

INTRODUCTION

Introduction: Power to the image! Science, technology and visual diplomacy

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Abstract

This special issue explores the power that images with a techno-scientific content can have in international relations. As we introduce the articles in the collection, we highlight how the study of this influence extends current research in the separate (but increasingly interacting) domains of history of science and technology, and political science. We then show how images of different types (photographs, cartoons and plots) can inform inter-state transactions through their public appeal alongside the better-studied dialogic practices of the diplomatic arena. Finally, we offer an analysis of the interlacing of different diplomatic tracks based on words and images and conclude that, in contrast with words, images conflate agency and argument, therefore creating opportunities to inform transactions and negotiations which their designers may not have even intended.

On 31 May 2020 aboard the International Space Station (ISS), image was everything. Multiple cameras with special lighting captured the arrival of the *SpaceX Dragon* capsule on the ISS and the greeting of a new crew. The resultant video and photographs materialized international space collaboration. It is not just that the grinning US and Russian crewmembers exemplified an ideal of peaceful scientific exchanges by standing in front of a camera side by side. They *strengthened* it, through the production and circulation of photographic and filmic imagery on this space enterprise (see [Figure 1](#)). The symbolic force of this imagery, put forth as an argument for a cooperative approach to space science and technology, is notable three years later, given that the Russian Federation threatens to abandon its participation in the ISS in response to international condemnation of its invasion of Ukraine. Indeed, its ride-share agreement with the United States seems more contradictory still, given the recent photographic imagery ambiguously suggesting that in fact its cosmonauts currently support Ukraine by wearing blue and yellow spacesuits – something that, unsurprisingly, Russia has since vigorously denied.¹

The image and the ongoing story of the ISS make it plain that images play important, unexplored and at times even unintended and ambiguous roles in current international affairs involving science and technology, mediating between technoscientific projects and the

¹ 'International crew blast off for space station', *BBC News*, 5 October 2022, at www.bbc.com/news/av/science-environment-63152225. On the yellow and blue spacesuits see Haroon Siddique and Maya Yang, 'Russia denies ISS cosmonauts wore yellow and blue suits to support Ukraine,' *The Guardian*, 20 March 2022, at www.theguardian.com/world/2022/mar/20/russia-denies-iss-cosmonauts-wore-yellow-and-blue-suits-to-support-ukraine (accessed on 2 March 23).



Figure 1. US and Russian crewmembers in the International Space Station on 31 May 2020. Courtesy of NASA.

geopolitical frameworks in which those projects occur. The absence of in-depth historical studies on the role of images in science, technology and diplomacy and the urgent need to examine this topic led us to gather a group of scholars for this purpose at the 2020 European Society for the History of Science conference in Bologna. Due to the pandemic the meeting could only take place online, but it helped us to assemble the set of articles that follows this introduction.

This special issue focuses on the visual diplomacy of science and technology, especially on the ways in which images with a techno-scientific content can mediate international affairs. It is a first glance rather than a comprehensive view of a historical phenomenon which has only recently received focused attention from scholars in the field (and beyond). As such, it ranges chronologically and thematically in historical exploration, offering up several illustrative instances. The ISS and its crew provide one recent example of the significance of this phenomenon. As we will see below, current trends both in the history of science and technology and in the study of international relations and diplomacy suggest the increasing significance of the image in scholarly studies.

Disciplinary innovation and visual diplomacy

Imaging has, of course, long mattered in the historiography of science. Frequently historians of science have examined images in the context of the production of new scientific knowledge, particularly as a way of presenting scientific arguments. ‘Making visible’, as M. Norton Wise notes, is an essential aspect of displaying and demonstrating something in the realm of a scientific investigation. The related literature on this is vast and has investigated the extent to which images are central to the birth of objectivity in modern science – suggestive of how fruitful the examination of images has been and can be.²

² See, for instance, M. Norton Wise, ‘Making visible’, *Isis* (2006) 97, pp. 75–82. Lorraine Daston and Peter Galison, *Objectivity*, Princeton, NJ: Princeton University Press, 2007; Michael Lynch and Steve Woolgar (eds.),

Notably, this examination has recently extended to what images mean for the circulation of scientific knowledge, something that also has important implications for the study of visual diplomacy. This extension matches a shift over the last two decades to exploring the pivotal role played by this circulation in the historical shaping of the modern sciences. Scholars have thus begun to focus on how images with a scientific content play mediating roles in the international political arena. In particular, these roles legitimize the image's content and suggest normative measures in light of what the images reveal in their circulation across society. For instance, Nina Wormbs has problematized the process of visualization in climate change analysis and policy, contending that visualization of new scientific data is decisive not only for the ways in which we understand climate but also for how we negotiate remedial actions to counter anthropogenic global warming.³

The essays in this collection take this analysis forward, suggesting that the issue of objectivity is intertwined with the mediating roles that images with a techno-scientific content play when they circulate, especially when they cross national borders. In fact, examination of their visual diplomacy elucidates their fundamental role in the *co-production* of knowledge and power. This is significant, because if we accept that this co-production underscores how the construction of new knowledge informs, and is informed by, a society's own normative structures, then we should equally postulate that 'making visible', as an act of scientific validation, depends on the evidentiary power of images in the diplomacy arena, locally and globally. At the same time, this power in international affairs contributes to their validation of objectivity and 'objective' facts, due to what images signify diplomatically.⁴

This leads to very interesting possibilities not only for the history of science and technology but also for areas immediately outside the field. First, it allows for a more nuanced and critical approach to the currently popular notion of 'science diplomacy'. Science diplomacy's advocates view international scientific exchanges and collaborations as potentially decisive in multiple ways, claiming that science diplomacy can establish the circumstances for advancing the scientific enterprise globally, address otherwise unresolvable diplomatic tensions and tackle global challenges. These highly optimistic propositions were initially floated with little critical historical context to them. Historians have since analysed numerous cases, especially those involving scientists in roles as international advisers and experts in bi- and multi-lateral negotiations (from nuclear disarmament to environmental treaties), as well as those involving the establishment of international non-governmental and inter-governmental agencies that blend scientific and diplomatic ambitions.⁵

Representation in Scientific Practice, Cambridge, MA: MIT Press, 1990; Bruno Latour, 'Visualisation and cognition: drawing things together', in M. Dodge, R. Kitchin and C. Perkins (eds.), *The Map Reader*, London: Wiley-Blackwell, 2011, pp. 65–72; Caroline Jones and Peter Galison (eds.), *Picturing Science, Producing Art*, New York: Routledge, 1998.

³ On this see Nina Wormbs, 'Eyes on the ice: satellite remote sensing and the narratives of visualized data', in M. Christiansen, A.E. Nilsson and N. Wormbs (eds.), *Media and the Politics of Arctic Climate Change: When the Ice Breaks*, New York: Palgrave, 2013, pp. 52–69. For similar analyses on remote sensing see also Sebastian V. Grevsmühl, *La terre vue d'en haut: L'invention de l'environnement global*, Paris: Seuil, 2014; Johan Gärdebo, 'Environing technology: Swedish satellite remote sensing in the making of environment 1969–2001', PhD thesis, KTH Royal Institute of Technology, Stockholm, 2019.

⁴ On co-production see Sheila Jasanoff, 'The idiom of co-production', in Jasanoff (ed.), *States of Knowledge: The Co-production of Science and Social Order*, London and New York: Routledge, 2004, pp. 1–12.

⁵ Examples of an optimistic approach are in Royal Society/American Association for the Advancement of Science, *New Frontiers in Science Diplomacy*, London: Royal Society, 2010. See also Vaughan P. Turekian, 'The evolution of science diplomacy', *Global Policy* (2018) 9, pp. 5–7. A critical appraisal is in Tim Flink, 'The sensationalist discourse of science diplomacy: a critical reflection', *The Hague Journal of Diplomacy* (2020) 15(3), pp. 359–70. For an overview from a critical perspective see also Pierre-Bruno Ruffini, *Science and Diplomacy: A New Dimension of*

The proliferation of European Union research projects and scholarly organizations devoted in different ways to the study of science diplomacy as a historical phenomenon suggests the greater historical depth that these analyses are bound to gain.⁶ The emergent literature recognizes that science and technology play a part in international affairs not just through traditional forms of diplomatic engagement such as negotiations and deliberations, but as a form of coercive power, as a source of scientific gifts and objects ‘with strings attached’.⁷ This diplomatic agency often leads to the establishment and maintenance of geopolitical asymmetries. Thus the study of the visual in the history of science and technology promises to extend and specify this critical evaluation of science diplomacy.

Moreover, the study of visual diplomacy, being inherently interdisciplinary, puts historians of science in contact with a host of scholars who are interested in international relations and engaged in a set of disciplinary transitions to which the study of visual diplomacy, as well as history of science, speaks. Part of this transition involves a movement away from the traditional political-science focus on states and state actors. This is a shift catalysed by critical events in the recent past, such as the end of the Cold War and the rise of globalization. It is also a response to future challenges, especially the uncertain nature of future international relations in an age marked by the proliferation of actors in the global political scene and new tensions uninterpretable through Cold War analytical frameworks. Political scientists interested in international affairs have recognized the significance of (and the need for greater attention to) hybrid actors and systems of global governance, including non-governmental organizations (NGOs), multinational corporations, and transnational networks (often involving scientists and science).⁸

This transition has meant, among other things, the study of informal and public diplomacy channels, and the recognition that they can have greater impact than those typified by officially endorsed state representatives, their negotiations and their representations. Attention has turned, for example, to the diplomatic ambitions associated with music or sports events. We now know that the organization of the 1962 Hockey World Championship, the 1968 Berlin Olympic Games, and the 1984 Band Aid concert played considerable, but only recently acknowledged, roles in shaping various subsequent aspects

International Relations, Cham: Springer, 2017; Matthew Adamson and Roberto Lalli, ‘Global perspectives on science diplomacy: exploring the diplomacy–knowledge nexus in contemporary histories of science’, *Centaurus* (2021) 63 (1), pp. 1–16. Examples of historical studies on science and technology in the administration of international relations are Nick Cullather, ‘Miracles of modernization: the green revolution and the apotheosis of technology’, *Diplomatic History* (2004) 28(2), pp. 227–54; Matthew Evangelista, *Unarmed Forces: The Transnational Movement to End the Cold War* New York: Cornell University Press, 1999.

⁶ For an overview of some of these scholarly networks in the history of science see the website of the DHST Commission on Science, Technology and Diplomacy (STAND – <https://sciencediplomacyhistory.org>). Interdisciplinary EU projects with a history-of-science component comprise the now completed S4D4C (www.s4d4c.eu) and InsSciDE (www.insscide.eu). More recent ERC-funded research in the history of science includes the project Newworld@a – Negotiating World Research Data – A Science Diplomacy Study (<https://newworlddata.org>) and Living with Radiation (<https://hrp-iaea.org/page/2>).

⁷ For an analysis of scientific objects as tools of diplomacy see, for instance, Kenji Ito and Maria Rentetzi, ‘The co-production of nuclear science and diplomacy: towards a transnational understanding of nuclear things’, *History and Technology* (2021) 37(1), pp. 4–20. On the history of science diplomacy more generally see Adamson and Lalli, op. cit. (5); S. Turchetti, M. Adamson, Giulia Rispoli, Doubravka Olšáková and Sam Robinson, ‘Introduction: just Needham to Nixon? On writing the history of “science diplomacy”’, *Historical Studies in the Natural Sciences* (2020) 50(4), pp. 323–39.

⁸ Michael N. Barnett and Katherine Sikkink, ‘From international relations to global society’, in Robert E. Goodin (ed.), *The Oxford Handbook of Political Science*, Oxford: Oxford University Press, 2013, pp. 62–83; Thomas Kappen Risse, *Bringing Transnational Relations Back in Non-state Actors, Domestic Structures and International Institutions*, Cambridge: Cambridge University Press, 1995. Peter Katzenstein (ed.), *The Culture of National Security: Norms and Identity in World Politics*, New York: Columbia University Press, 1996.

of Cold War affairs.⁹ The work of scholar and diplomat Joseph Nye has been especially significant in conceptualizing, through the notion of ‘soft power’, these channels of public diplomacy – showing that influence decisive to state relations can often come through propositions for exchange and collaboration outside the sphere of these affairs, in ways pertinent to the cultural world.¹⁰

One consequence of this transition in political science is the increasing salience of images and visual diplomacy in analyses of international affairs. In particular, the last ten years have witnessed the emergence of a rich vein of studies exploring international relations from a situationist perspective. In the 1950s, avant-garde intellectuals insisted on analysing the role of images and representation in what they came to view as a media-dominated capitalist society. Provocatively, situationists have also argued that in mediatised societies the images of individuals acquire greater prominence than their real persona. The growth of the media complex of the last decade, from mass media to social media, makes these reflections even more pertinent and relevant, including in the diplomatic ‘spectacle’.¹¹

Today’s situationist analysis of international relations similarly emphasizes the mediating roles that images play in the diplomatic arena alongside and in lieu of logocentric diplomatic practices. Some political scientists have in fact proposed that a situationist analysis calls explicitly for the study of the visual in the realm of international relations. One of the most prolific amongst them, University of Cyprus scholar Costas M. Constantinou, has argued that images should be understood as a ‘kind of non-human diplomat’, and that the interactions between countries, peoples and individuals through physical encounters matter as much as their mediatised representations in images. Constantinou proposes that we live in a world of visual fetishes increasingly replacing real diplomacy with a media-based one. His work extends an important area of investigation seeking to make sense, for instance, of highly visualized celebrity diplomacy. At the same time, Andrew Cooper is one of several scholars contending that what makes celebrities such as Bob Geldof, Bono Vox and Angelina Jolie influential in the arena of international campaigning and the mobilization of public opinion is not necessarily what they advocate for but their ability to connect with the public through their own visual image. Hence their ‘mediatised self’ serves representative roles typically assigned to diplomats. In fact, their public image makes them more effective in the international arena than emissaries in the flesh.¹²

Constantinou’s and Cooper’s provocative understanding of visual diplomacy has informed our effort here to reconsider images from the world of science in international affairs. Indeed, considering what these disciplinary transitions suggest, the image of astronauts aboard the ISS may well have more diplomatic agency than the diplomats on the ground below.

⁹ On the diplomacy of these international sporting events see Heather L. Dichter, *Bidding for the 1968 Olympic Games: International Sport’s Cold War Battle with NATO*, Amherst: University of Massachusetts Press, 2021. On music diplomacy see for instance Kathryn C. Statler, ‘The sound of musical diplomacy’, *Diplomatic History* (2012) 36/1, pp. 71–5.

¹⁰ Nye’s production is vast, but a good starting point is Joseph S. Nye Jr, ‘Soft power’, *Foreign Policy* (1990) 80, pp. 153–71.

¹¹ For an overview on the situationists’ tenets, especially with regard to mediatised society, see Alastair Hemmens and Gabriel Zacarias, ‘The spectacle’, in Hemmens and Zacarias, *The Situationist International: A Critical Handbook*, London: Pluto Press, 2020, pp. 149–67.

¹² On visual diplomacy see C.M. Constantinou, ‘Visual diplomacy: reflections on diplomatic spectacle and cinematic thinking’, *The Hague Journal of Diplomacy* (2018) 13(4), pp. 387–409; Constantinou, ‘Diplomacy’, in Roland Bleiker (ed.), *Visual Global Politics*, London: Routledge, 2018, pp. 104–10. On celebrity diplomacy see Andrew F. Cooper, *Celebrity Diplomacy*, Boulder, CO and London: Paradigm, 2008.

Image types, diplomatic argument and international agency

This special issue contributes to our increasing understanding of images as not only amplifying agency but also becoming agents themselves in historical episodes of science diplomacy. The articles in the volume examine a crucial period for the development of the links between diplomacy, science and technology, i.e. from the late nineteenth century to the end of the twentieth, forging what has also been termed the age of ‘technoscience’.¹³ As the articles show, during this period different types of images with a science and technology content ended up informing the diplomatic arena in multiple ways. Moreover, their diplomatic agency was channelled through multitrack diplomatic operations – ultimately allowing us to see visual diplomacy dynamically at work.

When considering typologies, it is appropriate to recall that in their making, images entail human-centred acts of creation combined with the mobilization of materials and instruments that give representation to the features of nature and the world. Different types of image may appear at first glance to vary considerably. Vesalius’s illustration of the exposed brain in the 1543 *De Humani Corporis Fabrica* might involve more of the artist’s touch than, say, a magnetic-resonance scan of the brain.¹⁴ However, in different ways, both images are interpretable by various audiences and have the potential to influence the context and outcome of social affairs and, we argue here, geopolitical negotiations. In this special issue, we sample three categories of images – cartoons, photographs and scientific plots (graphs and maps) – each emergent from different technological engagement on the part of their human creators – to see how they influence international proceedings.

We start with cartoons and the article by Maria Paula Diogo, Paula Urze and Ana Simões on the techno-diplomatic dimensions of the 1890 British Ultimatum to Portugal. Cartoons are typically drawings aimed at triggering reflection, often satirical or humoristic in kind, on a given state of affairs. They directly reproduce intentions and ambitions through the skills and imaginative abilities of the cartoonist. Historically, cartoons have even assisted in shortening the distance between science and its publics: satirical depictions in cartoon images often worked as a key to enter the sciences’ ‘ivory tower’ and familiarize the public with the esoteric contents within. For instance, the rise of the scientific movement in Victorian Britain offered an opportunity for *Punch* cartoonists to engage its publics utilizing some of the techno-scientific issues of the day, from biological evolution to the development of a worldwide telegraphic network. Later, cartoons often played up fears and anxieties about controversial scientific developments, such as in nuclear science. Cartoons work well as commentary because they focus on the human relationships and values that underpin the emergence of scientific discoveries and novel technologies.¹⁵ Furthermore, cartoons are also an integral part of public commentaries on international relations and at times have become influential in diplomatic transactions as well. Walt Disney’s 1942 *Saludos Amigos*, seemingly an innocent cartoon portraying the friendship between the parrot José Carioca and Donald Duck, was

¹³ On technoscience see John V. Pickstone, *Ways of Knowing: A New History of Science, Technology and Medicine*, Manchester: Manchester University Press, 2000, pp. 162–88. On some of the conceptual issues see also Pickstone, ‘On knowing, acting, and the location of technoscience: a response to Barry Barnes,’ *Perspectives on Science* (2005) 13(2), pp. 267–78.

¹⁴ Alison Abbott, ‘Neurophysiology: the man who bared the brain’, *Nature* (2015) 521, p. 160; N. Weiskopf, L.J. Edwards, G. Helms *et al.*, ‘Quantitative magnetic resonance imaging of brain anatomy and in vivo histology’, *Nature Review Physics* (2021) 3, pp. 570–88.

¹⁵ On Victorians see Richard Noakes, ‘Science in mid-Victorian *Punch*’, *Endeavour* (2002) 26(3), pp. 92–6; on nuclear energy see Adrian Bingham, ‘“The monster”? The British popular press and nuclear culture, 1945–early 1960s’, *BJHS* (2012) 45(4), pp. 609–24. On technology see Jon Agar, ‘Technology and British cartoonists in the twentieth century’, *Transactions of the Newcomen Society* (2004) 74(2), pp. 181–96.

in fact conceived as a device to foster US–Brazil relations amid the Second World War. More recently, in 2015 a PRC-endorsed company generated the animated cartoon for President Xi Jinping’s state visit to Moscow for the 2015 BRICS meeting.¹⁶

Diogo, Urze and Simões’s article suggests that cartoons *transform* rather than simply *complement* the unfolding of a diplomatic exchange, making the cartoonist an active agent and endowing the cartoon with diplomatic agency. They demonstrate this via their exploration of a specific historical entanglement involving nineteenth-century colonial rivalry. In this particular episode, while *Punch* cartoonists sought to publicize modern science, their Portuguese analogues engaged in a ‘cartoon fight’ emphasizing their country’s shortcomings in the development of the large technological systems that form the backbone of colonial conquest (railways especially).

Compared to cartoons, photographs may look at first sight to involve less human intervention. A photograph results from film’s exposure to light, but in fact photographic images also possess an important subjective element, through complementary processes connected to this light exposure, such as the staging of a photographic set, the decisions taken on the positioning the camera (i.e. the camera angle), and the selection of the photographs to be printed. This may well be the reason why the current literature in the history of science tells us much about the role that photographic images play in the communication of scientific discoveries. However, little comment on their mediating role in visual diplomacy accompanies this examination. The potential for historical learning from photographs is significant, demonstrated not least by the way in which past pictures have informed us about underrepresented groups in science history. Historians have not yet sufficiently explored the diplomatic ambitions of scientific photography, even though UNESCO’s early post-war literature explicitly mentioned photography’s ambassadorial potential as a means for a universal communication.¹⁷

Three essays in this special issue take up this challenge, each focusing on distinct periods, illustrating different forms of diplomatic agency deriving from combinations of human and technological components. The first of these articles in the special issue, Beatriz Medori’s study of various photographic depictions of the Curie family, demonstrates how, in the first half of the twentieth century, photographs became a constitutive feature in the promotion of radiation-based cancer treatments. As with the example of the Portuguese cartoons, these photographs championed nationalistic modernism and suggested that the modern state should invest more substantially in these novel medical therapies. However, in contrast to the cartoon case of colonial rivalry, we see here the promotion of transnational scientific and diplomatic networks with the double goal of supporting the international spread of radiation treatment for cancer and strengthening international political alliances. As a substantial literature has already shown, the Curies were at the centre of these networks. However, the article makes an interesting detour into celebrity diplomacy, too, in that it features Marie Curie’s daughter Ève as the one

¹⁶ M. Adamson and S. Turchetti, ‘Friends in fission: US–Brazil relations and the global stresses of atomic energy, 1945–1955’, *Centaurus* (2021) 63, pp. 51–66. On China’s cartoon see Austin Ramzy, ‘Xi Jinping makes cartoon appearance before meeting in Russia’, *New York Times/Sinosphere*, 7 July 2015, at <https://archive.nytimes.com/sinosphere.blogs.nytimes.com/2015/07/07/xi-jinping-of-china-makes-cartoon-appearance-before-meetings-in-russia> (accessed 9 February 2023)

¹⁷ See, for instance, J. Mussell, ‘Arthur Cowper Ranyard, knowledge and the reproduction of astronomical photographs in the late nineteenth-century periodical press’, *BJHS* (2009) 42(3), pp. 345–80. On photography in reconstructing the history of science see Ronald E. Doel and Pamela M. Henson, ‘Reading photographs: photographs as evidence in writing the history of modern science’, in Ronald E. Doel and Thomas Söderqvist (eds.), *The Historiography of Contemporary Science, Technology, and Medicine*, London: Routledge, 2006, pp. 201–36. On UNESCO see Tom Allbeson, ‘Photographic diplomacy in the postwar world: UNESCO and the conception of photography as a universal language’, *Modern Intellectual History* (2015) 12(2), pp. 383–415.

who advanced her mother's mission of bonding countries together in the fight against cancer. This made Ève a contributor to moving pictures in the 1930s, as shown by her cameo role in a Portuguese documentary advertising radium-based treatments.

A second essay focusing on photographs suggests a different kind of agency for images of these types, one that constructs an argument about the state of affairs in distant places and the appropriate posture for the home country to take vis-à-vis the foreign entity. Here, Gordon Barrett considers a set of photographs sent by the biochemist (and historian of science) Joseph Needham to Britain in the context of his scientific mission in China during the Second World War. The choice of Needham is particularly pertinent, given that his work has received attention in current science diplomacy literature.¹⁸ Barrett adds historical depth to this literature by examining Needham's role as a photographer and collector of others' photographs to make the case that he was well positioned to perform the ambassadorial task of information gathering, especially by depicting the state of scientific research in China at that time. Since this was a discordant moment in Chinese history, coming at the end of the country's Civil War and the constitution of the PRC, the pictures' agency rested with their capacity to document the modernizing stances of the two parties contending for control of the country. Therefore the photographs had implications for both science and international affairs. Notably, photographs-as-agents construct different potential roles for the Curies and for Needham. If they transformed the Curies into (scientific) celebrities, they allow us to conjecture about Needham as the scientist who played a parallel role in self-fashioning a position for himself as someone informing British government decisions at home in order to shape views about the modernizing stances of Chinese Communists and Nationalists.

In our third photography-based case, Matthew Adamson examines the role of images in shaping the diplomatic activities of one of the most prominent inter-governmental scientific organizations of the Cold War period, the International Atomic Energy Agency (IAEA). A parallel might be found in UNESCO's photographic diplomacy, in that the IAEA images, which appeared in its regular, globally distributed, bulletin, played a performative diplomatic role. They advertised the benefits for individual member states who were willing to tie themselves to the agency in the face of the initial doubts that many state representatives had about its reach and ambitions. Images of nuclear instruments, facilities and operations aimed to dispel these concerns associated with Cold War geopolitics and the unfair advantage that the most technologically advanced countries might assume, and replaced them with the dream of nuclear modernization embodied in the 'peaceful atom'. On the pages of the globally distributed IAEA bulletin – in contrast to the limited reach of human diplomats – photographic agents gained a widespread influence over the perceptions of their audiences and beyond.

Although there are mechanical and chemical manipulations involved, a photograph is ultimately the product of unblocked exposure to light and in this sense captures a given scene – however constructed that scene may be – directly. Scientific plots and graphic representations, in contrast, not only involve often complicated mechanical intervention, but also are abstracted representations of natural phenomena, such as a plot recording of a seismic event. They are also quite different from the artistic manipulations of cartoons, as plots are interpolations of natural processes through mechanical or even computerized means. In this, scientific plots are akin to photographs in that their reliance on mechanism appears to result in neutral visual evidence of nature, especially in terms of visualizing data, rather than being the creative product of a human point of view. Of course, a subjective component is always present in these forms of visualization, since the production and running of the instruments that make the plots, as well as the assemblage of

¹⁸ Royal Society/AAAS, *op. cit.* (5), p. 1.

plotted drawings, involve human decisions about technique, timing and mode of representation. Nevertheless, they represent a distinct image type.¹⁹

Two articles in this special issue look at the visual diplomacy of scientific plots. The first is an examination from Sebastian Grevsmühl and Régis Briday of the key role of images in the international negotiations to reduce the ‘ozone hole’ in the 1980s. The process was fundamentally one of visual diplomacy. Focusing especially on the computerized tomography satellite maps that NASA scientists assembled at the Goddard Flight Space Centre, Grevsmühl and Briday reveal that the imaging of the ozone hole was more decisive in instigating remedial measures to reduce the size of the hole than was its actual discovery. In other words, while these images did not constitute the initial evidence for the ozone hole, they gained diplomatic as well as scientific agency and more readily and credibly rallied support in the negotiating arena for the approval of provisions banning the chemicals (chlorofluorocarbons) responsible for ozone depletion.

Finally, a very different negotiating arena featured yet another image form, the ‘stacked plot’. Originally developed as a tool to aid radio astronomers in their assessment of the power of radio signals from celestial objects, the stacked plot, as Simone Turchetti shows us, eventually played a role in representing the radio astronomers’ interests in the international arena of telecommunications negotiations. In the cases of both the charting of the ozone hole and the radio signal stacked plot (and in contrast with the other four cases presented in this special issue) the image neither advertises, nor functions as, a device to gather or report information. Rather, the image encapsulates something that is at stake in the international negotiations arena, in turn lending support to some of the relevant stances on the basis of what the image purportedly shows.

By advertising, displaying and encapsulating, images therefore acquire a new dimension in the arena of visual diplomacy. However, how each type of image configures agency merits further exploration.

Visual channels in multitrack diplomatic transactions?

The issue of agency is central enough to visual diplomacy that it requires us to clarify how this agency finds actionable channels in relevant international affairs. As noted, the most important recent innovation in diplomatic studies consists of the novel characterization of diplomacy as happening on multiple, coincidental, parallel tracks. In this view, any portrayal of past or present diplomatic transactions should account for how these separate tracks overlap, and how they inform these transactions through their interconnection. Put differently, considering what recent history of science and technology and political science literatures contend, it is no longer sufficient to explain or understand diplomatic activities as solely determined by emissaries operating in government-organized exchanges, but rather as an outcome of how words and images overlap in the diplomatic spectacle. In addition, it is equally naive to think that anything coming from the diplomatic sphere (including that of science) automatically has a direct and positive impact on a different context, as performative science diplomacy narratives often claim. To shed light on multitrack diplomatic transactions, one must account for the role and mutual influence of contemporaneous diplomacy tracks, including visual science diplomacy, operating in different domains.²⁰

¹⁹ For an overview see Qi Li, *Embodying Data*, Singapore: Springer and Jiao Tong University Press, 2020, pp. 17–47.

²⁰ For an overview of this mechanic of integration of multiple tracks in science diplomacy see S. Turchetti, ‘A diplomacy turn? Writing the history of science in the context of international relations’, *Physis* (2022) 57(1), pp. 225–44. For an overview from a political science perspective see Louise Diamond and John W. McDonald, *Multi-track Diplomacy: A Systems Guide and Analysis*, West Hartford, CT: Kumarian, 1996.

To enrich analysis of multitrack diplomacy with an account of the role of images, it is important first to recognize the chief element of novelty that images bring to diplomacy. Official diplomacy practices are customarily logocentric (i.e. fundamentally based on use of language). They entail a search for correspondence between the aims and interests at stake in a diplomatic matter and the words utilized by the interlocutors involved. Ambiguity may of course surface, as it is often a matter of strategic approach (and sometimes of familiarity with different languages). But logocentric diplomatic messaging, whether monologic or dialogic, ultimately is addressed to a limited audience capable of apprehending the words involved.²¹

In contrast, images offer up meaning and potential interpretation in a considerably wider arena of potential publics, themselves immersed in an image-rich social environment. In other words, this meaning is all the less likely to be a direct product of the deliberation of its makers and more likely to inform these deliberations indirectly and unexpectedly through the mediation of a wider audience not traditionally associated with diplomatic affairs. Therefore images affect a diplomatic transaction through the set of parallel (and at times unintended) meanings attached to them by these audiences – often through allusion and suggestion coming from an external space in a mediatised society. Their effectiveness rests with how persuasive those suggestions are, to which publics, and then to what extent that persuasion has the capacity to influence parties engaged in diplomatic deliberations.

This means that we cannot fully grasp the true complexity of diplomatic transactions without reference to visual diplomacy. Images add to an ongoing diplomatic transaction an indirect but often considerable force of persuasion that reifies what that transaction aims to achieve. Furthermore, while this is true in general, it is even more so when these images come from a techno-scientific domain, as they then communicate authority in light of the prestige and power attached to the practices of discovering and engineering nature.

We would argue that the essays in this collection suggest that, in fact, images can affect an ongoing diplomatic transaction or setting in two distinct ways. First, they can present or re-present the transaction's argument in more suggestive ways in the popular domain, reflecting like a sound echoing off of a wall the popular sentiment for a given initiative back into the diplomatic arena. Second, images can bring attention to an entirely different argument that, nevertheless, informs international affairs due to the suggestion of given vital contextual factors involved – factors all the more influential when assumed to be veridical.

This second dynamic of multitrack interaction is best seen in cases where the diplomatic dimension is implicit rather than explicit. In the case of the Curies and radium therapy, state actors feature at first glance as facilitators who support scientists and non-governmental organizations involved in the fight against cancer. The photographs and films showing their encounters seem to have little ambition beyond recording and celebrating (using scientists as celebrities) this support while focusing the viewer's attention on this campaign. However, these images indirectly reinforced state officials' political and international positioning, too, thus informing France's pursuit of more cordial relations with the US, and, more instructively still, assisting Portugal's Estado Novo regime in deflecting attention from its authoritarian nature and propagandizing its openness

²¹ On strategic opacity, especially in nuclear diplomacy, see Grégoire Mallard, *Fallout: Nuclear Diplomacy in an Age of Global Fracture*, Chicago and London: The University of Chicago Press, 2014. On limited exposure see Bud Goodall, Angela Trethewey and Kelly McDonald, 'Strategic ambiguity, communication, and public diplomacy in an uncertain world: principles and practices', Consortium for Strategic Communication, Arizona State University, Report 604, 21 June 2006, pp. 1–14, at <https://csc.asu.edu/wp-content/uploads/pdf/116.pdf> (accessed 5 February 2023).

to modernity. These images associated with the Curies, radium therapy and the modernity they represented came to contextualize the Estado Novo's geopolitical positioning, including Portugal's neutrality during the Second World War.

Similarly, images of nuclear-instigated modernity and cutting-edge expertise had behind them an ambition to frame participation in the IAEA's technical assistance as materially beneficial. However, hidden behind the images was an implicit invitation to accept a given geopolitical order, premised on the peaceful coexistence of capitalist and communist blocs, and to renounce parallel projects founded on non-alignment. In other words, the images lent themselves to the geopolitical arguments of the time, suggesting a line between the Cold War alliances which the agency would facilitate and the non-aligned position which, without agency support, would prevent the country from enjoying the material benefits pictured in its bulletin.

An even more compelling case exploring the power of indirect but very pointed messaging with images involves Bordalo Pinero's late nineteenth-century cartoons. The visual satire serving as a commentary on the 1890 British Ultimatum had the explicit ambition to amuse. Yet it indirectly alluded to the need for political change, using allegorical means to call critical attention to the technological imbalance between Britain and Portugal. What makes the cartoonist a quasi-diplomat is the power of his drawings to present a subversive argument to wider audiences, from the Portuguese populace to his colleagues at *Punch*, thereby moving his claim to centre stage in the political arena. (Predictably, the Portuguese state authorities were none too pleased and ended up prosecuting Pinero for his satirical drawings).

In contrast to these first three examples, the two cases in our special issue involving the scientific plot as the category of image show us instances when the pictorial representations encapsulated the content of an ongoing diplomatic affair without, however, directly figuring in the transaction or negotiation. Public circulation of visualizations displaying aspects of what was being discussed at the negotiating table played a transformative role in the evolution of those transactions, thereby indirectly informing their result. We find in one case that the NASA maps of the atmosphere were not a feature in the negotiations concerning the ozone hole, but their release heightened the negotiators' sense of urgency to reach an agreement to mitigate ozone depletion. Furthermore, even as international negotiators debated, the same images transmitted in the public media reinforced the imperative to bring the negotiations to a successful conclusion. Similarly, the stacked plot informed telecommunications negotiations in the context of the 1979 World Administrative Radio Conference because it helped the radio astronomers to clarify their argument that satellites were interfering with their own research. The image worked to draw particular attention to interference at the edge of the frequency bands that the existing regulation reserved for their exclusive use.

Finally, the fascinating story of Needham's photographs lies somewhere in between these examples of influence based on reinforcing given contexts (the Curies and radio-therapy, the IAEA bulletin, Bordalo Pinero) or on the re-representation of the object of negotiation (the ozone hole, the radio frequency stacked plot). On the face of it, the photographic images which Needham sent home as evidence of the state of advancement of Chinese science and technology were simply pictorial confirmation of his descriptions in accordance with his mission as an information gatherer. However, Needham's careful curation of the photographs to be sent represented something more complex and intriguing, a bid to persuade his audience of British state officials that China's efforts to modernize its scientific infrastructure amidst the struggles of war earned it the right to receive British support in that area.

In sum, visual diplomacy consists of a diverse phenomenology comprising both a variety of image types and a varied set of diplomatic scenarios uniting official and unofficial

diplomacy channels through the combined use of words and pictures. One might even suggest that all these cases reveal different kinds of diplomatic agency through the differing sorts of argument that images directly or indirectly make. In our examples, the use of charts or graphs affects the act of negotiation proper, hence the reliance upon a non-human (diplomat) to play a disguised role in a set of conversations whose aim is to persuade given parties to enter into an agreement. Photography informs the ambassadorial practice of representation of certain interests either abroad (in the case of cancer treatments), in the realm of multi-lateral organizations (the IAEA bulletin), or within subversive circles conspiring against state authorities (Pinero's cartoons). In the Needham case, the photographs function as the emissary representing interests at least as much as the agent reporting the information gathered.

In all these cases, images do not just operate differently from words in the diplomatic arena, emphasizing suggestion rather than affirmation. Instead, and in contrast with words, they conflate argument and agency. Whereas in official diplomacy it is for the diplomat to present/represent an argument, in the case of the visual an image puts forth the argument, at times apparently even without the need for a specific mediator. Perhaps this appears as true for any social or political activity in recent history as it does for science. However, there is something that makes the visual diplomacy of science and technology especially compelling. Over the last fifty years, there has been a proliferation of imaging techniques at the edge of mechanical plotting and photography, such as various types of X-ray imaging techniques, magnetic resonance, computerized tomography, various Earth-imaging techniques and so on. All of these have extended visual diplomacy to many areas where science, technology, society and various politics overlap and claim a space, especially in mass media and social media. At times we might, then, see in a seemingly predictable manner something directly visualizable and instantly relevant to diplomatic affairs involving public health, the environment or sensitive technologies; at other times, the use of such images may be more surprising, artistic reconfigurations or works of fiction appropriating imagery to make influential claims about the world.

This proliferation multiplies the significance of a phenomenon scholars have yet to explore fully and reveals how unpredictable is the suggestive power of visual diplomacy. Images with a science and technology component can confer on their makers a diplomatic role, as shown by Pinero's cartoons and Needham's photographs, but they can equally be circulated in an environment with no reference at all to their designers. One of the articles goes as far as to claim that, in contrast with the radio astronomers who designed the stacked plot, post-punk artists reused it to give voice to their subversive ambitions in a separate international social domain with no access to official (state-to-state) diplomatic representation. This unpredictability reminds us that images do more than just contribute to the integration of the scientific enterprise in contemporary mediatized society. They act as go-betweens, often above and beyond what their designers intend, shaping the conflicting ambitions of the cohorts in its social and political – and diplomatic – fabric.

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