



# MIT Sloan School of Management

MIT Sloan Working Paper 4638-07  
January 2007

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The Formation of the ISO

JoAnne Yates (MIT Sloan School) and Craig N. Murphy (Wellesley College)

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## Coordinating International Standards: The Formation of the ISO<sup>1</sup>

JoAnne Yates (MIT Sloan School) and Craig N. Murphy (Wellesley College)

In the article on “Standardization” in the 14<sup>th</sup> edition of the *Encyclopædia Britannica*, Paul Gough Agnew, the long-time Secretary of the American Standards Association (ASA), argued:

In the flow of products from farm, forest, mine, and sea through processing and fabricating plants, and through wholesale and retail markets to the ultimate consumer, most difficulties are met at the transition points—points at which the product passes from department to department within a company, or is sold by one company to another or to an individual. The main function of standards is to facilitate the flow of products through these transition points. Standards are thus both facilitators and integrators. In smoothing out points of difficulty, or “bottlenecks,” they provide the evolutionary adjustments which are necessary for industry to keep pace with technical advances. They do this in the individual plant, in particular industries, and in industry at large. They are all the more effective as integrators in that they proceed by simple evolutionary steps, albeit inconspicuously.<sup>2</sup>

Albeit inconspicuous, standard setting has been among the nuts and bolts of globalizing industrial capitalism since its beginning, assuring that things needing to work together fit from product to product, industry to industry, and country to country. The foci of the first two of the now 229 “technical committees” of the non-specialized international standards organizations that emerged after the two world wars—the interwar International Standards Association [ISA] and the post-World War II International Organization for Standardization [ISO]—are iconic: “Screw Threads” and “Bolts, Nuts and Accessories.” Over the past two decades, voluntary standardization processes, invented by turn-of-the-twentieth-century engineers working in national and international technical committees, have increasingly been

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<sup>1</sup> We would like to thank Madame Beatrice Frey at ISO for her help in providing us access to original documents from UNSCC and ISO, and Stacy Leistner at ANSI for his help in providing access to the minutes from AESC and ASA meetings.

<sup>2</sup> Quoted as epigraph of Dickson Reck, ed., *National Standards in a Modern Economy*, (New York, 1956), v.

applied to issues that have little in common with those of fitting one mechanical part to another, such as work processes (ISO 9000), environmental pollution (ISO 14,000), and human rights (SA 8000 and the planned ISO 26000).<sup>3</sup> This rapidly expanding scope, plus the high visibility of standards in networked areas such as telecommunications, has led to a new scholarly interest in standard setting practices.<sup>4</sup>

ISO and ISA, like much of the institutional architecture of twentieth-century standard setting, are part of a relatively under-studied and under-theorized realm of institutions that have helped shape the modern global economy. They are similar to the professional and trade associations, whose interests are fundamentally different from those of any single firm, and to other voluntary transnational organizations (e.g., Amnesty International), which have a kind of power, but one that gains its legitimacy from something fundamentally different than the sovereign state.

Business and economic historians have begun to differentiate the wide array of economic coordination mechanisms that exist along the dimension from “market” to

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<sup>3</sup> On the extension of ISO-style standard setting into new realms see, Kristiana Tamm Hallström, “International Standardization Backstage: Legitimacy and Competition in the Social Responsibility Field,” prepared for the Stockholm Centre for Organizational Research conference, *Organizing the world: rules and rule-setting among organizations*, Stockholm, 13-15 Oct. 2005, and Jennifer Clapp, “The Privatization of Global Environmental Governance: ISO 14000 and the Developing World,” *Global Governance* 4:3 (1998), 295-316.

<sup>4</sup> In international relations see, for example, Walter Mattli and Tim Büthe, “Setting International Standards: Technological Rationality or the Primacy of Power?,” *World Politics*, 56 (Oct. 2003): 1-42; and Jennifer Clapp, “The Privatization of Global Environmental Governance: ISO 14000 and the Developing World.” *Global Governance* 4:3 (1998): 295-316. In sociology, see Thomas A. Loya and John Boli, “Standardization in the World Polity: Technical Rationality over Power,” in John Boli and George M. Thomas, eds., *Constructing World Culture: International Nongovernmental Organizations since 1975*, (Stanford, CA, 1999), 169-97. In political science, see Samuel Krislov, *How Nations Choose Product Standards and Standards Change Nations* (Pittsburgh, PA, 1967). In social studies of science and technology, see Tineke Egyedi, “Shaping Standardization - A study of standards processes and standard policies in the field of telematic services,” Ph.D. Thesis, 1996, Delft Technical University. In history, see Andrew L. Russell, “Standardization in History: A Review Essay with an Eye to the Future,” in Sherrie Bolin, ed., *The Standards Edge: Future Generations* (Ann Arbor, MI, 2005), 247-260; Amy Slaton and Janet Abbate, “The Hidden Lives of Standards: Technical Prescriptions and the Transformation of Work in America, in Michael Thad Allen and Gabrielle Hecht, eds., *Technologies of Power: Essays in Honor of Thomas Parke Hughes and Agatha Chipley Hughes* (Cambridge, MA, 2001), 95-143.

“hierarchy,”<sup>5</sup> and clearly ASA, ISO, and similar organizations can readily be understood as falling somewhere between the extremes. Yet standardization, *per se*, can be accomplished by institutions that lie anywhere along the line. Naomi Lamoreaux and her colleagues observe that, “Coordination mechanisms from one part of our scale can sometimes be made more effective by combining them with devices from other parts.”<sup>6</sup> Similarly, early advocates of ISO-like standard setting argued that the process would improve both the efficiency of markets and the success of firms. Moreover, this national and international process, while certainly not exclusively or even primarily governmental, involved national interests and even government bodies in greater or lesser ways.

The political scientists, economists, and sociologists who have theorized about the development of international standardization reflect the biases of their fields, the political scientists overemphasizing the power of the state and the differences created by different state structures; the economists, individual (rational) firms with more or less complete information making decisions within markets; and the sociologists, the impact of an emergent global culture.<sup>7</sup> Traditionally, historians of technology have tended to focus their work on national engineering institutions and professional societies in particular technical arenas.<sup>8</sup> It is worthwhile to take a broader historical look at trends in standardization globally by considering the records created by national (in this case American) and international

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<sup>5</sup> See, especially, Naomi R. Lamoreaux, Daniel M. G. Raff, and Peter Temin, “Beyond Markets and Hierarchies: Toward a New Synthesis of American Business History,” *American Historical Review* 108 (April 2003): 404-33.

<sup>6</sup> *Ibid.*, 409.

<sup>7</sup> Mattli and Büthe, “Setting International Standards,” reports on and contributes to the work in political science, and critiques sociologists Loya and Boli’s “Standardization in the World Polity.” For an economic approach, see, for example, Stanley M. Besen and Joseph Farrell, “Choosing How to Compete: Strategies and Tactics in Standardization” *The Journal of Economic Perspectives* 8:2 (Spring, 1994), 117-131.

<sup>8</sup> E.g., Bruce Sinclair, “At the Turn of a Screw: William Sellers, the Franklin Institute, and a Standard American Thread,” *Technology and Culture* 10 (Jan., 1969), 20-34; Sinclair, *A Centennial History of the American Society of Mechanical Engineers: 1880-1980* (Toronto, 1980).

standardizing institutions at the time that they formed. Even if we accept that complex pressures toward globalization have existed throughout the history of capitalist industrialism, and that the larger market areas associated with each new wave of lead industries have been supported by international standard setting, those recurrent pressures tell us little about the sequence and timing of the standardizing institutions that might appear in any particular era in any particular part of the world.<sup>9</sup>

Local and national standardizing efforts were underway in the United States and other countries by the turn of the twentieth century. In 1901, several British engineering societies founded the Engineering Standards Committee (later the British Engineering Standards Association, BESA), the first of the private voluntary national standardizing associations (“the oldest body of its kind in the world and the model for standards associations in many other countries”<sup>10</sup>) as a site for cooperation among scientists, engineers, firms, and associations. In 1918, the American Engineering Standards Committee (AESC, which became the ASA, and later ANSI, the American National Standards Institute) was established on its model, with an explicit policy of using a voluntary, consensus approach to establishing American industrial standards.

No such general body yet existed to foster international standards at the time the AESC was founded, but standardizing activity around specific network technologies such as railroads, telegraph, and electricity had occurred across countries, complementing intergovernmental work on weights and measures, money, banking transactions, and various

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<sup>9</sup> Craig N. Murphy, *International Organization and Industrial Change: Global Governance since 1850*, (Oxford, UK, 1994), 92-93, 196-97, and “Globalization and Governance: A Historical Perspective,” in Roland Axtmann, ed., *Globalization in Europe*, (London, 1998), 144-67.

<sup>10</sup> Edward R. Weidlein and Vera Reck, “A Million Years of Standards,” in Dickson Reck, ed., *National Standards in a Modern Economy* (New York: Harper & Brothers, 1956), p. 20.

areas of public administration.<sup>11</sup> As early as 1906, the International Electrotechnical Commission (IEC) was established with the lofty goal of standardizing the nomenclature and ratings around electrical devices worldwide. Although it covered only a single (if broad) domain, this organization represented a significant advance in international standardization and developed many of the institutional structures and processes that survive even today. In 1926 the first general international standardizing body, the ISA (International Federation of the National Standardizing Associations) was established on the model of the IEC, with AESC, then ASA, representing the U.S. In spite of its name, it was never truly international, with its member associations representing primarily the countries of continental Europe (the “metric bloc”). The most important so-called “inch” countries (the U.S. and Great Britain) never fully participated, and consequently its work had a relatively limited direct effect on international industry and trade. Nevertheless, its indirect effect was important, since many of the standardizing procedures and committees it established would be reborn in the ISO. Only at the end of World War II was a truly international standardizing body of broad scope, ISO, created.

By what process did this comprehensive global standardization body finally take form? Many of the processes and institutional structures for international standardization were established in the domain-restricted IEC before the wars. At the end of the first world

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<sup>11</sup>In fact, the original network of late nineteenth century intergovernmental organizations and their successors, the “Specialized Agencies” of the League of Nations and then the United Nations were—and sometimes still are—referred to as “standard setting agencies.” One of the recent important studies that maintains that usage is the UK Department for International Development’s controversial assessment of the effectiveness of different multilateral agencies, which distinguishes operational development and humanitarian agencies that provide direct services, such as UNICEF, from the older “standard setting agencies” (e.g., the International Labour Organisation and World Health Organization) which also now provide direct services other than the promulgation of standards, their original purpose (Alison Scott, “Assessment of Multilateral Organisational Effectiveness,” International Division Advisory Department, Department for International Development, unpublished paper dated 1 June 2005).

war, and spurred by the desire to transcend that conflict, the vision of such a body existed in the minds of the major standard setters in the less-internationalist “inch countries.”

Nonetheless, tensions within and among nations, technical and trade associations, and firms all delayed progress until the beginning of World War II suspended that organization (as well as the IEC) entirely. After the war, the national standards communities felt the desire for international cooperation even more strongly, and at this point, with models already available to draw on, they succeeded in creating a more effective international standardizing body—the ISO.

In what follows we first briefly discuss the establishment of the IEC and the AESC, then two waves of general international standardization in the wake of the two world wars, culminating in the formation of the ISA and the ISO, the second of which succeeded much better than the first. Key themes emerge from this narrative and are drawn together in the conclusion.

### **The Formation of the IEC and AESC: Early International and U.S. Standardization**

Howard Coonley, at various times President of ISO, ASA, and the National Association of Manufacturers, the largest industrial trade association in the U.S., retrospectively described the beginnings of the international standards movement in this way:

While the British Engineering Standards Association was in smooth operation prior to the First World War, until then it was the only national standards agency in existence. World War I gave the impetus to national standardization in all countries involved in that struggle and at the same time established the need of an international standards movement.<sup>12</sup>

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<sup>12</sup> Howard Coonley, “The International Standards Movement,” in Reck, *National Standards*, 37.

The state of national and international standardization in specific technical domains, rather than broadly conceived, was not this bleak before World War I. Various national scientific and technical associations formed in the second half of the 19<sup>th</sup> century included standardizing in their mandates, and international Congresses and Commissions, including the still-surviving IEC, undertook standardization on the international level. Nevertheless, the first world war clearly provided an impetus to broad standardization movements in both the national and international arenas. In 1918, five American professional associations came together to form the first private and general standards-setting organization in the U.S.—the American Engineering Standards Committee—and in less than a decade, the first international organization with a broad standardization agenda—the International Standards Association—was formed. Both drew on some of the institutional structures that had already been developed within narrower technical domains, particularly that of electricity.

In 1861, the British Association for the Advancement of Science had established a Committee on Standards of Electrical Resistance with a mandate to develop standard measurement units related to telegraphy and other electrical phenomena that would be broadly accepted.<sup>13</sup> Electrotechnical associations soon began to be formed, in Britain in 1871 (Britain's Society of Telegraph Engineers, soon to become the Institution of Electrical Engineers, or IEE) and then in several other countries during the 1880s and 1890s (France, Austro-Hungary, the U.S., Canada, Germany, Italy).<sup>14</sup> Beginning in 1881 (even before national electrical associations were formed anywhere but in Britain), a series of

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<sup>13</sup> Lary Randles Lagerstrom, "Constructing uniformity: The standardization of international electromagnetic measures, 1860-1912," doctoral dissertation in history, University of California, Berkeley, 1992.

<sup>14</sup> Mark Frary, "The World of Electricity: 1820-1904," in *100 Years of the IEC* (IEC, 2006) on the website of the International Electrotechnical Commission, [http://www.iec.ch/100years/articles/world\\_of\\_electricity.htm](http://www.iec.ch/100years/articles/world_of_electricity.htm), accessed 7/12/2006.



International Electrical Congresses were held among representatives of the different national scientific and engineering communities to standardize electrical units. The initial Congress was followed by several others, at each of which the discussions (and sometimes conflicts) over standard units continued. The 1904 International Electrical Congress in St. Louis passed a resolution calling for the establishment of an ongoing international commission to serve as the institutional mechanism for such activity.<sup>15</sup> At least two different developments occurred in the wake of this Congress. A small and relatively informal group composed primarily of scientists representing the national physical laboratories continued to work on bringing precision and consistency to the system of electrical units at several International Conferences on Electrical Units in subsequent years, wrapping up most of its work at the London International Conference in 1908, with a follow-up “Working Meeting on Electrical Standards” in Washington, D.C. in 1910.<sup>16</sup> The group did not become an ongoing international organization; in fact, the scientists who reached those agreements found that their work was temporarily facilitated by limiting discussion to fellow-scientists at the new national laboratories that existed in only a handful of countries, thus abandoning the more inclusive decision-making procedures followed by most of the 19<sup>th</sup> century international conferences that created the precursors of today’s intergovernmental organizations.<sup>17</sup> Meanwhile, a group of engineers representing professional and commercial (rather than purely scientific) interests responded more directly to the call, with the oldest of the electrotechnical societies, the British IEE, aided by its American counterpart, undertaking the

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<sup>15</sup> Frary, “The Founding of the IEC,” in *100 Years of the IEC*, at <http://www.iec.ch/100years/articles/founding-iec.htm>, accessed 7/12/2006.

<sup>16</sup> Lagerstrom, “Constructing Uniformity,” pp. 245-317 and Appendix 1.

<sup>17</sup> This is one of Lagerstrom’s central conclusions. On the 19<sup>th</sup> century international conference system as the mechanism for creating intergovernmental organizations see, Murphy, *International Organization and Industrial Change*, pp. 71-81.

organizing work to form (and thus putting its stamp on) the International Electrotechnical Commission (IEC). The IEC became the first permanent international organization for industrial standardization, though in a restricted domain.

The IEC pioneered many of the techniques and institutional mechanisms that came to typify voluntary consensus standard setting, including the ongoing involvement of engineers and representatives of private companies in the discussion of technical standards within their fields. The inclusiveness of the first IEC meeting was facilitated by some of the peculiarities of the new “high-technology” field that linked businessmen, scientists, and engineers across countries. The chair of the first meeting was Alexander Siemens, a British citizen, head of the British division of the German company Siemens, and the nephew of the “electrician” (the telegraph engineer) Werner von Siemens, who founded the parent company and had been at the center of the debates about measurements of electricity since the 1860s. Japan’s delegate was Ichisuke Fujioka, “the Father of Electricity of Japan” and founder of Toshiba. Thus, although engineers (many of whom were professors of engineering) and a few scientists were also involved, a major concern of the first meeting was assuring “that manufacturing interests should be represented on the Local Committees.”<sup>18</sup>

Other institutional mechanisms emerged at the IEC’s founding meeting in 1906. One was what Lagerstrom has referred to as “the principle of the subcommittee.”<sup>19</sup> The

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<sup>18</sup> The quotation is from, “1981 ...A Year of Anniversaries,” *IEC Bulletin*, 15, 67(January 1981): 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 26<sup>th</sup> and 27<sup>th</sup> 1906,” (London: IEC, 1906). The discussion of the decisions made in that first meeting (in the next two paragraphs of the text, above) is based on this report/minutes. On Fujioka, see “Ichisuke Fujioka: A Wizard with Electricity,” <http://www.toshiba.co.jp/spirit/en/ichisuke/index.html>, accessed 7/19/2006..

<sup>19</sup> Lagerstrom, “Constructing Uniformity,” 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.”

organizers from the British IEE had drafted a set of proposed rules for the new organization and circulated it to the 33 delegates from 13 countries before the meeting, and delegates had raised several issues and proposed some amendments before the opening meeting. After Chairman Siemens catalogued these suggestions, C. O. Mailloux, part of the American delegation and a member and future president of the AIEE, suggested appointing a subcommittee to consider the rules and amendments and to make a recommendation to the entire group:

Mr. Mailloux (U. S. A.) ventured to think it would be an unwise proceeding to adopt the Rules *en bloc* before the Delegates had had sufficient time for their consideration; he himself had not had an opportunity as yet of considering the amendments proposed. He mentioned that in discussing the whole question of the proposed Commission, quite informally, with some of the Delegates he found that some difference of opinion existed. In order that the Commission might work harmoniously and accomplish the greatest measure of good, it would, he thought, be necessary to proceed with great caution and deliberation in drafting these Rules, so that there might be no criticisms later on as to the intention of the Commission, which, he felt sure they would all agree with him, was to further the interests of the electrical industry of the world. He, therefore, suggested that a Sub-Committee with one Representative from each country should forthwith be appointed to consider the Rules *seriatim* and report to the whole Commission.

Recognizing that a smaller subcommittee could more readily reach a decision than the larger group, and that it was advisable to proceed “with great caution and deliberation” to prevent future acrimony, the delegates immediately agreed and the subcommittee commenced work.

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He sees this principle as explaining the limitation of negotiations over units primarily to the national laboratories in the less formal conferences that followed the 1904 Congress, and as being part of what allowed “the transformation of the local into the universal and the subjective into the objective” (pp. 314-315). But the general principle that a smaller subcommittee can more readily reach a decision is clearly applicable to the formation of the IEC itself, and to its ongoing decision-making.

Another IEC organizing structure introduced a few years later—the technical committee (TC)—also reflected the subcommittee principle.<sup>20</sup>

After agreeing on the IEC’s mission (standardizing nomenclature and ratings of electrical apparatus and machinery), the subcommittee worked its way through the proposed rules and amendments to create basic operating procedures, some of which would shape subsequent international standards organizations. Although each country would have a single vote, thus giving it international legitimacy, it was not an intergovernmental organization. Each country would be represented by a local committee formed by that country’s technical societies or, if a country did not yet have a relevant technical society, appointed by the government. The voluntary consensus approach was built into the rules, as decisions would be published as those of the IEC only when passed unanimously; split decisions would be published only with the names of countries voting for and against them. The IEC’s central office, to support which the local committees would contribute equally, would initially be in the IEE offices in London, reflecting that body’s formative influence. A President and Honorary Secretary would be elected; these two individuals plus two delegates from each member country’s local committee would comprise a Council that conducted business, by correspondence or in meetings. The President could call a meeting of the Council and/or of the entire Commission when desirable. Local committees would pay their own expenses and contribute equally to the central office.

Some of these same principles and institutional structures, drawn in part from the British and American electrotechnical associations and manifested internationally in the IEC,

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<sup>20</sup> 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 7/16/2006).

would be adopted in the first American general standards setting organization, the American Engineering Standards Committee (AESC). The AESC was formed in 1918 by the professional associations of civil, electrical, mechanical, and mining engineers and the American Society for Testing Materials (ASTM). At the first meeting, the five organizations agreed, “after lengthy discussion of the subject,” to invite representatives of U.S. Navy, War, and Commerce Departments to join the organization.<sup>21</sup> At the same meeting, the representatives of the five associations approved a draft “Constitution” and “Rules of Procedure” that outlined both the justification for establishing national standards and the mechanisms by which they would be created.<sup>22</sup>

From the beginning, members wanted to establish the legitimacy of this non-governmental organization and its standard-setting processes. The draft constitution’s preamble asserted:

At the present time many bodies are engaged in the formulation of standards. There is no uniformity in the rules for such procedure in the different organizations; in some cases the committees engaged in the work are not fully representative; and in a considerable proportion of cases they do not consult all the allied interests.<sup>23</sup>

What would become Sections 6 and 7 of the final Rules of Procedure<sup>24</sup> addressed the representativeness of standard-setting committees, and, hence, the legitimacy of the resulting standards. AESC standards-making committees dealing with “standards of a commercial character (specifications, shop practices, etc.)” would become “fully representative” by being “made up of representatives of producers, consumers and general interests, no one of these

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<sup>21</sup> 14 May 1918, Minutes, American Engineering Standards Committee (AESC), p. 1 (page numbers provided until sequential numbering of minutes begins in March 1919; after that, we indicate minute number with #). The National Bureau of Standards [NBS], in charge of the U.S. system of weights and measurement, was under the Department of Commerce.

<sup>22</sup> Included as appendices to 14 May 1918, Minutes, AESC.

<sup>23</sup> *Ibid.*, p. 1 of the first appendix.

<sup>24</sup> Originally they were parts a and b of Section 3 of the draft.

interests to form a majority.” At this time, “consumers” and “producers” were largely understood as consuming and producing companies; it would take much longer before individual consumers were explicitly brought into the picture. “General interests include independent engineers, educators, and persons who are neither consumers nor producers, as defined above.” The “general interest” groups would be especially important in less commercial realms:

Sectional Committees dealing with standards, of a scientific or non-commercial character shall consist of persons specifically qualified, without regard to their affiliation.

These technical committees, following IEC precedent, became the primary mechanism through which voluntary standards would be developed.<sup>25</sup> A May 1919 amendment to the draft constitution assured that the role of the overall “Committee,” the organization’s “government,” would be limited to the “approval” of standards developed through these mechanisms.<sup>26</sup>

As World War I wound down, the representatives of the engineering associations and government debated both the draft documents and three larger visions of what a national standards agency should be. One group wanted the government to take the central role. In January 1919, AESC Chairman Comfort A. Adams, Professor of Electrical Engineering at Harvard and his society’s representative, reported to his colleagues that the National Bureau of Standards Director, Samuel W. Stratton, had written to say that

...it was his desire that the Bureau be the standardizing body for the nation and that in his opinion the American Engineering Standards Committee should act in an advisory capacity to the Bureau, but that if this arrangement was not agreeable he would accept

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<sup>25</sup> For discussion of this mechanism and the principal of voluntary standards, see David Hemenway, *Industrywide Voluntary Product Standards* (Cambridge, MA, 1975).

<sup>26</sup> 17 May 1919, Minutes, AESC, #123.

our invitation and join in the work of the Committee according to our Constitution and Rules of Procedure.<sup>27</sup>

A second group, including the Chairman, advocated opening the organization to all of the professional associations, trade associations, and even individual firms that either produced or used standards. Most of the other representatives of the engineering societies were aghast. One asked:

“How large would this American Standards Association be?”

“About one thousand,” replied Professor Adams.

“If that were the case it would be impossible to arrive at any conclusions.”<sup>28</sup>

Initially, a third view came to dominate: AESC should slowly add additional “cooperating societies” that shared the five original members’ “general” (i.e., non-commercial) interest in standard setting. Yet, the rapidity with which new organizations (trade associations as well as professional organizations) and even firms were actually admitted to the AESC reflected the eventual triumph of Adam’s vision.

In part, this proved a practical necessity. In 1918, Adams had stressed the importance of having the ultimate users of standards at the table, interested, and willing to pay for the often expensive work of standard setting, although another representative “expressed the vigorous opinion that this Committee should not consider the proposed reorganization on the grounds of financial support alone.”<sup>29</sup> Recurrent financial difficulties marked the early history of the U.S. standards agency, however, and attempts to mitigate them through measures short of giving most standards producers and consumers a place at the table failed.

When AESC turned to private foundations, in 1921, the Carnegie Corporation’s James R.

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<sup>27</sup> 17 Jan. 1919, Minutes, AESC, p. 1.

<sup>28</sup> 18 Jan. 1919, Minutes, AESC, p. 3.

<sup>29</sup> 1 March 1919, Minutes, AESC, #69.

Angell wrote back, “The work ought to be carried out by the industries.”<sup>30</sup> A simultaneous scheme to convince industrial firms to give voluntary financial contributions almost cost more than it raised. The Committee’s Secretary Paul Agnew, just back from a trip to Europe, reported that the European way of funding national standards bodies was through dues paid by trade associations and firms who acted as members, adding further support to this view.<sup>31</sup>

In part, the eventual embrace of Adams’s vision may have been a consequence of his ability to convince his colleagues that the failure of the standards movement (due to lack of funding or to the lack of legitimacy of proposed standards) would spell disaster in other arena, such as labor. The minutes of one meeting in early 1919 record:

Prompted by the remarks of some members of the Committee as to the limitation of the field of our work strictly to engineering standards, Chairman Adams pointed out the close relation which standardization in general bears to the present labor situation. Since the statement throws a new light on the discussion at hand it is given below in full.

“The industrial labor situation is no theoretical matter, but a vital one to every one of us. We are faced with a situation in which labor is beginning to feel its power, and it has power if it organizes in a democratic country. It is my opinion, that with our present productive capacity per man, (all industries considered), it is impossible to raise the wages of all occupations up to the point of the best paid ones today, even taking into account the skill involved. Put in another way, the productive capacity of the individual, on the average, is not sufficient to create the wealth he wishes as a return for his labor. We must either face the possibility of a Bolshevik movement in this country or devise some means for increasing the average productivity of labor. This can be done by cooperation and standardization, which go hand in hand.

[“]If anyone looks at the present situation critically, and sees it in the right perspective, he realizes the chaotic condition of the creation of standards in this country. The number of bodies involved is many and various. All kinds of methods are employed, some of them crude and unsatisfactory, some of them commercial.

[“]I think you cannot fail to see the tremendous possibility and value to all industries, and to the nation as a whole, of this work of standardization. It is not outside the field

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<sup>30</sup> 2 June 1921, Minutes, AESC, #534.

<sup>31</sup> 15 September 1921, Minutes, AESC, #540.



of this Committee to attempt to do this work. If we can get in these other organizations, the textile industry and the others as well, and inject into their working plans of organization the idea which we have evolved here of thorough, broad and comprehensive co-operation in the production of standards, I think we will have accomplished one of the biggest jobs which has ever been undertaken in this country. It would be more to solve the present problems of the United States than anything else we could do.”<sup>32</sup>

Thus, he argued, potential labor unrest could be quelled by the high incomes made possible by the rapid increases in productivity that effective industrial standards would encourage. In 1922, Commerce Secretary Herbert Hoover, one of the most important advocates of scientific rationalization through voluntary cooperation of trade associations and professional societies,<sup>33</sup> addressed the expanding AESC board with a similar productivity-based argument, but for him, the maintenance of the U.S. export position was the ultimate object.<sup>34</sup>

An even grander argument had been heard three years earlier, when, just a month after the signing of the Treaty of Versailles, the head of the British Engineering Standards Association (BESA), Charles Le Maistre, came to New York to address the fledgling AESC. In 1901, at age 25, Le Maistre had become the first Secretary of BESA’s predecessor, the Engineering Standards Committee, and 1906 the first General Secretary of the IEC.<sup>35</sup> In 1919, he told the Americans, “. . . 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.”<sup>36</sup> He argued for Anglo-American and worldwide cooperation among standardization bodies. Adams responded to Le Maistre’s address by saying that his British colleague’s remarks,

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<sup>32</sup> 1 March 1919, Minutes, AESC, #70.

<sup>33</sup> See Ellis W. Hawley, “Herbert Hoover, the Commerce Secretariat, and the Vision of an Associative State,” *The Journal of American History* 61 (Jan. 1974): 116-40.

<sup>34</sup> 15 June 1922, Minutes, AESC.

<sup>35</sup> IEC, “Charles Le Maistre,” dated March 2006, found on the Internet at: [http://www.iec.ch/online\\_news/etech/arch\\_2006/etech\\_0306/news.htm#top](http://www.iec.ch/online_news/etech/arch_2006/etech_0306/news.htm#top).

<sup>36</sup> 15 Aug. 1919, [Transcript of the] Committee Meeting of the American Engineering Standards Committee, p. 6 (minutes were not numbered in this transcript, so page numbers are used, instead).

“have served, I think, the purpose which I have in mind.” Adams returned to his theme of increasing the productivity of labor in order to provide rising incomes, and of the role of standardization in that larger process:

...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.<sup>37</sup>

Le Maistre’s visit helped secure the agreement of all AESC members to the principle, in Adams’s words, “that the admission of other societies is desirable,”<sup>38</sup> but agreement on the desirability of cooperation beyond the “narrow or small” interest of one nation would take longer. For example, less than three months after Le Maistre’s address, the AESC decided that it had no power to act in response to a request from the International Aircraft Standards Commission (IASC) that the U.S. set up a corresponding U.S. Commission. In this field (unlike in any other field it discussed), the AESC argued that the issue would have to be taken up by Congress before it would be able to act.<sup>39</sup> Perhaps the AESC’s decision had something to do with the fact that the IASC grew out of the pre-war Franco-German international aviation regime (in which Britain and the U.S. did not participate).<sup>40</sup> Moreover,

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<sup>37</sup> Ibid, p. 22.

<sup>38</sup> Ibid., p. 27.

<sup>39</sup> 1 Nov. 1919, Minutes, AESC, #168.

<sup>40</sup> Kenneth W. Colegrove, *International Control of Aviation*, (Boston, 1930), 50-51. Aircraft standards remained controversial, partially a matter of intergovernmental agreement. The United Nations Specialized Agency that was given some of those functions, the International Civil Aviation Organization (ICAO), was created at the same time as the ISO. The ICAO’s headquarters was placed in Montreal, the only UN agency based there, in part because it continued the functions of the largely French pre-war intergovernmental regime. The ISO’s Technical Committee 20 was also given responsibility for aircraft standards and the British Standards Institution (BSI, the successor to BESA) was made its secretariat. TC 20 was one of the more active ISO committees in the two decades after the Second World War. ISO, *The ISO Technical Committees Shown in Figures, 1947-1964*, (Geneva, 1964), 5, 19.

Le Maistre had made a particular point of the desirability of Anglo-American agreement that would build on the British experience in aviation standards.<sup>41</sup>

In 1921 and 1923, the Committee sent Paul Agnew to European conferences of the general secretaries of all the European national standards associations, including that of Germany.<sup>42</sup> Then, from 1923 through 1925, AESC encouraged the development of standardization associations throughout Latin America.<sup>43</sup> At the third postwar “informal conference of the national standards bodies” held in Europe in 1925,<sup>44</sup> the associations agreed to hold a further meeting in 1926. The agenda would include forming a more permanent body linking the national standards associations. In January and February 1926, AESC debated 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. The Americans agreed that the time was ripe, but 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.<sup>45</sup> Thus they worked to modify the ISA draft constitution to reflect a focus on coordinating national standards, rather than setting international standards.

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<sup>41</sup> 1 Nov. 1919, Minutes, AESC, #168. In any event, immediately after deciding *not* to pursue international cooperation on aviation standards through the existing body, “The use of the term ‘Anglo-American’ was discussed and the Committee expressed the wish that in all correspondence the term ‘international’ be used in the place of ‘Anglo-American.’”

<sup>42</sup> 12 March 1921, Minutes, AESC, #438; 12 Sept. 1923, Minutes, AESC, #1062.

<sup>43</sup> The report of the AESC representative to the first Pan-American Conference on Standardization (held in 1925), offered some cautious words about what could be expected, emphasizing, “...the importance of an understanding of the fundamental differences in the two civilizations [present in America] and in the cultural background from which they developed. Such an understanding would be necessary in any active cooperation in standardization matters. The Anglo-Saxons were chiefly concerned with and interested in processes and results. The Latin peoples and Latin-American’s in particular cared less for industrial processes and results, but were more interested in artistic and emotional side of cultural and industrial development” (19 April 1925, Minutes, AESC, #1356).

<sup>44</sup> It was in fact the third, but it was designated as the “second,” because the meeting of 1921 was not considered formal enough to be called an “informal conference,” 25 Nov. 1925, Minutes, AESC, #1446.

<sup>45</sup> 12 Jan. and 11 Feb. 1926, Minutes, AESC, #1533 and #1554.

## **The International Federation of National Standardization Associations (ISA)**

ISA's constitution as adopted organized its work through technical committees like those of the IEC, each covering a different field and representing all national associations that wished to be involved. A committee's primary job was to exchange information; international standards would be proposed only "after the new organization had considerable experience."<sup>46</sup> The secretariat (administrative) work of most of the technical committees would be given to the standardizing body of a single country, with two exceptions: Screw threads and fasteners would be the subject of separate "inch" and "metric" committees, with BESA and the Swiss association, respectively, in charge; and the ISA would have two Secretaries, BESA's Le Maistre (for whom it may have been an honorary role since he continued his positions in BESA and the IEC) and a Swiss engineer, Mr. Huber-Ruf.<sup>47</sup>

From the beginning, ISA's work was hampered by a set of recurrent problems. There was the long-standing division between the "inch" and the "metric" countries (reflected in the dual secretariats and secretaries just noted), 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 Switzerland) on the other. In fact, one of ISA's few triumphs was agreement on a standard inch-millimeter conversion ratio.<sup>48</sup> Moreover, in the early years, Britain and Canada had little active support from the United States. The financial difficulties of the AESC (a consequence of its slow and only partial embrace of the principle of broad inclusion led to an April 1928 resolution that, "definite action in regard to the support of

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<sup>46</sup> 10 June 1926, Minutes, AESC, # 1600.

<sup>47</sup> Switzerland had provided the secretariat for sequence of "informal" meetings that led to ISA (14 Oct. 1926, Minutes, AESC, #1657).

<sup>48</sup> Coonley, "The International Standards Movement," 38.

international cooperation in standardization should await further progress in reorganization of the AESC.”<sup>49</sup>

The U.S. association finally agreed to join ISA on October 16, 1929, less than two weeks before Black Monday, October 28. The downward spiral of world trade that immediately followed the stock market crash assured that ISA would have very little impact on the scale of industry, productivity of labor, or average income of men and women in the “democratic countries”—very little impact on the causal nexus that so concerned the early Anglo-American leaders of the standards movement.

Nevertheless, some consequences of ISA’s work (beyond creating standard translations between the inch and metric systems) remain part of everyday life. Howard Coonley, the U.S. industrialist who became the first head of the ISO, later pointed out that ISA established a global standard for the placement of sound on motion picture film, something that immediately proved to be of great importance to one of the internationally-oriented U.S. industries of the Depression era.<sup>50</sup> Other legacies of ISA include the standard sizing of paper (A2, A4, etc.) worked out by the German national standards body, which served as the secretariat of the relevant ISA technical committee.<sup>51</sup> And one of the last decisions of an ISA technical committee, taken in 1940, was to approve the prefix “nano-” as meaning  $10^{-9}$ .<sup>52</sup>

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<sup>49</sup> 26 April 1928, Minutes, AESC, #2009.

<sup>50</sup> Coonley, “The International Standards Movement,” 39.

<sup>51</sup> Markus Kuhn, “International Paper Sizes,” 29 Oct. 1996, <http://www.cl.cam.ac.uk/~mgk25/iso-paper.html>, viewed 17 May 2006. Kuhn, a University of Cambridge computer scientist, is very much an heir of the true believers in standards a century ago. He writes, “Globalization starts with getting the details right. Inconsistent use of SI units [units internationally agreed upon through ISO and other bodies] and international standard paper sizes remain today a primary cause for US businesses failing to the expectations of customers worldwide.”

<sup>52</sup> See “nano-” on the International System of Units (SI) website, <http://www.sizes.com/units/nano.htm>, viewed 17 May 2006.

The next round of international standards activity was triggered by World War II.

### **War and Post-war International Standardization: UNSCC and ISO**

When war broke out in Europe in 1939, ISA initially tried to keep functioning. But by early 1941, Agnew reported to the ASA Board of Directors that it had been effectively mothballed for the duration of hostilities, with the files and records remaining in neutral Switzerland, in the hands of Mr. Huber-Ruf, and with a recommendation to pay him a retainer.<sup>53</sup> By the following month, he explained to the Standards Council, “a cablegram had been received from ISA headquarters stating that all efforts to hold elections had been discontinued.”<sup>54</sup> The IEC had similarly gone into “hibernation.”

The disappearance of these international standardizing bodies came at a time when international standardization—at least standardization across the Allied forces—was more important than ever. Although ASA was initially preoccupied with converting U.S. standard setting to an emergency basis and creating streamlined wartime procedures, by 1943 ASA leaders were turning their attention towards broader international issues.<sup>55</sup> At its December 1943 meeting, the Board of Directors discussed what they referred to as “Inter-Allied Cooperation in Standardization Matters”—the first of the talks that would create the United Nations Standards Coordinating Committee (UNSCC).<sup>56</sup> The director of the British

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<sup>53</sup> 26 March 1941, Minutes of ASA Board of Directors, #3378.

<sup>54</sup> 10 April 1941, Minutes, ASA Standards Council.#3384.

<sup>55</sup> See, for example, 22 May 1942, Minutes, ASA Board of Directors, #3532, “Status of ASA Work on War Emergency Standards.”

<sup>56</sup> 9 Dec. 1943, Minutes, ASA Board of Directors, #3635. The Allied countries began referring to themselves as the United Nations at the beginning of 1942, even though the United Nations as an organization was not established until after the war.

Standards Institution (BSI, the new name for BESA, following rechartering in 1931<sup>57</sup>), Percy Good, had been in the U.S. for a meeting on screw threads, and on this trip he consulted informally with officers of the Canadian and U.S. standardizing associations about setting up an “agency for inter-allied cooperation in standards work.”<sup>58</sup> As reported to the ASA general meeting the next day,

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.<sup>59</sup>

Support for such an organization was strong, but so was ambivalence about its status and relationship to ASA. The ASA Board of Directors authorized affiliation with this proposed group but requested an outline of how ASA would interact with it, to be delivered to the Council at the same time that the Constitution of the United Nations Standards Committee was presented for final action.<sup>60</sup> Director Harold S. Osborne, former chief engineer of AT&T and representative of the American Institute of Electrical Engineers (AIEE), noted that “this new project should not be confused with international standardization in peace-time, since the plan was for establishing a war agency to handle urgent problems.” Secretary Agnew, along with Director Robert E. Wilson (the petroleum engineer who headed Standard Oil of Indiana), explained the role of the proposed organization (as summarized in the minutes) as follows:

...the proposed United Nations Standards Committee would not have authority to set up or promulgate standards. Its purpose was to stimulate cooperation on standards work between the United Nations. The standards worked upon would be promulgated

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<sup>57</sup> BSI, “History of the BSI Group,” <http://www.bsi-global.com/News/History/index.xalter>, viewed 17 May 2006.

<sup>58</sup> 9 Dec. 1943, Minutes, ASA Board of Directors, #3635.

<sup>59</sup> 10 Dec. 1943, Minutes, Twenty-Fifth Anniversary Meeting of ASA, #3663.

<sup>60</sup> 9 Dec. 1943, Minutes, ASA Board of Directors, #3635.

by the respective national standardizing bodies. An important object was, of course, that the work would lead to increasing uniformity between such national standards.<sup>61</sup>

This focus on coordination and cooperation was made explicit in the expanded name soon adopted—the United Nations Standards Coordinating Committee (UNSCC),<sup>62</sup>

Talks continued well into 1944, as the ASA members involved developed protocols for how ASA would relate to the new organization. The ambivalence among ASA Directors and Council members about whether this organization should be seen only as a war-time institution doing emergency work or as the kernel of a post-war international standards organization continued to be displayed throughout this period. Although most saw it as primarily a war-time body, the Standards Council determined that UNSCC work should be based on ASA's normal (voluntary consensus) standardization process, not on its streamlined war-time procedures, which at least one member considered a "violation of the ASA Constitution."<sup>63</sup> Indeed, the Council revised one passage of the report to say that "standards developed under UNSCC Procedure that are acceptable to the ASA shall be published in accordance with ASA procedure for other American Standards,"<sup>64</sup> rather than according to the American War Standards Procedure.<sup>64</sup> Nevertheless, when the procedures for ASA-UNSCC relations were established, the Directors determined that the Procedure of the UNSCC should not be made an official part of ASA procedures, but a one-of-a-kind procedure.<sup>65</sup>

Meanwhile, a series of international meetings including members of standards organizations in Australia, Canada, Great Britain, New Zealand, and the U.S., along with a

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<sup>61</sup> Both quotes, *ibid.*.

<sup>62</sup> It was referred to by that name in the minutes of the next round of meetings in May 1944: 18 May 1944, Minutes, Standards Council, #3674.

<sup>63</sup> *Ibid.*

<sup>64</sup> *Ibid.*

<sup>65</sup> 14 Sept. 1944, Minutes, Standards Council, #3707.



Russian observer, developed the organization's ground rules.<sup>66</sup> When the organization was officially established on July 1, 1944, the ambivalence exhibited within ASA was also built into the new organization's ground rules: UNSCC was authorized to exist for just two years before the need for it would be reviewed.<sup>67</sup> Two UNSCC offices were established—the first in London under the direction of Charles Le Maistre, and the second in New York—and standards work began. Latin American countries had been invited to join, as well.

This organization was not established soon enough to be very useful to the war effort. Indeed, in May of 1945, after hostilities in Europe had ended and only a few months before Hiroshima, the ASA Standards Council had only just agreed to several projects to be undertaken by the UNSCC (including radio interference, shellac, and testing of textiles).<sup>68</sup> Nevertheless, the chairman of ASA's Advisory Committee of the Council on UNSCC reported to the ASA Board of Directors that his committee "was beginning to function and it looked as though the work of the UNSCC would be very valuable."<sup>69</sup>

When the war ended, the UNSCC technical committees continued to function to help with the recovery, but discussion immediately 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.<sup>70</sup> From the

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<sup>66</sup> "United Nations Standards Committee Opens," *Industrial Standardization* 15:10 (1944), 209-210. This committee, which had begun with three countries, would ultimately include 18: Australia, Brazil, Belgium, Canada, Chile, China, Czechoslovakia, Denmark, France, Great Britain, Mexico, Netherlands, New Zealand, Norway, Poland, South Africa, United States, and USSR (Coonley, "The International Standards Movement," in Reek, *National Standards*, 39).

<sup>67</sup> The July 1 date comes from an undated form letter from C. Le Maistre, Secretary-in-charge of London Office, UNSCC, inviting standards organizations in other countries to join (UNSCC files, ISO, Geneva).

<sup>68</sup> 24 May 1945, Minutes of ASA Standards Council, #3771.

<sup>69</sup> 25 May 1945, Minutes, ASA Board of Directors, #3795.

<sup>70</sup> "UNSCC," *Economist*, Vol. 148 (3 March 1945), 286-87.

*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 UK and British Empire) would not adequately forward economic recovery of all. Within the ASA, where the president had appointed "a committee to advise the Board on the future organization of international standardization work," one member of the Standards Council asked why the pre-war international association, ISA, was not being reactivated.<sup>71</sup>

In response [...], the Chairman mentioned that the enemy countries had been members of the old organization and that it might be difficult to carry on work if the old organization were reactivated. It therefore seemed desirable to organize a new body which could function free from any prejudices.

Unlike the author of the *Economist* article, the ASA leaders were obviously not yet ready to include enemy countries in any new organization, apparently wishing at least to establish procedures for the new organization with other friendly countries. Moreover, although the U.S., as represented by ASA, had played a relatively small role in ISA, a new organization would necessarily put it in a more central position.<sup>72</sup> That new organization would be the ISO.

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 (ASA Secretary Agnew represented the U.S.) met to develop a proposal for presentation to the larger group.<sup>73</sup> The

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<sup>71</sup> 27 September 1945, Minutes of ASA Standards Council, #3808. Subsequent quotation from same.

<sup>72</sup> Coonley, "The International Standards Movement," 39.

<sup>73</sup> 27 September 1945, Minutes of ASA Standards Council, #3808.

New York UNSCC meeting included 23 participants representing the UNSCC secretariat and the standards bodies of eleven countries: Australia, Belgium, Brazil, Canada, China France, Denmark, Mexico, South Africa, the United Kingdom, and the U.S.<sup>74</sup> Before presenting their proposals for governance, the executive committee presented “the three foundation values in our organization”: 1) that it be composed only of national standardization bodies; 2) that it coordinate, not promulgate, standards; and 3) that technical divisions be created.<sup>75</sup> The discussions around these three principals at this and subsequent meetings, as well as around a few other sticky points, were key to the establishment of the new international standards organization. The draft constitution that emerged from the first meeting was circulated to the national standards bodies, some of which responded by drafting three alternatives.<sup>76</sup> These four drafts all became input to the consolidated draft produced for the London meeting.

In the New York meeting, the first value generated an extensive discussion of how to define *national* standardizing bodies.<sup>77</sup> In particular, the ASA director who was asked to chair this meeting of the UNSCC, Harold S. Osborne, repeatedly raised a fairness issue around excluding developing countries that did not have national standards bodies.<sup>78</sup> As the IEC had a method for creating member bodies even when a country lacked technical societies, he wanted the ISO to allow countries to form a body for international standardization, whether or not they had a national standards body. This position was consistent with the ASA Board of Directors vote a week earlier that membership “should be

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<sup>74</sup> “List of participants,” in “Report of New York Conference, October 8-11, 1945,” (UNSCC files, ISO, Geneva). Only the U.S had more than two representatives, and it had six.

<sup>75</sup> UNSCC Proceedings of New York Meeting, 8-11 Oct., 1945 (UNSCC files, ISO, Geneva). The following account comes primarily from these Proceedings.

<sup>76</sup> P. G. Agnew, “Plan Merger of Standards Groups,” *Industrial Standardization* 17 (September 1946), 217.

<sup>77</sup> UNSCC Proceedings of New York Meeting, pp. 9-19.

<sup>78</sup> Osborne was a former Chief Engineer of AT&T and a Past President of the IEC; he is identified before Osborne, “Liberating Research and Development with National Standards,” in Reck, *National Standards*, 64.

open to the national standardizing body of each nation of the world and in the nations not having national standardizing bodies to a body established for the purpose of international standardization which is found by the new agency to be sufficiently representative.”<sup>79</sup> In spite of his advocacy and the IEC precedent, the first value was ultimately accepted as originally proposed, not allowing membership to countries without national standards bodies. Subsequently this initial decision was modified very little.<sup>80</sup>

The second value, that the new body would be a coordinating body, not a standardizing body, raised a key point of contention for the new organization. The UNSCC Executive Committee’s vision, incorporated in the name initially proposed for the association—the International Standards Coordinating Association—would be modified significantly during subsequent discussions. The discussion around it centered on the meaning of “coordinating,” or, as the ASA delegate preferred, “harmonizing.”<sup>81</sup> Mr. Good, the lead British representative, was particularly adamant that the new association should *coordinate*, not *establish*, standards. He argued that only national bodies could establish standards, and that nothing could be called an “international standard” without unanimous support, much as in the IEC. Indeed, he urged that the new organization not designate any

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<sup>79</sup> 28 Sept. 1945, Minutes, ASA Board of Directors, #3832.

<sup>80</sup> Article 3 of that final draft defined membership in much the same terms: “The members of the Organization shall be those National Standards Bodies which have agreed to abide by the Constitution and Rules of Procedure, and have been admitted into the Organization in accordance with the procedure defined in the Rules of Procedure.” “International Organization for Standardization, Draft Constitution,” Annex I, United Nations Standards Co-ordinating Committee, “Report of Conference of the United Nations Standards Co-ordinating Committee Together with Delegates from Certain Other National Standards Bodies,” London, 14-26 Oct. 1946 (UNSCC files, ISO, Geneva), p. 27. Hereafter “UNSCC Report of London Meeting, Oct. 1946.” One hypothesis would be that this unusual resistance to precedent reflected British, French, and Dutch desire to maintain imperial hold over standards, if not over soon-to-be-independent colonies.

<sup>81</sup> *Ibid.*, pp. 19-33. The ASA Board of Directors saw the purpose of the new organization as bringing national standards into “international harmony” and they felt that “Such harmonizing agreements should express as nearly as possible an international consensus of opinion on the subjects dealt with and should have the status of recommendations for international use and be accepted by the member-bodies in that sense” (28 Sept. 1945, Minutes, ASA Board of Directors, #3832).

international standards, but simply report annually on which nations accepted which standards, another procedure drawn from IEC precedent. One of the underlying reasons for his strong stand emerged later in the meeting when a Chinese representative proposed a method for dealing with the metric versus foot-pound or “English” measurement systems by using a single system when possible and two standards as nearly consistent as possible when not.<sup>82</sup> At that point, Good invoked the “coordinating” role of this new body to state unequivocally that the U.K. would not participate in any discussion of this issue. Clearly, the British were unwilling to allow the proposed international organization to make decisions that could over-ride that country’s perceived national interests.

The jurisdiction and powers of the new organization—in particular, whether it coordinated national or established international standards—continued as a source of disagreement through the rest of this and the two subsequent conferences. The draft constitution that emerged from that meeting made technical committees the primary working groups of the organization (as in IEC), and put the secretariat of (and thus administrative control over) each technical committee in one of the member national organizations (again as in the IEC), a structure that preserved the fiction that only national bodies established standards. After much debate, the delegates agreed that most publications of the association would simply be minutes and reports on standards work done by technical committees, including descriptions of which bodies agreed to which proposed standard.<sup>83</sup> Subsequently it was proposed that with the consent of all member bodies of the administrative council (a

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<sup>82</sup> UNSCC Proceedings of New York Meeting., pp. 107-18. In the discussion, it becomes clear that at least three of the eleven countries—Mexico, Brazil, and China—have laws forbidding use of the foot-pound system.

<sup>83</sup> *Ibid.*, pp. 123-30.

body of representatives from 11 countries<sup>84</sup>) the new organization could publish recommendations on *international* standards, a position that was soon softened beyond that of the IEC to require only lack of dissent or veto from any member body.<sup>85</sup> This policy, which moved beyond simply coordinating national standards to establishing international standards, was also reflected in the name ultimately adopted for the organization: the International Organization for Standardization (to be abbreviated as ISO), which dropped the word “coordinating” from the name initially proposed.<sup>86</sup>

The third principal stated that related technical committees could be clustered into technical divisions, a position taken by the ASA previous to the New York meeting, as well.<sup>87</sup> This structure, which had no precedent in the IEC but was intended to accommodate that organization, was easily accepted, since it simply added a layer to the structure of technical committees already used by most national and international standards bodies. As explained in the final draft presented at the London meeting,

The Technical Divisions may be comprised of either International Organizations interested partially or totally in standardization and which are affiliated to the Organization, or groups of Technical Committees, the activities of which are closely related and which it would be advantageous to co-ordinate more closely.<sup>88</sup>

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<sup>84</sup> The USSR wanted to establish 5 permanent members of the council (as in the UN itself), but they agreed instead to having 5 members that stayed stable for the first 5 years, as the other 6 rotated. After 5 years, all would rotate. The 5 members were the standards bodies of China, France, the UK, USA, and USSR.

<sup>85</sup> Ibid., pp. 220-21; Draft Constitution, London Conference, Oct. 1946, p. 27.

<sup>86</sup> Ibid. The draft with explanations circulated by UNSCC in August 1946 (UNSCC files, ISO Geneva office), between the Paris and London meetings, eliminated the word “co-ordinating” from the name.

<sup>87</sup> 28 Sept. 1945, Minutes, ASA Board of Directors, #3832.

<sup>88</sup> Draft constitution, London Conference, Oct. 1946, p. 28.

Most importantly, this structure allowed the IEC to be incorporated into ISO as its electrical division, allowing it to retain its name and technical (though not budgetary) autonomy.<sup>89</sup> The delegates also agreed to create other divisions as needed.

A few other issues that came up at this first conference would continue to create considerable discussion in this and the next two meetings. The issue of official languages for the organization was initially a hot one. At the New York meeting, the British had suggested that English be the only official language, but soon French was added.<sup>90</sup>

By the Paris meeting, the USSR, which had only sent observers to the final day of the New York meeting, had declared its interest in belonging and sent a delegation.<sup>91</sup> There, it insisted that the Russian language be put on the same basis as English and French. When the other delegates did not agree, the Russian delegates asked the French and American delegates to stay after the meeting was over to discuss this further. The American delegates later reported to ASA that a tentative agreement had been reached in this informal group (an informal version of subcommittee) to name the Russian language as official in the text, but to require the USSR member body to do all the translating and publishing in Russian themselves (as other countries were allowed to do anyway). Reports of the London

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<sup>89</sup> The committee recommendations for the ASA delegates to the New York conference made explicit the link between providing for divisions and incorporating the IEC as one such division, leaving the details to be worked out later (28 Sept. 1945, Minutes, ASA Board of Directors, #3832). This issue was especially important since some members of the U.S. delegation were members of the IEC as well as the ASA, and the same was probably true of other national delegations.

<sup>90</sup> As reported in 7 Dec. 1945, Minutes, ASA Standards Council, #3851.

<sup>91</sup> 12 Sept. 1946, Minutes, ASA Standards Council, #3946, Agnew's "Report of the Meetings of the Executive Committee of the United Nations Standards Coordinating Committee and the Council of the International Federation of National Standardizing Associations (ISA)." It noted that "A month before the Paris meetings, however, the Russians had sent a communication through the London office of UNSCC announcing that the higher authorities of the Soviet Government had decided that Russia would participate in all important international technical meetings. The Russian representative, who had appeared through some misunderstanding, had by common consent of the delegates been allowed to remain and had not been aware of his lack of invitation." The description of how the issue was resolved also comes from this report.

conference and its aftermath simply state that the new organization has three official languages: English, French, and Russian.<sup>92</sup> Only in 1954 did the Russian language actually achieve co-equal status with English and French in the ISO.<sup>93</sup>

A less politically fraught issue, but one that had practical ramifications, was the choice of office location. At the New York conference there had been agreement that the new organization, unlike the UNSCC, would only have one office. Agnew reported to the ASA Standards Council that

The British delegate had suggested that it should be in London, and the American delegation had urged that it be located in the United States. There also had been considerable sentiment in regard to having the location in the Netherlands at The Hague. It had been decided that the question should be open without recommendation because it might be found desirable for the headquarters to be in the same country as that of the office of the United Nations Organization.<sup>94</sup>

By the London meeting, Russia had suggested Paris as a central city in continental Europe, and Montreal and Geneva (the latter being the location for many of the Specialized Agencies and part of the secretariat of the new United Nations organization) had also been

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<sup>92</sup> According to the draft constitution out of the London conference. See also 21 Nov. 1946, Minutes, ASA Standards Council, #3990, "Report of International Conference to Establish the International Organization for Standardization (ISO)"; and "Twenty-Five Countries Set Up New International Standards Organization," *Industrial Standardization* 17 (Dec. 1946): 297. Many decades later, Willy Kuert, a Swiss delegate to the London conference, explained the process as follows: "After a long discussion, we decided to ask a small group to work on this. The group came back and said that the Soviet Union was prepared to translate all the documents and to send translations to every member of the new organization. However, the Soviet Union wished to have no distinction between Russian and English and French. We could accept this proposal and it was set down." From Willy Kuert, interview in "The Founding of ISO," *Friendship Among Equals: Recollections from ISO's first fifty years* (Geneva, Switzerland, 1997), p. 20.

<sup>93</sup> ISO, *List of Resolutions adopted at the Meetings of the Council and General Assembly since the creation of ISO 1947-1963*, [ISO/RESOL 1 Oct. 1964], (Geneva, 1964), 29. The successful resolution of the language debate was significant. In contrast, the USSR withdrew from the simultaneous discussions aimed at creating the rest of the institutional architecture of a postwar global economy: the International Monetary Fund, the International Bank for Reconstruction and Development, and the stillborn International Trade Organization. It is perhaps surprising that the private sectors leaders who dominated the ISO discussions found it easier to accommodate Soviet concerns than did the government representatives at the other conferences who the Soviets, in 1947, condemned for wanting to create mere "branches of Wall Street." See Edward S. Mason and Robert E. Asher, *The World Bank since Bretton Woods* (Washington, DC, 1973), 29-30.

<sup>94</sup> 7 Dec. 1945, Minutes, ASA Standards Council, #3851.



nominated.<sup>95</sup> During that meeting delegates held a series of votes, and ultimately chose Geneva over Montreal by a single vote.<sup>96</sup>

A final complication was the ISO's relationship to the pre-war and war-time associations. The first president of the ISO, Howard Coonley, would later say that the ISO was "a merger of the original Federation (ISA) and the UNSCC," and from a technical point of view, it would be exactly that, but circumstances and the actions of one individual prevented that merger from proceeding straightforwardly. At the initial New York meeting the French delegate noted that many European nations objected to what they saw as the U.S., the UK, and France "cutting out" the old ISA and suggested that the demise of the ISA be dealt with explicitly.<sup>97</sup> The Swiss delegate suggested convening ISA for just long enough to dissolve itself, but that raised additional issues. Did the ISA still exist legally? Could it meet without Italy, Japan, and Germany? Could its 1939 Executive Committee, the last elected, still act for the association? If not, who could? The participants of the New York conference ultimately decided to create the constitution for the new organization first, then to dissolve ISA and UNSCC and to bring their activities into the new organization.

Subsequently the London meeting, originally planned for June 1946, had to be postponed to October. As Agnew reported to the ASA Standards Council, "Developments had come about as a result of a more thorough study of the situation in regard to the old International Standards Association which had made it practically essential that this meeting

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<sup>95</sup> Kuert, *Friendship Among Equals*, 21.

<sup>96</sup> Ibid. See also 21 Nov. 1946, Minutes, ASA Standards Council, #3990, "Report of International Conference to Establish the International Organization for Standardization (ISO)."

<sup>97</sup> UNSCC Proceedings of New York Meeting., p. 47. The discussion continued, pp. 47-59.

be postponed.”<sup>98</sup> Meanwhile, a joint meeting of the UNSCC Executive Committee and the ISA Council was held in Paris in June to continue designing the new organization and outlining the technical agenda based on the past work of those two predecessor organizations. At that time, delegates decided that the London conference would be “convened by the UNSCC with the collaboration of the ISA Council.”<sup>99</sup> The London Conference was planned as the occasion on which the new constitution was to be voted, ISA and UNSCC to be dissolved, and the baton to be passed to the new organization created out of the merger of the two old ones. Meanwhile, those who met in Paris had asked Le Maistre to travel to Switzerland to meet with Mr. Huber-Ruf, the Swiss secretary of the ISA before the war, since he had been too ill to attend the Paris conference. At the opening steering committee meeting of the London Conference, Le Maistre 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 the General Secretary of ISA and that he should be made the Director of the new organization, under a newly appointed General Director.<sup>100</sup> Since Huber-Ruf’s demands were unacceptable to the London delegates, they agreed to drop the ISA as a co-sponsor of that 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 took it upon themselves to liquidate ISA legally as soon as possible.

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<sup>98</sup> 25 April 1946, Minutes, ASA Standards Council, #3896, “Report on Development of New International Standards Body.”

<sup>99</sup> UNSCC Report of London Meeting, Oct. 1946, Minutes of Meeting of Steering committee, 14 Oct. 1946, p. 9.

<sup>100</sup> 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.

Despite these difficulties, the ISO was provisionally created at that London conference, formal ratification by member bodies to take place subsequently. The status of the ISO was described as follows in the December 1946 issue of ASA's *Industrial Standardization* magazine:

While technically the new International Organization for Standardization is "provisional", it is starting active work immediately by reviewing the projects and reports of the two predecessor organizations and considering a number of new proposals.

This is made possible by agreement on the part of the United Nations Standards Coordinating Committee to continue in existence and to maintain its office in London until the office of ISO in Geneva is in a position to take over.

...

The new organization will be formally completed when its constitution is ratified by 15 national standards bodies.<sup>101</sup>

The Minutes of the November meeting of the ASA Standards Council made clear how difficult that ratification might have been had those involved with the three key meetings not been so committed to the goals of the new institution.<sup>102</sup> A representative of ASA's Temporary Committee on International Standardization reported on its study of the proposed constitution, noting two areas in particular that worried the committee—the addition of Russian as an official language and an ambiguity about whether standards of ASA member bodies which had not been adopted by ASA as American Standards could be considered by the new organization.<sup>103</sup> Then a letter from the Executive Secretary of a member organization, the American Society for Testing Materials (ASTM), was presented, raising as problematic some additional issues (e.g., the previously noted ambiguity and the Geneva location) and recommending that more time be taken to allow member bodies to confer and

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<sup>101</sup> "Twenty-Five Countries Set up New International Standards Organization," *Industrial Standardization* 17 (Dec. 1946): 297-98.

<sup>102</sup> 21 Nov. 1946, Minutes, ASA Standards Council, #3991.

<sup>103</sup> Ibid.

present their positions to the ASA Board of Directors. Clearly, the more member bodies looked closely at the ISO Constitution, the more issues would be raised and the harder it would be for the ASA to endorse it.

Countering this desire to dissect the constitution and find problems, however, was the ASA leadership's recognition of how difficult it was to achieve such an international agreement and belief that it was better to have an imperfect international organization for standardizing than to have none at all. Harold Osborne, the chair of the Temporary Committee on International Standardization, had not been able to attend the meeting, but he sent a brief letter for distribution to the Standards Council, which made the following point:

It is my view that the question of immediate ratification should be governed largely by the views of Agnew and Crittenden [ASA's delegates to the three international meetings], based on their knowledge of the situations. I think the present document, though imperfect, could properly be made the basis of a start if they feel it important to do so.<sup>104</sup>

Following the presentation of this letter, the chairman of the meeting framed the Standards Council's current issue as deciding whether to ask for more time or to ratify the constitution in its current form, while pointing out that they would want to make some changes at some later time. Secretary Agnew "remarked that on the merits of the case internationally he would be very much disappointed if there were a delay in the ratification of the proposed Constitution and Rules of Procedure."<sup>105</sup> Although he considered the views of member bodies very important, he pointed out "the difficulty in getting agreement from 25 different countries with different industrial, technical, and linguistic backgrounds. It had been

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<sup>104</sup> H. S. Osborne to the Asst. Sec'y of ASA, 17 Nov. 1946, transcribed in 21 Nov. 1946, Minutes, ASA Standards Council, #3991.

<sup>105</sup> Ibid.

necessary to overlook many minor points in the interests of getting acceptance of more important ones.”<sup>106</sup>

Ultimately, this view in favor of compromise won out, and the Council voted unanimously to recommend that the ASA promptly approve the Constitution and Rules of Procedure, but also “inform all of the other Member-Bodies of ISO that recommendations will be submitted later for certain changes in the procedures, and possibly in the Constitution.”<sup>107</sup> The subsequent discussion in the Board of Directors meeting covered the same ground, but ultimately the board took the same position and ratified the Constitution on November 22, 1946.<sup>108</sup> This compromise allowed ASA to be the first national body to join ISO.<sup>109</sup> By April 1947, the number of member bodies that had ratified the constitution exceeded the necessary 15, making ISO official rather than provisional.<sup>110</sup> The first official meeting of the ISO was scheduled for Geneva in June 1947, and it had applied for consultative status with the Economic and Social Council of the UN. The first truly international standardization organization now existed.

## Conclusion

At the end of the World War I, and based in great part on the structures and processes established by the IEC, Comfort Adams and Charles Le Maistre had a vision of something

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<sup>106</sup> Ibid.

<sup>107</sup> Ibid.

<sup>108</sup> 22 Nov. 1946, Minutes, ASA Board of Directors, #4020.

<sup>109</sup> “ASA is First Body to Join International Organization,” *Industrial Standardization* 18 (Jan. 1947), 21.

<sup>110</sup> “International Standards Body is Now Officially Ratified,” *Industrial Standardization* 18 (April 1947), 96. The first 15 were Australia, Austria, Brazil, Chile, China, Czechoslovakia, Denmark, Finland, France, India, Mexico, Sweden, Switzerland, U.K., and U.S.A. By the 24 April meeting of the Standards Council, 22 bodies had ratified (24 April 1947, Minutes, ASA Standards Council, #4049, “Report on International Organization for Standardization”).

very much like the ISO that was created 27 years later. The realization of that vision was delayed by divisions between the “inch” countries and the “metric” world (especially between Britain and its industrial competitors on the continent) combined with jurisdictional disputes within national standards associations over who should be involved in standard setting. The Depression and traditional ideas about international cooperation with recent enemies played a role as well. At the same time, the accretion of institutional innovations, and their repetition from one context to the next (the IEC to the ISA to the UNSCC), helped eventually overcome these conflicts and shaped the nature of the ISO.

The work of the organization became organized around voluntary technical committees including representatives of engineering and commerce that were characteristic of the Anglo-American approach pioneered by the IEC and further developed by ISA. The system gave responsibility for the secretariat of each committee to one of the national standards bodies, assuring that there were agencies responsible for, and capable of carrying out, international standardizing work. This system also helped gain buy-in from the separate, powerful national bodies. Moreover, it helped finesse the conflict between those who wanted the international body to have only a coordinating role and those who wanted the international body to set standards. The continuous involvement of certain key figures, including Le Maistre and Agnew, also contributed to cooperation, as, perhaps, did a sense of urgency and a desire need to “get things right” after World War II, to avoid the delay and timidity that marked the creation of international institutions after the First World War.