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Impact Factors, Open Access, and 125 Years of *Angewandte Chemie*

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First, the good news: next year, *Angewandte Chemie* will reach its 125th anniversary. For this occasion, the Gesellschaft Deutscher Chemiker (German Chemical Society, GDCh), the journal owners, together with its publishers Wiley-VCH, are holding an Anniversary Symposium in Berlin on Tuesday March 12, 2013. Presentations will be given by eleven renowned speakers, including three Nobel Prize laureates (see Table 1 and the advertisement in this issue; further information can be found on the website http://angewandte.org/symposium). Directly after the Symposium there will be a buffet reception, to which all participants are invited. The lecture hall accommodates more than 1000 attendees, and we are very much looking forward to a great celebration.

The 125th volume of *Angewandte Chemie* will begin with an issue featuring contributions from over a dozen Chemistry Nobel Prize laureates and many of the current and past members of the Editorial and International Advisory Boards. On top of this, another highlight will follow with issue 10/2013, which will include the program of the Anniversary Symposium and contributions from the speakers. The editorial team will put every effort into making this anniversary year another milestone in the history of *Angewandte Chemie*, not least through publishing the best and most interesting of the more than 10000 Communications that are anticipated to be submitted in 2013.

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10000 Communications in 2013! How did we get there? In 2010, only 7419 papers were submitted, and in 2000, there were just 1861. The reasons behind this stunning development are manifold. One is the increasing productivity in science, and another is the rapid rise of Asian countries, particularly China, over the last decade. Further reasons are the expansion of the profile of chemistry, which today covers parts of materials and life sciences, and the increasing relevance of interdisciplinary research. Much research today is a collaboration between chemists and, for example, biologists and/or physicists. The spectrum of articles published in *Angewandte Chemie* is, consequently, broader than ever. On top of all this, the steep increase in the Impact Factor of the journal is also a cause of the enormous increase in manuscript submissions to *Angewandte Chemie*. However, the importance attributed to the Impact Factor today is quite absurd. At the end of the eighties, I first heard of this factor; in the nineties, it emerged now and again in discussions; only over the last decade did it then adopt such a prominence for science politicians, funding agencies, publishers, and scientists that it strongly influences their actions and defines publishing behavior today. This is terrible! The Impact Factor mania encourages scientists to submit as many articles as possible to journals with as high an Impact Factor as possible. The Viennese writer and critic Karl Kraus wrote of academic "experts" about 100 years ago, that they "can live in the belief that the aim of carpentry is the production of wood shavings". Today, it appears that many live in the belief that science is all about the production of citations. To base the quality of a manuscript on the Impact Factor of the journal it is published in is nonsense! I will allow myself to state that *Angewandte Chemie* publishes much good work; good work, however, also appears in journals with lower Impact Factors. And the manuscripts published with us are not good because of the Impact Factor, rather because authors submit many excellent articles in the first place, and then they are evaluated critically by the editors and the referees and further improved in the editing process.

If the quality of a single article has no relationship with the journal Impact Factor, how then can entire journals be assessed? Here, caution is also needed:

Table 1: Speakers at the *Angewandte Chemie* Anniversary Symposium in Berlin on March 12th.

Carolyn R. Bertozzi	University of California, Berkeley
François Diederich	ETH Zürich
Alois Fürstner	Max-Planck-Institut für Kohlenforschung, Mülheim
Roald Hoffmann	Cornell University
Susumu Kitagawa	Kyoto University
Jean-Marie Lehn	Institut de Science et d'Ingenierie Supramoleculaires, Strasbourg
E. W. "Bert" Meijer	Eindhoven University of Technology
Frank Schirrmacher	Frankfurter Allgemeine Zeitung
Robert Schlögl	Fritz-Haber-Institut der Max-Planck-Gesellschaft, Berlin
George M. Whitesides	Harvard University
Ahmed Zewail	California Institute of Technology, Pasadena

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what does "impact" actually mean? Does one number suffice to characterize a journal, knowing how multifaceted the journal landscape is, ranging from pure Letter to pure Review journals, with all the hybrids in between, or from quarterly issued journals to weekly published magazines? Then there are the many subdisciplinary journals, which can serve large subjects or niche activities. For the "top" general chemistry journals, a multidimensional presentation that couples the Impact Factor and article and citation numbers is presented in Figure 1. Notably, only a small time period is considered for calculating Impact Factors: for the 2011 Impact Factor of a journal, only the literature citations from 2011 are considered for contributions published in 2009 and 2010. For specific contributions that have had and still have a known "impact", the first two or three years after publication are, in terms of the number of citations, occasionally not so impressive. In Figure 2, this is demonstrated for the first publications on click chemistry.

"Cultures are in their nature not comparable", wrote the French anthropologist Claude Lévi-Strauss in his writings on Japan. This maxim is as applicable to whole nations as to cultures and disciplines within science: cultures in biology, chemistry, and physics are as incomparable as those within chemistry; for example, in solid-state inorganic chemistry and total synthesis. Similarly, publications in different fields cannot be compared by using numbers such as the Impact Factor of the journals in which they are published. Ideally, one should ignore the Impact Factor; those who use this factor often and indiscriminately could be said to have a high Ignorance Factor.

Speaking of literature citations: these also are part of discussions on open access, as, according to campaigners, open-access publications will be cited more than articles in traditional journals. The results of "research" on this topic certainly give no conclusive evidence, and one shouldn't forget (see above) that the quality of an article cannot be one-dimensionally based on the number of citations. Open access means that readers have cost-free access to scientific publications; this sounds wonderful, for publishers and editors included, who do not wish anything more than for a large readership of their published contributions. These carefully chosen terms camouflage, however, the

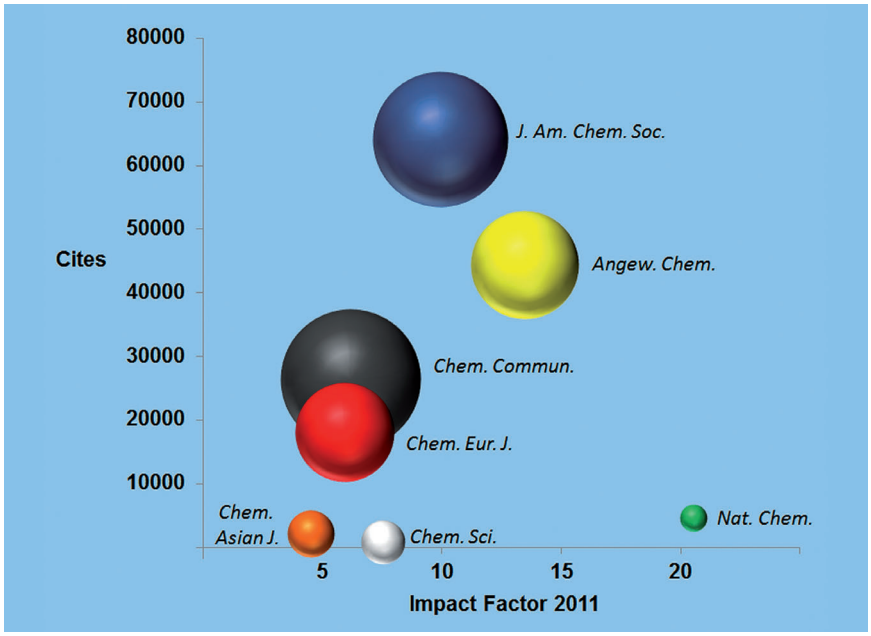

Figure 1. How often articles published in various general chemistry journals in 2009 and 2010 were cited in the entire Literature in 2011 is plotted against the Impact Factor 2011; the number of contributions published in these journals in 2011 is shown as a third dimension (sphere size). "Impact" is relative.

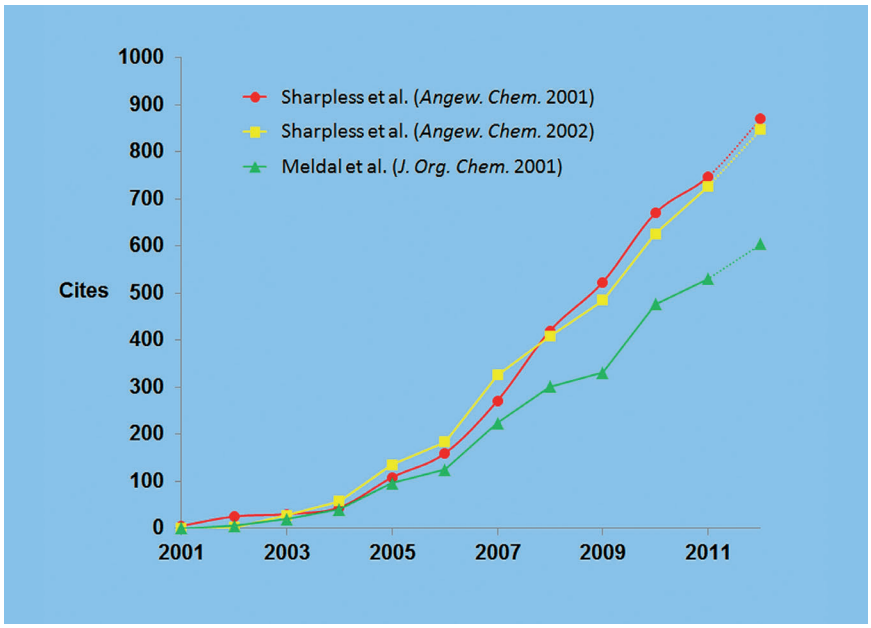

Figure 2. The first click chemistry article: no impact for the Impact Factor. The Review published in 2001 from H. C. Kolb, M. G. Finn, and K. B. Sharpless, "Click Chemistry: Diverse Chemical Function from a Few Good Reactions" (*Angew. Chem.* **2001**, *113*, 2056; *Angew. Chem. Int. Ed.* **2002**, *41*, 2004), in which the visionary concept of click chemistry was presented, received a mixed reaction and was cited only modestly in the beginning. In 2002, K. B. Sharpless et al. and M. Meldal et al. described experimental results of the copper-catalyzed cycloaddition of azides to alkynes in a Communication in *Angewandte Chemie* (*Angew. Chem.* **2002**, *114*, 2708; *Angew. Chem. Int. Ed.* **2002**, *41*, 2596) and a Full Paper in the *Journal of Organic Chemistry* (*J. Org. Chem.* **2002**, *67*, 3057), which were also little cited in the following two years. The further development, however, leaves no doubt as to the "impact" of these works.

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costs of scientific publishing. Indeed, while the reader, or in general institutions or libraries, no longer have to pay, instead the author of the publication does, and one assumes that this would be covered by the author's institution or funding agencies. In this "business model", more money is earned the more articles are published, and the consequences are clear and can be observed first-hand for the journal PLoS ONE: in the first half of this year, 10394 articles were published (however, almost none were genuinely chemistry articles). In the peer review process for the journal, PLOS ONE publishes "*all papers that are judged to be technically sound*". The world of open access journals—according to the Directory of Open Access Journals there are currently well over 8000 of them, to which three or four are added daily—is multifaceted. Apart from the rare exception where open access journals are published by trusts, it is generally the authors who pay. Cue the dispute: who pays how much in publications from more than one research group or if more than one funding agency is supporting a project? How can an author finance a publication if no third-party funding is provided or there is none left? Will the freed-up library budgets be made available to authors, and if so, who decides how much individual research groups of an institution will receive? These are just a few practical questions that arise if one steps down from the idealistic, political perspective and into the day-to-day activities at universities and other research institutions. In earlier Editorials I have pointed to more fundamental problems of the author-pays publication mode (see *Angew. Chem. Int. Ed.* **2005**, *44*, 4–7 and *Angew. Chem. Int. Ed.* **2010**, *49*, 4–6) Despite many political statements and the high number of open access journals, only a small portion of manuscripts in all of the sciences are published in the open access mode. For many good reasons, chemists have been particularly reserved towards adopting open access as a publication model. In case authors of *Angewandte Chemie* wish, or should they be compelled, to make their manuscript available freely directly at the time of publication, the publisher offers this service under the term OnlineOpen. This was used for 0.4 % of published Communications in the first half of 2012; this statistic is similar for ACS and RSC journals that offer a similar service under different names. The reason for this reluctance among scientists to enter this brave new world could lie in the fact that it was never so easy before to have access to so much information. To improve quality filters or at least to keep them in operation—this is the problem of our time, not access to information. In agreement with the constitution of the GDCh, we at *Angewandte Chemie* and its publisher Wiley-VCH will do everything to make qualitatively high-value contributions as widely available as possible, and this in our anniversary year 2013 more than ever!

Peter Gölitz

P.S. Last but not least: Since the middle of August, there has been an *Angewandte Chemie* App, which allows for seamless browsing of contributions published in EarlyView or in the current issues (with free access to full text articles during the test phase). Please do try this yourself if you have an iPad! Should this have positive resonance, the publishing house will certainly further the application so that journals other than *Angewandte Chemie* can also be read and on other mobile devices.

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