mistake... fundamentally misquoting three authors seems like carelessness.'

[5] Mäckler & Schäfers, 1989, p. 70, quote 339. Martin Heidegger, *Holzwege*. 3. Aufl., Frankfurt am Main: Vittorio Klostermann Verlag, 1957 [1950], p. 273. Karl Popper said: 'One has to read Heidegger in the original to see what a swindler he was.' Nevertheless, there are many academics in Germany and, even more surprisingly, also in other countries, who enthusiastically interpret and fanatically defend Heidegger's words. As Heinrich Heine wrote: 'That is beautiful with us Germans – no one is so crazy but that he may find someone crazier who will understand him.' ("Das ist schön bey uns Deutschen; Keiner ist so verrückt, daß er nicht einen noch Verrückteren fände, der ihn versteht." *Die Harzreise*)

[6] Martin Heidegger, *Off the Beaten Track*. (Edited and translated by Julian Young and Kenneth Haynes), Cambridge: Cambridge University Press, 2002, p. 222.

[7] The pitfalls of translation are many. In this first quote I give two translations: the old-fashioned 'man' and the politically more correct, nonsexist 'human being'. In the other quotes I will confine myself to the gender-neutral version.

[8] The translation of the original German title *Holzwege* into *Off the Beaten Track* is misleading. The English title should have been *Down the Garden Path*.

[9] Martin Heidegger, *Contributions to Philosophy (From Enowing)*. (Translated by Parvis Emad and Kenneth Maly), Bloomington: Indiana University Press, 1999, p. 307. Martin Heidegger, *Beiträge zur Philosophie (Vom Ereignis)* (1936–1938). (Gesamtausgabe Bd. 65), Frankfurt am Main: Klostermann, 2003, p. 435:

> Das Sichverständlichmachen ist der Selbstmord der Philosophie.

A little over a hundred years before Heidegger another German philosopher became notorious for his 'Hegeleien'. According to Arthur Schopenhauer this consisted of 'empty, hollow, moreover, disgusting verbiage' ("leerer, hohler, dazu ekelhafter Wortkram").

[10] Mäckler & Schäfers, 1989, p. 82, quote 411. Dietrich Bonhoeffer, *Gesammelte Schriften*. Bd. III (Hrsg. Eberhard Bethge), München: Christian Kaiser Verlag, 1960, p. 64.

[11] I have no idea how to translate 'Aktbewegung' into intelligible and meaningful English. The noun 'Aktbewegung', a compound consisting of 'Akt' (act) and 'Bewegung' (movement), seems to me a pleonasm. Maybe this word belongs to the more untranslatable German terms like 'Bierernst', 'Doppelgänger', 'Kitsch' and 'Angst'. To deepen my confusion, I am not even sure I know what an 'Aktbewegung' is. Google gives only a handful of hits. The word seems to have been coined by Max Scheler, who, unfortunately, appears to have forgotten to provide its meaning as well. (Max Scheler, *Vom Ewigen im Menschen*. Bd. I [Religiöse Erneuerung], Leipzig: Der Neue Geist-Verlag, 1921, pp. 551-552):

> Wie nun, wenn Gott eben seinem Wesen nach erst in diesen Akten und nur durch sie gegeben wäre und gleichzeitig in einem unzerreißbaren Grunderlebnis auch als die wirksame Ursache des Vollzugs dieser Aktbewegung selbst?
> What if God, according to his essence, were given only in and only through these acts and simultaneously in an unbreakable fundamental experience also as the effective cause of the performance of this Aktbewegung itself?

[12] Mäckler & Schäfers, 1989, p. 94, quote 496. Helmut Thielicke, *Theologische Ethik*. Bd. I (Prinzipienlehre), Tübingen: Verlag J.C.B. Mohr (Paul Siebeck), 1958, p. 706 (2158).

[13] I chose the awkward term 'worldiness' over the more usual translations 'worldliness' and 'worldness' (Elmar Waibl and Philip Herdina, *German Dictionary of Philosophical Terms: English-German*. Munich: K.G. Sauer / London: Routledge, 1997, p. 432). Admittedly, all translations are problematic as, of course, is the original German term 'Weltlichkeit'. 'Unusable through ambiguity', as Kingsley Amis put it.

[14] Mäckler & Schäfers, 1989, p. 99, quote 517. Novalis, *Schriften*. Bd II, (ed. R. Samuel), Darmstadt: Wissenschaftliche Buchgesellschaft, 1965, p. 268.

[15] Mäckler & Schäfers, 1989, p.117, quote 658. Friedrich Schiller, *Kabale und Liebe*, Act I, Scene 1, *Schillers Werke – Nationalausgabe*. Bd. V, (eds. J. Petersen/H. Schneider), Weimar: Hermann Böhlaus Nachf., 1957, p. 6.

[16] This seems to be a logically true statement. And so, one might add, is 'Potato is potato.' Except that one may pronounce the noun in different ways. (George Gershwin and Ira Gershwin *Let's Call the Whole Thing Off*, 1937. Conversely, the first and the third word in the 1985 song title *Live is Life* by the Austrian band Opus are written differently but pronounced identically.)

[17] Mäckler & Schäfers, 1989, p. 118, quote 659. Max Frisch, *Tagebuch 1946–1949*. Frankfurt am Main: Suhrkamp Verlag, 1950, p. 82.

[18] "Aristotle and Phyllis" by Hans Baldung – http://www.ibiblio.org/wm/paint/auth/baldung/. Licensed under Public Domain via Wikimedia Commons – https://commons.wikimedia.org/

wiki/File:Aristotle_and_Phyllis.jpg#/media/File:Aristotle_and_Phyllis.jpg

[19] Karel van het Reve, *Lenin heeft echt bestaan*. Amsterdam: G. A. van Oorschot, 1972, p. 61:

> Er zijn bibliotheken en universiteiten vol sociologie en sociale psychologie, maar zij hebben geloof ik tot nu toe niet veel meer opgeleverd dan papier en geluid. Kan iemand mij een sociologische bewering noemen die niet óf een in hoogdravende onduidelijkheid verpakte *Binsenwahrheit* óf onzin is? Als ooit een socioloog iets interessants ontdekt heeft, hoe kan het dan dat ik vijftig jaar geworden ben zonder daar ooit iets van gemerkt te hebben? Er zou toch af en toe iets van in de krant gestaan hebben?

[20] Alan Sokal and Jean Bricmont, *Fashionable Nonsense: Postmodern Intellectuals' Abuse of Science*. New York: Picador, 1998. Ophelia Benson and Jeremy Stangroom, *The Dictionary of Fashionable Nonsense: A Guide for Edgy People*. London: Souvenir Press, 2006.

[21] Harry G. Frankfurt: *On Bullshit*. Princeton (NJ): Princeton University Press, 2005 [1986].

[22] Stanislav Andreski, *Social Sciences as Sorcery*. London: Andre Deutsch, 1972.

[23] Ludwig Wittgenstein, *Tractatus Logico-Philosophicus* 4.116: "Alles was sich aussprechen läßt, läßt sich klar aussprechen."

[24] The term free-floating intelligence ("freischwebende Intelligenz") acquires a new meaning here.

[25] Karel van het Reve, *Literatuurwetenschap: het raadsel der onleesbaarheid* [*Literary Studies: The Enigma of Unreadability*]. Baarn: Het Wereldvenster, 1979, pp. 22–23; also published in *Een dag uit het leven van de reuzenkoeskoes* [*A Day in the Life of the Giant Cuscus*]. Amsterdam: G. A. van Oorschot, 1979, pp. 128–155:

> Heeft men werkelijk iets te zeggen, heeft men werkelijk een ontdekking gedaan, dan treedt die ontdekking markanter naar voren naarmate men hem eenvoudiger, korter, begrijpelijker, simpeler formuleert. Heeft men echter niets te zeggen, heeft men eigenlijk niets ontdekt, doet men eigenlijk niets meer dan open deuren intrappen, dan werkt eenvoud juist schadelijk: in al zijn armoede staat de auteur dan voor ons. En dan krijg je vanzelf die pogingen tot aankleden, het gebruik van een speciaal vocabulair [...]. [...] Pas als je die woorden terugvertaalt, blijkt het medegedeelde niets of heel weinig om de hakken te hebben. Je begrijpt niet waarom het allemaal zo geestdodend en uitvoerig gezegd moet worden, en je begrijpt trouwens al helemaal niet waarom het *überhaupt* gezegd moet worden, tot de oplossing van welk probleem die uitvoerige en geestdodende uiteenzettingen bijdragen.

[26] Milan Kundera, *Identity*. (Translated by Linda Asher), London: Faber and Faber, 1998, p. 62:

> [...]; the sophisticated, empty chatter of the social sciences; [...].

[27] Harald Martenstein, *Die neuen Leiden des alten M. – Unartige Beobachtungen zum deutschen Alltag*. München: C. Bertelsmann, 2014, pp. 9-10:

> Die Leute wollen unterhalten werden, oder berührt. Wenn Sie Unterhaltung nicht hinbekommen, können Sie es als Autor mit tiefen Gedanken probieren, gehen Sie halt auf die intellektuelle Schiene. Und wenn Sie auch das nicht hinkriegen, dann tun Sie so, als ob. Werden Sie dunkel, raunen Sie, weichen Sie aus ins Ungefähre. Oft funktioniert das. Wenn die Leute etwas nicht verstehen, dann werden zumindest einige von ihnen denken, es sei groß, was, wie wir beide wissen, nur selten tatsächlich der Fall ist. (People want to be entertained or touched. If you cannot accomplish entertainment then you as author might try it with deep thoughts. And if you cannot accomplish that either then you do as if. Do become obscure, do murmur, do dodge into vagueness. Oftentimes this works. When people do not understand something, then at least some of them will think that it is great, which, as we both know, is seldom the case.)

[28] For example, some of the more recent French philosophers are also not paragons of readability or 'clarté et distinction'.

[29] Comparing quotation dictionaries in other languages one certainly gets the impression that in English, French, Italian, Spanish and Dutch dictionaries verbose and vague quotations are absent (English) or at least more rare (French). See, for instance:

- John Bartlett and Emily Morison Beck, *Bartlett's Familiar Quotations*. Boston: Little, Brown and Co., 1968.
- Elizabeth Knowles, *The Oxford Dictionary of Modern Quotations*. Oxford: Oxford University Press, 2002.
- Pierre Oster, *Dictionnaire de citations françaises*. Paris: Le Robert, 2006.
- Franca Rosti, *Tra virgolette – Dizionario di citazioni*. Bologna: Zanichelli, 1996.
- Wenceslao Castañares and José Luis González Quirós, *Diccionario de citas*. Madrid: Noesis, 1999.
- Gerd De Ley, *Het grootste citatenboek ter wereld*. Houten: TerraLannoo, 2014.

[30] Milan Kundera, *Immortality*. (Translated by Peter Kussi), London: Faber and Faber, 1991 [1988], p.150:

> 'German lacks a tradition of reason and clarity, it's full of metaphysical mist and Wagnerian music, [...].'

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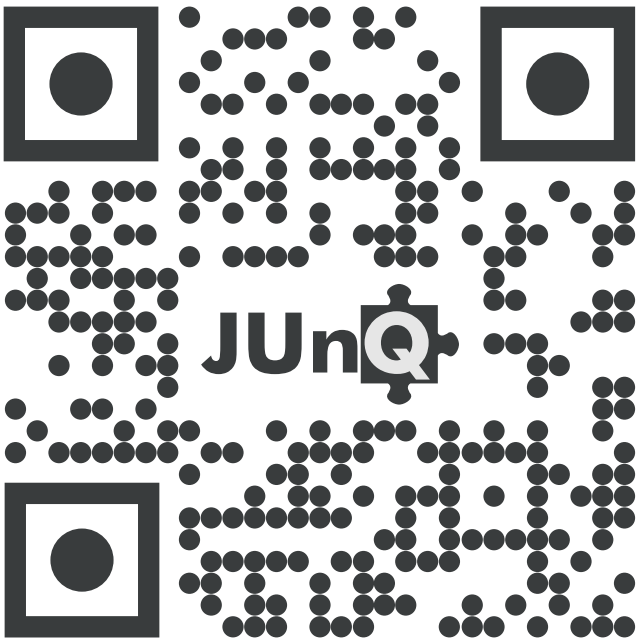

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