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Charles Le Maistre: Entrepreneur in International Standardization

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Introduction: Entrepreneurship, Standard-Setting, and Le Maistre's Role

In Schumpeterian terms, entrepreneurship is a force of creative destruction, and entrepreneurs are risk-takers who pioneer an innovation—typically a technological innovation but also possibly an organizational innovation. Such entrepreneurs are often true-believers in the innovation, and proselytize for it in the marketplace and sometimes, in the case of what are today called “intrapreneurs,” within an organizational hierarchy. Industrial standardization is usually thought of as a staid field that limits, rather than promotes, innovation. Yet standard setting systems and organizations form what Giddens would consider social structures, which inevitably both constrain *and* enable.¹ These articles in this issue demonstrate that the standards field is populated by multiple individuals who can be seen as *entrepreneurs of standardization*, either in a particular technical arena or on a broader, organizational level.

This piece focuses on Charles Le Maistre, a figure who served as the evangelizing entrepreneur around an organizational innovation—voluntary consensus standards setting—extending it from the U.K. to many other countries and into the international realm. Indeed, he has been called both “the father of international standardization”² and “the deus ex machina of international standardization.”³ A British engineer, he was employed by the U.K.’s Engineering Standards Committee (ESC, one of the predecessors of today’s British Standards Institute, or

¹ A. Giddens, *The Constitution of Society: Outline of the Theory of Structuration*, Berkeley, CA, University of California Press, 1984.

² *Friendship among equals: Recollections from ISO's first fifty year*, Geneva, ISO, 1997, p. 16.

³ C. Sharp, Discussion on Standardization, *AIEE Transactions*, Vol.35, Part 1, 1916, p. 491, as cited in P. Van Den Bossche, *The Electric Vehicle: Raising the Standards*, doctoral dissertation, Vrije Universiteit Brussel, April 2003.

BSI) from its beginnings just after the turn of the 20th century, and he was a strong believer in the principles on which it was founded, including the coordination of producers and users in setting industrial standards and the establishment of local committees in British Dominions and in foreign countries to encourage use of British standards. As Assistant Secretary of ESC's Electrical Standards Section in 1906, when the International Electrotechnical Commission (IEC) was founded to establish international standards for nomenclature and ratings around electrical devices, he was appointed General Secretary of that new international institution, a position he held until 1953. The IEC, covering a single but broad domain, was the first significant international standardization association and developed many of the institutional structures and processes that survive today.

Le Maistre spread the word about voluntary standardizing associations that combined (and served the interests of) both industry representatives and engineering associations to many other countries, playing an important role in the creation of national standards bodies in France, Australia, and the U.S. In 1919 Le Maistre, by then head of the British Engineering Standards Association (BESA, the name for the British standards organization after ESC and before BSI), came to New York to address the newly formed American Engineering Standards Committee, saying “. . . if we can bring together the engineers of the English-speaking races, it will shortly be one of the greatest helps towards the peace of the world.” He argued for Anglo-American and worldwide cooperation among standardization bodies, though that was to take much longer to realize.

He played a central role in the formation of the first general international organization for standardization, the ISA (International Federation of Standards Associations). In a series of post-World War I conferences of national standards bodies held in Europe in the mid-1920s, the

associations agreed to form a more permanent body linking the national standards associations. Le Maistre wrote the draft proposal from which the ISA emerged, incorporating technical committees like those of the IEC, with their secretariat (administrative) work in most cases to be handled by the standardizing body of a single country. He was appointed one of two Secretaries of this organization, though he retained his roles in the British association and in IEC. This organization never fully transcended the tensions between the inch and metric blocs, but it led the way towards the subsequent, and more successful, ISO that would emerge after World War II. In the formation of this organization, too, he played an important role. Thus for 50 years, Charles Le Maistre was at the center of the emergence of an international system of standardization.

How should we understand Le Maistre's role? Joseph Schumpeter's notion of the "political entrepreneur" is one useful lens for doing so. Schumpeter was not only concerned with entrepreneurs in private businesses. He also developed a concept of a "political entrepreneur," someone who operated in the realm of partially organized political forces to establish the administrative and regulatory systems that facilitated investment in new generations of technologies and new generations of firms. William C. Mitchell, a celebrated public choice theorist explains that, "Like his counterpart in the economy[, . . . Schumpeter's] political entrepreneur becomes an advertiser[,] for that is the way in which he must compete for the attentions of busy citizens." Although Schumpeter viewed such advertisers of systems as necessary, he "also viewed them with the same aristocratic disdain that his one-time colleague Galbraith views Madison Avenue."⁴ From Schumpeter's perspective, Le Maistre would be a necessary, if a bit annoying, sort of organization builder, a creative proselytizer for a particular

⁴ W. Mitchell, "Schumpeter and Public Choice, Part II: Democracy and the Demise of Capitalism: The Missing Chapter in Schumpeter," in J. Wood, ed., *Joseph Schumpeter: Critical Assessments*, vol. iv, London, Routledge, 1991, p. 169.

kind of regulatory regime that, in fact, regularly proved itself capable of solving one of the main problems that can impede industrial innovation.

Political scientists long ago adopted Schumpeter's concept of a "political entrepreneur," but broadened its meaning to cover any *legislative* innovator.⁵ Consequently, when they have looked at "political entrepreneurship" in the field of standard setting more recently, they have typically focused on men and women who use legislative powers in the service of special interest groups, thus impeding standardization even in the face of high private demand and clear public welfare gains.⁶ This is quite the opposite of the role Le Maistre played, or that Schumpeter first highlighted.⁷

On the other hand, many recent analysts of international governance have focused on precisely the kind of evangelical work that Le Maistre performed. In John Braithwaite and Peter Drahos's massive empirical study, *Global Business Regulation*,⁸ they call this work "model mongering," and refer to the ubiquitous role in the development of international governance of men and women who promote a particular model solution to all kinds of regulatory problems, in all sorts of forums and whether or not the model solution seems, on the surface, to be completely appropriate to the problem at hand. Using less colorful language, other scholars have pointed to the importance of the same kind of advocacy of particular institutional designs, which has often

⁵ For the key usage of the term, see R. Dahl, *Who Governs? Democracy and Power in an American City*, New Haven, Yale University Press, 1961. For Dahl, the multiplicity of successful political entrepreneurs in New Haven helped prove that the plural sources of political power in the U.S., a position he contrasted to the assertions of C. Wright Mills and others that the U.S. was dominated by a small power elite.

⁶ See, especially, H. Spruyt, "The Supply and Demand of Governance in Standard-Setting: Insights from the Past", *Journal of European Public Policy*, vol. 8, June 2001, p. 371-91.

⁷ The role of a political entrepreneur who serves a particular interest is similar, perhaps, to what some management scholars have termed "institutional entrepreneurship," which takes place when a firm sponsors "its [own] technology as a common standard." For an exploration of how Sun Microsystems played this role relative to its Java technology, see R. Garud, S. Jain, and A. Kumaraswamy, "Institutional Entrepreneurship in the Sponsorship of Common Technological Standards: The Case of Sun Microsystems and Java", *Academy of Management Journal*, vol. 45, no. 3, 2002, p. 196-214.

⁸ J. Braithwaite and P. Drahos, *Global Business Regulation*, Cambridge University Press, 2000, p. 588-90.

been carried on by social movements with specific goals (improving safety, promoting human rights, etc.) that, nevertheless, propose their designs in many policy domains.⁹

Even though the innovation for which Le Maistre was a tireless advocate (voluntary consensus standard-setting on a national and especially international level) has now been extended to a host of unexpected realms (including human rights), Le Maistre's own advocacy agenda grew in two primary ways: As new industrial sectors emerged, he urged the extension of consensus standard-setting to them; for example, he took a practice that had first emerged for standardizing steel parts to serve the industries of the "Railway Age," and applied it to serve the manufacturers of electrical products and other "Second Industrial Revolution" industries in early 20th century. Secondly, he worked constantly to internationalize—and ultimately, to globalize—a practice that had begun (in this particular form) among British engineers. Neil Fligstein has written about the social and political skills so-often deployed by the proselytizers who try to convince others to adopt a given technology as a standard (consider, for example, Steve Jobs's personal campaigns for the iPod and iPhone)¹⁰; Le Maistre's favored technology may have been an organizational one, not a technical one, but he used the same set of skills.

Le Maistre-as-entrepreneur was not only an advocate or proselytizer. He also designed, recombined, and reformed organizational structures, often in surprising ways. Hokyung Hwang and Walter W. Powell argue that much of the existing literature on institutional entrepreneurs emphasizes only 1) the power of professionalism (of authority derived from knowledge of a particular realm) and 2) the significant social skills that have characterized many inventors of

⁹ C. Murphy, *Global Institutions, Marginalization, and Development*, London, Routledge, 2005, p. 54-72; R. Carpenter, "Setting the Advocacy Agenda: Theorizing Issue Emergence and Nonemergence in Transnational Advocacy Networks", *International Studies Quarterly*, vol. 51, March 2007, p. 99-120.

¹⁰ N. Fligstein, "Social Skills and Institutional Theory", *American Behavioral Scientist*, vol. 40, December 1997, p. 397-405.

successful new organizations (both public and private) over the last two centuries.¹¹ Both dimensions are important to understanding Le Maistre's role. Nonetheless, his institutional innovations themselves—the succession of successful organizations that he helped design—reflect a third important dimension, and perhaps the real core of his entrepreneurial role.

Le Maistre's involvement in the British standards-setting institution

Born into the family of a country parson in 1874, Le Maistre attended secondary school at Brighton College, where his father had become a master. Le Maistre applied for and was elected to student membership in the Institution of Electrical Engineers (IEE) in 1894, during his third year of training in this engineering field at London Central Technical College.¹² Two years later, having completed his studies and gotten employment in the electrical department of the Thames Iron Works and Shipbuilding Company of Blackwall, he applied for and was granted Associate status. In 1901, he became Assistant to the Secretary of the new British Engineering Standards Committee (ESC). With the outbreak of the first world war, its original secretary, Leslie Robertson, went into the ministry to work on the war effort; on his death, Le Maistre became Secretary and later Director of the Committee, remaining in that position until 1942.

The Engineering Standards Committee, initially formed under the auspices of the Institution of Civil Engineers to standardize iron and steel girders, included members from the Institutions of Civil Engineers, Mechanical Engineers, and Naval Architects, as well the Iron and Steel Institute.¹³ Within months it decided to extend the standardization efforts, and added members from the Institution of Electrical Engineers, of which Le Maistre was a part.

¹¹ H. Hwang and W. Powell, "Institutions and Entrepreneurship", in S. Alvarez, R. Agarwal, and O. Sorenson, eds., *Handbook of Entrepreneurship Research: Disciplinary Perspectives*, Berlin, Springer, 2005, p. 202-203.

¹² Charles D. Le Maistre, application for student status, filled out 8 November 1894 and granted 22 November 1894. Application for transfer to associate status filed and approved 14 January 1886. Both courtesy of The Institution of Engineering and Technology, London, U.K. See also obituary notice, "Charles Delacour Le Maistre", *The Journal of the Institution of Electrical Engineers*, September 1953, p. 308.

¹³ *Fifty Years of British Standards, 1901-1951*, London, British Standards Institution, 1951, p. 27-29.

Representatives of the Federation of British Industries were subsequently added to represent industry trade associations. Under the main committee, a series of “sectional committees” (forerunners of what were later called “technical committees”) were established to develop specifications for certain domains (e.g., steel sections for bridges and building construction); these sectional committees included representatives of many more institutions (e.g., classifying institutions such as Lloyd’s Register of Shipping, which set safety standards for seagoing vessels), industrial or trade organizations (e.g., the Scottish Steel Founders’ Association), government bodies (e.g., the Admiralty and the Board of Trade), and some selected individuals.¹⁴ In 1918, the organization would separate from the Institute of Civil Engineers and become the autonomous British Engineering Standards Associations (BESA).

In his dissertation on “The Evolution of British Standards,” Robert C. McWilliam notes that the British founders of this organization admired standardization around structural and rail steel in the U.S., and saw themselves as following the American lead.¹⁵ The American standards for structural steel were what McWilliam labels “Source-B Standards”—standards sponsored by an entity with a proprietary interest (in this case, the Carnegie steel companies), and thus not comparable to British standards established through ESC or later BESA.¹⁶ The standard for sections of rail for the railroads, however, were established under the auspices of the American Society of Civil Engineers, and thus were, in McWilliam’s terms, “Source-C Standards,” that is, “Standards agreements arrived at within, and published by[,] voluntary Standard-developing organizations (SDOs) such as BSI.”¹⁷ Yet ESC went well beyond this American precedent,

¹⁴ *Fifty Years of British Standards*, p. 28-29.

¹⁵ R. McWilliam, “The Evolution of British Standards,” doctoral dissertation, University of Reading, September, 2002, p. 26.

¹⁶ *Ibid.*, pp. 25-26.

¹⁷ *Ibid.*, p. 25. For a discussion of the process by which they were negotiated, see S. Usselman, *Regulating Railroad Innovation: Business, Technology, and Politics in America, 1840-1920*, Cambridge, Cambridge University Press, 2002, Chapter 6.

since it established a broader mandate and membership from multiple engineering societies (though under the auspices of the Institution of Civil Engineers until 1918), as well as representatives of industry. It was this British model that would be followed by subsequently formed national societies, and Le Maistre would be the major carrier of that model.

In a paper presented to the American Society of Mechanical Engineers in 1918, Le Maistre argued that the newly renamed BESA embraced several underlying principles.¹⁸ The cornerstone, he claimed, was that it represented “the community of interest of producer and consumer.” Entities involved on both ends of industrial transactions were represented and served by the organization, though the “consumers” he discussed are clearly other industrial firms and government departments, not individuals. The Federation of British Industries serve as a conduit for the views of trade associations whose member firms are affected by standards. Initially, ESC worked on the level McWilliams has called Stratum 1, focused on public works, in which government was the primary purchaser or consumer.¹⁹ By the year of Le Maistre’s talk, which was also the year of the organization’s reincarnation as the autonomous BESA, it had expanded to include and even emphasize Stratum 2, Industrial Support, in which firms were both producers and consumers. Secondly, Le Maistre noted that it is an industrial organization, rather than an “academical body”; thus it responds to real and practical needs, not to pure science. This principal is reflected in how any new subject is taken up: “The procedure before embarking on any new subject is to ascertain by means of a representative conference that there is a volume of opinion favorable to the work being undertaken.”²⁰ A third principal is that it is involved only in

¹⁸ C. Le Maistre, “Summary of the Work of the British Engineering Standards Association,” initially presented at the Annual meeting of the American Society of Mechanical Engineers, New York, December 1918 and reprinted in *Annals of the American Academy of Political and Social Science*, Vol. 82, Industries in Readjustment, March 1919, p. 247-252. The principals are explained on p. 247-248, and quotes come from these two pages unless otherwise indicated.

¹⁹ McWilliam, p. 48.

²⁰ *Ibid.*, p. 251

the creation, not in the enforcement, of standards; users were responsible for monitoring and enforcing standards. The British Standards Institute (BSI), which succeeded BESA in 1931, would much later reject this principle and take on a monitoring role, but ESC and BESA stayed out of that arena. Finally, BESA embraced a principle of revisiting and revising standards periodically to avoid becoming “hidebound.”

The organization’s underlying beliefs, which Le Maistre referred to as “democratic and progressive principles,” allowed BESA to provide “the neutral ground upon which the producer and the consumer, including the technical officers of the large spending departments of the government and the great classification societies, have met and considered this subject of such vital interest to the well-being of the engineering industry of the country.”²¹ Its funding reflected its eclectic make-up, coming from the British government, from the governments of other dominion countries such as India, and from the industries involved, with the proportion of funding from industry increased beginning in 1918.²² This curious hybrid organization, which represented firms, professions, and government departments, became a model for many other standardizing bodies, both national and international, through Le Maistre’s proselytizing activities.

The organization, and particularly Le Maistre, seems to have had international interests from early on. Le Maistre’s 1918 talk to the American Society of Mechanical Engineers (ASME) was one of his many outreach efforts. He noted in it that BESA was cooperating with the American Institute of Electrical Engineers (AIEE) on electrical apparatus, and with the American Society of Mechanical Engineers (ASME) on screw thread standards, and that “[i]ndeed, there is a wide field for Anglo-American agreement on engineering standardization

²¹ Ibid., p. 248.

²² McWilliam, p. 263

generally...”²³ BESA was also attempting to disseminate British standards throughout the empire as well as to foreign countries. These internationalizing efforts accorded with Le Maistre’s overarching belief in the value of standardization to the industrial community:

Standardization, after all, is no more and no less than proper coordination. To effect it may necessitate the sinking of much personal opinion, but if its goal, through wideness of outlook and unity of thought and action, is the benefit of the community as a whole, standardization as a coordinated endeavor is bound increasingly to benefit humanity at large.²⁴

While BESA tended to focus primarily on Anglo-American and Commonwealth cooperation in standards, Le Maistre himself was interested in broader international cooperation. His second major standardizing effort, begun only a couple years after the British standardizing committee was established, reflected his international aspirations.

International expansion: The IEC

According to Le Maistre’s 1953 obituary in *The Journal of the Institution of Electrical Engineers*, the International Electrotechnical Commission, or the IEC, was “his *magnum opus*.”²⁵ Beginning in 1881, when only Great Britain had a national association of electrical engineers (the IEE), a series of International Electrical Congresses were held among representatives of the different national scientific and engineering communities to standardize electrical units. Such international congresses, to which participating nations sent delegations, were a common forum for standardizing efforts in the late 19th century. The 1904 International Electrical Congress in St. Louis became a turning point for international institutions of industrial standardization. At it, the Chamber of Delegates passed a resolution calling for the establishment of an ongoing

²³ Ibid., p. 252.

²⁴ Ibid., p. 252.

²⁵ “Charles Delacour Le Maistre,” *The Journal of the Institution of Electrical Engineers*, September 1953, p. 308.

international commission to serve as the institutional mechanism for such activity.²⁶ Colonel Rookes Evelyn Bell Crompton, a member of the British IEE who had presented a well-received paper on electrical standardization, was asked to take the lead in organizing a permanent organization. Colonel Crompton, coordinating with the British IEE and the American Institute of Electrical Engineers (AIEE), organized a 1906 meeting in London to found the IEC as such a permanent organization. At that meeting, Lord Kelvin was elected the first President of the IEC, and Colonel Crompton the first Honorary Secretary.²⁷ Crompton asked Le Maistre, who was also at the 1906 meeting, to act as secretary, and put him in charge of the Commission's new office established in London.²⁸ In 1908 when the Statutes of the IEC developed at the 1906 meeting were formally adopted, Le Maistre was appointed General Secretary, a central position he retained until his death in 1953.

As Le Maistre's obituary noted of his involvement with the IEC, "For nearly half a century he attended every meeting and visited practically every country in the world on its behalf."²⁹ In this capacity he served as an ambassador of international standardization, also becoming involved in the founding of two subsequent international standards-setting organizations. The IEC developed many of the techniques and institutional mechanisms that came to typify international standard setting. First, it included representatives of industry as well as the engineering professions and governments. Alexander Siemens, head of the British division of the German company Siemens, and the nephew of its founder and telegraphic pioneer Werner von Siemens, chaired the first meeting for the IEE, and Japan was represented by

²⁶ M. Frary, "The Founding of the IEC," in *100 Years of the IEC*, at <http://www.iec.ch/100years/articles/founding-iec.htm>, accessed 8 April 2007.

²⁷ International Electrotechnical Committee, "Report of Preliminary Meeting Held at the Hotel Cecil, London, on Tuesday and Wednesday, June 26th and 27th 1906," London, IEC, 1906, p. 48.

²⁸ R. E. Crompton, *Reminiscences*, London: Constable & Co. Ltd, 1928, p. 205; L. Ruppert, "History of the International Electrotechnical Commission," 1954, obtained from the ISO office, Geneva, p. 2.

²⁹ "Charles Delacour Le Maistre," *The Journal of the Institution of Electrical Engineers*, September 1953, p. 308.

Ichisuke Fujioka, “the Father of Electricity of Japan” and the founder of Toshiba.³⁰ Such industry representatives, in addition to engineers from academic and industry backgrounds and a few scientists, undoubtedly reinforced the group’s agreement “that manufacturing interests should be represented on the Local Committees.”³¹

Other institutional mechanisms for international standardization emerged at the 1906 founding meeting. One was “the principle of the subcommittee,” as one scholar has called it.³² Before the meeting, the organizers from the British IEE had drafted and circulated proposed rules for the new organization to the 33 delegates from 13 countries. After Chairman Siemens reviewed suggestions for changes, a member of the American delegation suggested that a subcommittee, rather than all 33 delegates, consider the draft rules and suggested amendments and make a recommendation to the entire group. The delegates immediately agreed and the subcommittee successfully completed the task. The establishment of the first technical committee (TC) in 1911, undoubtedly drawing on the precedent of the ESC’s sectional committees, also reflected the subcommittee principle.³³

The rules for representation and decision making established by IEC also set a precedent for subsequent international standardizing organizations. Its organizers agreed that each country would have a single vote, thus giving the organization international legitimacy. Nevertheless,

³⁰ B. Bowers, “Siemens, Alexander (1847-1927), *Oxford Dictionary of National Biography*, first published 2004, <http://dx.doi.org/10.1093/ref:odnb/48189>, accessed through Wellesley College, 6 May 2007. “Ichisuke Fujioka: A Wizard with Electricity,” <http://www.toshiba.co.jp/spirit/en/ichisuke/index.html>, accessed 6 May 2007.

³¹ The quotation is from, “1981 ...A Year of Anniversaries,” *IEC Bulletin*, 15, 67, January 1981, p. 4. The members and minutes of the first meeting are in, International Electrotechnical Committee, “Report of Preliminary Meeting Held at the Hotel Cecil, London, on Tuesday and Wednesday, June 26th and 27th 1906,” (London: IEC, 1906).

³² L. Lagerstrom, “Constructing uniformity: The standardization of international electromagnetic measures, 1860-1912,” doctoral dissertation in history, University of California, Berkeley, 1992, p. 315. He enunciates the principle as follows: “The appointment of a sub-committee to make a decision for a larger group on the one hand limits the subjective, personal element by reducing the number of people who have a say, and on the other allows greater reign to the personal judgment of the subcommittee members, in both cases increasing the likelihood of a decision being reached.”

³³ In 1911, TC 1 was established to deal with matters of terminology and definition in the electrotechnical domain (background section of Strategic Policy Statement for IEC TC1, at <http://www.iec.ch/cgi-bin/getspis.pl/1.pdf?file=1.pdf>, accessed 6 May 2007).

the IEC was not created as an intergovernmental organization. Each country was represented by a local committee formed by that country's technical societies; only if a country did not yet have a relevant technical society could the government appoint a committee. The voluntary consensus approach followed by the IEE and the ESC was also built into the IEC rules. Decisions would be published as those of the IEC only when passed unanimously; split decisions would be published with the names of countries voting for and against them, and would not have the status of IEC standards. In part undoubtedly to facilitate Le Maistre's dual roles in IEE and IEC, the new organization's central office, supported by equal contributions from each local committee, was initially in the IEE offices in London. A Council made up of an elected President and Honorary Secretary plus two delegates from each member country's local committee would conduct the organization's standards-setting business by correspondence or in meetings.

Charles Le Maistre would carry the principles established at this 1906 meeting, along with the principles of the IEE and ESC, around the world as he proselytized for the standard-setting process. In the first Charles Le Maistre Memorial Lecture, André Lange said that Le Maistre "devoted himself to [standardization] with the faith of a crusader and became its apostle."³⁴ Lange catalogued what he saw as four techniques that Le Maistre developed and used in his work for the IEC and for standardization more broadly. The first was his "warmly personal" tone, in both French and English, in the extensive correspondence he conducted with engineers and standardizers throughout the world.³⁵ His second and third techniques were the working methods for international meetings, and his ability to intervene appropriately and productively in such meetings to "so illumine the issues that the solution became clear to each

³⁴ A. Lange, "Charles Le Maistre: His Work, the I.E.C.", Geneva, IEC Central Office, 1955, p. 19.

³⁵ Lange, p. 8.

side and they would be left with the impression that they had found it themselves.”³⁶ A fourth technique was to speak to broader audiences at other types of conferences, putting his “persuasive powers” to work in convincing audiences of the importance of standardization.³⁷

Le Maistre’s subsequent activities make clear that he was personally particularly devoted to the internationalizing of standards—to an extent greater than many of his more nationalistically oriented colleagues in the ESC. This devotion may be seen in his influence on standardization bodies in many countries.

Influence on national standardizing bodies

In his 1918 ASME talk, Le Maistre noted BESA’s cooperation with the standardizing committees of American engineering associations, and expressed his support for “Anglo-American agreement on engineering standardization.”³⁸ That was the same year in which, in the wake of World War I, the first American general standardizing association, the American Engineering Standards Committee, was established, with ASME and four other engineering associations as its founding organizations. BESA, the only general national standardizing body then in existence, clearly served as a model for American Engineering Standards Committee. Indeed, its chairman, Charles Adams, noted at an early meeting of AESC in August 1919 that he was back from a trip to Europe where he had “conferences with the corresponding French Committee, and particularly the British Committee.”³⁹ “[O]ur good friend Mr. Le Maistre”

³⁶ Lange, p. 8-9, quote from p. 9.

³⁷ Lange, p. 9-10, quote from p. 10.

³⁸ Le Maistre, “Summary of the Work of the BESA,” p. 252.

³⁹ Minutes, Committee Meeting of the American Engineering Standards Committee, New York City, August 16, 1919 (Courtesy of the American National Standards Institution), p. 1.

himself had served as an ambassador for him in England and was with him at this AESC meeting.⁴⁰

Le Maistre addressed the meeting before they took up their main business, the breadth of membership in the new organization. Le Maistre noted his own lobbying during the previous years to persuade American engineers to form a general national standards body:

During the three years and a half which I have had the privilege of directing the work of the office, we have received from America a large number of requests for cooperation, so much so that I have had to devote more or less a small section to dealing with the American correspondents on standardization, with the requests for information, and Dr. Rosa this morning showed me a very comprehensive list of a number of associations over here, dealing with technical matters, and a large number which deal with standardization;...

Now all those associations over here, apparently, are not coordinated, and we, in England, have found the benefit of our standardization being under one roof...[B]ecause it is all one organization under one roof, we get that coordination, which is absolutely impossible otherwise....

...

I have for the last year or two, in each case replied to my American correspondents, that of course, we, in England, would be only too glad to cooperate every way possible,, but that we beg and we pray that some central organization may come into being in order that the situation may not be confused and worse confounded...⁴¹

He expressed his pleasure that the AESC had now been formed to unite the American societies involved in standardizing. Indeed, he went on to explain that while he had also received requests for cooperation with the newly formed national standards bodies in other countries, he had postponed calling an international meeting “because I felt it so important...that the English-speaking people should not go into the wider conference international, without being absolutely sure that we understand each other to begin with.”⁴²

After Le Maistre spoke, Chairman Adams responded to his address by saying that his remarks, “have served, I think, the purpose which I have in mind,” which was for Le Maistre to

⁴⁰ Ibid., p. 3.

⁴¹ Ibid., pp. 10-11.

⁴² Ibid., p. 12.

persuade his American colleagues of the “necessity, not the desirability, but the necessity of our getting going...and really accomplishing something.”⁴³ Indeed, Adams went further, saying

...it seems to me that it is almost a crime that work of this sort should be blocked by what would seem, —and again I speak very frankly—to be narrow or small group interests. We have a job to do, something that is bigger than any one of the component cooperating units with which we are concerned, and we should, while serving of course our constituents as best we can, see first of all the task in hand and its importance and try to so order our work that it may be as effective as possible.⁴⁴

In addition to obtaining Le Maistre’s aid in persuading his colleagues of the need to act promptly, he also sought Le Maistre’s advice in setting up the mechanisms of cooperation in standardizing. In particular, the group was arguing over how large the AESC should be and what organizations other than the founding ones should be allowed to be members. He argued against the need for unanimous agreement of the governing boards of every member organization to every new member, because of the time this would take even if there was agreement, not to mention the possibility of disagreement blocking any action. In discussing the “machinery of admission,” Mr. Thackeray of the American Society of Civil Engineers “issue[d] a word of warning not to attempt to broaden this too much and to call too many people into counsel, because I don’t believe in multitude of counsel.”⁴⁵ In response, Le Maistre made a crucial distinction based on the British experience:

There are two points, the question of the technical details and discussions, and the methods of getting the standards adopted. You can’t call too many organizations in to help you to get the standards adopted. You can’t get too few people on the committee that draws up the standards, so long as they will take the right means to consult the industries.⁴⁶

This principle of inclusiveness is a central one to voluntary consensus standard setting, and Le Maistre’s visit helped secure the agreement of all AESC members to the principle, in Adams’s

⁴³ Ibid., p. 21.

⁴⁴ Ibid, p. 22.

⁴⁵ Ibid., p. 33.

⁴⁶ Ibid., p. 34.

words, “that the admission of other societies is desirable.”⁴⁷ This inclusiveness was made more feasible by the subcommittee principle which limited the size of the group who actually drew up the standards.

Because Le Maistre played such a central role in encouraging and shaping the new American body, it is not surprising that the AESC reflected so many of the ideas present in ESC/BESA and the IEC. Like these organizations, the AESC was committed to involving producers and consumers (i.e., consumer firms) as well as general interests in the determination of standards. It, too, was clearly a practical, not a scientific body—though this principle is evidenced through its actions and members, not through any discussion recorded in the minutes. Like the other organizations Le Maistre was central to, it also took as its domain the coordination but not the enforcement of standards. Thus this Briton with a French name extended his championing of voluntary consensus standard setting to the U.S., as well.

Le Maistre played a similar role of promoter and encourager in the formation and early workings of other national bodies. Not surprisingly, he was very active among Commonwealth countries, including Australia, New Zealand, Canada, and South Africa.

The Canadian Engineering Standards Association had been formed during World War I (in 1917, though receiving letters patent in 1919) at the encouragement of British Board of Trade and BESA, of which Le Maistre was Secretary.⁴⁸ In Australia, Le Maistre became involved with the national standardizing organization in the late 1920s. The Australian Commonwealth Engineering Standards Association (ACESA), was founded in 1922.⁴⁹ George Julius, ACESA’s

⁴⁷ Ibid., p. 27.

⁴⁸ B. McKenzie, “Canadian Engineering Standards Association”, *Annals of the American Academy of Political and Social Science*, Vol. 137, May, 1928, p. 17.

⁴⁹ W. Higgins, *Engine of Change: Standards Australia since 1922*, Blackheath, Australia, Brindle & Schlesinger, 2005, p. 31-33. The organization was initially entitled simply the Commonwealth Engineering Standards Association, but at its second meeting in 1923 some members of its governing board pointed out that it had the same

Chairman, met BESA Secretary Le Maistre in London in 1927, during a tour of industrialized countries.⁵⁰ The two developed a working relationship then, and Le Maistre would come to the organization's aid in 1931. By then Le Maistre was Director of the renamed BSI, touring the British Dominions in an effort to encourage "harmonisation of standards in aid of imperial trade."⁵¹ With a change in government and the Great Depression, SAA had serious funding problems, so Le Maistre delayed his planned departure for New Zealand to join the now Sir Julius George in a trip to Canberra to lobby the government for SAA funding. Later in Le Maistre's tour of the Dominions, he visited Canada, where he gave an address to the Empire Club of Canada.⁵²

Le Maistre's relationships to the standardization bodies in other countries were not limited to Dominion countries. In 1923 he made an extended visit to the Soviet Union at the invitation of the Russian Electrotechnical Committee. A report of that visit was published in the *Electrical Review*, noting that "Mr. le Maistre cares nothing for politics—he is concerned only with technical matters."⁵³ The report paraphrases him as follows: "Whilst, as he says, the present prospect of doing business with Russia may be somewhat unattractive, it is most necessary and desirable that we should keep in close touch with the technical men with whom we shall have to deal when better times return." This visit reflected Le Maistre's strong belief in the value of international standardization, in spite of the political situation at any particular time. This attitude toward his Russian colleagues would show up again in the formation of the ISO a quarter century later.

initials as the Canadian Engineering Standards Association; Thus "Australian" was added to the name. In 1929 it would become Standards Association Australia, or SAA (Higgins, p. 51).

⁵⁰ Higgins, p. 48.

⁵¹ Higgins, p. 54-55, quote on p. 54..

⁵² C. Le Maistre, "Empire Trade Requires Uniform Standards", *The Empire Club of Canada Speeches 1932*, Toronto, The Empire Club of Canada, 1932, p. 174-187, as found online at <http://empireclubfoundation.com/details.asp?SpeechID=1211&FT=yes>.

⁵³ "Russian Affairs", *The Electrical Review*, Vol. 92, May 18, 1923, p. 761.

He also had a strong interest in French standardization, perhaps a result of his identification with that country by virtue of name, birthplace, and love of France. Born on Jersey, one of the Channel islands where French was often spoken, with a French-sounding name, Le Maistre had loved France since his first cycling tour there at age 21.⁵⁴ He knew Jean Tribot-Laspière, the head of the technical service of the French Permanent Committee of Standardization (CPS – Comité Permanente de Standardisation) and later founder of AFNOR (Association Française de Normalisation), as a colleague and friend.⁵⁵ This friendship and his interest in French standardization would soon play an important role in the formation of ISA.

ISA

In 1926 a group of nations established the first general international standardizing body, the ISA (International Federation of the National Standardizing Associations), drawing on the IEC as a model. In light of his belief in the IEC, Le Maistre's involvement in the formation of the first association established to facilitate international standardization in a broad range of industrial areas is not surprising. Even though the “inch countries,” the British Empire and the United States, never fully participated in the ISA, Le Maistre played a central role in the organization. He became one of its two Secretaries, serving alongside a Swiss engineer and adding his ISA job to the similar roles he continued to play in BESA and the IEC.⁵⁶

In 1925, Le Maistre took the initiative to call a meeting of national standardization bodies in Zurich, with the goal of creating international cooperation. When the French CPS didn't respond to the invitation, he went to his friend Tribot-Laspière and asked him personally to

⁵⁴ Lange, p. 5.

⁵⁵ A. Durand, *AFNOR: 80 ans au service du normalisation*, Paris, AFNOR, 2008, in press, p. 22.

⁵⁶ Switzerland had provided the secretariat for the sequence of “informal” meetings that led to ISA (14 Oct. 1926, Minutes of the American Engineering Standards Committee, Minute #1657).

attend. Unable to attend, Tribot-Laspière sent a representative.⁵⁷ The Zurich meeting created agreement that such an international association, to be named ISA (International Standards Association), was feasible. Further meetings took place in New York and London, with Le Maistre continuing to push things along, in spite of many challenges. A committee composed of representatives from standards organizations in seven countries (Sweden, Germany, Switzerland, Czechoslovakia, the US, the Netherlands, and Belgium) plus the UK (represented by Sir Archibald Denny as president and Le Maistre as secretary), with France's Tribot-Laspière sitting in, worked on the association's terms.

Negotiations were based on Le Maistre's ambitious draft proposal for a federation whose secretariat would collect and publish standards in both English and French, and in both English and metric units. When the American AESC debated the proposal, they agreed with Le Maistre that the time was ripe for an internationalization of standard setting in all fields, but they felt that Le Maistre was putting too much emphasis on the *creation* of international standards rather than the *exchange* of standards that had been developed within separate countries,⁵⁸ a view that prevailed. Until AFNOR was established in France in 1927, Belgium represented Francophones on the committee. At the London meeting, agreements were made and a London office was set up with Denny as President and Le Maistre as interim secretary general, to be joined soon by a second secretary general, a Swiss named Huber-Ruf.⁵⁹

From the beginning, ISA's work was hampered by a set of recurrent problems. Most obvious was the long-standing division between the "inch" and the "metric" countries (reflected in the dual secretaries), with Canada, Great Britain, and the U.S. on one side and the rest of ISA (Austria, Belgium, Czechoslovakia, France, Germany, Holland, Italy, Japan, Sweden, and

⁵⁷ Durand, p. 22-23.

⁵⁸ 12 Jan. and 11 Feb. 1926, Minutes AESC, #1533 and #1554.

⁵⁹ Duand, p. 23-25, 38.

Switzerland) on the other. In fact, one of ISA's few triumphs was agreement on a standard inch-millimeter conversion ratio.⁶⁰

In addition, national competition got in the way. The interwar years witnessed the rise of a second political entrepreneur for industrial standards—Herbert Hoover—who was just as much an enthusiast as Le Maistre. In 1923, Le Maistre wrote, with envy, “our industries do not fully realize the actual nearness of the competition and the keen vigilance and persistence with which our American cousins are watching and working” on industrial standardization.⁶¹ Unfortunately, by 1928, Le Maistre had concluded that the American prophet of standards was serving a different god than Le Maistre's own:

The policy of the American government is one of backing business, rather than doing business. The Department of Commerce has tremendous influence throughout the country, and is able to bear a persuasive propaganda, which undoubtedly plays no small part in Mr. Hoover's campaign.⁶²

The strong coordination of U.S. standard-setting bodies, Le Maistre believed, was giving the U.S. commercial advantage overseas. In fact, Hoover was even providing technical assistance to help other governments (e.g., Brazil) set up standardizing bodies of their own; something Le Maistre had originally imagined as an international, ISA, responsibility.⁶³

In the meantime, as noted earlier, Britain was also promoting a Commonwealth-wide community of industrial standards that would serve the protectionist policy of Imperial preference, succumbing to what historian of BIS Robert McWilliam calls, “The Imperial Illusion.” Even Le Maistre seemed to adopt this theme when, in 1932, he addressed the Empire Club in Toronto on the topic “Empire Trade Requires Uniform Standards,” although his aim was

⁶⁰ H. Coonley, “The International Standards Movement,” in D. Reck, ed., *National Standards in a Modern Economy*, New York, 1956, p. 38.

⁶¹ In a British Standards Circular, quoted in McWilliam, p. 203.

⁶² Quoted in McWilliam, p.204.

⁶³ McWilliam, p. 204.

primarily to encourage Canada to adopt the consensus standard-setting approach used by BESA, rather than a more cumbersome approach of government-mandated standards that was coming into fashion in the Dominions.⁶⁴ He felt that the BESA approach was preferable in part because it involved more stakeholders who would assure that resulting standards would be more widely accepted.

The U.S.-British cooperation required by the second world war would soon reduce the tendency of both governments to back their own businesses to the detriment of “doing business.” It would also open the way for establishment of the ultimately more successful ISO. Again, Le Maistre would play an important role.

ISO

During World War II, ISA was suspended and the Allied countries formed the United Nations Standards Coordinating Committee (UNSCC), the London Office of which was directed by Le Maistre. After the war, he was a major force in the dissolution of the ISA and UNSCC and formation of the new ISO (International Organization for Standardization).

Two years after the U.S. entered the war, the American Standards Association (ASA, the renamed AESC) began discussing “Inter-Allied Cooperation in Standardization Matters” with their Canadian and British counterparts, the talks that would lead to the UNSCC:

The function of the organization was to ‘spark plug’ cooperation between the allied belligerent countries in standardization matters as an aid to production and use. The object was to secure the maximum possible coordination of standards necessary for the war efforts and the immediate post-war period.⁶⁵

⁶⁴ C. Le Maistre, “Empire Trade Requires Uniform Standards,” Address to the Empire Club, Toronto, April 29, 1932, <http://www.empireclubfoundation.com/details.asp?SpeechID=1211&FT=yes>, accessed 6 May 2007.

⁶⁵ ASA, 10 Dec. 1943, Minutes, Twenty-Fifth Anniversary Meeting of ASA, #3663.

UNSCC came into being in July 1944 and was authorized for only two years. Two central offices were established—the first in London under the direction of Charles Le Maistre, and the second in New York—and standards work began among the Commonwealth countries, the U.S., and Latin America. Almost all of the wartime allies that were not occupied by Germany, Italy, or Japan became members, except the Soviet Union.

This organization was not established soon enough to be very useful to the war effort, but, when the war ended, the UNSCC technical committees continued to function to help with the recovery, and discussion turned to creating a successor organization to take over its work. The war had certainly highlighted the need for greater international standardization. According to the *Economist*, differences between British and American standards for screw threads alone added at least £25 million to the cost of the war.⁶⁶ From the *Economist*'s point of view, going forward with either the UNSCC (which eliminated all enemy countries, occupied countries, and neutrals) or the ISA (which was dominated by the metric bloc and consequently did not have full participation of the U.S. or the British Empire) would not adequately forward economic recovery of all.

The sequence of international meetings that formed the ISO began in October 1945 in New York, followed by conferences in Paris in July 1946 and London in October 1946. In preparation for the New York meeting, the executive committee of the UNSCC, consisting of officers of the British, Canadian, and American standards bodies met to develop a proposal for presentation to the larger group.⁶⁷ The executive committee agreed on “the three foundation values in our organization”: 1) that it be composed only of national standardization bodies; 2)

⁶⁶ “UNSCC,” *Economist*, Vol. 148, 3 March 1945, 286-87.

⁶⁷ 27 September 1945, Minutes of ASA Standards Council, #3808.

that it coordinate, not promulgate, standards; and 3) that technical divisions be created.⁶⁸ This third “value” certainly bears the hallmark of Le Maistre’s diplomacy and his devotion to the IEC, as it allowed the IEC to be brought into the new organization as a relatively autonomous “technical division.”

A small number of issues had to be resolved before agreement could be reached; some of the issues were raised by the Soviet Union and its allies, countries that had not been party to the wartime agreement. Consistent with his earlier beliefs that the need for industrial standardization trumped politics, Le Maistre encouraged the Soviet delegates to observe, and, after the London conference, Le Maistre and the representatives from the U.S. met with these delegates and hammered out a compromise that allowed the Soviet Union to become a member of ISO, even though the Soviets had refused to join the major post-war international economic organizations, the International Monetary Fund and World Bank (which both began operating in 1946) and the General Agreement on Tariffs and Trade (negotiated in 1948).

Yet, perhaps the stickiest complication was the ISO’s relationship to the ISA. Some of the difficult issues were raised by governments, but one was a more personal problem. In 1945, the delegates who were creating the new organization asked an aging Le Maistre, now past 70, to travel to Switzerland to meet with Mr. Huber-Ruf, the Swiss co-secretary of the ISA before the war, who had been too ill to attend the organizing conferences. Le Maistre, on his return, reported Huber-Ruf’s position that the terms of office of the former ISA Council Members had expired, thus preventing them from acting with authority. Moreover, he claimed that he was still

⁶⁸ UNSCC Proceedings of New York Meeting, 8-11 Oct., 1945 (UNSCC files, ISO, Geneva). The following account comes primarily from these Proceedings.

the General Secretary of ISA and that he should be made the Director of the new organization!⁶⁹ Since Huber-Ruf's demands were unacceptable to the delegates, they agreed to drop the ISA as a co-sponsor of their conference, ending the (brief) meeting convened under both names and immediately beginning another sponsored only by UNSCC. Informally, members of ISA who attended this conference, undoubtedly including Le Maistre himself, took it upon themselves to liquidate ISA legally as soon as possible. Despite these difficulties, the ISO was provisionally created at that meeting

The ISO's official history credits Le Maistre for the entire set of complex legal and political maneuvers that assured creation of the ISO. It quotes an IEC colleague's description of him at the time as

... an extraordinary man. He was the old school—very much the gentleman. Very diplomatic. He knew everybody. But you could see him quite often looking terribly worried and tired because he had a problem to solve. You could almost say he was married to standardization.⁷⁰

Le Maistre was there for the first official meeting of ISO in 1947, and he continued to work on international standardization for six more years. After his death in 1953, the ISO governing body passed its first "Special Resolution" to honor his passing.⁷¹ His continuous involvement contributed to the cooperation that allowed that new organization to form. A true entrepreneur and "evangelist" of international standardization, Le Maistre left a recognizable mark on the field.

⁶⁹ Huber-Ruf's position is laid out in the minutes of the opening day Steering Committee meeting in the UNSCC Report of London Meeting, Oct. 1946. The minutes of the steering committee meeting do not explain more fully, but it is clear that no one there was willing to entertain Huber-Ruf's proposal.

⁷⁰ *Friendship among equals*, pp. 16-17.

⁷¹ ISO, *List of Resolutions adopted at the Meetings of the Council and General Assembly since the creation of ISO 1947-1963*, ISO/RESOL 1 October 1964, Geneva, ISO General Secretariat.

Le Maistre's Mission

What explains Le Maistre's commitment, his "marriage," to standardization, especially his dedication to extending voluntary consensus standard setting to all industrial fields and his commitment to the globalization of the practice?

At base, Le Maistre's position was utilitarian. He argued that,

In its broadest aspect it [standardization] may be said to imply, the introduction, through collective effort of economical measures of manufacture, not so much with the idea of gaining individual dividends as of unifying the needs of industry and thus bringing about the greatest good for the greatest number.⁷²

But, for Le Maistre, unlike for many men of the twentieth century who shared this utilitarian ethical position, achieving the "greatest good for the greatest number" did not require maximizing the production of goods. In an important paper read before the Royal Society of Arts in 1931, at the height of the Depression, Le Maistre chided Americans for their habit of constantly creating new wants through their "propaganda founded on the idea expressed by the term 'progressive obsolescence' [which] has not prevented mass production over-running consumption."⁷³ The main problems of the modern economy were, for Le Maistre, maldistribution and overproduction of things people did not want. "In fact," Le Maistre argued, "manufactures all have a tendency to produce too much, and in too great a variety." Then, sounding very much like some psychologists today, he added, "When you purchase anything, you like, it is true, to have some choice, but not such a [i.e., "so much"] choice as to confuse you."⁷⁴

⁷² C. Le Maistre, "Standardization: Its Fundamental Importance to the Prosperity of Our Trade, Paper read before the North East Coast Institution of Engineers and Shipbuilders on the 24th March, 1922 and reprinted by the order of the Council," London, BESA, 1922, p. 1.

⁷³ C. Maistre, "The Effect of Standardisation on Engineering Progress, A paper read before the Royal Society of Arts, February 4th 1931," London, The Royal Society, 1931, p. 2.

⁷⁴ *Ibid.*, p. 3. On recent research on choice-overload see B. Schwartz, *The Paradox of Choice: Why More is Less*, New York, HarperCollins Publishers, 2004.

Consensus standard setting helped confront this latter problem directly. Moreover, it could even help with issues of mal-distribution by encouraging employers to maintain staff during cyclical downturns. In a radio talk, Le Maistre gave the example of the work in the granite quarries that produced the curbs on the sides of Britain's roads. Such work had always tended to be intermittent, but a new national standard for such curbs, will

. . . enable the Quarry Masters to keep their men in constant employment making these kerbs, certain that the stocks will be used when the orders come in again; that is to say, such a Standard is stabilizing employment.⁷⁵

Still, Le Maistre was suspicious of attempts by *government* to impose standards; he worried that such activity would impede innovation—an argument regularly made by British engineers and industrialists. In one lecture, he noted that some people argue that standardization “retards invention and progress,” but that is why periodic review of any standard is essential and governments are just not equipped to regularly review and replace outmoded legislation and regulations. The need to encourage innovation is also why there should be no “coercion either by Government or by one section of the community over the other: indeed there is nothing compulsory in it [voluntary consensus standard setting] at all, its only authority being industrial public opinion.”⁷⁶

Le Maistre also often argued that the system set up by BESA, which served as the model for so many that followed it, was desirable because it saved a great deal of money compared to any governmental system. BESA actually relied on the volunteer effort of engineers who served on various standardizing committees in their professional capacity as a normal part of the service they did for their profession, rather than as paid consultants to government.⁷⁷ (A similar

⁷⁵ Le Maistre, “The Effect of Standarisisation,” p. 6.

⁷⁶ Le Maistre, “Standardization,” p. 2.

⁷⁷ For example, in the draft of a “non-technical” history of BESA that Le Maistre sent to the Glasgow Engineering magnate, Lord Weir, Le Maistre wrote “Over 2000 Engineers and business men throughout the country give their

argument is still made by ISO, which notes that just at the level of the international secretariat, volunteer labor provides the equivalent of a staff of about 500; ISO is the only major international organization that operates this way.⁷⁸⁾

Le Maistre's cosmopolitan commitment to globalizing the practice of standard setting was of a piece with his utilitarian principles. That commitment contrasted with that of other British promoters of the practice. Le Maistre praised Sir John Wolf Barry (the publicly prominent engineer who designed London's Tower Bridge) for insisting that the engineering associations form BESA, but Le Maistre noted that Barry was not only concerned with reducing duplication and cost; he also wanted to promote British industry by promoting British standards abroad. Le Maistre clearly considered that any advantage gained in that way would only be temporary, since every other industrial nation also began its own system of standard setting.⁷⁹

Similarly, in the late 1920s and early 1930s, Le Maistre work closely with Viscount Weir, a wealthy industrialist and engineer and head of the Federation of British Industries, to make BESA the undisputed national organization for standardization in Britain and to put it on a firmer financial footing. Viscount Weir shared Barry's view that standardization should be an aid to British industry and Le Maistre was not above writing Weir "private and confidential" letters to tell him of news Le Maistre had obtained that the US was getting ahead of Britain in the standardization game.⁸⁰ But, of course, Le Maistre had all this "confidential" knowledge only

time and experience to this national work without fee or recompense." Le Maistre to Lord Weir, 4 Nov. 1927, Papers of Viscount Weir, University Archives, Glasgow University, collection 96, box 15.

⁷⁸ J. Barkin, *International Organization: Theory and Institutions*, Basingstoke, Palgrave Macmillan, 2006, p. 126.

⁷⁹ Le Maistre, "Standardization," pp. 12-13.

⁸⁰ For example, 11 March 1927, "A most interesting letter I have just received from America informs me privately that Mr Hoover has called a Conference of all the simplifying and standardizing people. Up to the present Simplification and Standardization, as you know, have been carried out separately and now they are to be combined." Similarly, on 18 March 1930, Le Maistre informed Weir and other members of the BESA Council "private[ly] and confidential[ly]" that a group of major American industrialists had agreed to underwrite the work of ANSI (then the American Standards Association) so that U.S. standard setting could be greatly expanded. Papers of Viscount Weir, University Archives, Glasgow University, collection 96, box 15.

because he had been working so closely with his American colleagues on the problem of setting up the international standardizing bodies that would make that kind of competitive industrial standard setting obsolete.

Schumpeter, like many earlier commentators on the industrial system (including Babbage, Marx, and J. A. Hobson) was convinced that the “new economy of force and knowledge” had an internal logic that could propel it beyond the regions of its birth until it encompassed the entire world.⁸¹ Yet, more than most of his predecessors, Schumpeter understood that this promise (or curse) would only be fulfilled if political entrepreneurs established the administrative and regulatory systems that would encourage investment in new technologies. Le Maistre was one of those entrepreneurs.

⁸¹ Murphy, *Global Institutions*, pp. 40-41. The “new economy of force and knowledge” is J. Hobson’s phrase, *The Evolution of Modern Capitalism*, London, Walter Scott Publishing Company, 1912, p. 74.