Past President's Column

A Good Beginning Makes a Good Ending

by Natalia Tarasova

On 28 July 2016, I received the following message from Sir Martyn Poliakoff, Professor at Nottingham University in the UK and a Foreign Member of the Russian Academy of Sciences, who I have known for years. He wrote:

> "Dear Natalia,
> I hope that you are well. I have realized that 2019 will be the 150th anniversary of Mendeleev's publication of the Periodic Table. Therefore, I was wondering whether IUPAC might lead a request to make 2019 the International Year of the Periodic Table. I feel that this proposal might get a lot of support. What do you think?
>
> Best Wishes
> Martyn."

It was the beginning of a story with a happy ending. On 20 December 2017, the United Nations General Assembly proclaimed 2019 the International Year of the Periodic Table of Chemical Elements (IYPT 2019) during its 74th Plenary Meeting, at the 72nd Session. In proclaiming an International Year focusing on the Periodic Table of Chemical Elements and its applications, the United Nations has recognized the importance of raising global awareness of how chemistry promotes sustainable development and provides solutions to global challenges in energy, education, agriculture, and health. Indeed, the resolution was adopted as part of a more general Agenda item on Science and Technology for Development. This International Year will bring together many different stakeholders, including UNESCO, scientific societies and unions, educational and research institutions, technology platforms, non-profit organizations, and private sector partners to promote and celebrate the significance of the Periodic Table and its applications to society in 2019.

As I was involved in the activities of the 2011 International Year of Chemistry Management Committee, the algorithm of the procedure was clear to me. The key element at the initial stage is to identify the country which will be willing, through its National Delegation to UNESCO, to promote the idea of the IYPT. It is UNESCO, as the UN body, that can recommend that the UN General Assembly proclaim the year 2019 as the IYPT. In fact, the time we had to move the idea forward was quite short. According to UN rules, the decision must be taken two years in advance. My colleagues from the IUPAC Executive Committee supported the idea of the IYPT in principle, though with healthy skepticism, based on the memories of the proclamation of the International Year of Chemistry in 2011. Russia, as the motherland of Dmitry Mendeleev, was chosen to lead the initiative through UNESCO.

On 30 September 2016, 3000 participants of the 20th Mendeleev Congress, held in Ekaterinburg, Russia, unanimously voted for the proclamation of the IYPT in 2019. The resolution was supported by the Mendeleev Russian Chemical Society and the Russian Academy of Sciences. Based on this resolution, academician

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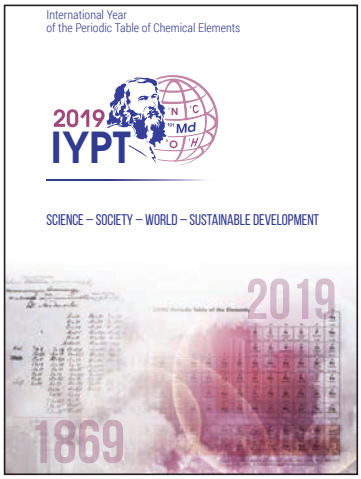
Vladimir Fortov, at that time the President of the Russian Academy of Sciences, sent a letter to the Minister for Foreign Affairs of the Russian Federation, Sergey Lavrov, asking him for the support of the IYPT initiative in UNESCO. Simultaneously, the letter from the Russian Academy of Sciences (the Russian National Adhering Organization (NAO) for IUPAC) was sent to the IUPAC Secretariat. The Russian Academy of Sciences invited IUPAC to be the leading Union for the IYPT, as the identification of a leading international science union is a compulsory part of the UNESCO procedure. Based on this request, on 18 December 2016, I sent a letter to Professor Irina Bokova, at that time the Director General of UNESCO. I wrote:

> "It is with great pleasure that the International Union of Pure and Applied Chemistry (IUPAC) accepts the invitation from the Russian Academy of Sciences to be the main sponsoring organization for the application to UNESCO that 2019 be designated as the International Year of the Periodic Table of Chemical Elements, celebrating the 150th Anniversary of the Mendeleev Periodic Table.... The periodic table is strongly linked to IUPAC's mission. The chemical elements are crucial for humankind and our planet, and for industry. At the same time, it is important that whilst they are used to give added value and products necessary for our civilization, that this is done in a sustainable way. In particular, awareness is needed of the sustainability of the use of scarcer elements, which are often either diluted in the earth's crust or only available in very specific locations. An International Year of the Periodic Table of Chemical Elements would give an opportunity to draw the attention of children through to senior adults to these aspects that are important for the future of our planet, whilst also celebrating the genesis and development of the periodic table over the last 150 years. Other activities will also be organized making full use of the extensive network of IUPAC members. We very much hope that UNESCO will grant the request for the International Year of the Periodic Table of Chemical Elements and IUPAC is very proud and honoured to be the main sponsoring organization for the application."

The end of 2016 was rich in events linked to the Periodic Table of Chemical Elements. On 28 November 2016, IUPAC approved the names and symbols for four new elements: the names nihonium (Nh), moscovium (Mc), tennessine (Ts), and oganesson (Og), were officially applied to element 113, 115, 117, and 118, respectively. This event was widely covered by the mass media. In the beginning of 2017, the inauguration ceremonies took place at the Oak Ridge National Laboratory (ORNL, USA), at the Joint Institute for Nuclear Research, Dubna and in Moscow (Russia), and in Tokyo (Japan). During the inauguration ceremony in Moscow, a letter to UNESCO was signed by the director of the ORNL, Thomas Mason, the director of Lawrence Livermore National Laboratory (LLNL, USA), William Goldstein, and the director of the Joint Institute of Nuclear Research (Dubna, Russia), academician Victor Matveev. In this letter, they supported the IUPAC appeal to UNESCO on the declaration of the year 2019 as the International Year of the Periodic Table of Chemical Elements. They wrote:



The 2019 IYPT Prospectus

> "Dear Prof. Bokova,
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> One of the greatest scientific achievements of the XIXth century was the discovery made by D.I. Mendeleev. He was the first to notice that the properties of chemical elements are periodic in their nature. In 2019 the world scientific community will celebrate the 150th anniversary of the Periodic Table of Chemical Elements. Today, for the first time in its entire history, the Table looks most complete: all the elements of its 7 periods have been discovered and have acquired their final names.
>
> Over the past 100 years, humankind has made a giant leap in the understanding of how elements found in nature are formed. This has allowed, among other things, conducting laboratory synthesis and studies of the properties of more than 20 transuranic elements. Over the past 16 years, scientists from the Joint Institute for Nuclear Research (JINR, Dubna) in collaboration with their colleagues from the leading US nuclear centres: the Lawrence Livermore and Oak Ridge National Laboratories, as well as Vanderbilt University and the University of Tennessee at Knoxville, have become the first to synthesize five superheavy elements completing the seventh row of the Periodic Table.

In 2012, IUPAC named element 114 as flerovium (Fl) and element 116 as livermorium (Lv). On 28 November 2016, IUPAC made a final decision to assign the following names to elements 113, 115, 117, and 118: nihonium (Nh) for element 113; moscovium (Mc) for element 115; tennessine (Ts) for element 117; and oganesson (Og) for element 118.

The Periodic Table of Elements truly is the province of all humankind. All the leading countries of the world have made their invaluable contribution, completing the Table with new elements, studying and specifying the properties of the discovered ones. The international colloquium dedicated to the naming of the three superheavy elements with numbers 115, 117, and 118 was held in Moscow on 2 March 2016. The participants of the colloquium were over 200 delegates from 112 countries, among them representative delegations of JINR (Dubna, Russia), ORNL (USA), LLNL (USA), Vanderbilt University and University of Tennessee at Knoxville (USA), RIKEN (Japan), GSI (Germany), PSI (Switzerland), GANIL (France), IUPAC and IUPAP, and the Russian Academy of Sciences, as well as the leading scientists who made significant contributions to this field of nuclear physics.

We, the undersigned, on behalf of the participants of the colloquium, taking into account the importance of D.I. Mendeleev's discovery, support the IUPAC appeal to UNESCO on declaration of the year 2019 as the International Year of Periodic Table of Elements."

Over the next few months, the initiative of the IYPT was supported by the International Union of Pure and Applied Physics (IUPAP), the European Association for Chemical and Molecular Sciences (EuCheMS), the International Astronomical Union, The International Union of History and Philosophy of Science and Technology (IUHPS), and by more than 80 IUPAC National Adhering Organizations, Academies of Sciences, chemical societies, and research institutions. Tremendous work to support the initiative was done by the IUPAC Secretariat, led by Dr. Lynn Soby.

On 24 January 2017, I had the pleasure and privilege to present the concept of the IYPT at the 10th meeting of the UNESCO Scientific Board at UNESCO Headquarters in Paris. Following the recommendations of the UNESCO International Basic Science Programme, the International Steering Committee was formed. Thirteen scientists from all over the world, together with the Working Group of the Russian Academy of Sciences (scientific secretary and member of the RAS, professor Julia Gorbunova) produced a 15-page Prospectus on the IYPT. Many volunteers from all over the world helped with pictures, ideas, and comments (and sometimes with criticism). The Prospectus and the concept were presented at the IUPAC 49th General Assembly, 7-13 July 2017, in São Paulo, Brazil. The Russian Permanent Delegation to UNESCO and the Commission of the Russian Federation for UNESCO worked very effectively to get support among the UNESCO member countries, and at its 39th Session on 2 November 2017, the UNESCO General Conference adopted the resolution recommending the U.N. General Assembly declare 2019 as the United Nations International Year of the Periodic Table of Chemical Elements.

United Nations Educational, Scientific and Cultural Organization

2019 IYPT International Year of the Periodic Table of Chemical Elements

And it happened.

Labor recedet, bene factum non abscedet. A little more than 18 months after Sir Martyn Poliakoff wrote to me, the International Year of the Periodic Table of Chemical Elements became a reality. It was IUPAC's 98th birthday when he first wrote to me on 28 July 2016. At the time, it did not occur to me, or to him, that the IYPT will likely be the most unusual birthday present IUPAC has ever received—in 2019, not only will we celebrate IYPT, we will also celebrate the IUPAC Centenary.

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