A great question

Who is the greatest chemist of all time?

These eight simple words pose a question that is far from simple to answer. The first obvious problem is with the concept of 'greatness' — how should this be defined and measured? After all, greatness doesn't come with a handy SI unit. Continuing to analyse the question further, would everyone agree with exactly what is meant by the term 'chemist'? There are some prominent historical figures that both chemists and physicists would claim as their own — and the boundaries between disciplines are perhaps more blurred today than they have been since the days when scientists of any stripe were called 'natural philosophers'.

Another complication is a fundamental (and unavoidable) one associated with all questions and polls of this type — the influence of time. Consider the world of sport for example — when a team or an individual becomes very successful, comparisons are often made with so-called 'greats' of a bygone era. But in the same way as it would be impossible for the Manchester United teams of 1968 and 1999 to play one another to inform a fair comparison[1], how do we judge the relative merits of the contributions that Wöhler and Woodward made to chemistry?

The technical challenges involved in the syntheses of urea and vitamin B12 are poles apart, but each of these achievements were incredibly significant landmarks in their own time. And as difficult as it is to try and judge the 'greatness' of two milestones in the history of chemical synthesis, the comparison is much harder when trying to evaluate contributions in very different areas of chemistry. For example, how can the synthetic work of Grignard be compared meaningfully with the conceptual developments of Lewis? To continue the sporting analogy, we're now faced with evaluating just how the achievements of Manchester United measure up to those of the Yankees — it's still sport, but a whole different ball game.

In spite of these problems, there is undoubtedly some value in asking (and responding to) questions of this kind. Yes, the answers will be subjective, but it's the debate surrounding the answers — and indeed the question itself — that often prove more interesting than the final results or ranking. We asked the greatest-chemist question on our journal's Twitter feed[2] back in early January and gave a comprehensive round-up of the responses we received on the Sceptical Chymist blog[3]. We received a total of 86 votes, with 36 different names put forward as the greatest — Linus Pauling came out on top with 16 votes.

To our surprise, there were some truly great chemists missing from the list. No Gibbs, no Dalton and no Priestley. One omission in particular, that of the only person to be awarded two Nobel Prizes in Chemistry, sparked some debate in the blogosphere at the Curious Wavefunction[4] and Second Messenger[5]. Was Sanger's name missing because chemists tend to focus on fundamental topics such as structure and bonding rather than more applied aspects? And, as discussed at There (& Hopefully) Back Again[6], should our evaluations of the 'greatness' of a scientist change when we consider not just their momentous achievements, but also their more nefarious (Haber) and/or eccentric (Pauling) pursuits? The greatest-chemist debate continued on a number of other blogs including ChemBark[7], and ScienceGeist[8] and we encourage you to read them and their comment threads to get a feeling for what others think.

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The main point of asking the question was not to uncover a definitive answer as to who the greatest chemist of all time is, but to see if any consensus did emerge and how many different suggestions were put forward. Whereas in physics it is hard to see past Einstein leading the way in this sort of exercise, we were curious as to whether a similar figure would emerge for chemistry. At the end of 1999, *Physics World* published a special millennium issue that included the results from a survey of 250 physicists asked about the past, present and future of their subject[9]. One of the questions was 'Which five physicists have made the most important contributions to physics?' Einstein received the most votes, with Newton and Maxwell trailing in second and third places, respectively, and a total of 61 others were nominated.

One would somewhat confidently predict Einstein to top the physics survey, but would any of us have picked Pauling to lead the chemistry one with the same certainty? The cat is out of the bag now, but it's also worth bearing in mind the subtle difference between asking 'Who is the greatest chemist?' and asking 'Who do you think would top a poll of greatest chemists?' Another difference is that Einstein and the photos of him with stereotypical 'mad-genius' hair have crossed into popular culture — and this is certainly not the case with Pauling.

Is the lack of a recognisable figurehead in chemistry a problem? If there was an Einstein-like figure we could point to, would this help to brighten up chemistry's somewhat tarnished public image? It might also serve our community better than generic images of men and women in lab coats and goggles standing in front of pretty-coloured liquids in strange-shaped glass vessels. There is no easy answer here, but perhaps a greater awareness of some of the inspirational chemists of the past would help spark the imagination of budding chemists out there today.

Our Twitter poll, as we suggested at the time, was somewhat arbitrary and unscientific — as is the question itself. Nonetheless, it is clear that, even from such a small data set, many different individuals are considered to be greatest chemist of all time. They can't all be the greatest, but that matters not — they are all great, and this reflects the strength and diversity of chemistry. ❐

References

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