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INTRODUCTION

The art of gathering: histories of international scientific conferences

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Abstract

Hundreds of thousands of conferences have taken place since their first appearance in the late eighteenth century, yet the history of science has often treated them as stages for scientific practice, not as the play itself. Drawing on recent work in the history of science and of international relations, the introduction to this special issue suggests avenues for exploring the phenomenon of the international scientific conference, broadly construed, by highlighting the connected dimensions of communication, sociability and international relations. It lays out a typology of scientific conferences as a way of gaining an overview of their diversity in the nineteenth and twentieth centuries. It argues that the international scientific conference is a central locus for understanding science as a social, cultural and political practice.

International conferences are a standard feature of scientific life. Hundreds of thousands have taken place since their first appearance in the late eighteenth century.¹ Conferences are intrinsic to virtually every discipline and a familiar phenomenon also beyond science. Only global seismic shocks like the world wars and the recent pandemic have interrupted conference gatherings and spurred scholars to reflect on their functions. But in normal times, conferencing is so routine that most of us barely even notice the practice, either in our own work lives or in history.

Perhaps that is why conferences make sparse appearances in the historiography of science. Famous meetings do figure in the literature, of course, like the Solvay councils in histories of modern physics.² But in such instances, they are predominantly treated as backdrops to the action of interest, not as practices in their own right – as stages for science, not as the play itself.

One important exception is a largely francophone historiography that focused from the 1990s onwards on international conferences and examined their rise in the nineteenth

¹ Union of International Associations (ed.), *International Congress Calendar*, 37th edn, Brussels: Union of International Associations, 2017.

² Pierre Marage and Grégoire Wallenborn, *The Solvay Councils and the Birth of Modern Physics*, Basel: Birkhäuser Verlag, 1995.

century as a ‘singular historical phenomenon’.³ Led by Anne Rasmussen, these studies have analysed the conference format as a new form of sociability, as a mode of communication and as a manifestation of internationalism.⁴ This integrative approach has since been developed, albeit selectively and sporadically.⁵ In this special issue, we build on these analyses and apply them to three recent historiographical developments in order to provide a fresh perspective on the phenomenon of international scientific conferencing.

First, we integrate conferences into the historiography of communication in science, a lively field of study over the last twenty years. Inspired by the history of the book, scholars have questioned assumptions around print publication, studied knowledge circulation through ‘literary replication’, and revealed myriad everyday reading and writing practices. They have also addressed the development of the scientific journal and the rise of the journal article as the basic unit of scientific production.⁶ This work has shown how knowledge is shaped as it is transmitted, and how deeply its communication is part of its creation, but it has been limited in its focus on written communication. Yet the epistemological constraints of writing have been known since Michael Polanyi pointed out that crucial know-how is not – cannot – be transmitted by words alone.⁷ Steven Shapin and others have stressed that face-to-face interaction is vital to the transfer of trusted knowledge, and that informal communication has historically played a larger role in science than modern sensibilities would expect.⁸ And while informal and spoken communication has been studied for lab floor interactions, research visits and science on stage, conferences, as the most concentrated instances of oral communication and face-to-face interaction, have not been systematically researched.⁹

³ Anne Rasmussen, ‘Jalons pour une histoire des congrès internationaux’, *Relations internationales* (1990) 62(2), pp. 115–33, 116.

⁴ *Les congrès scientifiques internationaux*, special issue of *Relations internationales* (1990) 62(2); Anne Rasmussen, ‘Sciences et sociabilités: Un “tout petit monde” au tournant du siècle’, *Bulletin de la Société d’histoire moderne et contemporaine* (1997) 44(3–4), pp. 49–57.

⁵ The more substantial contributions include, on the humanities, Pascale Rabault-Feuerhahn and Wolf Feuerhahn (eds.), *La fabrique internationale de la science: Les congrès scientifiques de 1865 à 1945*, special issue of *Revue germanique internationale* (2010) 12; Debra A. Everett-Lane, ‘International scientific congresses, 1878–1913: community and conflict in the pursuit of knowledge’, PhD dissertation, Columbia University, 2004; on economics: Béatrice Cherrier and Aurélien Saïdi (eds), *The Role of Seminars, Conferences and Workshops in the History of Economics*, special issue of *Revue d’économie politique* (2021) 131(4). Recent STS work on conferences includes Emily F. Henderson, *Gender, Definitional Politics and ‘Live’ Knowledge Production: Contesting Concepts at Conferences*, London: Routledge, 2019; Harry Collins, Willow Leonard-Clarke and Will Mason-Wilkes, ‘Scientific conferences, socialization, and the Covid-19 pandemic: a conceptual and empirical inquiry’, *Social Studies of Science* (2023) 53(3), pp. 379–401.

⁶ See e.g. Adrian Johns, *The Nature of the Book: Print and Knowledge in the Making*, Chicago: The University of Chicago Press, 1998; Johns, *Piracy: The Intellectual Property Wars from Gutenberg to Gates*, Chicago: The University of Chicago Press, 2010; James Secord, *Victorian Sensation: The Extraordinary Publication, Reception, and Secret Authorship of Vestiges of the Natural History of Creation*, Chicago: The University of Chicago Press, 2003; Secord, ‘Knowledge in transit’, *Isis* (2004) 95(4), pp. 654–72; Elaine Leong, *Recipes and Everyday Knowledge*, Chicago: The University of Chicago Press, 2018; Alex Csiszar, *The Scientific Journal: Authorship and the Politics of Knowledge in the Nineteenth Century*, Chicago: The University of Chicago Press, 2018; Aileen Fyfe, *Steam-Powered Knowledge: William Chambers and the Business of Publishing, 1820–1860*, Chicago: The University of Chicago Press, 2012.

⁷ Michael Polanyi, *The Tacit Dimension*, Garden City: Doubleday, 1967; William D. Garvey, *Communication: The Essence of Science*, Elmsford: Pergamon Press, 1979. Thanks to Alex Csiszar for this reference.

⁸ Steven Shapin, *A Social History of Truth: Civility and Science in Seventeenth-Century England*, Chicago: The University of Chicago Press, 1994, pp. 409–17. A corollary is that conference proceedings cannot be taken to fully cover conference interactions; they provide a partial, redacted view, and should be studied as a textual genre of their own.

⁹ Notable exceptions include Nir Shafir, ‘The international congress as scientific and diplomatic technology: global intellectual exchange in the International Prison Congress, 1860–1890’, *Journal of Global History* (2014) 9, pp. 72–93; Nico Randerad, ‘The International Statistical Congress (1853–1876): knowledge transfers and their

A second, partly connected cluster of relevant studies analyses scientific sociability, community building and discipline formation. This subject has a well-established literature on cases like princely courts, academies, professional organizations and research schools.¹⁰ But the fact that communities were, after the mid-nineteenth century, largely formed through conference gatherings has often fallen out of view. We have a good understanding of how scientists organized and presented themselves nationally, for example, through the British Association for the Advancement of Science.¹¹ But we still know much less about how communities and networks were forged across borders. Here, too, international conferences were key.

A third body of scholarship that the study of international scientific conferences speaks to is the historiography of international relations. Building on studies by diplomatic historians who examined formal statements and written correspondence, in the last decade a number of scholars have turned to political conferences as occasions where international relations were *performed*, analysing a much wider range of sources in the process. Naoko Shimazu, Stephen Legg and others have revealed the importance of conference staging, seating arrangements, formal receptions and even dances as features of interstate diplomacy in practice.¹² This work has sensitized us to the performances and meanings of ‘international’ in the conferences we study, building on scholarship of the often technical scaffolding of internationalism.¹³ In this issue, we move our gaze from the explicitly political to technical and scientific gatherings, where geopolitics was just as present. This focus is boosted by recent scholarship on science diplomacy, which has shown Cold War international relations as directly affected by the interactions of nuclear scientists, informally or in the service of their governments.¹⁴ The point holds more generally: since science has historically been described as a domain that is by nature international, scientific conferences have been claimed to represent true internationality – claims whose foundation in practice has often been shaky.¹⁵

limits’, *European History Quarterly* (2011) 41(1), pp. 50–65. Studies of non-written scientific communication include William Clark, ‘On the professorial voice’, *Science in Context* (2003) 16(1–2), pp. 43–57; David Gooding, *Faraday Rediscovered*, London: Palgrave, 1985; Staffan Bergwik, ‘An assemblage of science and home: the gendered lifestyle of Svante Arrhenius and early twentieth-century physical chemistry’, *Isis* (2014) 105(2), pp. 265–91; Aileen Fyfe and Bernard Lightman (eds.), *Science in the Marketplace*, Chicago: The University of Chicago Press, 2007.

¹⁰ Mario Biagioli, *Galileo Courtier: The Practice of Science in the Culture of Absolutism*, Chicago: The University of Chicago Press, 1993; Roger Hahn, *The Anatomy of a Scientific Institution: The Paris Academy of Sciences, 1666–1803*, Berkeley: University of California Press, 1971; Roy MacLeod and Peter Collins, *The Parliament of Science: The British Association for the Advancement of Science, 1831–1981*, Northwood: Science Reviews, 1981; Gerald Geison and Frederick Holmes (eds.), *Research Schools: Historical Reappraisals*, Chicago: The University of Chicago Press, 1993, *Osiris* vol. 8.

¹¹ Louise Miskell, *Meeting Places: Scientific Congresses and Urban Identity in Victorian Britain*, Farnham: Ashgate, 2013.

¹² Naoko Shimazu, ‘Diplomacy as theatre: staging the Bandung Conference of 1955’, *Modern Asian Studies* (2014) 48(1), pp. 225–52; Stephen Legg, Mike Heffernan, Jake Hodder and Benjamin Thorpe, *Placing Internationalism: International Conferences and the Making of the Modern World*, London: Bloomsbury, 2022; Stephen Legg, *Round Table Conference Geographies: Constituting Colonial India in Interwar London*, Cambridge: Cambridge University Press, 2023; Ruth Craggs, ‘Postcolonial geographies, decolonization, and the performance of geopolitics at Commonwealth conferences’, *Singapore Journal of Tropical Geography* (2014) 35(1), pp. 39–55.

¹³ Jessica Reinisch, ‘Agents of internationalism’, *Contemporary European History* (2016) 25(2), pp. 195–205. Martin H. Geyer and Johannes Paulmann (eds.), *The Mechanics of Internationalism*, London: German Historical Institute, 2001.

¹⁴ Simone Turchetti, Matthew Adamson, Giulia Rispoli, Doubavka Olšáková and Sam Robinson (eds.), *Science Diplomacy*, special issue of *Historical Studies in the Natural Sciences* (2020) 50(4); Claire Mays, Lénard Laborie and Pierre Grisot (eds.), *Inventing a Shared Science Diplomacy for Europe: Interdisciplinary Case Studies to Think with History*, 2022, Zenodo, at <https://zenodo.org/record/6590097> (accessed 21 July 2023).

¹⁵ Geert Somsen, ‘The Princess at the conference: science, pacifism, and Habsburg society’, *History of Science* (2021) 59 (4), pp. 434–60.

This special issue aims to contribute to these three historiographies by studying the international scientific conference as a crucial component of scientific practice, highlighting the connected dimensions of communication, sociability and international relations. Spanning from the late nineteenth century to today, and covering a range of scientific fields, the contributions each examine a particular conference or series, analysing both its intended purposes and the experiences of the actual event, as well as its wider significance. We ask what happened at conferences, what functions they performed, and how they were shaped by broader social and political contexts. We focus exclusively on international gatherings, as loci of border-crossing exchange and community formation and as performances of academic geopolitics. In all these dimensions, we see scientific meetings not in isolation but as expressions of a much wider conferencing phenomenon.

This special issue is a product of two collaborative research projects that took place against the background of the COVID-19 pandemic and the resulting interruption of live conferences as well as growing concerns about their environmental footprint and embedded inequalities.¹⁶ As we paid attention to these debates (and were solicited to contribute to them), they opened our eyes to the ongoing relevance of approaches focused on sociability, communication and internationality – discussed in this issue by Charlotte Bigg – just as they shaped our reading of historical events.¹⁷

Types of international scientific conference: an overview

What are and what were international scientific conferences? Attempts to organize them into typologies are almost as old as the conferencing phenomenon itself. Problems of classification begin when trying to define what a ‘scientific conference’ is. Even when side-stepping semantic debates about purported differences between conferences, congresses, meetings, symposia, colloquiums and workshops (labels which featured differently in different languages and moments of time, though the popularity of ‘congress’ in the nineteenth century was widely displaced by ‘conference’ in the twentieth), a question remains about the remit of international *scientific* meetings. In this issue we are keen to develop a broad and inclusive view, understanding both large-scale international gatherings of scientists and smaller meetings as part of the same history of scientific conferencing. In addition, we include not just specialized academic meetings but also conferences where technical conventions (like scientific standards) and matters of political concern (like nuclear arms) were of common concern to political and scientific establishments.

When, where and why did scientists begin to gather at conferences? ‘The Republic of Letters never assembled’, Ken Alder once remarked.¹⁸ The fact that scientists went to conferences increasingly from the early nineteenth century was due to at least three factors: *infrastructural*, particularly the growing ease of travel; *social*, with the emergence of interest groups (such as scientists) operating across national borders; and *political*, in that conferences became considered a means of a collaborative regulation.

In this, scientists were no different from other professions. The number of conferences on all manner of subjects grew starkly in the course of the nineteenth century, alongside and as a result of the growth of European imperial ambitions, political mass movements and capitalist markets. In the early 1920s the American jurist Pitman Potter counted a

¹⁶ See our project website at www.sciconf.nu.

¹⁷ Charlotte Bigg, Jessica Reinisch, Geert Somsen and Sven Widmalm, ‘No amount of technology can replicate in-person conferences’, *Times Higher Education*, 4 August 2022, p. 25.

¹⁸ Ken Alder, ‘Scientific conventions: international assemblies and technical standards from the republic of letters to global science’, in Mario Biagioli and Jessica Riskin (eds.), *Nature Engaged: Science in Practice from the Renaissance to the Present*, New York: Palgrave Macmillan, 2012, pp. 19–39; Eric Brian, ‘Y-a-t-il un objet congrès? Le cas du congrès international de statistique (1853–1876)’, *Mil neuf cent*, (1989) 7, pp. 9–22.

rising frequency of ‘international private conferences’ (distinguished from explicitly diplomatic meetings) from just ten in 1840–9 to 985 by 1900–9.¹⁹ The variety of meetings taking place is indicated by one bibliography of international congresses published in 1923: ranging from philosophy, natural sciences, anthropology, history, archaeology and geography to ‘games and sports’, ‘relief and charity’, ‘social questions’, ‘finance’, ‘colonization and expansion’, ‘industry’, ‘trades’ and ‘transportation’.²⁰

Paris, London, Geneva and Brussels became favourite locations for international conferences. It was in Brussels that the Union of International Associations, conceived as a headquarters and clearinghouse of information, was founded and produced the first statistics on conferences.²¹ Congresses helped to position Brussels as an intellectual and internationalist hub in mid-century Europe, and for Belgium to take on an active, modernizing role in the Concert of Europe.²² In the twentieth century, international scientific conferences gradually began taking place on a regular basis outside Europe and North America.²³ Throughout this history, the boundaries of the international community and the nature of internationalism remained fiercely contested, especially concerning the question of which countries and interests were to be represented at conferences, particularly as anti-colonial movements and decolonization projects began to contest the primacy of the US and Northern European conference sites and rules.

In what follows, we attempt to give an outline of four overlapping clusters of conferences as they became instituted in the course of the nineteenth and early twentieth centuries, and thereby provide context and a road map for the eight case studies in this special issue.

Disciplinary conferences

A first cluster of conferences looks perhaps most familiar to *BJHS* readers, namely those that were held by and for members of specific scientific disciplines. International conferences in different scientific fields were a major means by which new kinds of communities of scientists in universities and the private sector were shaped and functioned. These conferences were a product both of professionalization and of evolving disciplinary specialization, developments themselves contingent on the founding of research departments in universities and industries during the nineteenth century in Europe and later worldwide. As scientific disciplines formalized, scientists, who had long taken part in meetings convened by their national associations and academies, increasingly began to meet with their colleagues from other countries. It was no longer (just) the nation, but the discipline that became the main common denominator.²⁴

¹⁹ Pitman Potter, *Introduction to the Study of International Organization*, New York: The Century Company, 1922, p. 291.

²⁰ M. Robert Doré quoted in Edward Eyre Hunt, *Conferences, Committees, Conventions, and How to Run Them*, New York: Harper & Brothers, 1925, p. 125.

²¹ Daniel Laqua, Wouter van Acker and Christophe Verbruggen (eds.), *International Organizations and Global Civil Society: Histories of the Union of International Associations*, London: Bloomsbury Academic, 2019.

²² Daniel Laqua, *The Age of Internationalism and Belgium, 1880–1930: Peace, Progress and Prestige*, Manchester: Manchester University Press, 2013; Jürgen Osterhammel, *The Transformation of the World: A Global History of the Nineteenth Century*, Princeton, NJ: Princeton University Press, 2015; Akira Iriye, *Global Community: The Role of International Organizations in the Making of the Contemporary World*, Berkeley: University of California Press, 2002; Paul Reinsch, *Public International Unions: Their Work and Organization*, Boston: Ginn and Company, 1911; David Aubin, ‘Congress mania in Brussels, 1846–1956: soft power, transnational experts and diplomatic practices’, *Historical Studies in the Natural Sciences* (2020) 50(4), pp. 340–63.

²³ Martin Grandjean and Marco H.D. van Leewen, ‘Mapping internationalism: congresses and organizations in the nineteenth and twentieth centuries’, in Laqua, Van Acker and Verbruggen, op. cit. (21), pp. 225–42.

²⁴ Brigitte Schroeder-Gudehus, ‘Les congrès scientifiques et la politique de coopération internationale des académies des sciences’, in *Les congrès scientifiques internationaux*, op. cit. (4), pp. 135–48.

In the early decades, their conferences often aimed at providing an overview of the state of the art in a field, part of the wider objective to ‘unify science’, an undertaking still conceivable in a period when they could pretend to bring together a large proportion of all representatives: for instance, 836 physicists attended the 1900 physics congress in Paris, over half of all professionals in the field.²⁵ The overview function later evolved to keynote lectures, held besides more specialized research papers.

Conferences were also the preferred means for establishing collective standards, a key condition for the construction of knowledge by dispersed networks of practitioners, as Ted Porter has noted.²⁶ This function was adopted in parallel with, and sometimes taken from, the technical meetings discussed below, and made disciplinary conferences scientific as well as political affairs. The moment often signified the institutionalization of these congresses: they became permanent organizations with their own statutes, tasked with organizing regular meetings and enforcing collective rules and standards (intentions that did not always materialize or that proved to be fraught). At the same time, disciplinary communities were built and maintained through social programs of banquets, excursions and cocktail parties – activities adopted from the associations conferences discussed next, and by Geert Somsen in this issue.

From 1899, successive attempts to regulate (mostly Western) international relations in science took place via the creation of umbrella organizations: the International Association of Academies (1899), and its postwar successors the International Research Council (1919) and the International Council of Scientific Unions (1931). The latter two consisted of disciplinary unions tasked with organizing recurring international conferences. These caused controversy, because of the exclusion of former Central Powers during the interwar period and East–West and North–South polarization after the Second World War. But they also made scientific diplomacy into a permanent feature of international science conferencing.

Scientific societies’ and associations’ conferences

A second cluster of conferences to consider are the meetings called by scientific associations, like the Gesellschaft Deutscher Naturforscher und Ärzte (GDNÄ) and the British Association for the Advancement of Science (BAAS). These first appeared in the early 1800s and had become routine by mid-century. Well studied in various national historiographies, they are also relevant to historians of international conferences, not least because they present a move away from the more local academy meetings that preceded them and because they often became itinerant over the years. Several started out as multinational gatherings: the GDNÄ travelled the various German states for half a century before unification; the same was true for its Italian counterpart and a Scandinavian science conference series, fuelled by a similar movement for unity. From 1828, when Alexander von Humboldt chaired the GDNÄ meeting in Berlin, it began attracting participants from other parts of Europe as well, and inspired British scientists to establish the BAAS as a forum for scientific societies outside London, though it also attracted members of the metropolitan elites and foreigners.²⁷ Comparable association conferences, often with foreign participants, were later established in France and the US, and towards

²⁵ Mary-Jo Nye, *The Question of the Atom: From the Karlsruhe Congress to the First Solvay Conference, 1860–1911: A Compilation of Primary Sources*, New York: Tomash Publishers, 1984, xxiv; Richard Staley, *Einstein’s Generation: The Origin of the Relativity Revolution*, Chicago: The University of Chicago Press, 2008, pp. 166–204.

²⁶ Theodore M. Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life*, Princeton, NJ: Princeton University Press, 1995.

²⁷ Jack Morrell and Arnold Thackray, *Gentlemen of Science: Early Years of the British Association for the Advancement of Science*, Oxford: Clarendon, 1981.

the end of the century in colonial India, South Africa and Australia.²⁸ Like other conference types, these meetings brought together geographically dispersed participants, though unlike the disciplinary conferences they attracted a variety of public audiences to their meetings.²⁹

A major goal of the association conferences was community building. According to GDNÄ founder Lorenz Oken, ‘personal acquaintance’ was key to scientific productivity – an insight that, as Sven Widmalm discusses in this issue, runs as a common thread throughout the history of conferencing.³⁰ Nineteenth-century meetings hence incorporated bourgeois festive culture, with a focus on communal eating, drinking and singing. Charles Darwin made note that at the 1847 BAAS meeting, ‘We enjoyed (wife and myself) our week beyond measure: the papers were all dull, but I met so many friends and made so many new acquaintances ... and took so many pleasant excursions.’ While the presence of women was initially a novelty, the BAAS began issuing ‘lady tickets’ in 1844, and, by the turn of the century, ‘ladies’ programmes’ had made it into international disciplinary conferences too.³¹

The scientific associations had emerged along with other social or political reform movements in post-Napoleonic Europe, some with permanent organizations, others as more ephemeral set-ups. Conferences increasingly became these organizations’ public face and lifeblood – a way of spreading their ideas and managing their dispersed constituents, defining their public profile and mission, and staking out their competence vis-à-vis rival groups. Many of these movements made explicit references to science.³² The sexual reform conferences after the First World War, discussed by Laura Forster in this issue, resembled other association conferences both in their ambition to enrol science as an ally for a social cause and in their social make-up, involving large gatherings of urban middle-class crowds, by now often with women in prominent roles working on reformist issues. Forster coins the term ‘manifesto conference’ for what they set out to do, namely publicize an agenda and build a political cause in alliance with scientific expertise.

Technical conferences

A third cluster of conferences concerns inter-governmental meetings involving scientists and technicians for the solution of political or technical problems on behalf of their nations. They signify a broader technocratic turn in international diplomacy and policy. Throughout the nineteenth century, governments collaborated on scientific and technical questions which required international agreement. ‘Historically unparalleled norm setting’ via expert conferences accelerated in the second half of the nineteenth century, in the course of which many subjects, such as train gauges and timetables, international mail, steamship services, coinage, currencies and weights and measures were standardized for large parts of the world.³³

²⁸ Rainald von Gizycki, ‘The Associations for the Advancement of Science: an international comparative study’, *Zeitschrift für Soziologie* (1979) 8(1), pp. 28–49; Ilja J.J. Nieuwland, ‘Science to bring the nation together: the formation of Nomadic Congresses in the Netherlands and Flanders’, in F.J. Dijksterhuis, A. Weber and H.J. Zuidervaart (eds.), *Locations of Knowledge in Dutch Contexts*, Leiden: Brill, 2019, pp. 155–84.

²⁹ Rasmussen, op. cit. (3).

³⁰ Quoted in Myles Jackson, ‘Harmonious investigators of nature: music and the persona of the German *Naturforscher* in the nineteenth century’, *Science in Context* (2003) 16(1–2), pp. 121–45, 123.

³¹ Nils Eriksson, ‘*I andans kraft, på sanningens stråt...: De skandinaviska naturforskarmötena 1839–1936*, Gothenburg: Acta universitatis gothoburgensis, 1991, p. 72.

³² Jakob Kihlberg, ‘European reform movements and the making of the International Congress, 1840–1860’, *International History Review* (2021) 43(3), pp. 488–507.

³³ Jürgen Osterhammel, *The Transformation of the World*, Princeton: Princeton University Press, 2009, p. 510.

Historians of science have argued that the first identifiably international scientific conference took place in 1798–9, when delegates from neutral or allied states were invited by the French government to help determine and give witness to the technical reliability of the measurements underlying the metric system.³⁴ Geodesists would later set a more general example for meetings of this type through their *Mitteeuropäische Gradmessung* (1862), soon renamed *Europäische Gradmessung*, and from 1886 *Internationale Erdmessung*.³⁵ Those meetings were as political as they were scientific. They had a formal character: attendance was by invitation only, participants represented their states, and governments were heavily involved in the setting of agendas and agreements reached around the table. To observers these conferences looked like diplomatic congresses, including performances of officialdom such as royal receptions and state banquets.

An influential, genre-defining series of technical meetings were the International Sanitary Conferences, fourteen conferences held between 1851 and 1907 to agree on urgent measures to be taken against the spread of certain epidemic diseases. Medical delegates represented their countries in deliberations about whether and how cholera could be subjected to internally agreed quarantine measures.³⁶ Another field-defining series of technical-political conferences were the two conferences at The Hague, resulting in the famous Hague Conventions of 1899 and 1907, as the first inter-governmental treaties that set out to regulate the conduct of warfare, and to create an international court for arbitration.³⁷ Although overlapping with the standard-setting activities taking place within scientific disciplines, the Sanitary and Hague Conferences, and others like them, were more explicitly and overtly diplomatic affairs, involving specialists in medicine or international law who were also national representatives, and their discussion of problems with immediate political consequences for participating nations.

Technical conferences, like disciplinary conferences with which they sometimes overlapped, became associated with international exhibitions when these began multiplying from the 1870s onwards.³⁸ This was no coincidence: conferences and exhibitions, in different but complementary ways, aimed at displaying and organizing the twin worlds of things and ideas. Both conferences and exhibitions were stages where national and international interests played out. In this issue, Thomas Mougey's study of geologists' meetings at universal exhibitions from Paris in 1878 exemplifies these intertwined agendas.

After the Versailles Peace conferences in 1919, and with the creation of the League of Nations, opportunities and demands for inter-governmental conferences led by scientists or other specialists increased further. The League of Nations itself was a new kind of inter-governmental organization conceived as a standing conference. Under the umbrella of its technical branch, as Jessica Reinisch shows in this issue, a new interpretation of 'technical conferences' gained influence. These drew on elements of earlier conferences dominated

³⁴ Alder, *op. cit.* (18).

³⁵ Volker Bialas, *Erdgestalt, Kosmologie und Weltanschauung: Die Geschichte der Geodäsie als Teil der Kulturgeschichte der Menschheit*, Stuttgart: Konrad Wittwer, 1982, pp. 241–6.

³⁶ Mark Harrison, 'Disease, diplomacy and international commerce: the origins of international sanitary regulation in the nineteenth century', *Journal of Global History* (2006) 1(2), pp. 17–217; Valeska Huber, 'The unification of the globe by disease? The International Sanitary Conferences on Cholera, 1851–1894', *Historical Journal* (2006) 49(2), pp. 453–76; Huber, 'Pandemics and the politics of difference: rewriting the history of internationalism through nineteenth-century cholera', *Journal of Global History* (2020) 15(3), pp. 394–407; Norman Howard-Jones, 'The scientific background of the International Sanitary Conferences, 1851–1938', *WHO Chronicle* (1974) 28, pp. 159–508.

³⁷ Martha Finnemore and Michelle Jurkovich, 'Getting a seat at the table: the origins of universal participation at modern multilateral conferences', *Global Governance* (2014) 20(3), pp. 361–73; Geoffrey Best, 'Peace conferences and the century of total war: the 1899 Hague Conference and what came after', *International Affairs* (1999) 75(3), pp. 619–34.

³⁸ Rasmussen, *op. cit.* (4).

by scientists or other specialists, but were refigured into meetings where participants no longer represented particular governments or foreign policies but solely areas of expertise, with the task to debate and solve ‘technical questions’.³⁹ As Reinisch shows, this genre of meeting drew on a new literature of systematic conference studies, textbooks and manuals, and coincided with international relations as a new academic field, and a growing appeal of technocratic solutions.

This development continued and accelerated even as the League of Nations was dismantled and planning for a new post-war organisation began during the Second World War. Conferences on post-war reconstruction went far beyond the summits of top political representatives.⁴⁰ Continuing insights developed under the umbrella of the League of Nations; the war years saw an explosion of technical conferences in the Allied planning hubs, featuring the work of public administrators, civil servants, scholars and experts of all kinds. Each meeting was framed by specific, solvable problems of practical importance, and was a chance for the participants to mark out their claims as (scientific) experts.

Within the UN system, UNESCO was seminal in the promotion of research on the organization of conferences, adopting organizational, behavioural and group psychological approaches to the promotion of international problem solving and understanding. Conferences, once again, featured as a generic ‘technique’ for approaching the problem of international cooperation, including in the sciences and on questions with apparent scientific solutions.⁴¹ Behavioural scientists and anthropologists like Margaret Mead approached them as part of an agenda by UNESCO and other organizations to spread Western-style science and promote international relations.⁴²

Small ‘elite’ conferences

In addition to – and, in some cases, in reaction against – discipline-specific meetings, early in the twentieth century a fourth cluster of conferences emerged: meetings funded by and often named after wealthy industrialists and their philanthropic foundations. The establishment of elitist science meetings by wealthy industrialists constituted an intervention by private enterprise into international scientific relations, reflecting visions of sustainable free-market capitalism as well as an individualistic ethos.

Some of the wealthiest American philanthropists singled out the causes of higher education and scholarly research, particularly in fields such as medicine, the natural sciences and engineering. They included the Rockefeller, Carnegie and Ford families and their philanthropic foundations that focused on the creation of new research institutes and building of facilities. They also promoted the identification and training of social and professional elites to combat, in the words of the Flexner report on medical education, ‘cheaply made doctors’ and an ‘overcrowding [of the profession] with low-grade material’.⁴³ This

³⁹ Johan Schot and Vincent Lagendijk, ‘Technocratic internationalism in the interwar years’, *Journal of Modern European History* (2008) 6(2), pp. 196–217; Andreas Fickers and Pascal Griset, *Communicating Europe: Technologies, Information, Events*, 2019, London: Palgrave Macmillan – and other books in the Making Europe series.

⁴⁰ David Reynolds, *Summits: Six Meetings That Shaped the Twentieth Century*, New York: Basic Books, 2007.

⁴¹ *The Technique of International Conferences: A Progress Report on Research Problems and Methods*, special issue of *UNESCO International Social Science Bulletin* (1953) 5(2).

⁴² Mary Capes and A.T.M. Wilson (eds.), *Communication or Conflict: Conferences: Their Nature, Dynamics and Planning*, London: Routledge, 2007 (first published reprint 1960); Margaret Mead and Paul Byers, *The Small Conference: An Innovation in Communication*, Paris: Mouton & Co., 1968.

⁴³ The Carnegie Foundation commissioned reports such as Abraham Flexner’s *Medical Education in the United States and Canada* (1910), Charles Riborg Mann’s *A Study of Engineering Education* (1918), Josef Redlich’s *The Common Law and the Case Method in American University Law Schools* (1914) and William J. Gies’s *Dental Education in the United States and Canada* (1926). The quotations are from Abraham Flexner, *Medical Education in the*

language stuck with organizers of small-group research meetings for the next century. The medium of conferences became one of several ways for philanthropists to strengthen specific political research agendas, as did the funding of published conference proceedings, which, as Edward Berman has noted, set ‘the parameters within which particular issues were subsequently discussed’.⁴⁴

The Belgian industrialist Ernest Solvay used portions of his wealth to establish the so-called Solvay Conferences. The first one in Brussels in 1911 has become famous as a meeting of great minds debating the fundamental questions of physics at that moment, and shaping its transformation. They did so in a novel format: twenty-three prominent physicists from various countries were invited to present pre-written reports, which formed the basis for discussion and a more general debate.⁴⁵ These meetings would become typical of a new type of conference: strictly closed to outsiders, focused on big questions, and marked by the informal interaction of invited ‘leading experts’. The organizers of the Solvay meeting thought carefully not just about managing foundational disagreements within the field of physics, but also about the ‘conference atmosphere’ that could facilitate lively and productive discussions as well as the published proceedings.

Subsequent conference series replicated the idea of getting the *crème de la crème* of science together and combined it with the ambition to train up the next generation in ‘frontier research’. The Gordon Research Conferences (GRC), drawing on funding from the Chemical Foundation of New York, are discussed in this issue by Georgiana Kotsou as one important example. Others include the famous Macy conferences, funded by the Josiah Macy Jr Foundation, which set a trend for interdisciplinary discussions. Each meeting was set up as a problem-solving exercise with the aim of creating a shared language and unity across scientific specialisms.⁴⁶ Carefully chosen leading practitioners of relevant fields were invited to present their work in informal conversations. Perhaps the most famous were the Macy Cybernetics conferences, seeking to set the foundations for a ‘general science of the workings of the human mind’, convening for the first time in 1946. The Hixon Symposium in 1948 was another small conference of ‘leading men’ designed to foster interdisciplinary conversations, this time in fields such as neurophysiology, psychiatry and experimental psychology.⁴⁷

Throughout these and similar conferences, a major point of discussion was not just the subject matter under review but also the method of intellectual exchange, as part of a wider search for the most productive methods of meeting and conferencing.⁴⁸ The Macy and Hixon meetings provided a model for interdisciplinary research groups widely adopted by think tanks and institutes of advanced study. During the Cold War, small interdisciplinary meetings bringing natural and social scientists together with policy makers became a standard format for thrashing out issues related to a growing number of urgent problems, including the arms race, environmental crises and North–South relations. Contributions in this issue by Sven Widmalm about the Nobel Symposia, Jenny Beckman on the International Foundation for Science (IFS) conferences, and Waqar Zaidi on the Pugwash Conferences on Science and World Affairs, all draw on this history.

United States and Canada: A Report to the Carnegie Foundation for the Advancement of Teaching, New York: Carnegie Foundation for the Advancement of Teaching, 1910, p. 14.

⁴⁴ Edward H. Berman, *The Influence of the Carnegie, Ford, and Rockefeller Foundations on American Foreign Policy*, 1983, New York: State University of New York Press, p. 129.

⁴⁵ Marage and Wallenborn, op. cit. (2).

⁴⁶ Claus Pias, ‘The age of cybernetics’, in Pias (ed), *Cybernetics: The Macy Conferences, 1946–1953 – the Complete Transactions*, 1st edn, Zurich: Diaphanes, 2003, pp. 11–26, 12.

⁴⁷ Lloyd A. Jeffress (ed), *Cerebral Mechanisms in Behavior: The Hixon Symposium*, New York: John Wiley & Sons, 1951.

⁴⁸ Margaret Mead, ‘The cybernetics of cybernetics’, in H. von Foerster et al. (eds), *Purposive Systems*, New York: Spartan Books, 1968, pp. 1–11; Claus Pias, ‘The age of cybernetics’, op. cit. (46), p. 11.

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Conclusions

The four types of international scientific conference outlined above cannot fully encompass the diversity and variety of such a widespread and evolving phenomenon. As the twentieth century wore on, attempts to categorize them became increasingly imprecise, as the number of meetings increased and conference formats cross-pollinated, along with an exponential increase in the numbers of scientists across the globe and crucial challenges to US–Northern European dominance. Jenny Beckman in this issue describes the resultantly crowded landscape of conference-hosting institutions in the 1970s, including competition regarding overlapping remits. Other trends are not addressed in this issue, such as the emergence of very large conferences, involving tens of thousands of participants, often organized by disciplinary associations and heavily commercialized.

However, identifying broad categories and their interrelated histories yields some useful insights. First, our perspective enables us to look at individual conferences as part of a shared cultural and political phenomenon and (scientific) form of life, with a remarkably stable ensemble of features and functions across space and time. All the conferences studied here combined formal parts of their proceedings with informal possibilities for social interaction, and not by coincidence: conferences helped to create, define and maintain professional communities. Some ideas about the function of conferences had lasting appeal. The idea that scientific conferences provided a supposedly apolitical arena, as promoted by both philanthropic benefactors and organizers of technical conferences, remains influential to this day. Ideas about the advantages of small group meetings and the need to break out of narrow scientific conversations gained momentum in the course of the twentieth century and were ultimately shared by a range of conference organizers and organizations.⁴⁹

Second, by looking beyond archetypal academic conferences we can identify the ways in which scientists worked alongside or with diplomats and other kinds of scholars and experts in a wide range of conferences. Overtly diplomatic meetings and elite symposia on world problems each possess their own historiographies that, we argue, benefit from connection with scholarship on how knowledge is made and communicated. The fact that it sometimes proves difficult to disentangle ‘scientific’ from ‘technical’ or ‘social-reform’ conferences shows us that each domain of activity gains from being considered within the same frame of analysis. The history of science is enriched by a more sustained engagement with social and political history and the history of international relations.

Third, considering scientific conferences in such a capacious manner helps to uncover the myriad ways in which modern societies have mobilized scientific, medical and technical experts, in undertakings from national and international public policy to industry. A focus on conferences can reveal how actors and organizations conceived of ‘science’ and what they thought its role in society is or ought to be, along with other questions central to the history of science.

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⁴⁹ Margaret Mead, ‘The conference process’, in Mead and Byers, op. cit. (42), pp. 3–54; Mead, ‘The cultural perspective’, in Capes and Wilson, op. cit. (42), pp. 9–18, 11–13.