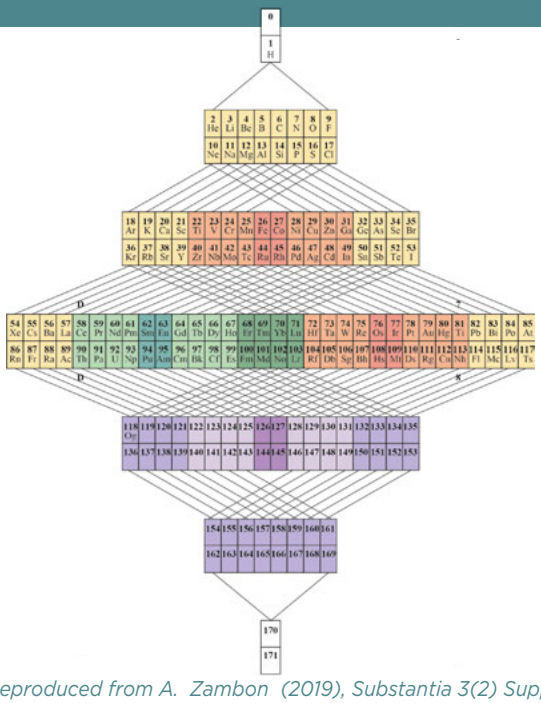
The Period System, a history of shaping and sharing

reviewed by Brigitte Van Tiggelen and Annette Lykknes

The International Year of the Periodic Table of the Chemical Elements (IYPT) has witnessed an increase in publications on a topic that was already popular in the literature. As expected, the history of its development, and the discussion about its representation, were the most frequent aspects covered in these publications. To many observers, the fact that 150 years after the Periodic System (PS) proposed by Dmitri Mendeleev and Lothar Meyer is still in use is a testimony to its intrinsic validity. However, the concept of the system as well as of other constitutive notions such as element atom, or matter, have all evolved over a century and a half, and the PS now in use is the result of a continuous reworking in symbiosis with these developments to keep performing as the universal tool it has become. The special issue of *Substantia:* **"The Periodic System, a history of shaping and sharing"** (full online open access) with its introduction https://riviste.fupress.net/index.php/subs/article/view/737/332) edited by Brigitte Van Tiggelen, Annette Lykknes, and Luis Moreno Martinez focuses on that process of reworking which explains several features in the history of the PS that are generally unknown, ignored and under-investigated.

One of these features is the teaching context which was central for the making AND the sharing of the new system of classification. Both Mendeleev and Meyer produced their ordering of chemical elements while they were writing a textbook, and whereas this is often acknowledged, how the new system permeates from their work into the classroom where it is so ubiquitous now, is another question that is usually left aside. It might thus come as a surprise to many contemporary chemists that the introduction of the periodic tables in textbooks and even more their implementation in chemical education only really took off after the beginning of the 20th century. In the special issue these aspects pertaining to the early development of the PS in the pedagogical context are covered by three contributions: one dedicated to the often forgotten work of Lothar Mayer (by Gisela Boeck), another on the early responses in the Portuguese community (by Isabel Malaquias and João A. B. P. Oliveira) and a third one on a precious wall chart acquired in 1888 at St Andrews, UK (by Alan Aitken and M. Pilar Gil). To complement this perspective, two other contributions analyze the way the history of the PS is presented in textbooks in Spain and Norway (by Luis Moreno Martinez and Annette Lykknes) and Ethiopia (by Gebrekidan Mebrahtu Tesfamariam and Mengesha Ayene). They analyze how these occurrences shape not only the central place of the PS in the teaching but also conveys something about the way chemistry developed.



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The other feature scrutinized in this issue, which is deeply connected with pedagogy, is the plasticity of the PS. The term plasticity refers to the quality of the PS to constantly undergo reform in tune with new understanding of matter and its constitution, but also to be repurposed and adjusted to different needs and level of readings and use. One contribution describes the limited success at standardization by IUPAC (by Ann Robinson). Two other contributions stress new approaches that might help reintroduce chemistry where explanation are usually made in quantum mechanical—and relativistic terms—periodicity trees for secondary school education (by Alfio Zambon) and the computerized reconstruction of groupings of elements by analysis of chemical knowledge in 1869 and now (by Guillermo Restrepo).

All this explains why the discussion on the "best" representation of the PS into a tabular format will probably remain vivid for a long time, and to some extent is an intrinsic part of the process that leads the PS. If indeed the endurance of the Periodic System is due to its ability to be reshaped over time then there is no such thing as the final version, and this is good news for this scientific icon that is will probably stay relevant for another century.

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