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100 Years of the International Union for Pure and Applied Physics

Roberto Lalli[1,] & Jaume Navarro[2]*

The International Union for Pure and Applied Physics (IUPAP) celebrates its centenary this year, but its beginnings were far from easy. Roberto Lalli and Jaume Navarro reflect on IUPAP's evolving role in promoting international cooperation.

July 1922, Brussels. During a General Assembly of the International Research Council (IRC), a number of physicists agreed on the statutes for an International Union for Physics with William Bragg as President and Henri Abraham as General Secretary (Figure 1). 18 months later, in December 1923, the First General and Constitutive Assembly met in Paris and finally gave official birth to the IUPAP with representatives of 16 countries. Physics was, with this, following after the steps of astronomy, mathematics, chemistry, geodesy and radiotelegraphy, which had, in the previous years, set up international unions under the auspices of the IRC.

Indeed, the IRC was the main driving force promoting the internationalization of science after the Great War. Yet, 'international' meant, for the IRC, the explicit exclusion of the Central Powers, particularly Germany. This led, in turn, to the rejection of a number of leading physicists to give any scientific content to the new union: the IUPAP seemed to be on the road of becoming a stillborn international project for physics.

Things formally changed in 1931 with the transformation of the IRC into the International Council of Scientific Unions (ICSU) and the openness to all countries. Robert A. Millikan, the newly appointed president of the IUPAP that year, had great expectations, including the promotion of a Commission for Nomenclature, Standards and Units, and the organization of a large international conference of physics in Chicago in 1933. The former did take off with some reports and liaisons with other scientific unions; the Great Depression shattered Millikan's plans on the latter.

Moreover, the dream of a truly international union of physics would have to wait. German academies of physics were reluctant to join the IUPAP, more so after 1933. Niels Bohr, a true promoter of internationalism, was elected president in absentia during a large physics meeting in London and Cambridge in 1934, but declined the offer "until the union is fully international"[1]. Only in 1937 did the IUPAP find a new president in the Swedish physicist Manne Siegbahn, after Enrico Fermi had also declined. Like Bragg and Millikan before him, Siegbahn could hardly give any impetus to the IUPAP in the interwar period. Finally, during World War II, IUPAP activities ceased completely, and the long-term secretary general, Henri Abraham, was deported and killed in Auschwitz in 1943.

Things dramatically changed after World War II. In 1947, the IUPAP was refounded in the context of the new world order. After the ICSU had signed a formal agreement with UNESCO in 1946, all Unions restarted their activity with more funds, but, more importantly, within the general agenda for the promotion of world peace pursued by UNESCO.

This had a profound impact on the IUPAP. On the political side, physicists involved in its reconstruction stressed that the union should not repeat past errors. The IUPAP was envisioned to be truly international and, in principle, open to all national groups of physicists, which led to the association of (West) Germany in 1952, even before the Federal Republic of Germany had regained full sovereignty.

On the scientific side, the IUPAP immediately started establishing specialized and affiliated commissions devoted to promote international cooperation in specific research domains. The first to be established were the commissions on thermodynamics and cosmic rays, and the affiliated one on optics. Today there are 15 of the first and of 5 of the latter kind.

Until the mid-1950s, the active membership of IUPAP was mostly limited to the Western bloc. After Stalin's death and the end of the Korean War, the Soviet Union changed its foreign policies which lead it to join the IUPAP in 1956, and many of the countries within its sphere of influence followed suit. This opened a new phase in which the reach and activities of IUPAP expanded with greater attention to the issues of education and support for developing countries. Another major topic was the promotion of free circulation of physicists, requiring that no scientist was precluded from attending IUPAP-sponsored conferences.

Within this new phase, the IUPAP had to face various political and territorial controversies. Especially troublesome were the two-Germany and the two-China problems. In 1958-59, physical societies from East Germany, the People's Republic of China (PRC) and the Republic of China in Taiwan all formally requested to join the IUPAP. The result of the negotiation within the IUPAP Executive Committee was to accept them all, under the assumption that the term 'national membership' did not imply any political claim. This led the PRC to withdraw its request because it could not accept the official recognition of Taiwan as a member. Only in 1984 did the PRC join again, after the term 'nation' had been totally dropped from the description of membership in the IUPAP statutes.

After the end of the Cold War, the quest for a truly comprehensive Union continued, with an increasing attention to the global challenges, the promotion of membership from developing countries, and an attention to gender balance. Today, it has more than 50 countries as members.

As we tried to show, the relations between political and scientific matters have shaped the function and activities of IUPAP, and these relations depended on the changing international state of affairs. The path of the IUPAP in the one-hundred years of its existence exhibits the transformations of the ideal and practices of scientific internationalism and their impacts on what is now called science diplomacy. If we look at the history of IUPAP from this perspective, we can see how the refoundation of IUPAP after World War II was the result of a learning process of physicists reflecting on the limited internationalism that had hampered its role in the interwar period. This historical process is also shaping how the IUPAP is reacting to the current challenge on the military offensive on Ukraine by Russia, the latter being a long-lasting member of the Union. At the beginning of the conflict, the Executive Council issued the statement: "In our 100th anniversary this year, we note the critically important historical role that IUPAP has always strived to play in bringing physicists together across political divides even during our most difficult years in the past. IUPAP continues to embrace and promote scientific collaboration across the world as a driver for peace."[2] This reflects in positions that are significantly different from those of other international scientific organizations. On the one hand, Ukraine has been accepted as a new member of the IUPAP starting from the next general assembly this year. On the other, there are efforts not to break with Russia. The recent IUPAP resolution regarding international conferences in this time states, in fact, that "[i]t will be inappropriate for IUPAP to bar any scientist, especially from a member nation, from any scientific activity"[3] as long as her of his work does not contribute to weapon capabilities. This attempt to bring Ukraine and Russia under the same organization is in line with the historical role IUPAP had designed for itself after World War II and that was already implemented during the Cold War.

1. Bohr to Abraham, 12 December 1934, in IUPAP archives, Quebec Secretariat, Subseries E1, Box 5, Folder 38.
2. Statement by the International Union of Pure and Applied Physics on the events occurring in Ukraine https://iupap.org/wp-content/uploads/2022/03/IUPAP_Ukraine_2022_03_01.pdf
3. IUPAP resolution regarding international conferences in this time https://iupap.org/wp-content/uploads/2022/03/IUPAP_conferences.pdf

Competing interests

The authors declare no competing interests.

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[1]*Max Planck Institute for the History of Science, Berlin, Germany.*
[2]*University of the Basque Country and Ikerbasque, Bilbao, Spain*
**e-mail: rlalli@mpiwg-berlin.mpg.de*

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Figure 1. William Bragg, first President of the International Union for Pure and Applied Physics (left), and Henri Abraham, first General Secretary (right). Left: Pictorial Press Ltd/Alamy Stock Photo, Right: Volgi archive/Alamy Stock Photo