1   Invention, Interdependence, and the Lag
Conceptualizing International Relations in the Age of the Machine

> The great fact that the world is a unit rests upon the underlying conditions of modern invention and science
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> – Paul S. Reinsch, *Public International Unions* (1911)[1]

In 1934, the American National Committee on Intellectual Cooperation of the League of Nations, an internationalist pressure group, published a report on the state of the discipline of international relations. In the introduction, the eminent historian and political scientist James T. Shotwell made an impassioned plea for the scientific study of international relations. This was required, he reasoned, because in the modern era, 'radically different from any that has gone before', science was leading not only to 'the conquest of time and space but a complete readjustment of the activities of mankind'.[2] In making this argument Shotwell expressed a sentiment widespread amongst thinkers on international relations. At a time widely characterized as a modern 'machine age', science, machines, and technical expertise were seen as decisive motive forces affecting not only society and culture but also international relations and war. Their primary effects on world affairs were thought to be a growing global integration and interdependence, as well as the transformation of war through scientific weapons. Mankind's organizations and social forms, however, lagged behind technical development, leading to imbalances in world affairs, international tension, and ultimately warfare. International organization and global integration, the solution to the problems of modern science, were held back by the intransigence of nationally minded leaders and backward traditional institutions.

This chapter charts the development of these ideas from 1910 onwards to 1950, and argues that liberal internationalist thinking on science and

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[1] Paul S. Reinsch, *Public International Unions* (Boston: Ginn, 1911), 8.
[2] James T. Shotwell, 'Introduction', in *The Study of International Relations in the United States: Survey for 1934*, ed. Edith W. Ware (New York: Columbia University Press, 1934), 3–20.

machines in Britain and the United States was much broader in scope, and more important to theory, than has generally been recognized. This theorizing on science and machines was driven by disciplinary developments within the maturing field of international relations, international events, and changing perceptions of international organizations and international relations. It also built on widespread perceptions about the impact of various machines and devices on society. Aviation and the atomic bomb, in particular, informed, energized, and shaped this thinking in a multitude of ways. This thinking was shared between Britain and the United States, although there were notable differences in the prominence and context of these ideas and when they were expressed. Although some of the concepts developed and used by internationalist thinkers, particularly 'cultural lag', have subsequently disappeared, others live on and are still with us today.

Interdependence

The origins of liberal internationalist thinking on international relations date back to the seventeenth and eighteenth centuries. By the late 1800s earlier beliefs about the peaceful effects of free trade and liberal republican systems of government had been incorporated into a fully formed and influential British internationalist ideology.[3] The ideas of philosophers Herbert Spencer and Henry Sidgwick typify this development. In *Political Institutions* (1882) Spencer argued that the key emergent distinction in international affairs was between industrial and militant societies. The urge to produce, trade, and make profit meant that industrial societies preferred individual freedom and peace, whereas warfare and militarism were inimical to the growth of international prosperity. Sidgwick argued that the search for international security was pushing nations into larger agglomerations, and characterized the British Empire as part of this natural evolution.[4] By the beginning of the twentieth century liberal internationalists could point to growing international organizations and global interconnections as evidence of increasing international integration.[5] The growth of

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[3] *Sylvest, British Liberal Internationalism*, 35–45; Duncan Bell, 'Victorian Visions of Global Order: An Introduction', in *Victorian Visions of Global Order: Empire and International Relations in Nineteenth-Century Political Thought* (Cambridge: Cambridge University Press, 2007), 1–25.

[4] Sylvest, *British Liberal Internationalism*, 101–147; Herbert Spencer, *Political Institutions, being Part V of the Principles of Sociology (The Concluding Portion of Vol. II)* (London: Williams and Norgate, 1882).

[5] Sluga, *Internationalism in the Age of Nationalism*, 11–32; Emily S. Rosenberg, 'Transnational Currents in a Shrinking World', in *A World Connecting 1870–1945*, ed. Emily S. Rosenberg (Cambridge, MA: Belknap Press, 2012), 813–996.

international law held up the possibility of international peace, and a series of international treaties and conventions appeared to demonstrate that this was not a pipe dream.[6] By the end of the nineteenth century science and modern means of transport and communication were increasingly coming to be seen as drivers of global interdependence. New mechanical and electrical devices, alongside transnational scientific and technical cooperation, were, it was believed, having an integrative effect on the world.[7] The telegraph, perhaps the most prominent and celebrated of the new means of communication of the late eighteenth century, attracted significant comment, with many claiming that long distances were no longer a barrier to the formation of common political and cultural identities.[8]

The 'new liberal internationalists' developed these notions further in the first two decades of the twentieth century whilst retaining the Cobdenite antithesis between industrial and commercial activity on the one hand and militarism on the other. This is particularly clear in the intellectual output of Norman Angell, an influential and widely read writer on international affairs at that time. By 1914 Angell's insistence that growing 'interdependence' and trade made war an increasingly 'diminishing factor' and irrational choice in international relations was predicated not only on an international division of labour but also on the 'the improvement of communication and the cheapening of transport'. For him, as for other internationalists, it was not the changing patterns of transport and communications over many hundreds of years that counted, but rather the introduction of a small number of 'mechanical' inventions in the nineteenth century: 'the compound steam-engine, the railway, the telegraph' as well as 'printing, gunpowder, steam, electricity'.[9] The Cobdenite faith in modern mechanical industry remained. Conflict could be eradicated by replacing it with mechanical work: 'Machinery and the steam-engine have done something more than make fortunes for manufacturers ... the more man succeeds in his

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[6] Sylvest, *British Liberal Internationalism*, 61–100; Koskenniemi, *The Gentle Civilizer of Nations*, 11–97.

[7] Bell, 'Victorian Visions of Global Order'; Duncan Bell, 'Dissolving Distance: Technology, Space, and Empire in British Political Thought, 1770–1900', *The Journal of Modern History* 77, no. 3 (September 2005): 523–562. A significant US example were the statements of Representative William L. Wilson during the 1888 tariff debates. For example, National Democratic Committee, *The Campaign Text Book of the Democratic Party of the United States, For the Presidential Election of 1888* (New York: Brentanos, 1888), 570.

[8] Simone M. Müller, *Wiring the World: The Social and Cultural Creation of Global Telegraph Networks* (New York: Columbia University Press, 2016), chapter 3.

[9] Norman Angell, *Arms and Industry: A Study of the Foundations of International Polity* (London: G. P. Putnam & Sons, 1914), xx–xxi, xxii; Norman Angell, *The Great Illusion: A Study of the Relation of Military Power to National Advantage*, 4th ed. (New York: G. P. Putnam & Sons, 1913), 335, 142.

struggle with nature, the less must be the role of physical force between men, for the reason that human society has become, with each success in the struggle against nature, a completer organism'.[10]

Communications and transport-driven interdependence emerged as an important motif in international relations writing in the first decade of the twentieth century and was often used to make the argument for international governance. In Britain, the most influential thinkers to use interdependence in this way were Leonard Woolf, particularly through his 1916 Fabian Society pamphlet *International Government*, and J. A. Hobson through his *Towards International Government* (1915) and *Democracy after the War* (1917).[11] In the United States the most detailed arguments were penned by diplomat and political scientist Paul S. Reinsch in a series of articles published in the first decade of the twentieth century, and compiled in his influential 1911 volume *Public International Unions*.[12] They were also widely disseminated through Pitman B. Potter's books, especially his popular *An Introduction to the Study of International Organization*, which was first published in 1925 and went through four editions to 1935.[13]

These works took Victorian-era ideas about modern means of transport and communications bringing the world closer together and inserted them into more systematically liberal internationalist analyses of international relations and interdependence. Reinsch labelled them 'instrumentalities', and for Hobson they were the 'vast and complex machinery of communications and transport'.[14] The most commonly cited examples were the telegraph, railways, and the post, though the steamship and the telephone also often made an appearance. These, along with science and sometimes other technical problems of an international nature (usually relating to health or crime), required international governance through

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[10] Angell, *The Great Illusion*, 277–278.

[11] Leonard Woolf, *International Government: Two Reports by L.S. Woolf Prepared for the Fabian Research Department, Together with a Project by a Committee for Supernational Authority that will Prevent War* (London: Fabian Society, 1916); J. A. Hobson, *Towards International Government* (London: George Allen & Unwin, 1915); J. A. Hobson, *Democracy after the War* (London: George Allen & Unwin, 1917).

[12] Reinsch, *Public International Unions*.

[13] Pitman B. Potter, *An Introduction to the Study of International Organization* (New York: Century, 1922), 308–309. Also Pitman B. Potter and Roscoe L. West, *International Civics: The Community of Nations* (New York: Macmillan, 1927), v, 38–46. Other prominent works which referenced interdependence include Raymond Leslie Buell, *International Relations* (London: Sir Isaac Pitway & Sons, 1926), 139–140; Stephen Haley Allen, *International Relations* (Princeton, NJ: Princeton University Press, 1920), 2; Edmund A. Walsh, ed., *History and Nature of International Relations* (New York: Macmillan, 1922), 96.

[14] Reinsch, *Public International Unions*, 176; Hobson, *Towards International Government*, 116–117.

either smaller specialist technical organizations (e.g. for Woolf, or Reinsch, who labelled them 'Unions') or one large international organization (as in Hobson). In these works, as in earlier ones, existing technical organizations (the Telegraphic Union and the Universal Postal Union came up the most) were held up as examples of how this 'internationalism' was already coming into being through necessity.[15]

By the beginning of the 1930s interdependence was firmly established as an indisputable fact of international relations. Although introduced as a 'platitude' by one book on the topic, it was still nevertheless thought novel enough to warrant several popular works which took it as their central motif.[16] In Britain, economic historian George N. Clark's 1920 *Unifying the World* pointed to 'modern methods of communication' as driving integration, though alongside the usual devices such as the telegraph and 'wireless machines' he included inventions which transmitted ideas ('ideal communications'): printing, photography, cinematography, and the typewriter.[17] Similarly, the Liberal Party intellectual Ramsay Muir organized his *The Interdependent World and its Problems* (1932) into seven chapters which closely followed the then commonly held arguments relating to interdependence. The first chapter described the 'Interdependent World' and how it had come about, whereas the second emphasized the continuing existence and power of nationalism. The third explained the 'Perils of Interdependence' arising from the interaction between nationalism and growing interdependence, followed by three chapters on solutions to these perils: the limitation of state sovereignty, the abolition of war, and economic cooperation. It concluded with a chapter on the inadequacy of national approaches for dealing with these problems.[18] These arguments were commonplace enough for Alfred Zimmern to welcome the book as 'a useful restatement . . . of conditions familiar to most students of international affairs'.[19] William L. Langer's review for *Foreign Affairs* was blunter: 'A

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[15] Woolf, *International Government*, 99, 116, 117, 197–200; Hobson, *Towards International Government*, 116–117; Hobson, *Democracy after the War*, 196–197; Reinsch, *Public International Unions,* 4, 6, 7, 12–76, 176. On Reinsch, see Jan Klabbers, 'The Emergence of Functionalism in International Institutional Law: Colonial Inspirations', *The European Journal of International Law* 25, no. 3 (2014): 645–675. On Hobson's and Woolf's wartime writing, see Long, *Towards a New Internationalism*, 121–172; Peter Wilson, *The International Theory of Leonard Woolf: A Study in Twentieth-Century Idealism* (London: Palgrave Macmillan, 2003), 23–81.
[16] Ramsay Muir, *The Interdependent World and its Problems* (London: Constable, 1932), 1.
[17] G. N. Clark, *Unifying the World* (London: Swarthmore Press, 1920), 9–36.
[18] Muir, *The Interdependent World and its Problems*, chapters 1, 3, 7.
[19] Alfred Zimmern, 'Review of *The Interdependent World and its Problems*, by Ramsay Muir', *International Affairs* 12, no. 2 (March 1933): 247–248.

survey of present day political and economic problems, offering little that is new'.[20]

In the United States, political scientist Pitman B. Potter's *The World of Nations*, published in 1929 for a non-academic audience, struck a peculiarly optimistic note, symptomatic perhaps of the heights of exuberance prior to the Great Crash. He predicted a 'complete unification of world markets and world supplies of material goods, and a complete unification of world information and experience in another seventy years … something approaching a real world state'.[21] James T. Shotwell's thought in the first three decades of the century, meanwhile, emphasized that communications-driven interdependence was a manifestation of the transformative effects of modern science and industrialization.[22] Shotwell had stressed the importance of science for the creation of modern society from his earliest writings and, by the twenties (in essays such as 'Mechanism and Culture'), was characterizing the modern epoch as one characteristically shaped by science-based machines.[23] The connection to international relations arrived in his 1929 *War as an Instrument of National Policy*, which explained spreading industrialization and growing communications-driven interdependence as characteristic of a new 'scientific era' for international affairs.[24] The impact of science, working through industrial machines and transport and communication inventions, remained important for his subsequent writings, particularly his widely read 1936 internationalist tract *On the Rim of the Abyss*. 'Mechanism and Culture' was meanwhile incorporated into a 1942 collection on *Science and Man*, which included essays by well-known scientists.[25]

By the mid-twenties internationalists increasingly linked the transformative effects of modern communications and transport to the League of Nations. This was especially so in Britain, where the League

[20] William L. Langer, 'Some Recent Books on International Relations', *Foreign Affairs* 11, no. 4 (July 1933): 720–732.

[21] Pitman B. Potter, *The World of Nations: Foundations, Institutions, Practices* (New York: Macmillan, 1929), 339–340.

[22] On Shotwell see Harold Josephson, *James T. Shotwell and the Rise of Internationalism in America* (Cranbury, NJ: Associated University Presses, 1975).

[23] James T. Shotwell, 'History', in *The Encyclopaedia Britannica: A Dictionary of Arts, Sciences, Literature and General Information*, 11th ed. vol. XIII, ed. Hugh Chisholm (New York: Encyclopaedia Britannica, 1910), 527–533; James T. Shotwell, *The Religious Revolution of Today* (Boston: Houghton Mifflin, 1913); James T. Shotwell, 'Mechanism and Culture', *The Historical Outlook* 16 (January 1925): 7–11.

[24] James T. Shotwell, *War as an Instrument of National Policy and its Renunciation in the Pact of Paris* (New York: Harcourt, Brace, 1929), 27–31.

[25] James T. Shotwell, *On the Rim of the Abyss* (New York: Macmillan, 1936), 42–43; James T. Shotwell, 'Mechanism and Culture', in *Science and Man*, ed. Ruth Nanda Anshen (New York: Harcourt, Brace, 1942), 151–162.

had more salience for internationalists. For supporters of the League its Covenant and political functions were the institutional equivalent to the processes of global interdependence already underway. In a 1930 survey of the success of the League, Ramsay Muir noted that 'the world had become a single political and a single economic system, and that all peoples must henceforward be interdependent. This idea dictated the institution of the League of Nations'.[26] For the first Sir Ernest Cassel Professor of International Relations at the University of London, Philip Noel Baker (later Noel-Baker), the League Covenant was exactly the political instrument required to deal with the 'virtual destruction of the international barriers of time and space' unleashed by 'scientific discovery and invention' in the nineteenth century. The integration initiated by 'the steamship, the railway and the telegraph' decades ago was in the process of being renewed by 'aircraft and wireless telegraphy'.[27] Geneva-based journalist C. Howard-Ellis in his 1928 *Origin, Structure, and Working of the League of Nations* attributed three world-changing effects to 'science' (which he defined as 'organized and cumulative knowledge') over the past two hundred years. He presented 'the telegraph, telephone, railway, steamship and cheap printing' as products of the 'application' of science which had led the 'globe' to 'shrink'. Because of this, 'mankind is culturally and economically becoming one interdependent society'. The League of Nations was formed in order to 'build on the peace-organizing tendency' and to give 'formal and binding expression to the interdependence of modern nations' – the 'next step' in the organization of international relations. The Concert of Europe, the Hague Conferences, and public international unions were part of a previous 'unconscious' development of international organization which the League Charter had transformed into a 'conscious' one. The Covenant was 'the turning-point in the evolution of the world toward international organization'.[28] In the United States, textbooks on international organization positioned the League as the rational culmination of decades of development in international institutions. For political scientists E.C. Mower and Clyde Eagleton, it was the next phase in the development of 'international government', whereas for Potter the League was the

[26] Ramsay Muir, *Political Consequences of the Great War* (London: Thornton Butterworth Limited, 1930), 178. Similarly, William E. Rappard, *International Relations as Viewed from Geneva* (New Haven, CT: Yale University Press, 1925), 4–5.

[27] P. J. Noel Baker, 'The Growth of International Society', *Economica* 4, no. 12 (November 1924): 262–277.

[28] Howard-Ellis, *The Origin, Structure, and Working of the League of Nations*, 24, 25–26, 60, 67, 485. On the enigmatic Howard-Ellis, see James Cotton, '"The Standard Work in English on the League" and its Authorship: Charles Howard Ellis, an Unlikely Australian Internationalist', *History of European Ideas* 42, no. 8 (2016): 1089–1104.

'culminating event in the development of international organization' and the germ of the 'international federation' required to manage growing interdependence ('cosmopolitanism').[29]

By the early 1930s internationalist supporters of the League (once again, more so in Britain than the United States) had come to see the League's 'technical' organs and not the Covenant or its political activities as the new significant factor in international relations. Surveys of the League noted the difficulties faced in its political work – as early as 1926 academic (and League diplomat) William E. Rappard's stock-take of the League's progress expressed disappointment with its attempts at the 'prevention of war', but judged its 'promotion of international co-operation', particularly in the economic sphere, a success.[30] International relations scholar Charles K. Webster's 1933 *The League of Nations in Theory and Practice* blamed the 'instability of the League' on great power politics and economic depression (the 'instability of the age').[31] Political scientist Harold Laski's 1931 lecture at the Geneva Institute of International Affairs argued that the League needed to develop its 'technical bodies' in order to meet the needs of an increasingly interdependent society.[32]

Political scientist H.R.G. Greaves' 1931 *The League Committees and World Order* was the most significant work to emphasize the League's technical activities.[33] Greaves highlighted the success of 'international technical co-operation' through League organs such as its committees, the International Labour Organization, and the disarmament commissions. This technical work, he argued, mirrored the increasingly technical functions carried out by national governments, and as it progressed would eventually obviate the need for national governments. Not only was the League's best contribution to peace 'technical and administrative', but

[29] Edmund C. Mower, *International Government* (Boston: D. C. Heath, 1931); Clyde Eagleton, *International Government* (New York: Ronald Press, 1932); Potter and West, *International Civics*, 198; Potter, *An Introduction to the Study of International Organization*, 455.

[30] William E. Rappard, 'The Evolution of the League of Nations', *The American Political Science Review* 21, no. 4 (November 1927): 792–826. Similarly, see William E. Rappard, 'The League of Nations as a Historical Fact', *International Conciliation* 11 (June 1927): 270–322.

[31] Charles Webster and Sydney Herbert, *The League of Nations in Theory and Practice* (Boston: Houghton Mifflin, 1933), 304.

[32] H. J. Laski, 'The Theory of an International Society', in *Problems of Peace*, 6th Series, eds. H. J. Laski, et al. (London: George Allen & Unwin, 1932), 188–209.

[33] H. R. G. Greaves, *The League Committees and World Order: A Study of the Permanent Expert Committees of the League of Nations as an Instrument of International Government* (Oxford: Oxford University Press, 1931). A corresponding work published in the United States: Norman Hill, *International Administration* (New York: McGraw-Hill, 1931).

nothing is more significant than the League of Nations and the technical experiments it is carrying on. Not only are these co-ordinating the technical organization of the world along the various functions of society, and improving the conditions of life at the same time, but they are also developing a habit of co-operation and mutual confidence.[34]

This 'international technical government' worked because, just as in the domestic sphere, technical committees were increasingly staffed by 'experts' and 'technicians' who focused on technical rather than political issues.[35]

The emphasis on the League's role in engendering international technical cooperation died away by the mid-1930s. The growing belief that the League was failing in its political endeavours also coloured assessments of its administrative and (so-called) technical activities. More broadly the global depression led many to question the efficacy of economic and social experts and their organizations. Leonard Woolf's 1931 review of Greaves' *The League Committees and World Order* faulted him for taking 'a too optimistic view of the achievements of some of the committees'.[36] Georg Schwarzenberger's 1936 *The League of Nations and World Order* ignored technical expertise, and instead explained international cooperation on technical issues in terms of nations' common interests outweighing their opposing interests.[37] Stephen King-Hall's 1937 history of interwar international relations recognized the League's 'important experiments in international co-operation', but ultimately dismissed them as having made 'little progress' towards the 'substitution of world order for world chaos'.[38] George Keeton's 1939 *National Sovereignty and International Order*, largely about the League, devoted barely a sentence to its 'organs of international administration', and yet still dwelled on the advent of such organizations prior to 1914.[39] The fourth (1935) edition of Potter's *An Introduction to the Study of International Organization* ended with a new section questioning the 'Effectiveness and Value of the League', including in the 'fields of conference and administration'.[40] Alfred Zimmern, in his 1936 *The League of*

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[34] Greaves, *The League Committees and World Order*, vii, 6, 244. [35] Ibid., 5, 6.

[36] Leonard Woolf, 'Review of *The League Committees and World Order*, by H. R. G. Greaves', *Economica* 11, no. 34 (November 1931): 485–487.

[37] Georg Schwarzenberger, *The League of Nations and World Order* (London: Constable, 1936), 124–128.

[38] Stephen King-Hall, *The World Since the War* (London: Thomas Nelson and Sons, 1937), 95.

[39] George Keeton, *National Sovereignty and International Order* (London: Peace Book, 1939), 61–62.

[40] Pitman B. Potter, *An Introduction to the Study of International Organization*, 4th ed. (New York: D. Appleton-Century, 1935), 481–494.

Nations and the Rule of Law, distanced himself from his own earlier belief in the increasing power of the League of Nations expert.[41] Now, in 1936, he noted that many were asking if expert cooperation:

extended indefinitely throughout the field of public affairs? Why should not one problem after another be detached from the complex of 'high politics' and subjected to scientific treatment in the new atmosphere of international co-operation? And why should not this lead, in the long run, to the elimination of the causes of war?[42]

This sort of thinking, he noted, emerged 'in League circles' and was a 'curious combination of Fabianism and Cobdenism': 'Little by little, so it began to be believed, the morass of "high politics" would dry up along its edges, as one issue after another was drained off to Geneva'. These hopes, however, had turned out to be 'unfounded'.[43]

Yet, notwithstanding growing disillusionment with the League, interdependence remained a prominent motif in liberal international relations writing through to the end of the 1930s. Schwarzenberger, for example, still used it to argue that a universal League was a necessity in the modern world, and King-Hall asserted that modern international relations was moulded by the effects of the two industrial revolutions through the mechanization and the speeding up of processes, most prominently communications.[44] Zimmern, who had been writing of the effects of the industrial revolution on international relations since 1914, did so again in his 1936 *The League of Nations and the Rule of Law*, where he talked of the 'industrial revolution' creating a 'material internationalism' and presented as examples "five different fields of communication: Posts, Telegraphs, Wireless Telegraphy, Railways and Motor-cars".[45] Interdependence was so omnipresent that it could be found in avowedly anti-liberal internationalist works on international relations, such as the prominent English Marxist analysis of international relations, Palme Dutt's 1936 *World Politics*, which took as axiomatic that communications and trade-driven unification was the fate of the current nation-state system.[46]

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[41] For example: Alfred Zimmern, 'The Prospects of Democracy', *Journal of the Royal Institute of International Affairs* 7, no. 3 (May 1928): 153–191.

[42] Alfred Zimmern, *The League of Nations and the Rule of Law 1918–1935* (London: Macmillan, 1936), 321–322.

[43] Ibid., 322–323.

[44] Schwarzenberger, *The League of Nations and World Order*, 175; King-Hall, *The World Since the War*, 85–87.

[45] Alfred Zimmern, 'German Culture and the British Commonwealth', in *The War and Democracy*, eds. R. W. Seton-Watson, et al. (London: Macmillan, 1914), 348–382; Zimmern, *The League of Nations and the Rule of Law*, 40–41.

[46] Palme R. Dutt, *World Politics 1918–1936* (London: Victor Gollancz, 1936), 21, 351–352.

Once the Second World War began, liberal internationalist intellec-
tuals added their voices to the growing call for the United Nations to
formalize their alliance into a United Nations Organization (UNO).
Significantly, however, interdependence was not prominent in justifica-
tions for the formation of such an organization. It was instead eclipsed by
the new language of the Atlantic Charter (1941) and the United Nations
Declaration (1942). At the April 1943 Annual Meeting of the American
Academy of Political and Social Science, for example, international legal
scholar Quincy Wright was the only one to make the interdependence
argument in support of the UNO. However, even Wright failed to address
in any detail how the UNO was better suited than the League to deal with
'the new conditions of technology and economy'. Although he offered
some explanation in terms of allowing fairer international trade, he rooted
this in the values of the proposed organization, which were to flow from
the four freedoms of the Atlantic Charter and the United Nations
Declaration. The ideals embodied in these declarations were certainly
liberal internationalist in nature but were not explicitly connected to
interdependence. Instead, for internationalists such as Wright, the free-
doms in the Atlantic Charter were rooted further back in time. They had
'spread throughout the world since the Renaissance' and were 'accepted
as the standards of world civilization'.[47] The other major reasons for the
UNO, offered by fellow internationalist Clark Eichelberger, were the
need for cooperative post-war reconstruction and collective security.[48]
These reasons were disseminated widely by internationalist lobbies.
Grayson Kirk and Walter R. Sharp's 1942 Headline booklet, *United
Today for Tomorrow,* for example, argued that a UNO would be an
expression of the Four Freedoms, and was grounded in the need for post-
war reconstruction. There was only a brief mention of interdependence in
the final paragraph.[49]

The rhetoric of technological interdependence and integration was
heard during the war but was linked to the plethora of Allied international
technical and specialist organizations created from 1942 onwards. These
wartime organizations, internationalists argued, portended a new type of
technocratic organization which was necessary not only for the prosecution
of the new technical and scientific warfare now being waged but also for the

[47] Quincy Wright, 'United Nations-Phrase or Reality?', *Annals of the American Academy of
Political and Social Science* 228, no. 1 (July 1943): 1–10. On the new language of the
Charter see: Borgwardt, *A New Deal for the World*, chapters 1, 2.

[48] Clark M. Eichelberger, 'Next Steps in the Organization of the United Nations', *Annals of
the American Academy of Political and Social Science* 228, no. 1 (July 1943): 34–39.

[49] Grayson Kirk and Walter R. Sharp, *United Today for Tomorrow: The United Nations in War
and Peace* (New York: Foreign Policy Association, 1942).

transformed era of international relations after the war ended. Such claims were particularly prominent in Britain. Historian and international relations expert E.H. Carr, once a critic of liberal internationalist thinking, noted in *Nationalism and After* (1945) the existence of 'modern technological developments which have made the nation obsolescent as the unit of military and economic organization and are rapidly concentrating effective decision and control in the hands of great multi-national units'. As examples of such 'functional' organizations, he pointed to interwar technical organizations linked to the League, as well as to wartime organizations such as UNRRA, the FAO and the Middle East Supply Centre.[50] Harold Laski too (in 1943) called for the formation of separate specialist technical international organizations to deal with global technical 'functions' (aviation, railways, road transport, and currency).[51]

The pacifying and integrative effects of international technical cooperation were captured and elucidated in their most sophisticated form by political scientist David Mitrany. His influential 1943 paper on *A Working Peace System* took as its central problematique the inability of the nation-state system to solve the 'technical' problems created by modern 'technical inventions' . Nation-states, he argued, were increasingly unable to deal with the problems created by modern transport and communications, or to ensure that they achieve their fullest potential. Drawing inspiration from many areas, including the US Tennessee Valley Authority (TVA) project and wartime Allied cooperation and post-war planning, he argued that the most successful trans-border organizations were those pragmatically set up to tackle specific trans-border problems – whose powers were limited to specific areas sufficient to fulfil their limited functions. Such technical organizations (be they global or regional in scope), he argued, should have remits limited to particular economic or technical areas, and have sufficient authority and jurisdiction to fulfil their functions. Fruitful areas for such international cooperation could include water and natural resource management, power generation, transport and communication, healthcare, and even scientific and technological research. He singled out 'railway systems', 'shipping', 'aviation', and 'broadcasting' to be particularly amenable to this 'functional' approach.[52] Apolitical technocrats would ensure the success of

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[50] E. H. Carr, *Nationalism and After* (London: Macmillan, 1945), 38, 48. For a proposed 'European Reconstruction Corporation' and a 'European Planning Authority' see E. H. Carr, *Conditions of Peace* (London: Macmillan, 1942), 236–275.

[51] Harold Laski, *Reflections on the Revolution of Our Time* (London: Allen and Unwin, 1943), 7, 234–239.

[52] David Mitrany, *A Working Peace System: An Argument for the Functional Development of International Organization* (London: Royal Institute of International Affairs, 1943), 20, 33. On his functionalism see: Cornelia Navari, 'David Mitrany and International Functionalism', in Long and Wilson, *Thinkers of the Twenty Years' Crisis*, 214–246;

these organizations and convince nation-states to further empower them to deal with other technical areas. As the number and functions of these organizations increases, he argued, the increasing web of technical and economic integration will lead to political integration. National sovereignty, and eventually the nation-state itself, would wither away. This process, he argued, was necessarily to be a gradual one: history had shown that attempts to create, from scratch, international authorities with wide-ranging political powers would fail. Technical international organizations would also help in the prevention of war; a 'joint European transport organization such as the new European Central Inland Transport Organization', he argued in 1946, 'should be able to plan the railways and canals of Europe with a view to improving civilian communications and facilitating trade, but prevent the construction of railways and roads primarily for strategic purposes'.[53]

Fuelled by expectations raised by formation of the United Nations and its associated agencies, the functional approach came to be celebrated amongst international relations and government policy circles through to the early 1950s. By that time, however, it became clear that the United Nations, even in its supposedly functional organs (most prominently UNESCO), had become bogged down in political wrangling. International relations theorists began to rework Mitrany's functionalist approach within a regional context – foremost amongst them the political scientist Ernst Haas, whose *The Uniting of Europe* (1958) modified the functionalist approach to de-emphasize the role apolitical internationally minded technocrats.[54] Haas's neofunctionalist approach was closely linked to European integration – as this integration appeared to slow down in the 1960s many, including Haas himself, came to doubt the applicability of neo-functionalism, and both neo-functionalist and functionalist approaches declined in influence within the discipline of international relations.[55]

Scientific War

The widespread perception that the First World War had inaugurated a new type of scientific warfare found its way quickly and easily into international relations writing by the end of the twenties. The new

Lucian M. Ashworth, *Creating International Studies: Angell, Mitrany and the Liberal Tradition* (London: Taylor and Francis, 2017), 76–105.

[53] David Mitrany, 'The Growth of World Organisation', *Common Wealth Review* 3, no. 8 (June 1946): 12–13.

[54] Ernst B. Haas, *The Uniting of Europe: Political, Social and Economic Forces 1950–1957* (Stanford: Stanford University Press, 1958); Ernst B. Haas, *Beyond the Nation-State: Functionalism and International Organization* (Stanford: Stanford University Press, 1964).

[55] Stefan Borg, *European Integration and the Problem of the State: A Critique of the Bordering of Europe* (Houndmills: Palgrave Macmillan, 2015), 43–61.

scientific warfare was attributed to the invention of new armaments, which were assumed to have their origins in civilian science. Internationalists emphasized the power of this new warfare by arguing that it gave an over-riding advantage to the aggressor, adding further instability to the already anarchic state of international relations. Ideas about scientific warfare and its impact first became important for British international relations writers in the 1920s, but they quickly transferred over to the USA where they resonated much more strongly in the late 1930s and during the Second World War.

In Britain, the most developed versions of these arguments were put forward by the industrial magnate and Liberal MP David Davies (later a Baron), particularly in his *The Problem of the Twentieth Century: A Study in International Relationships*, published in 1930.[56] In it Davies presented a lengthy articulation of the argument that the First World War had ushered in a new era of destructive warfare based on modern, science-based weapons, the most powerful of which were 'aeroplanes and poison gas'.[57] Davies did not see new warfare as substantially altering the system of international relations – warfare was still driven by imperialist or nationalist motives, and remained a function of the anarchic nature of international relations. It did, however, make wars more deadly, and so made the prevention of warfare more important than ever before. As the next chapter shows, Davies developed these ideas into what he called the principle of the 'differentiation of weapons' which became part of the intellectual foundation of his attempts to reconstruct international relations through collective security and international organization. By ceding these new scientific weapons to international organization, leaving the older and less effective ones in the hands of nations, it was now possible, he reasoned, to abolish war.[58]

In the United States these ideas were explored in most depth by the academics and intellectuals Quincy Wright and James T. Shotwell, and the popular writer Ely Culbertson, though they found a wide audience through textbooks as well. For these internationalists the destructiveness of modern warfare was the end point of the progressive development of weapons through the ages. The industrial revolution accelerated this process, culminating in the modern scientific armaments which now threatened, in the words of Shotwell's 1936 *On the Rim of the Abyss*, to return civilization 'to the Dark Ages'.[59] Widely used international relations textbooks such as Frederick Schuman's 1933 *International Politics*

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[56] David Davies, *The Problem of the Twentieth Century: A Study in International Relationships* (London: Ernest Benn, 1930).
[57] Ibid., 275, 326–327.   [58] See Chapter 2.   [59] Shotwell, *On the Rim of the Abyss*, viii.

and Walter R. Sharp's and Grayson Kirk's 1940 *Contemporary International Politics* argued that the most important transformation in warfare arose from post-1800 development of industrialized weapons which lead to the birth of modern 'mechanized armies' many times more powerful than those which had gone before.[60] Shotwell similarly argued for a transformation of warfare in the 1800s in his 1929 *War as an Instrument of National Policy*, a warfare which in the new 'scientific era' mobilized new inventions, industry, and the 'entire economic structure of the belligerent nations'.[61] His 1944 *The Great Decision* used the then increasingly popular terms 'total war' and 'totalitarian war' (interchangeably) to describe this new type of warfare.[62] These histories allowed the authors to argue that modern war was immensely more destructive than previous wars, and so its abolishment needed to be a priority for diplomats and politicians.

The most prominent liberal internationalist theorist of warfare was the international legal expert Quincy Wright. In 1926 Wright was placed at the head of a large interdisciplinary research project on war at the University of Chicago. Wright published some of his early thinking on war in the 1930s, but the fullest exposition of his ideas arrived in 1942 with the publication of the 1,500-page *Study of War*.[63] Both an assimilationist culmination of the Chicago war project as well as the most developed elucidation of Wright's own thinking, *Study* was the most thorough liberal internationalist study of war to date. Wright presented a schematic for the development of warfare through the ages, culminating in the age of 'industrialization and nationalistic wars' (1789–1914) and finally from 1914 onwards the age of the 'airplane and totalitarian war'.[64] Modern current-day warfare, he argued, had six distinguishing characteristics: mechanization, increased army size, militarization of population, nationalization of war effort, total war, and 'intensification of operations'. These taken together he termed 'totalitarian war' – the logical end-point of a centuries-old arms race which manifested through the cyclical dominance of defensive and then offensive armaments.[65] In the totalitarian

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[60] Frederick L. Schuman, *International Politics: An Introduction to the Western State System* (New York: McGraw Hill, 1933), 644–649; Grayson Kirk and Walter R. Sharp, *Contemporary International Politics* (New York: Farrar & Rinehart, 1940), 397–427.

[61] Shotwell, *War as an Instrument of National Policy*, 32–38.

[62] James T. Shotwell, *The Great Decision* (New York: Macmillan, 1944), 3–15. On the terms 'total war' and 'totalitarian war' see: Hew Strachan, 'Essay and Reflection: On Total War and Modern War', *The International History Review* 22, no. 2 (2000): 341–370.

[63] Quincy Wright, *The Causes of War and the Conditions of Peace* (London: Longmans, Green, 1935); Quincy Wright, *A Study of War*, 2 vols. (Chicago: University of Chicago Press, 1942).

[64] Wright, *A Study of War*, vol. 1, 291–312.   [65] Ibid., 303–312.

phase, it was the offensive armaments which were in the ascendant. This warfare was totalitarian because it suited totalitarian states (who would be better than democracies at waging it), and because non-totalitarian states would have to adopt some totalitarian characteristics in order to wage it effectively. The impact on international relations was thus to give an advantage to aggressive totalitarian states, and to put liberal democracies at a disadvantage. To make matters worse these modern wars had a tendency to spread because of growing interdependence.[66]

Study did not reach a wide audience, instead the US reading public were exposed to internationalist thinking on war and international relations through the writings of the celebrity bridge player Ely Culbertson. His widely read *Total Peace: What makes Wars and How to Organize Peace* (1943) used a Davies-like typology of modern armaments to explain the impact of war on international affairs. Like others, Culbertson saw the industrial revolution as introducing a 'machine age' which 'revolutionized the structure and the technique of modern weapons, creating a new military age of heavy fighting machines'. Like Davies, he envisaged that this had led to an increasing divergence between two classes of weapons: 'heavy', scientific, complex mechanical weapons, and cheaper, lighter, simpler ones. Although initially only the USSR, Britain, and the USA would have such weapons, spreading industrialization would mean that other countries, especially China and Japan, could eventually develop them too. Larger countries would retain an advantage in industrialization, though, leading to a dangerously unstable system of international relations in which a small number of large powerful industrialized states confronted each other, with smaller states 'satellized around protector states'. As later chapters show Culbertson, like Davies, then went on to argue that this differentiation of weapons allowed for the formation of an effective international political organization armed with an international police force.[67]

The internationalist view of interdependence and war was contested by opponents of liberal internationalist causes. Although few denied that transport and communications were interconnecting the world, opponents argued that its significance was overstated. In the United States these arguments emerged most forcefully during debates surrounding arms-embargo legislation tabled before the Senate in 1933.[68] John Bassett

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[66] Ibid., 300–304, 313–314. For more on the internationalist nature of *A Study of War* see: Waqar Zaidi, 'Stages of War, Stages of Man: Quincy Wright and the Liberal Internationalist Study of War', *The International History Review* 40, no. 2 (2018): 416–435.

[67] Ely Culbertson, *Total Peace: What makes Wars and How to Organize Peace* (Garden City, NY: Doubleday, Doran, 1943), 21, 23–31, 42.

[68] Shinohara, *US International Lawyers in the Interwar Years*, 123–131.

Moore, an opponent of this legislation and a senior authority on international law (and once a judge on the Court of International Justice), made his case for non-intervention in European affairs by attacking the 'remarkably unfounded' internationalist argument that 'improved means of communication' were now causing previously localized conflicts to spread more widely. His 'Appeal to Reason' (published in *Foreign Affairs* in 1933) pointed out that the First World War 'did not begin as a local war' and 'did not exceed the spread of all previous wars, or equal that of some of them'. Moreover, 'The numerous local wars that have since occurred, but have remained local, clearly demonstrate that the supposed greater likelihood of spread is fanciful'.[69] In fact, Moore argued, speedier communications and transport empowered the state, and would allow the United States government to more effectively enforce its neutrality. He also attacked the 'hasty supposition' that 'by various modern devices ... discordant races and peoples have been harmoniously united in thought and in action and in brotherly love'. Indeed, 'The French and the Germans have for centuries lived side by side. No artificial device is needed to enable them quickly to come into contact'.[70] In Britain, by contrast, there was much less overt criticism of interdependence, perhaps because of perceptions of empire and because debates about intervention in Europe did not rest on connectivity to Europe, as economic and other connections could not be denied.[71] Internationalists claimed, as a riposte, that their opponents displayed ossified and out-dated worldviews. In *On the Rim of the Abyss* Shotwell maintained that Moore's opinions were part of a wider 'conservative' worldview of international relations which failed to recognize the transformations science had wrought on society and international affairs. Only the 'post-war peace movement' appreciated the impact of the 'interdependence of nations' and the fact that it had been brought about 'through the inventions and discoveries of science'. Shrugging off the criticism that peace movements were idealistic, he claimed that their

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[69] John Bassett Moore, 'An Appeal to Reason', *Foreign Affairs* 11, no. 4 (1933): 547–588. For more on Moore's view: Justus D. Doenecke, 'Edwin M. Borchard, John Bassett Moore, and Opposition to American Intervention in World War II', *The Journal of Libertarian Studies* 6, no. 1 (1982): 1–34.

[70] Moore, 'An Appeal to Reason'.

[71] Perhaps the most significant came from E. H. Carr in his 1939 attack on 'utopianism', *The Twenty Years' Crisis*. He, however, only focused on 'instruments' of mass media, which he argued carried no agency themselves. Instead of any inherent internationalism, their effects reflected the vested interests of those that controlled them: in 'totalitarian countries' the government and in 'democratic countries ... immense corporations' which collaborated with government. Carr, *The Twenty Years' Crisis*, 171–172.

activism was in fact grounded in an awareness of this new material reality.[72]

Cultural Lag

Interdependence and scientific war were drawn together through the concept of a 'cultural' or 'social lag' to construct a wider view of international relations. This master trope framed the various other claims about modern science, invention, and society, and helped to position social scientists and other commentators as experts on the impact of science on society. The lag argument was used both in relation to national society and in explanations of international relations – in the latter allowing internationalists to rebut more effectively the claim that there was precious little internationalism to be found in relations between states. The argument could be found in the writings of almost every British and American liberal internationalist one might care to name from the 1920s onwards.

Although there were several versions of the lag argument, in its essence it asserted that science and scientific inventions had advanced beyond mankind's understanding or control, leading to detrimental effects on society or international affairs. Typical arguments were that modern science-based armaments had advanced beyond society's ability to control their effects; or that man's social and/or governmental institutions were unable to deal with the consequences of the new transport-driven interdependence. In these arguments nationalism, nation-states and traditional militaristic thinking were depicted as increasingly redundant relics of an earlier era now holding back scientific and technical advance. Old-fashioned diplomats and politicians were often characterized as embodying the worst of this backwardness. Nationalism was more dangerous now than ever before because modern communications were putting peoples into increasing contact with each other, causing their nationalist impulses to clash, and leading to war. Sometimes the argument was made that man's understanding of social affairs lagged behind his understanding of scientific and technical matters. In some cases this argument was distilled into a specific concern with the state of the political and social sciences – that it was these which lagged professionally, methodologically and financially behind the natural sciences. If the social sciences could be advanced through the scientific study of society and politics, it was argued, the social effects of modern science and its applications could be understood and controlled.

[72] Shotwell, *On the Rim of the Abyss*, 41–44.

Although their earliest use in international relations writing was in Britain (for example by Norman Angell in 1913, Alfred Zimmern in 1914, and Arthur Greenwood in 1916), lag arguments were elaborated in the greatest detail in the United States.[73] In Britain lag arguments were tied more closely to calls for the empowerment of the League of Nations and the radical (Wells-esque) technocratic ordering of international relations, and were one of several motifs used to support these aims. Internationalists such as C. Delisle Burns and Noel Baker argued that the League was required for society and nations to deal with the effects of modern science and science-based machines.[74] They were also prominent calls for the technical and technocratic study and ordering of society – as in for example economist Josiah Stamp's 1936 Presidential address to the British Association for the Advancement of Science.[75] But it was through the writings of H.G. Wells that these arguments were introduced to wider audiences, particularly in relation to technocratic ordering. Although prominent in his earlier writings on the need for international organization, Wells' articulation of the lag probably reached its widest audience through his 1933 best-selling novel *The Shape of Things to Come*.[76] Through the novel Wells observed that man's 'social invention' lagged behind 'mechanical invention', but used the lag most forcefully to explain the onset of the war: 'new means of communication and transport, and the new economic life . . . were necessitating the reorganization of human affairs as a World-State', however the world was 'already parcelled up', leading to 'steadily intensified mutual pressure to develop into more or less thinly disguised attempts at world conquest'. The destructiveness of war reflected the fact that armaments had become too advanced for the 'small and antiquated disputes' for which they were used. Wells' solution was technocratic rule by a small group of aviators committed to technical advancement and free trade.[77]

[73] Zimmern, 'German culture and the British Commonwealth'; Angell, *The Great Illusion*, xiii; Arthur Greenwood, 'International economic relations', in Grant et al., *Introduction to the Study of International Relations* (London: Macmillan, 1916), 66–112.

[74] For example: C. Delisle Burns, *Modern Civilization on Trial* (New York: Macmillan, 1931), 178; Noel Baker, 'The Growth of International Society'; Howard-Ellis, *The Origin, Structure, and Working of the League of Nations*, 24, 63; C. Delisle Burns, *A Short History of International Intercourse* (London: George Allen & Unwin, 1924); C. Delisle Burns, *International Politics* (London: Methuen, 1920), 8, 11.

[75] Josiah Stamp, 'The Impact of Science Upon Society', *Science* 84, no. 2176 (September 1936): 235–239. Later expanded as: Josiah Stamp, *The Science of Social Adjustment* (London: Macmillan, 1937).

[76] H. G. Wells, *In the Fourth Year: Anticipations of a World Peace* (New York: Macmillan, 1918); H. G. Wells, *The Idea of a League of Nations* (Boston: Atlantic Monthly Press, 1919); H. G. Wells, *The Shape of Things to Come* (London: Hutchinson, 1933; London: Penguin, 1993). Citations henceforth refer to the Penguin edition.

[77] Wells, *The Shape of Things to Come*, 36, 55–56. These aviators are discussed in Chapter 2.

Lag arguments were more prominent in the United States by the early 1930s, especially in popular books where they often provided over-arching framing arguments. Internationalist activists and academics used them to make a case for the scientific study of international relations (especially interdependence), and for the strengthening of international organization. One prominent exposition was by noted internationalist Raymond B. Fosdick in a collection of his lectures, titled, tellingly, *The Old Savage in the New Civilization* (1928). Fosdick argued that man would not be able to control the great powers that the 'scientific revolu-tion' had put at his disposal unless the social sciences were developed too. He lamented the 'divergence between the natural sciences and the social sciences' caused by the gap between 'the brilliant development of scien-tific knowledge on the one hand and the almost stationary position of our knowledge of man on the other'. He called for the social sciences to inculcate 'the same technique that characterize our treatment of physics and chemistry'. Such scientific study of international affairs would con-firm, he claimed, the need for a League of Nations to 'handle the common interests of mankind that overflow national boundaries'.[78] In a letter to Paul Mantoux (the co-founder of the Geneva-based Graduate Institute of International Studies), he noted that:

It is a platitude that the recent war, together with our stupendous scientific advances, such as transcontinental trains, fast steamers, airplanes, wireless, etc., have brought the nations practically to each other's door-steps without having provided an adequate corresponding advance in their methods of dealing with each other. The relationships between nations since 1914 have been so funda-mentally revolutionized that practically all the pre-war studies and theories have been swept by the board and a wholly new set of difficulties created.[79]

John Herman Randall, Sr., founder of the World Unity Foundation, made similar arguments in his 1930 *A World Community*. Randall held that 'the new means of communication which science has devised' were the crucial driver behind the creation of a single global consciousness. Citing the works of prominent British and American internationalists Randall asserted that these new means join the world together into 'one physical neighbourhood' and 'one geographic community'.[80] Repeating

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[78] Raymond Blaine Fosdick, *The Old Savage in the New Civilization* (Garden City, NY: Doubleday, Doran, 1928), 36–37, 40, 44. The first lecture in this collection is titled 'Our Machine Civilization'.

[79] Raymond Blaine Fosdick, Memorandum, 'A Proposal to Establish an Institute of International Research', n.d., c. 1926, folder 11, box 154, Paul Mantoux Papers, Archives of the League of Nations, Geneva.

[80] John Herman Randall, *A World Community: The Supreme Task of the Twentieth Century* (New York: Frederick A. Stokes, 1930), 9, 21.

Fosdick's arguments almost word for word, he noted that warfare occurred because of the gap between the physical sciences and the lagging 'knowledge of man'. To stop society from 'cracking under the strain' he called for the 'increasing development of the same scientific method and spirit in the social sciences that has already found expression in the physical sciences, and a frank recognition that it is only though the scientific, rather than the older political methods, that the desirable changes can be brought about'.[81]

In the United States lag arguments were in fact well known beyond writings on international relations, with a rich literature in particular in academic sociology. Notably sociologist William F. Ogburn carved out a niche as the leading theorist of cultural lag arguments in relation to national society, and his work came to be widely debated in US sociology circles, and more broadly, by the 1930s.[82] The greater prominence of lag arguments in the United States as compared to Britain was due to a greater fascination with mechanization and industrialization, and their impact on society. The sense of rapid mechanical change was accentuated by faster national communications and connectivity, rapid electrification and mechanization in homes, and the growth of huge industrial and civil engineering enterprises.[83] Lag arguments also drew off a deeper well of engineers', social scientists', and social reformers' calls for more technical expertise in national policymaking.[84] And so Randall was able to announce that in relation to international relations 'social engineers and technicians must be recognized and accepted for what they are – the trained and competent experts in their particular field of social control and social reorganization, to whom rulers and statesmen must look for light on the new problems that old methods and formulas have proved themselves unable to solve'.[85]

Lag arguments continued well into the Second World War and were once again most noticeably reproduced in popular works. Wells in his 1940 *The New World Order* noted that the League of Nations 'broke down'

[81] Ibid., 53, 50, 52, 87–88.
[82] For an example of Ogburn's lag arguments see: William F. Ogburn, *Social Change with Respect to Culture and Original Nature* (New York: B. W. Huebsch, 1922). In 1957 Ogburn wrote that he had first used the term 'cultural lag' in 1914 and had developed a fully articulated theory by 1915: William F. Ogburn, *On Culture and Social Change* (Chicago: University of Chicago Press, 1964), 87. For a review of critiques of Ogburn's lag arguments see: Joseph Schneider, 'Cultural Lag: What Is It?', *American Sociological Review* 10, no. 6 (December 1945): 786–791.
[83] John M. Jordan, *Machine-Age Ideology: Social Engineering & American Liberalism, 1911–1939* (Chapel Hill: University of North Carolina Press, 1994), 3.
[84] Ibid., 255–279.   [85] Randall, *A World Community*, 87–88.

because it ignored the 'vast disorganisation of human life by technical revolutions, big business and modern finance that was going on'. He criticized the British government for failing to look beyond Hitler and to plan for the required 'new world order'; the war was 'delaying and preventing an overdue world adjustment'.[86] By the end of the war US world federalists were mobilizing lag argument in their increasingly popular calls for world federation. Books by publishers William B. Ziff, Sr. (whose magazines included technology-orientated *Popular Aviation*, *Radio News*, *Amazing Stories*, *Air Adventures*, and *Popular Electronics*) and Emery Reves claimed that the lag between modern science and the structure of international relations could only be resolved through international (in Ziff's case regional) federation. Ziff updated the usual list of world-changing modern sciences and machines by including 'chemistry, light metals and electronics'.[87] Reves emphasized industrialization more broadly. Echoing a motif first used by Harold Laski in 1931, he framed his best-selling (pre-Hiroshima) 1945 *The Anatomy of Peace* through the rubric of outdated 'Ptolemaic' political institutions versus a scientific 'Copernican' world. Reves explained why 'Our Ptolemaic political conceptions in a Copernican industrial world are bankrupt': 'scientific and technological developments achieved by the industrial revolution' had given rise to new problems of an international nature, including the need to promote international trade and communication, and the problem of modern industrialized war. The solution to the 'clash between industrialism and political nationalism' was world federation. The 'false notion of Inter-nationalism' and its international machinery such as the 'San Francisco League' would not work as it left national sovereignties intact.[88]

Lag arguments persisted in international relations writing too. Leonard Woolf's 1940 response to Carr's *Twenty Years' Crisis* framed an explanation for the war in terms of the lagging 'mediaeval' thinking of the 'European ruling classes' combined with the 'nationalism' of the 'ordinary people'.[89] Although the lag argument played an important part in Mitrany's functionalist approach as expressed in 1943, it was only briefly stated. The 1946 edition of this essay made it more explicit. The

[86] H. G. Wells, *The New World Order: Whether It Is Attainable, How It Can Be Attained, and What Sort of World a World at Peace Will Have to Be* (London: Secker and Warburg, 1940), 36. See also page 30.

[87] William B. Ziff, Sr., *The Gentlemen Talk of Peace* (London: John Lane the Bodley Head, 1945), 107–108.

[88] Emery Reves, *The Anatomy of Peace* (New York: Harper Brothers, 1945), 27, 29, 42, 175–176, 184, 268, 274; H. J. Laski, 'The Theory of an International Society', in Laski, *Problems of Peace*, 6th Series, 188–209.

[89] Leonard Woolf, *The War for Peace* (London: George Routledge & Sons, 1940), 74–77.

nineteenth century 'saw the rise of national states' but at the same time new factors of 'communications, of new sources of power, of new materials, of the opening up of new lands and the rise of mass production' broke down barriers and 'bound peoples increasingly together'. This, then, is what had led to the central 'paradox' of the twentieth century, that 'social life has a highly integrated organic unity, but politically our outlook is bound to a mosaic of separate national units'.[90]

Textbooks

Much of this thinking on science and machines was reproduced in and popularized by leading US international relations textbooks in the 30s and 40s. They were also instrumental in popularizing the word 'technology' in international relations writing, helping it to become the standard term for modern world-changing scientific machines by the mid-forties. Professor of Government Clyde Eagleton's *International Government* was the more conventional of the two major internationalist textbooks of the 1930s. The 1932 edition (there were revised editions in 1948 and 1957) was essentially a description and history of the development of particular forms of international cooperation, including the League of Nations. These were explained as manifestations of modern international relations which, Eagleton insisted, needed to be envisaged as a 'community' of interdependent nations, formed on the basis of 'new inventions' ('steam and electronic railways and ships, telegraphs and telephone, newspapers, and now aviation, radio, and moving pictures') flowing out of the industrial revolution. Like other internationalists, he saw these inventions as the product of international 'science' ('the joint produce of men of various nationalities who combined their knowledge for the benefit of mankind') which had 'decreased the size of the earth, made mankind one interdependent community socially and economically, and has changed the material basis of civilization faster than habits and traditions can keep pace'.[91]

Internationalist political scientist Frederick L. Schuman's *International Politics* was by far the most widely read, and probably the best-selling, textbook of the 1930s. First published in 1933, it was revised and republished in 1937 and 1941, and then four times thereafter. *International Politics* suggested that just as all 'state systems' had in the past evolved to

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[90] David Mitrany, 'A Working Peace System (1943)', in *The Functional Theory of Politics* (London: LSE & Political Science, 1975), 123–132.

[91] Eagleton, *International Government*, 10, 15. On 1930s textbooks see: Warren F. Kuehl, 'Webs of Common Interests Revisited: Nationalism, Internationalism, and Historians of American Foreign Relations', *Diplomatic History* 10, no. 2 (April 1986): 107–120.

some form of world state, so would the current 'Western state system'. The first three editions incorporated broadly the same arguments regarding science, 'technology' and this progressing international organization. These began with Reinsch's claim that International Public Unions marked the beginnings of a modern process of international organization. They were formed as a direct result of the 'industrial revolution' through which 'the new technology of the machine age introduced greater changes in the techniques of production, distribution, transportation, and communication than had occurred during the previous millennium'.[92] International organization consequently arose not because of the 'agitation of pacifists and reformers' or the need to deal with 'great issues of international politics', but rather out of the 'urgent necessity of international action in dealing with technical and routines matters'.[93] This was only the beginning of mankind's march to global integration, 'The world government of the future is already technologically possible':

Machine technology facilitates the surmounting of such barriers and makes possible an extension of State power over distances once regarded as fantastic. The world empires of today are existing realities made administratively possible by the new technology.[94]

Yet international organization was not progressing as fast as it should due to the lag between the 'the impact of science, technology, and the Industrial Revolution' and 'people unable or unwilling to adapt old habits to the stubborn facts of a changed world'. The word 'technology' was used singularly to refer to the complex of industrial and mechanical inventions emerging from the industrial revolution. This new 'system of technology' or 'machine industry' was created through the application of science to war, production, transportation, and communication, and had resulted in the 'unification of the world ... with no commensurate unification of the separate sovereignties of the World State System into a world polity. The Industrial Revolution changed a world of isolated, independent societies into a world of integrated, interdependent societies'. This lag required, Schuman suggested, a reformation of the system of international relations towards 'world unity'.[95]

Of the internationalist textbooks published during the war, two stand out for their emphasis on science and technology. The more popular of these was *Contemporary International Politics* (1940) by the political scientists Grayson Kirk and Walter Sharp. The book is notable for its widespread use of the term 'technology', particularly in a chapter titled

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[92] Schuman, *International Politics*, 242.   [93] Ibid., 242.   [94] Ibid., 506–507.
[95] Ibid., 93. Frederick L. Schuman, *International Politics: The Western State System in Transition*, 3rd ed. (New York: McGraw-Hill, 1941), 689.

'Technology and Communications', and was the first textbook to fully reflect the developing thinking on science and technology within the wider discipline of the social sciences.[96] By the late 1930s social scientists had begun to articulate the relationship between the term 'technology' and science. John C. Merriam's article on 'The Relation of Science to Technological Trends' in the 1937 report of the Subcommittee on Technology of the National Resources Committee on *Technological Trends and National Policy*, for example, noted that, although science was distinct from technology, its contribution to the latter was self-evident, though 'only in part direct'. Instead 'inventive genius' mediated by applying the results of 'research' to transform technology. A 'relatively large percentage' of 'recent advances' were a result of the application of 'the contribution of science carried to application by engineering', including new developments in transport and communications such as the automobile and radio.[97] This understanding was expounded in *Contemporary International Politics*, which, like earlier textbooks, presented a handful of transport and communication 'inventions' (presumed to be civilian) as evidence of the increasing effect of technology on international relations.[98] 'The airplane, the motion picture, the talking picture, and the radio', the authors claimed, would be serving the cause of internationalism were they not being perverted by the forces of nationalism. On radio, for example, they concluded that 'so long as the world is rent by such deep political cleavages as have marked the 1930s, the instrumentality of radio is not likely to contribute anything of importance to the organization of peaceful international relations. Indeed, by perverting the radio to aggressive propaganda, fascism has pursued a diametrically opposite course'. Similarly, 'Because of the close connection of civil and military aviation, the progress of commercial air transport has been influenced, if not handicapped, by national military considerations.' They counterposed a future of globalized 'constructive internationalism' against a future of misused technology, of 'political isolationism, national self-sufficiency, and competitive militarism'.[99]

University of Washington-based political scientist Linden A. Mander's *Foundations of Modern World Society* (1941), the other prominent wartime internationalist textbook, chose instead to emphasize international technical organization. The book was arranged around international problems which 'nations cannot by themselves adequately organize' and so

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[96] Kirk and Sharp, *Contemporary International Politics*.
[97] John C. Merriam, 'The Relation of Science to Technological Trends', in *Technological Trends and National Policy*, ed. National Resources Committee (Washington, DC: Government Printing Office, 1937), 91–92.
[98] Kirk and Sharp, *Contemporary International Politics*, 146–191.   [99] Ibid., 166, 190, 191.

required 'international government'. Individual chapters tackled, amongst others, international health, crime, monetary issues, trade, population and resources. Rather than suggesting a Mitranian solution based on the integrative activities of international technical organizations, he suggested instead the formation of an international political organization: 'it would be the height of folly to restore the small nations as sovereign entities … of what use to re-establish even a sovereign Britain or France?'[100]

Into the Post-war Period: Theorizing War and the Bomb

These approaches to science and machines persisted after the Second World War and were prominent enough to elicit a gathering at the University of Chicago in May 1948 on 'Technology and International Relations'. The assembled social scientists (mostly) repeated assumptions about science and technology noted in the sections above, but imported the atomic bomb into their Theorizing. William F. Ogburn's summing up of the papers concluded that both 'modern war inventions' (the atomic bomb, the air bomber, and the tank) and 'transportation inventions' (ship, railroad, the automobile, and most importantly the aeroplane) tended to amalgamate nations. Even if 'durable world state seems remote, the forces which help to produce the very large durable state are in existence'.[101] He espoused his lag approach in papers on 'Aviation and International Relations' and 'The Process of Adjustment to New Inventions'. Quincy Wright talked about the effects of 'war inventions' and 'peace inventions' and the consequent need for world federation in his paper on 'Modern Technology and the World Order'; the political scientist Robert Leigh reminded readers of the global integrative effects of 'mass communication inventions'; and historian A.P. Usher suggested that the 'present crisis in international relations' was 'primarily due' to the Industrial Revolution in his paper on 'The Steam and Steel Complex and International Relations'.[102]

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[100] Linden A. Mander, *Foundations of Modern World Society* (Stanford: Stanford University Press, 1941), vi, vii, 882.

[101] William F. Ogburn, 'Introductory Ideas on Inventions and the State', in *Technology and International Relations*, ed. William F. Ogburn (Chicago: University of Chicago Press, 1949), 1–15.

[102] The only contrary approaches were by realist political scientists Bernard Brodie and William T. R. Fox who did not see international political integration as an outcome or response to the atomic bomb. William T. R. Fox, 'Atomic Energy and International Relations', in Ogburn, *Technology and International Relations*, 102–125; Bernard Brodie, 'New Techniques of War and National Policies', in Ogburn, *Technology and International Relations*, 144–173.

Certain themes emerged more strongly than others in post-war writings on international relations. Interdependence, though still referred to in internationalist texts, lost its previous prominent place in their narratives. The fourth (1948) edition of Schuman's *International Politics* barely mentioned interdependence.[103] Quincy Wright's last major internationalist text, published in 1955, de-emphasized the role of interdependence, though still made reference to it. The historical development of global systems of international relations ('the Hague System, through the League of Nations, to the United Nations'), he informed his readers, had progressed in step with the development of communications ('steady progress from the slow and infrequent sailboats, horseback riders … through the more rapid and abundant steamboats and railroad trains … telegraph, cable, and radio').[104] Both led to ever-increasing international government, though counter currents remained, even as 'material and technological tendencies make for world unity … moral and sentimental tendencies make for national societies'.[105] New textbooks such as Norman Palmer and Howard Perkins' 1953 *International Relations* noted the existence and importance of interdependence, but characterized it as an economic phenomena, and did not highlight any mechanical or scientific foundation.[106] One significant exception was the 1948 edition of Eagleton's *International Government* which continued to dedicate a section to interdependence, only reducing it in the 1957 edition with a footnote explaining that it was no longer necessary to 'fully illustrate' the 'effects of interdependence'.[107]

Although the terms 'machine' and 'machine age' disappeared by the late forties, 'science' and 'technology' continued to be used. Schuman's fourth edition of *International Politics* (1948) continued to use 'technology' as a collective term for advanced machines and armaments, and framed the era of modern international relations as a technological age in which technology brought both benefits and threats. In this edition this point was illustrated through detailed studies of the use of modern armaments in the Second World War and failed attempts at the international control of the atomic bomb.[108] Quincy Wright, who had barely used the

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[103] F. L. Schuman, *International Politics: The Destiny of the Western State System*, 4th ed. (New York: McGraw-Hill, 1948).

[104] Quincy Wright, *The Study of International Relations* (New York: Appleton-Century-Crofts, 1955), 275–276.

[105] Ibid., 276.

[106] Norman D. Palmer and Howard Perkins, *International Relations: The World Community in Transition* (Boston: Houghton Mifflin, 1953).

[107] Clyde Eagleton, *International Government*, 2nd ed. (New York: Ronald Press, 1948), 8–13; Clyde Eagleton, *International Government*, 3rd ed. (New York: Ronald Press, 1957), 8.

[108] Schuman, *International Politics,* 4th ed., 16, 61, 87, 98, 104, 381–391, 414, 925–937.

word 'technology' in the 1930s and 40s, now concluded in *The Study of International Relations* that:

Technological advance tends to lead to the dilemma of one world or none. Until there is a sufficiently general and simultaneous will to make international organization work one world can give little security. But so long as each state looks to itself alone for defense, no state will enjoy security in a technologically united world. Technological advance has left man with the necessity of understanding himself in society, as well as he understands nature and its control, if he is to solve his political problems.[109]

The political scientist John Herz, more than anyone else, put the bomb at the heart of his post-war theorizing on international relations. By doing so he echoed many of the themes already developed by liberal internationalists. By the late forties Herz had come to believe in the need for a synthesis of 'political realism' and 'political idealism', a synthesis which advocated achievable liberal aims.[110] Although his 'realist liberalism' called for a radically transformed international relations in the face of recent science-based invention, it actually restated long-standing thinking. He contended that from the interwar period onwards the 'territoriality' of modern states was being denationalized by various factors, the most important of which were 'air warfare' and 'atomic warfare'. These weapons, however, were not the end of it; the 'processes of scientific invention and technological discovery' would continue to create more deadly 'innovations'. Before the bomb, he concluded, internationalists who called for world government were 'utopians'. Now, however, the world had to move beyond national sovereignty in order to deal with these newly invented weapons. He expressed his preference for some form of international government, which, quoting prominent physicist J. Robert Oppenheimer, he described as a 'radical solution' rather than a 'conventional one'.[111]

Cultural lag theories were also given a new (but short-lived) lease of life by the bomb. Ogburn turned to apply his well-established sociological analysis to international relations after the war. A United Airlines-funded study *The Social Effects of Aviation*, published in 1946, developed a lag-based model of the relationship between aviation and nationalism. Ogburn assumed aviation to be inherently civilian in nature, and

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[109] Wright, *The Study of International Relations*, 385.
[110] See in particular: John Herz, 'Idealist Internationalism and the Security Dilemma', *World Politics* 2, no. 2 (January 1950): 157–180; and John Herz, *Political Realism and Political Idealism: A Study in Theories and Realities* (Chicago: University of Chicago Press, 1951).
[111] John Herz, 'The Rise and Demise of the Territorial State', *World Politics* 9, no. 4 (July 1957): 473–93. See also: John Herz, *International Politics in the Atomic Age* (New York: Columbia University Press, 1959).

significant for international relations in that respect. Military aviation's effect was a deviation from aviation's natural influence, which was to allow for the formation of larger states within the world. But, and here is where Ogburn added his own twist, aviation could further either nationalism or internationalism within each state, depending on where the nation stood in terms of its nationalistic maturity – where it sat on a 'curve of nationalism'. Countries with differing languages, poor communications, and large sizes tended to have become 'over-expanded', and so there nationalism and national cohesion has some way to develop. In such states, which had low 'cohesiveness', aviation would bind the nation closer together, strengthening nationalism. In small states, which would already have high cohesiveness (where the curve of increasing nationalism had reached a plateau), civil aviation was more likely to inculcate internationalism. Military aviation, meanwhile, furthered nationalism. His conclusion was that aviation would strengthen regional groupings of states and eventually develop 'co-operation in world government'.[112] But, like others, Ogburn called for further study of the lag created by the invention of the atomic bomb, and suggested international control and the dispersion of the populations from America's largest cities as solutions to this lag.[113]

Duke University-based sociologist Hornell Hart produced the most articulated arguments relating the atomic bomb to lag. Hart presented his lag thesis through a paper on 'Technology and the Growth of Political Areas' at the Chicago institute mentioned earlier, and in papers published in the late forties and early fifties.[114] Like Ogburn he called for social science to be 'applied to the problems of directing international co-operation toward the protection of mankind from destruction by physical science applied to military technology'.[115] Modern international relations, he noted, was in crisis due to 'technological acceleration' which was manifesting through the invention of increasingly deadly weapons. This was leading to an 'atomic crisis' which was 'the result of the lag of social sciences behind the accelerating evolution of physical sciences'. Social sciences had, however, solved such lags in the past – he cited reduced instances of lynching, typhoid deaths, air fatalities, tuberculosis deaths, diarrhoea and

[112] William Fielding Ogburn, *The Social Effects of Aviation* (Boston: Houghton Mifflin, 1946), 686–706, 720, 723. Also: William Fielding Ogburn, 'Aviation and Society', *Air Affairs* 1, no. 1 (September 1946): 10–20.
[113] William Fielding Ogburn, 'Sociology and the Atom', *The American Journal of Sociology* 51, no. 4 (January 1946): 267–275.
[114] Hornell Hart, 'Technology and the Growth of Political Areas', in Ogburn, *Technology and International Relations*, 29–57.
[115] Hornell Hart, 'Technological Acceleration and the Atomic Bomb', *American Sociological Review* 11, no. 3 (June 1946): 277–293.

enteritis, and railway fatalities.[116] He also plotted graphs of the earlier developments of various bodies of knowledge as they became increasingly scientized to demonstrate that the social sciences should also, in theory, be able to close the current gap with the physical sciences. Once this was done, mankind would have the instruments to be able to control 'technological acceleration' and atomic energy.[117] Hart's work was to be the last gasp for lag arguments in international relations. They were soon to disappear from sociology as well: the final significant outing was a 1964 reprint of some of Ogburn's research.[118]

As the liberal internationalist colour within the discipline of international relations faded into the early Cold War, so too did many of these long-standing approaches to science and technology. International relations theorists and textbooks no longer referred to lags or technologically driven interdependence as revolutionary transformations in international relations. New works focused on power dynamics made science and machines appear secondary to the understanding of world order. Political scientist Hans Morgenthau, in his assault on 'scientific' attempts to solve the problem of war (*Scientific Man Versus Power Politics*, 1946), went as far as to explicitly challenge interdependence arguments directly. He pointed out that the experience from the domestic realm was that 'modern communications' had not created new types of political unity but had instead strengthened those that 'existed before and independently of the development of modern technology'. So, although 'this is "one world" technologically', it would not develop into 'one world politically', because the world was deeply divided politically.[119] Rather than scientific or technologically driven change, the great 'moving force' within Morgenthau's conceptualization of international relations was, as he put it in his *Politics Among Nations* (1948), 'the aspiration for power of sovereign nations'.[120] The notion of a scientifically transformed warfare survived longer thanks to atomic weapons, but it disappeared as the discipline accommodated itself to the strategy of mutually assured destruction.[121]

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[116] Hornell Hart, 'Some Cultural-Lag Problems Which Social Science Has Solved', *American Sociological Review* 16, no. 2 (April 1951): 223–227.

[117] Ibid. See also: Hornell Hart, 'Atomic Cultural Lag: I. The Value Frame', *Sociology and Social Research* 32 (March 1948): 768–775; and Hornell Hart, 'Atomic Cultural Lag: II. Its Measurement', *Sociology and Social Research* 32 (May 1948): 845–55.

[118] Ogburn, *On Culture and Social Change*.

[119] Hans Morgenthau, *Scientific Man Versus Power Politics* (Chicago: University of Chicago Press, 1946), 79–80.

[120] Hans Morgenthau, *Politics Among Nations* (New York: Alfred A. Knopf, 1948), 8.

[121] Lawrence Freedman, 'The First Two Generations of Nuclear Strategists', in *Makers of Modern Strategy from Machiavelli to the Nuclear Age*, ed. Peter Paret (Princeton, NJ: Princeton University Press, 1986), 735–778.