

PAN-SLAVISM AND THE PERIODIC SYSTEM OF THE ELEMENTS

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The Pan-Slavic (*panslavizam* or *sveslavenstvo*) and Pan-Germanic (*Pangermanismus* or *Alldeutsche Bewegung*) movements commenced after the end of Napoleonic wars in Europe, 1815 (1). On the one hand, these movements were a reaction to French and British imperialism, and on the other, they were a reflection of democratic processes, which were viewed at that time primarily as a striving for the self-determination of nations. But nationalism as a desire for self-determination of a nation gradually turned into unjustified national pride, then to antagonism towards other nations, and eventually to the political desire to enslave foreign nations both economically and politically (imperialism, colonialism). Similar things happened to the two movements; while their political outcomes were Nazism and Stalinism, from a cultural perspective they led to a very peculiar acceptance of the periodic system by Slavic nations.

The Slavs were afraid of the Germans, and the Germans despised the Slavs (2). For Germans, the term, “Slav,” is derived from the word *Sklave* (slave), in contrast to the Slavs, who connect their name, erroneously, with the word *slava* (glory); “Slav” originated from *slavo* (word), meaning that Slavs are people to whom you can speak, in contrast to the Germans (Russ. *Némec*, Serb. *Nemac*, Croat. *Nijemac*, etc.) with whom it is possible to communicate only as with inanimate beasts (e.g., Croat. *nijem* = mute, *njemak* = the mute). For Hitler, the Slavs were *Untermenschen*, like the Jews, and thus he did not even bother to learn the number of Soviet divisions before the attack on Russia in 1941. Closer to the topic of this paper, the German chemist Friedrich Wilhelm

Ostwald (1853-1932), born a subject of the Russian tsar, but of German parents, never learned Russian properly, and saw nothing but fairy tales in Russian history. “*Die mathematisch-naturwissenschaftlicher Fächer, deutsche Sprache und Literatur machten mir nicht die mindeste Sorge, Englisch und Französisch glaubte ich leidlich erledigen zu können, mit der Geschichte und dem Russischen sah es dagegen bedenklich aus,*” he wrote before his final exam in the gymnasium (3).



Figure 1. Central Europe at the time of the discovery of the periodic system of elements (from Atlas to the Historical Geography of Europe, 3rd ed., 1903)

The clashes between Germans and Slavs did not spare chemists in Russia. As a result of the growing tide of Pan-Slavic and Pan-Germanic movements, in the mid-

dle of the 19th century in Russia, there were pro-German (anti-Russian) and pro-Russian (anti-German) scientists. The tensions came to a head in 1881 when Friedrich Konrad Beilstein (1838-1906) was elected to the Russian Imperial Academy of Sciences after Dmitri Ivanovich Mendeleev (1834-1907) had been rejected. This election turned into an international scandal, because many scientific societies and eminent chemists backed Mendeleev as a better candidate (4-6). The scandal was talked about as far away as the court of the Duchy of Serbia, a new, small Balkan state which was officially liberated from Ottoman rule in 1830, but has been constantly troubled by internal unrests and experienced all kinds of political instabilities since. The Serbian writer Laza Kostić (1841-1910), on his return from Russia in January 1881, visited the Duchess (1875-1882) and later Queen (1882-1888) of Serbia, Natalija Obrenović (1859-1941) (7):

- By the way, did you meet anybody?
 - Oh, yes, I did. But mostly people who are not very close to the court, men of letters, professors, scientists, especially academicians. I don't know if it is this interesting to Your Highness.
 - Oh, please—the beautiful Duchess interrupted me somewhat provocatively—I am very interested in literature and science. Did anything happen?
 - Nothing special. But... There was an election to the Imperial Academy of Science that everybody speaks of, and that has been very badly received, especially in Russian circles. If it please Your Highness...
 - All right, go on.
 - The St. Petersburg Academy consists, beside official units, of two main groups, the Russian and so-called German group, which also includes the Swedes and Finns. Even though the Germans had a slight majority, this time the Russians had high expectations that they would succeed with their candidate, for the candidate was none other than the famous chemist, Mendeleev.
 - Well... who was elected?
 - No, he was rejected. A Swede or German was elected.
 - Naturally, that's right.
- I didn't believe what I had heard. However, without sensing my astonishment, the "Russian" proceeded:
- Germans are brighter than Russians.
- Suppressing my feelings, I bowed:
- Generally speaking, it is so, without doubt. Your Highness is right, in principle. But Mendeleev is the light of science, a spiritual giant to whom the German elected cannot be compared.
 - Yes, the Russians say so.

– Also the Germans, Your Highness. In Berlin the heads of science are kneeling down before Mendeleev, while the one elected was hardly heard of anywhere in Germany. Partisanship and agitation are everywhere stronger than reason and the feeling of justice. Just as in our country, especially in Belgrade. I am not surprised at all.

At that moment I noticed that Duchess was looking through the window and did not hear me, just as she had not heard the mayor of the palace two days before. I stopped. She stood up.

– Adieu.

I bowed and then looked around. I was alone.

It has to be noted that the Duchess Natalija was in that time not only the first lady of a Slav nation (Serbia), but also *Russian* by origin, which was alluded to in the text ("the 'Russian' proceeded").

Julius Lothar Meyer vs. Dmitri Ivanovich Mendeleev

The protests against Mendeleev's rejection to membership in the Russian Imperial Academy of Sciences were not as justified as the Serbian writer presented (5, 6); his views were rather distorted by national pride and the lack of historic perspective. Beilstein was not, as implied, a rank beginner who did not measure up to Mendeleev's standard. The open Chair at the Academy was in *Technology*, and unlike Mendeleev, Beilstein had spent the largest part of his career in technology and in the training of technologists. The magnitude of Mendeleev's "genius" was called more into question by the fact that the Periodic system of the elements was discovered independently by him and by the German Julius Lothar Meyer (1830-1895) in 1869 (8). This was recognized by the Royal Society for Chemistry, which, in 1882, awarded the Davy medal to both chemists, jointly (9).

To the Germans it was clear that both chemists deserved the recognition (10); not so to the Russians, Croats, Serbs, Slovaks, Bohemians, and other minor Slav nations, who were proud of their "Slav Newton." For the Russians, Lothar Meyer is only one among many chemists (Odling, Béguyer de Chancourtois, Newlands, etc.) who tried to classify the elements (11). When Egon Wiberg's *Anorganische Chemie* (12) was translated into Croatian, its translator, Hrvoje Iveković (1901-1991), professor at the Zagreb Faculty of Pharmacy, was moved to add in a footnote, contradicting the author: "Priority for the discovery of the 'periodic system' belongs indubitably

to MENDELEEV, because he first brought it to light at the Academy of Sciences in 1869 in his thesis, ‘The relation between the properties and atomic weights of the elements.’ L. MEYER had finished a similar system at the same time, but he was afraid to publish it until 1870, and then added nothing new to the Mendeleev’s table” (13).

Such feelings were of course expressed even more widely in the 19th century, when the Slav nations felt that they had to stick together against foreign cultural and political influences (mostly German, but also Hungarian and Turkish): “Everywhere the same nest, the same bird/ Everywhere the same family, the same mother song!” wrote the Croatian poet Silvije Strahimir Kranjčević (1865-1908). Slavic people inside the Austro-Hungarian empire (Bohemians, Slovaks, Croats, and Slovenes) had vague thoughts of their national independent states or of the formation of a third federal unit of Slavic provinces (alongside the Austrian and Hungarian units of the empire). There were also ideas of a state that should unite all southern Slavs, which was later realised in the two ill-fated Yugoslav states (the Kingdom of Yugoslavia, 1918-1941, and the communist Federal People’s Republic of Yugoslavia, 1943-1991). On the other hand, the Serbs had their independent state, but they were under the constant threat of Austrian incursions into their territory. They had very good relations with their “Russian brothers,” even more so because they shared with the biggest Slavic nation the same orthodox religion and Cyrillic alphabet. On the another hand, the Russians saw in Serbia, and even more in (also orthodox) Montenegro, a corridor to the Adriatic.

These political interests were also reflected in the cultural sphere. The author of the first Croatian dictionary of scientific terminology (14) was a Slovak, Bogoslav (Bohuslav) Šulek (1816-1895), who also wrote the first book on popular chemistry in Croatian (15). The first professor of chemistry at the Zagreb University was a Bohemian, Gustav Janeček (1848-1929), and he initiated the election of Mendeleev to honorary membership of the Yugoslav Academy of Science and Arts (16), on 5 December 1882, before Mendeleev had been elected to any other academy, including the Russian Academy of Sciences (17).

In his speech at the meeting of the Yugoslav Academy on 8 February 1908, Janeček had not the slightest doubt that Mendeleev was the real father of the periodic system (18):

About his own table of the elements Meyer said:
“This table is identical to the table proposed by

Mendeleev.” But it is interesting to see what Meyer said at the end of his thesis. “It would not be appropriate,” he said, “to correct accepted atomic weights on the basis of such vague assumptions. Generally, we should not, for the time being, place too much value on such arguments.” This is so with Meyer’s priority. Earlier, Meyer had been interested in the regularities which were observed in some groups of chemical elements. When he learned of the periodic system of Dmitri Ivanovich, he accepted it with the minor amendments, but he refused to accept that which forms the core of the periodic law. Therefore, the priority is not Meyer’s, nor is he its co-discoverer, but—just opposite—he is a rejecter of the periodic law, when he stated that the basis of the periodic system is vague and said that it should not be valued too much.

Periodic system as the Slavs’ pride

At the end of his speech, Janeček pointed out, “You [Mendeleev] were the son of a great brother nation, and therefore our pride,” and remembered that he had earlier been elected to the Yugoslav (Croatian) Academy of Sciences and Arts. In Serbia, Mendeleev was valued more for his scientific contributions. The periodic system first appeared in English textbooks in 1884, but Sima M. Lozanić (1847-1935), professor of chemistry at Belgrade University, introduced it in 1880 into the second edition of his textbook of inorganic chemistry (19), making *Neorganska hemija* the first textbook outside Russia containing the periodic table (20). “He [Lozanić] was convinced,” wrote his former student S. Drenovac, “that the periodic system was a revelation and thus it had to be described with the finest and the most delicate words” (7).

For Professor Lozanić, the periodic system was a “revelation,” but for the former student of Professor Janeček, Fran Bubanović (1883-1956) (21), Mendeleev’s table was the crucial proof that Slavs are not inferior to Germans (22):

That Slavs have no great philosopher, was assumed during the War [World War I] not only by some German “chauvinists,” but also by the greatest German scientists and philosophers. To back this assumption, they referred even to their scientific arguments... All this gradually led to the conviction, which was taken for granted even in our country, that the Slav race didn’t produce any great philosopher and that we Slavs are mentally undisciplined and extravagant, and therefore do not make real and fruitful contributions to the cultural development of humankind.

This sort of argument was also important to the Russians. Paul Walden (1863-1957) calculated that the contribution of Russian chemists to world chemistry was 10%, and Bubanović, who was attending his lectures, found it important to report this (23). All this echoes what Professor Ivan Alekseevich Kablukov (1857-1942) said at Mendeleev's funeral, "He [Mendeleev] realised the vision of the first Russian professor of chemistry, the peasant's son, Mikhail Lomonosov, by showing that Russian soil could give life to its own Newtons" (24).

Such words, quite standard in the 19th century, seem very strange today, even to the Slav's ears. Pan-Slavic feelings have evolved, since the formation of Slav national states after two world wars, into patriotic movements towards separate nations, and recently into striving to be good Europeans. Slav chemists no longer see Mendeleev as the "Slav Newton," and as a consequence of historic perspective, the periodic system of the elements is no longer regarded, even by the Slavs, as the product of a single "genius" or "national hero." Chemists of all major nations (France, Germany, Britain, America, and Russia) participated in the discovery of the periodic law. Mendeleev rose above the others because he was the chemist who made the greatest contribution to its development and popularization (25). But if we accept the general statement that "Meyer was more impressed by the periodicity of physical properties, while Mendeleev saw more clearly the chemical consequences of the periodic law" (26), then Lothar Meyer would be valued more highly than Mendeleev, bearing in mind the rise of quantum mechanics at the beginning of the 20th century. But such claims to priority seem very outdated a century and a half after the discovery of the periodic system, and, even more, after so many changes on the political map of Europe.

References and Notes

1. Officially, the Pan-Slavic movement started in 1848 in Prague at the First Pan-Slav Congress, where the Pan-Slav flag (blue-white-red) and anthem ("Hey, Slavs") were accepted. Later, the Pan-Slav flag became the flag of Yugoslavia, and "Hey, Slavs" the anthem of both "new" Yugoslavia (1943-1991) and Poland. However, the basic Pan-Slavic idea, the cultural and political unity of all Slav nations, can be traced back to the 17th century, in the writings of Croat Juraj Križanić (1618-1683).
2. The fact that Russia and either Prussia or Austria (or both) were usually allies seems to contradict my thesis. But in the long history of wars, especially European wars, *everyone* was foe to *everyone*, and ally of *everyone* at some time. Italy fought against Germany in World War I, but was its ally in World War II, Prussia (Frederick the Great) and Austria (Maria Theresa) were at war over Silesia, then allies in the war against France (Napoleon), etc. European history was very turbulent because states fought for their borders and domination of the continent, and in the 19th century nations fought for freedom from foreign domination (e.g., Italians led by Garibaldi). In this nearly permanent state of war, states didn't live long: during the 20th century Berlin, Bratislava, and Zagreb were each located in five different states, and the city of Belgrade was capital of two kingdoms and four republics. In Europe, however, national feelings do not necessarily correlate with the state in which someone lives or was born, simply because nations are much older than states.
3. "The fields of mathematics and science, German language and literature did not cause me the slightest problem, I thought I could reasonably pass English and French, but I had my doubts about History and Russian." F. W. Ostwald, *Lebenslinien: Eine Selbstbiographie*, Klasing, GMBH, Berlin 1926, p 65).
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5. M. D. Gordin, *A Well-Ordered Thing: Dmitrii Mendeleev and the Shadow of the Periodic Table*, Basic Books, New York, 2004.
6. M. D. Gordin, "Beilstein Unbound: The Pedagogical Unraveling of a Man and his *Handbuch*," in D. Kaiser, Ed., *Pedagogy and Practice of Science*, MIT Press, Cambridge, MA, 2006, Ch. 1, pp 11-39.
7. V. M. Mićović, "Odjek otkrića periodnog sistema u Srba i Hrvata (Influence of the Discovery of the Periodic System on Serbs and Croats)," *Lectures of the Serbian Academy of Sciences and Arts*, Book 10, Division for Natural sciences and Mathematics, Book 5, Belgrade, 1969.
8. J. W. van Spronsen, "The priority conflict between Mendeleev and Meyer," *J. Chem. Educ.*, **1969**, *46*, 136-139.
9. R. Winderlich, "Lothar Meyer," *J. Chem. Educ.*, **1950**, *27*, 365-368; C. Schmidt, *Das periodische System der chemischen Elemente*, (*The Periodic System of the Chemical Elements*), J. A. Bath, Leipzig, 1917, pp 22-24.
10. W. Spottiswoode, "President's Address," *Proc. Roy. Soc. London*, **1883**, *34*, 303-329.
11. Становление Химии как Науки. Всеобщая История Химии. (*Stanovlenie Khimii kak Nauki. Vseobshchaya Istorija Khimii [Founding of Chemistry as a Science. General History of Chemistry]*), Yu. I. Solovyev, Ed., Nauka, Moscow, 1983.
12. E. Wiberg, *Anorganische Chemie*, Walter der Gruyter, Berlin, 1951.
13. E. Wiberg, *Anorganska kemija*, H. Iveković, Trans., Školska knjiga, Zagreb, 1952, p 73.
14. B. Šulek, *Hrvatsko-njemačko-talijanski rječnik znanstvenoga nazivlja (Croatian-German-Italian Dictionary of Scientific Terminology)*, Zagreb, 1874.
15. B. Šulek, *Lučba za svakoga ili popularna kemija (Chem for Everybody or Popular Chemistry)*, Matica hrvatska, Zagreb, 1881.

16. The Yugoslav Academy was founded in 1866, long before the rise of Yugoslavia. But its name (*jugoslavenska*) means "of the Southern Slavs" (*Slavorum Meridionalium*), i.e., it was originally intended to be a Pan-Slavic cultural organization.
17. The Pan-Slav feelings were reflected in Mendeleev's letter dated March 19, 1883: "You very kindly decided to accept me into your community—a community of sciences and arts. My contribution is not great, although I will use all my strength to fulfil your brotherly trust in how I would contribute by my further work to your goal—to fight with the knowledge and skills for all the Slavs (*slavenstvo*), and in this way for all humankind." (Ref. 3.)
18. G. Janeček, "Dimitrij Ivanović Mendeljejev. Posmrtna besjeda. (Dimitrij Ivanovich Mendeleev. Memorial speech)," *Ljetopis Jugoslavenske akademije znanosti i umjetnosti*, Vol. 22, Zagreb, 1908, pp 127-176; Janeček quoted, but did not cite, J. Lothar Meyer, "The nature of the chemical elements as a function of their atomic weights," *Ann. Chem. Pharm. Suppl. VII* **1870**, 354-364: "Es würde voreilig sein, auf so unsichere Anhaltspunkte hin eine Aenderung der bisher angenommenen Atomgewichte vorzunehmen."
19. S. M. Ložanić, *Neorganska hemija (Inorganic Chemistry)*, 2nd ed., Belgrade, 1880.
20. J. R. Partington, *A History of Chemistry*, Vol. 4, Macmillan, London, 1964, p 897.
21. N. Raos, "Letters of Svante Arrhenius to his Former Croatian Student," *Bull. Hist. Chem.*, **2008**, 33, 12-16.
22. F. Bubanović, "Proročanski zakon D. I. Mendeljejeva (Prophetic law of D. I. Mendeleev)," *Kemijo, hvala ti! (Thank you, Chemistry!)*, Tome Jovanovića i Vujića, Belgrade, 1939, pp 74-86.
23. F. Bubanović, *Iz moderne kemije (From Modern Chemistry)*, Matica hrvatska, Zagreb, 1929, pp 7-8.
24. Quoted from Ref. 18. As Janeček quoted Kablukov in Russian, it is possible that he personally attended Mendeleev's funeral, because it took place during the chemical congress in St. Petersburg, which Janeček possibly attended. Another possibility is that Janeček learned of the Kublakov's speech from the Russian colleagues. Janeček had very close relations with Russian chemists, especially with Schröders, who offered him a job and even asked to adopt him (S. Paušek Baždar, personal communication).
25. E. R. Scerri, *The Periodic Table: Its Story and Its Significance*, Oxford University Press, Oxford, 2007.
26. H. M. Leicester and H. S. Klickstein, Eds., *A Source Book in Chemistry 1400-1900*, McGraw-Hill, New York, 1952, p 434.

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