



Welcome to the year of the periodic table

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Published online: 12 January 2019
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2019 was declared to be the International Year of the Periodic Table of the Elements by the General Assembly of the United Nations to commemorate the 150th anniversary of its first publication by Dmitry I. Mendeleev.

In my modest library of old science books, I happen to have several chemistry textbooks that pre-date 1869. Some of them are in Hungarian (of course), others are in French, which seems to have been the central language of the central science in the first half of the 19th century. There is one common feature of these books: all look positively weird. It takes some time until the reader realizes that it is the absence of the periodic table and its inherent logic which makes these texts highly unfamiliar to the modern eye.

For example, today it is obvious that elements must be listed in the order of their atomic numbers. Few chemists are aware of the fact that atomic numbers were only discovered (experimentally!) in the 1910s, well after Mendeleev's death. Originally, the order of elements was defined using atomic weights, which were sometimes known with considerable uncertainty at the time, and in our modern understanding, there are some cases when they even contradict the order of atomic numbers. Yet there still was some definite rationale in arranging the elements in a certain order.

Strong belief in this logic enabled Mendeleev to go much further than any of his contemporaries, this is why he deserves to be considered the unchallenged father of the periodic table [1, 2]. This logic made it possible to make predictions not only about the existence but also the properties of undiscovered elements. Many of these predictions were justified within two decades, which served as momentous proof of the underlying ideas. Interestingly, Mendeleev's success rate at his elemental predictions was not better than 50% [3], but this fact did not seem to harm his personal reputation or the eventual acceptance of the periodic table as the natural system of known elements.

A late and humble follower of Mendeleev, I try to teach chemistry emphasizing its logic. This is not an easy task at all as by now I came to the realization that most

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students do not believe science is logical. Even if they like science, they think it must be learned very much like a poem.

What's more: my unnerving observation is that many of my fellow chemistry researchers do not believe in logic, either. They believe in tradition, sometimes even in seriously illogical scientific dogma because it was written by a reputable scientist. They believe in X-ray crystal structures as the only reliable source of chemical information and they believe the only task worthy of the attention of a chemist is to prepare new materials.

So I am asking the reader: let's use the opportunity given by the International Year of the Periodic Table of the Elements to spread the word that chemistry is useful for society. And also let's bring logic back to chemistry.

Gábor Lente
Editor-in-Chief



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