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# International Advocacy for Fire Prevention: Calculating Risk and Brokering Best Practices in Theatres

**“A fire is nowhere more to be dreaded than in this class of building.”<sup>1</sup>**

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*The history of globalised theatre is not merely a history of how the circulation of aesthetics, human talent, and repertoires is facilitated by agents whose enterprise situates people and productions into networked premises. There is another facet that is scientifically oriented and empirically objectified, yet dependent upon human agency to create international comparability of standards. As such, fire prevention initiatives—which address the cityscape generally yet also prioritise theatres as sites of concern—bring together people from the building and design professions, engineering and materials research, civic administration, insurance and actuarial industry, and fire fighters as cultural mediators to determine, advocate, and proliferate standards for public safety. The history of these efforts coincides with international expansion of theatrical touring networks, yet is not an adjunct of that story. Instead, I argue that recognising the movement to identify and proliferate “best practices” for fire prevention is an important yet overlooked aspect of internationalism and knowledge circulation affiliated with discourse about the public sphere. Tracy C. Davis has a particular interest in performance theory, theatre historiography and research methodology. She is Barber Professor of Performing Arts and Professor of Theatre and English at Northwestern University (Evanston IL.)*

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Keywords: theatre fires, fire prevention strategies, Edwin O. Sachs, urban developments

**T**heatrical brokerage is rightfully located in the agents, artistic entrepreneurs, and financial tycoons who built syndicates and touring circuits across national, international, and transcontinental business empires from

the later-19th century. However, along with these developments in brokerage there is another stratum of activity on behalf of the theatrical industry not undertaken by agents per se but rather by other kinds of specialists; they took it upon themselves to advocate for reform in recognition of theatre's significance to cultural capital and civic repute, in line with a progressive ethos supporting interlinked networks of capital. These individuals and organisations focused on the protection of property and life by mitigating the likelihood, extent, and consequences of conflagration. Recognising this enriches the history of globalised theatre beyond the circulation of aesthetics, human talent, and repertoires in networked premises. Instead of foregrounding aesthetics and economics it recovers a parallel, scientifically-oriented and empirically objectified approach, devoted to creating international comparability of standards.

Fire prevention initiatives which address the cityscape generally yet also prioritise theatres as sites of concern bring together people from the building and design professions, engineering and materials research, civic administration, insurance and actuarial industry, and fire fighters as cultural mediators to determine, advocate, and proliferate standards for public safety. The history of these efforts coincides with international expansion of theatrical touring networks, yet is not an adjunct of that story. Instead, I argue that recognising the movement to identify and proliferate "best practices" for fire prevention is an important yet overlooked aspect of internationalism and knowledge circulation affiliated with discourse about the public sphere. Though neither impresarios nor agents, the individuals and organisations who furthered these efforts formed a network interested in the built environment, centrally incorporating theatre, but distinct from networks preoccupied by theatre ownership, property, capital, or aesthetics per se.

Until the mid-19th century, fire professionals sought compliance with safer standards one household, one building, and one block at a time. Subsequently, an echelon of leaders networked across their professions and national boundaries, asserted common cause in sharing technology, promulgating techniques, analysing disaster sites, and framing new building codes. Whereas these advocates' efforts at objective observation, empirical experimentation, and scientific advancement is consistent with Enlightenment initiatives, the historiography of modernity casts their descriptions of humans observed under stress, social engineering through regulation, and civic design and regularisation as central to newly articulated urban citizenship.<sup>2</sup> At the brink of the 20th century, they conjoined mathematical modelling with cartographic innovation to renovate the idea of risk (see Figure 1) and mobilised liberalism to motivate state provision for intervention into laissez-faire attitudes to the built environment and private insurance opt-ins in a format which is now nearly ubiquitous in the developed world. Specifically, they staged reciprocal visits of fire-fighting professionals between nations;<sup>3</sup> trade fairs to promote commercial rivalry and the dissemination of innovations; scientific congresses to link engineering and social science research to receptive audiences of fire brigade leaders, equipment purchasers, architects, builders, and politicians; and

“diplomatic” investigatory tours to strengthen personal ties and promote dialogue between national and civic representatives interested in reform. Essentially, the coalitions that emerged through these trade fairs, congresses, and touring missions which incorporated Europe and to some extent the Near East, Americas, and Australia called attention to various kinds of uncertainties (structural risks of buildings, inadequately equipped or trained personnel, and unregulated construction industries) to *identify risk as a political liability* then *leverage risk abatement* within the political economy so that it could be ameliorated by deliberate action. Extensive press coverage of the work of the coalitions in mainstream and trade periodicals as well as sponsored publication series and research papers worked across international boundaries. This changed attitudes and governing legislation within an impressively short period of time.

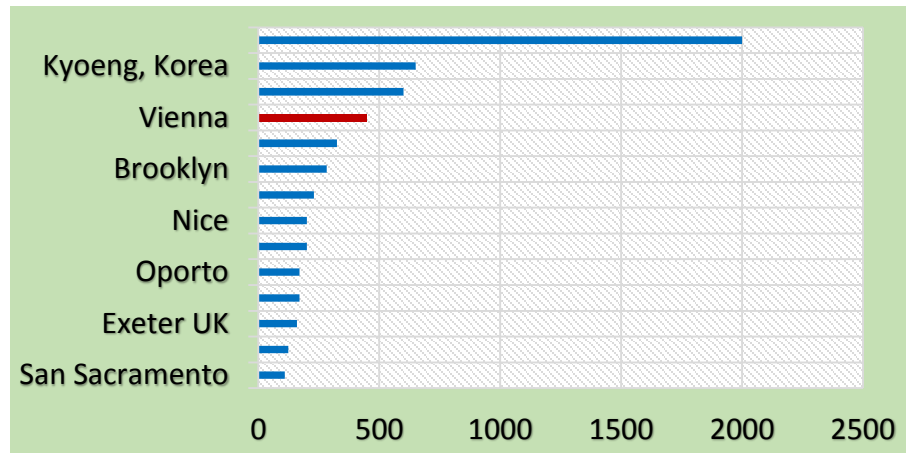


Figure. 1 Goad's insurance map of Leicester Square. (from Charles E. Goad, Insurance Plan of London. (London: Charles E. Goad, 1888.), n.p.

Beginning in the 1650s, German companies instigated an international traffic in fire mitigation technology. Empirical research on the topic was first published in 1690, in Amsterdam, the first city to organize a fire department on modern lines, though such investigations were not common for another three centuries.<sup>4</sup> In

London, Ambrose Godfrey conducted experiments on the use of explosion and suffocation to extinguish fires in 1723.<sup>5</sup> The fire insurance market fully emerged as a global industry by 1850, and the wide scale development of fire resistant construction and materials to prevent and contain outbreaks dates from around 1880.<sup>6</sup> Thus, the paradigms of risk and responsibility, and research and technology, had shifted sufficiently by the early-1890s that insurance rating systems were reformed to address the exigencies of specific industries, localities, and properties; insurers surveyed neighborhoods not just single buildings to determine risk; empirical experimentation on materials gained attention; and manufacturers addressed not only the technology for fire-fighting but also the materials and techniques for fire prevention.<sup>7</sup>

The theatrical industry is crucial to that acceleration. Unlike state edifices or privately owned factories, warehouses, and residences (which also feature in the fire prevention literature) theatres demonstrate the risk to entire populations at the vital heart of metropolises. The interior stratification of theatre auditoria made the differential outcomes for those exposed to fire and smoke a compelling demonstration of the class and gender nexus under modernity. A kind of emotive flammability incandesced when any part of the audience perished—even more so when children were victims, as at Exeter (1887) and Chicago (1903)—and each major theatre fire fueled a global news story.<sup>8</sup> Yet the 1881 Vienna Ring fire emerges as a touch point for this sensibility. Of the 100 “most significant” nineteenth-century fires singled out by Edwin O. Sachs, the Ring’s loss of 450 lives is the highest of any event outside Asia.<sup>9</sup> This loss of life and property, horrific though it was, brought relatively minor sanctions to the owner (Franz Jauner) and exoneration for the mayor (Julius von Newald), however the global media saturation of this event marks the discursive shift from theatre risk articulated through anti-theatricalism to risk to the citizenry as a deficiency of multi-institutional planning. The calamity of the Ring Theatre became an enduring synecdoche for how public life itself was threatened, not merely the safety of specific theatre-goers: public life, an integral aspect of civic capital and municipal reputation, put the onus on builders and legislators, not impresarios, to reform.<sup>10</sup> (Graph 1 and Figure 2)



Graph 1. Significant late-nineteenth-century fires with more than 100 Deaths. (From Edwin O. Sachs, *Modern Theatres and Opera Houses*, vol. 3, 133.)



Figure 2. "Burning of the Ring Theatre, Vienna How Some were Saved." *Illustrated London News* (London) 24 Dec. 1881: 617.

Maritime trading networks flourished or failed not just on the basis of ships' fortunes at sea. Fire in one city's warehousing district such as Hamburg in 1842 or Valparaiso (Chile) in the 1840s and 1850s had a collateral impact on investors, merchants, and traders matrixed to the worldwide flow of goods and capital. Changes in materials for example, replacing wood with brick enabled the construction of bigger warehouses wherein flammable contents were concentrated in greater and greater amounts. One risk (wooden structures) was traded for more of another (flammable goods) concentrated within a less flammable envelope;<sup>11</sup>

thus, the improved safety of building materials was cancelled out by what these materials enabled as a greater commercial efficiency. Fire reformers analysed these circumstances, but ultimately property owners decided whether or not to mitigate their own risk to capital. The risks inherent to theatres put this in another light, which reformers leveraged to maximise effect. In theatres, it was not cotton bales or nitrate stockpiles that ignited but scenery, ballet-girls, and soft furnishings; it was not just wealth that went up in smoke but people enjoying culture. Metonymously, it was not a merchant-trading network that perished but The Public itself, not just in that vicinity but by implication everywhere entertainments were enjoyed. During the nineteenth century, cities turned to stone: this emblem of modernity served rational planning and cultural pluralism, ordered compression of urban density, and experimentation and fractional subjectivity.<sup>12</sup> Theatres of stone increasingly built as civic focal points were not merely known to catch fire, not merely risky to enter, but an imperative to address on behalf of modernity as a civic and global project. Their presence in stone shared the same susceptibility as warehouses of brick: the envelope still contained scenery, machinery, and people but reputational risk multiplied. It was not the growing capitalisation of theatres that motivated impresarios to reduce risk, but the enhanced meaning and vulnerability of municipal reputations that brought impresarios into cooperation with architects, engineers, surveyors, actuaries, fire inspectors, and politicians. So, though each theatre was assessed in relation to its neighbourhood buildings, all theatres were matrixed together as a particular kind of high-stakes risk.

### ***Edwin O. Sachs and the Internationalisation of Fire Prevention***

Edwin O. Sachs emerges at the nexus of this reform activism as a captain among the multinational players. Born into an Anglo-German merchant family, Sachs studied as an architect, articulated with the Berlin firm of Ende and Böckmann while it designed Tokyo's government complex, and kindled a fascination with how his profession could link fire prevention advocacy with legislative action. He subsequently served on fire brigades in Berlin, Vienna, and Paris, where he became adept with the equipment of fire-fighting and had hundreds of opportunities to witness the progress of fire and forensically analyse its devastation. By the age of twenty-two, he had hung up his axe and opened an architectural practice in London. Rather than taking on many design projects, he devoted his time to writing *Modern Opera Houses and Theatres* (1896–8), a masterwork replete with drawings on a standardised scale of the architecture and technology of theatres worldwide.<sup>13</sup> His research took him to Russia, Egypt, and throughout Europe. The internationalised status of *Modern Opera Houses and Theatres* during preparation and at publication is attested to in the scope of original subscribers to the first edition.<sup>14</sup>

Sachs developed expertise not only in stage machinery but also in the comparative analysis of structural and material facets of theatrical building design.<sup>15</sup> Ranking in a succession of key theatre texts along with Vitruvius' *De Architectura* and Diderot's *Encyclopédie*, the three-volume folio of *Modern Opera Houses and Theatres* consolidates understanding at the end of the 19th century of



the premises in which performances occurred, modern materials for construction, and interior arrangements that stress the accommodations for spectators as well as the industrial necessities for assembling production elements. A substantial portion of the third volume is devoted to statistics on theatre fires that span the previous century. The implications of this became Sachs's professional focus for the ensuing decade.

As early as 1895, Sachs attended the Fire-brigades' and Life-saving Tournament and Exhibition at the Agricultural Hall (London). There were international gatherings of fire-fighters at Havre in 1892, Brussels in 1897, and Ghent in 1899 but it was the Paris Congress of 1900 that first shows evidence of including a programme of scientific papers by multi-disciplinary fire researchers scheduled alongside the traditional displays, drills, and competitions by fire professionals, exhibitions of historical equipment, and site visits.<sup>16</sup> The British Fire Prevention Committee—which Sachs founded in response to the Cripplegate fire of 1897 (London's largest fire since 1666)<sup>17</sup>—selected delegates for the 1900 Paris congress.<sup>18</sup> Beginning in 1899, the Committee ran a facility for testing materials, conducted its own tests, and rented it to firms whose tests it independently oversaw.<sup>19</sup> (Figures 3 and 4).



*Figure 3. British Fire Prevention Committee, Paddington Testing Station (c. 1900). (Saint, "Some thoughts about the Architectural Use of Concrete")*

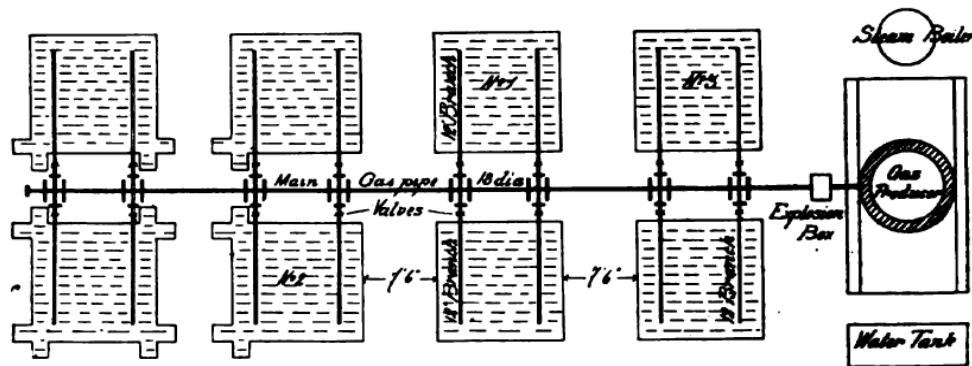


FIG. 1.

Figure 4. The British Fire Prevention Committee, layout of plant. (Sachs, "The Organization and Work of the British Fire Prevention Committee", n.p.)

The 1901 congress in Berlin attracted 2,500 delegates;<sup>20</sup> presided over by the German Ministers of Finance and the Interior, Chairman of the Central Council, and Chief [fire] Officer of Hamburg. Sachs proposed the first resolutions:

- (1) That the serious investigation of the fire resistance of materials and systems of construction should be supported both by the Government and local authorities, as well as by those technical societies to which members the results of such investigations are important in the practice of their professions.
- (2) In view of the fact that identical materials and systems of construction are frequently employed in different countries, an effort should be made to standardize the results obtained from fire tests in such a manner that the investigations made in different countries should be compared in a practical manner with due regard to units of measurement and temperature.<sup>21</sup>

This was carried unanimously. Later, the British ambassador, Commissioners of Works for Prussia, and president of nearly every fire organisation in Europe attended a banquet presided over by Sachs.<sup>22</sup>

From 6-9 July 1903, the Committee sponsored the congress in London. Nearly 56,000 members of British fire brigades attended, but even more significantly the congress attracted 386 imperial delegates representing 115 municipalities and institutions, 140 foreign delegates from 92 municipalities and institutions, and representatives of 12 foreign (non-British colonial) governments.<sup>23</sup> One-hundred-and-thirty exhibitors in the Earl's Court exhibition hall produced extensive equipment, historical, and informational exhibits mounted by firms and organisations from Britain, Germany, Italy, France, Sweden, Netherlands, Belgium, Spain, Austria, Hungary, Switzerland, and the USA. Delegates toured the House of Commons and other state buildings, Regent's Park, Shepherd's Bush railway power house, industrial premises, University College Hospital, and five West End theatres



and music halls. Theatre also infused the exhibition grounds, where there were panoramas of the 1666 Great Fire of London, Warwick, and Bothwell Castle; an enactment of the 1902 eruption of Mont Pelée by 20 Martiniquian survivors;<sup>24</sup> a village full of people and animals from Assouan (Egypt); Eugen's circus; fairground rides including the "River of Burning Lava"; and a cinematograph. But the undoubted hit was *Fighting the Flames*, staged in conjunction with the exhibition at the Empress Theatre (Brixton) and running until late-October. Organised by Chief Officer Graham of the Hampton Fire Brigade, it was staffed by actual firemen from around the nation. (Figure 5)



Figure 5. Testimonial presented by Chief Officer Graham to the Firemen doing duty at the Empress Theatre, International Fire Exhibition, 1903. (Edwin O. Sachs, *A Record of the International Fire Exhibition Earl's Court, London, 1903...* London: The British Fire Prevention Committee, 1903): fig 261, n.p..

The impression of this event can be gained from the remarks of contemporary viewers:

This is but the prelude to a realistic presentation of a London fire with every incident that can make such a scene dramatic, and every appurtenance that can prevent it from becoming a tragedy thrown in. The whole scene is a triumph of realism, and a better stage-managed crowd or more exciting effects have never been produced in any theatre. (*Daily Graphic* 2 June 1903).

Fire breaks out, and from beginning to end all the scenes of a great conflagration are vividly enacted, without exaggeration and without omitting a detail. (*Architect* 8 May 1903).

Then came the cry of 'Fire!' and then were portrayed all the usual scenes and confusion at a fire in a very thrilling manner: escapes were used; sheets were held by willing volunteers; fire-engines dashed up; water was poured in from the hoses; firemen performed deeds of prodigious valour amidst an environment which, if it was not actually dangerous, was undoubtedly uncomfortable and absolutely productive of an impression of reality. (*British Architect* 8 May 1903).<sup>25</sup>

This hour-long entertainment gave audiences insight into fire-fighting techniques as well as how the public behave when an ordinary day turns into a conflagration. (It also spawned an enduring legacy of similar conflagration entertainments in the USA.)<sup>26</sup>

The Paris, Berlin, and London congresses were succeeded by somewhat smaller undertakings at Budapest in 1904 and Milan in 1906. From 1800 to 1890, Berlin, Leipzig, Glasgow, Munich, and Budapest were among the world's fastest growing cities, expanding at the rate of 8-11% per year. Europe's population experienced its highest ever annual growth in 1850-1910, with the cities absorbing all the surplus. By 1913, not only London, Paris, and Berlin surpassed a million people but also St. Petersburg and Moscow, Vienna and Hamburg, and the Victorian industrial powerhouses of Manchester, Birmingham, Glasgow, and Liverpool. Population of the Danubian city of Budapest swelled from 300,000 in 1870 to 1,100,000 in 1910. This coincided with an urbanisation project on a grand scale, and it looked abroad for models: its National Assembly (1896-1904) is a mixture of neo-Gothic and Renaissance silhouettes, merging elements of the parliament at Westminster with St. Peter's Basilica. Just as Hanoi modelled its opera house on Garnier's Parisian original, Budapest's 1884 opera house considered one of the most fireproof in the world<sup>27</sup>resembled the interior of Dresden's Semper Oper and installed Austrian technology (the Asphaleia System). Despite its phenomenal growth in population and buildings, Budapest's fire rate had barely increased since the 1880s. It had much to show off to the world.

Whereas in his address to the London congress Sachs emphasised changing focus from firemen's training and equipment to preventing outbreaks and spread of fire, involving "architects, engineers, surveyors, municipal officials, legislators, insurance officials and fire surveyors," the 1903 address by A.B. Markusovsky (2<sup>nd</sup> Adjutant, Budapest Fire Brigade) focused on theatre safety.<sup>28</sup> Budapest required approval by the fire brigade of all factory and theatre building plans. Theatres were required to have point-to-point telegraph communication with the fire brigade, exit routes direct to the street, systematic inspection, 24-hour teams of professional fire watchmen, and sprinkler systems over the stage.<sup>29</sup> The Budapest congress of 1904 enabled Sachs and his team to see Budapest's modern achievements firsthand. The congress had at least a third fewer delegates than London, yet it

brought together very nearly all the best men in the fire service, and one saw sitting side by side the chiefs of the Paris Fire-Service Regiment, of the Berlin Fire-Police Department, and of the St. Petersburg Municipal Brigade, of the London Salvage Corps, and of the Roman Pompieri. One also saw side by side the heads of every leading Continental fire brigade organisation from the Imperial Russian Fire Society in the East to the French Fire Federation in the West.<sup>30</sup>

The British delegation, led by Sachs and facilitated at each step by British consuls, followed a 1,000-mile itinerary with stops in significant cities along their route, each member taking on a distinct topic to research.<sup>31</sup>

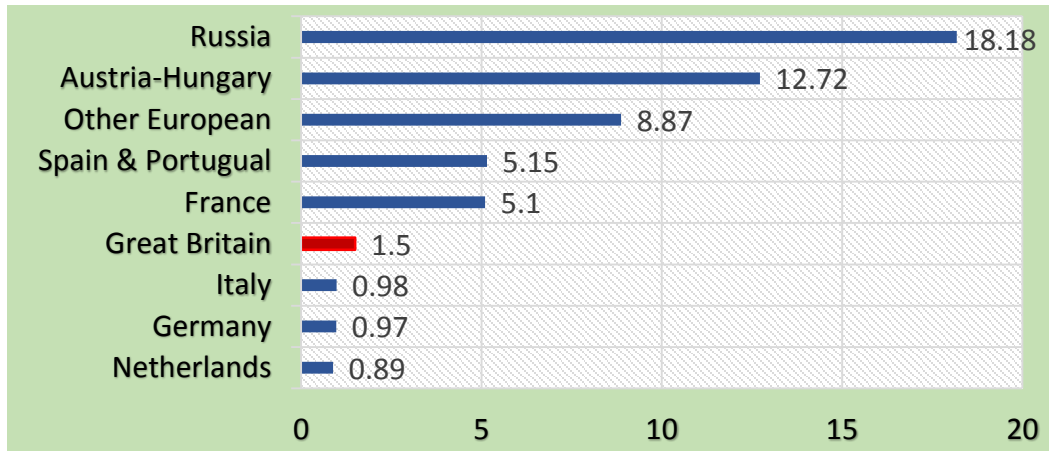
The visit to the Budapest Opera house was a highlight, not only from the perspective of the congress but also comparatively with the other theatres visited on the trip. The British delegation was impressed by the supply of 24 hydrants under good pressure. Under the gridiron, dry pipe sprinklers were serviced by tanks with 93 cubic meters capacity (18 minutes supply). Most impressively, for the delegates' edification the sprinklers were turned on, converging from stage and flies, literally flooding out the stage "so that no fire could have lived in this deluge."<sup>32</sup> Elsewhere along their route, British delegates noted contrasts with Budapest's technically advanced design features. At the Vienna Hofburg Theater, for example, electrics were antiquated and the woodwork was combustible matchboard. At the Royal Theater Munich, by contrast, the metal stage was supplied with a sprinkler system and there were good means of egress from the auditorium. At the new Nuremburg Municipal Theatre, structural ironwork was protected by a thick plaster coating on wire lathing. At the new Frankfort theatre, 300 automated thermostats rang into a guardroom near the stage door and during a performance were electrically routed to the nearest fire brigade station. The fire resisting curtain was hydraulic powered, there was special ventilation over the stage, and as at Budapest all scenery was coated with fire-resistant chemicals and the stage fitted with a sprinkler system.

The British Fire Prevention Committee published *The Record of the Special Commission Formed by the British Fire Prevention Committee to Visit the Principal*

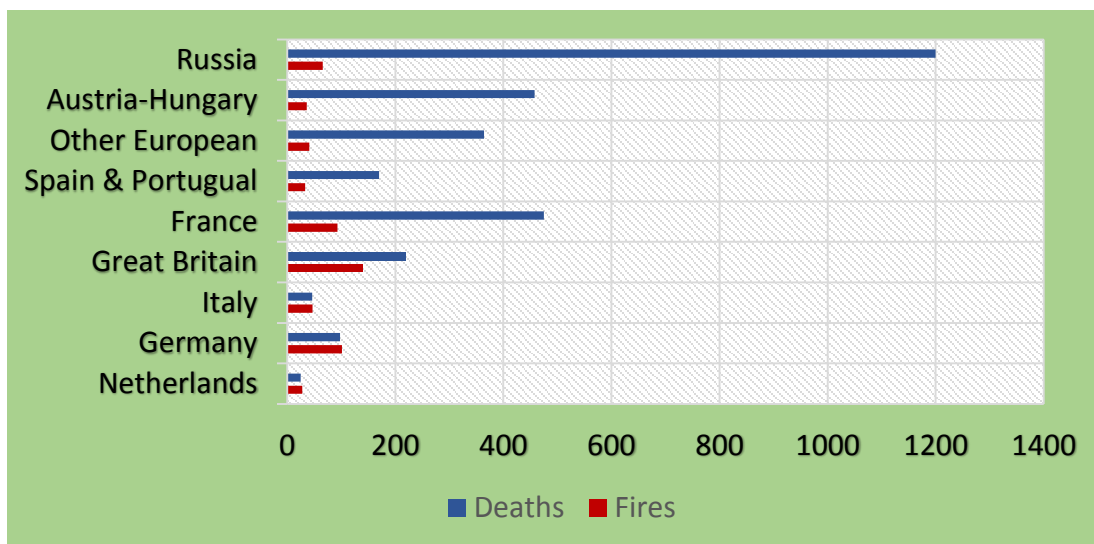
*Cities of Europe on the Occasion of the International Fire Service Congress at Budapest, 1904*, praised by the trade journal *Engineering* as setting “an example of the collection of knowledge which might be followed with advantage in some respects by the older professional societies,” such as mechanical engineers.<sup>33</sup> Whereas the National Fire-Brigades Union represented units and the Professional Fire-Chiefs Association represented individuals, the British Fire-Prevention Committee led by Sachs was “the scientific factor in the combination.” Their report documents that whereas Austria and Bavaria had national fire services, professional and well-equipped, Hungary was like the UK still developing in this regard. Vienna led the pack.<sup>34</sup>

### ***International Advocacy***

The International Fire-Service Council sponsored all these congresses. In the space of five years between the first Paris congress of 1900 and the Budapest congress of 1904 it grew to represent 3,000,000 members of fire-protective societies. When Sachs took up the chair of the Fire-Prevention committee in 1905, the Council undertook to create a multi-lingual dictionary of technical fire terms, a project likely to further its work of international communication, information sharing, and cooperation.<sup>35</sup> Such a lexicon (if it came to fruition) would help the interpretability of empirical research and its translation into materials science, manufacturing, and building trades. In 1906, the Milan Congress ambitiously proposed the compilation of international fire statistics.<sup>36</sup> Coupled with empirical testing, fire statistics were intended to document the success of policy implementation comparatively across nations. From the theatre fire statistics in *Modern Opera Houses and Theatres* Sachs could see that Italy, Germany, and the Netherlands had more favourable ratios of deaths per fire and thus were promising models for understanding how the variables of brigades’ proficiency, building materials, architectural choices, and construction codes resulted in more favourable outcomes for public safety in these advanced industrialised nations. On the other hand, the high number of deaths and unfavourable ratio of deaths per fire in the Austro-Hungarian Empire suggested that there was much to learn forensically as negative examples for empirical analysis within this region. (Graphs 2 and 3).



Graph 2. Ratio of deaths per fire, 1797-1896. (from Edwin O. Sachs, *Modern Theatres and Opera Houses*, vol. 3, 131.)



Graph 3. Distribution of theatre fires and lives lost, 1797-1896. (from Edwin O. Sachs, *Modern Theatres and Opera Houses*, vol. 3, 131.)

Up-to-date statistics were needed for on-going comparison as brigades' techniques, builders' materials, and municipalities' codes evolved. Whereas the practically-minded London-based trade journal *The Fireman* found such recommendations irrelevant for their purposes,<sup>37</sup> this helps to document the gap between the fire-fighting forces and Sachs's brand of internationalism focused on prevention, but specifically on scientifically determined measures for advocating preventive policies.<sup>38</sup> The devastating San Francisco earthquake and fire, which

happened two months before the Milan Congress, would have been on the minds of delegates: for some it signaled the value of highly-trained and well-equipped fire brigades, whereas for others it underlined the imperative to consider urban design, architectural principles, and optimal materials in burgeoning metropolises.

Whereas Amy Hughes emphasises how the historiography of theatre fires focuses on the phenomena of fear, insurance, safety, and materiality, my point is that fires and fire prevention also functioned to convey the ascendancy of transcultural identities, international cooperation, and a profound reckoning about the significance of theatres to civic and national reputations.<sup>39</sup> Sachs's role in forging the institutional structures and organizations, scientific community dedicated to sharing knowledge, and diplomatic protocols for travel, contact, and dissemination of knowledge to those with common cause demonstrates a very particular timeline for revising the historiography. He had formulated his agenda by the end of 1897, when he spoke to the Architectural Association in London about the Paris Charity Bazaar fire and laid responsibility for the remedy in his fellow architects' hands. They alone could determine what principles should be followed, then:

'Call together your leading architects and surveyors, your civil and mechanical engineers, your experts in chemical and other sciences. Call together your leading officials, the leading Government and Municipal workers, and others seriously and scientifically interested in the technical and economical problems of to-day. Don't forget the leading Fire Brigade officers nor the owners of warehouses, theatres, and other dangerous property. Combine the many conflicting interests.'<sup>40</sup>

Forensic analysis of fire sites continued to be the chief means to educate fellow professionals and then leverage reform. Following attendance at the Berlin congress, Sachs led groups to view fire sites in Hamburg and Antwerp. This was significantly more elaborated in conjunction with the Budapest congress.<sup>41</sup> In 1904, he led the British Fire Service's independent reports studying the Antwerp docks fire, a conflagration in Baltimore, and the Chicago Iroquois Theatre fire.<sup>42</sup> The period 1860-1914 is characterised by the development of globalised networks (communications, trade, transportation, finance, and socialisation)<sup>43</sup> and here is another instance, developed not through colonial integration but across many political alliances and differences as well as technical specialities, focused on places of public assembly for entertainment.

Edwin O. Sachs is remembered by engineers as "a remarkable Anglo-German architect who can be claimed as the father of modern British building research."<sup>44</sup> Additionally, Sachs's career demonstrates a major shift in the understanding and articulation of the problem of fire for civic life. In his address to the Society of Arts in 1894, hard on the heels of his experience in continental fire brigades, Sachs stressed the importance of educating the public for self-help, acquiring appropriate equipment for fire-fighting, and implementing prevention measures.<sup>45</sup> At a debate

sponsored by the (London) Playgoers' Society in 1901, Sachs emphasised "it was really time for some representative body of experts, officials, managers, and business men to decide, as based upon the experience of the great cities of the world generally, what was really essential."<sup>46</sup> Following the Budapest congress in 1904, he focused on the rhetoric of fire combating, stressing the erroneous nature of the claim "fireproof" and the more supportable concept of "fire-resisting," linking this to empirical experiments conducted by the British Fire Prevention Committee on floors, ceilings, partitions, doors, glazing, and curtains which result in buildings being *temporarily, partially, or entirely* fire-resistant for periods of forty-five, ninety, or one-hundred-and-fifty minutes respectively.<sup>47</sup> The final phase of his career, prior to the outbreak of war, was preoccupied with materials development, specifically reinforced concrete. As founding editor of the journal *Concrete and Constructional Engineering* (1906) and founder of the Concrete Institute (1907), Sachs helped stake a claim for Britain in this French-dominated field of applied engineering, advocating for concrete's fire-resistant properties and seeking an appropriate architectural expression for the material.<sup>48</sup> He diverged in 1911, however, to lead the British Fire Prevention Committee's efforts at the coronation of Edward V, specifically to condition public behaviour in case of fire by posting 5,000,000 notices of instruction.<sup>49</sup> Neither fire nor panic were eradicable, but whether the focus was on materials or human behaviour best practices could be deduced and promulgated. Sachs's synthetic approach to identifying challenges, studying problems, and identifying solutions is a remarkable testament.

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<sup>1</sup> *The Fireman* (1 August 1894): 26.

<sup>2</sup> William Paul Gerhard, *Theatre Fires and Panics: Their Causes and Prevention* (New York: John Wiley & Sons, 1896).

<sup>3</sup> *The Fireman* reports the first of these exchanges: French firemen visiting London, Leeds, and Brighton, in June 1891. In May 1894, British firemen visited Amsterdam, Berlin, Vienna, and other continental cities and in August 1894 the British Fire Service visited Lyons and was received at luncheon by President of France. "Dates and Events," *Fireman* (1 January 1898): 128-9.

<sup>4</sup> Jan Van Der Heyden, *Beschrijving Der Nieuwlijks Uitgevonden En Goetrojeerde Slang-Brand-Spuiten, En Hare Wijze Van Brand-Blussen, Tegenwoordig Binnen Amsterdam in Gebruik Zijnde* (Amsterdam: Jan Rieuwertz, 1690); Susan Donahue Kuretsky, "Jan Van Der Heyden and the Origins of Modern Firefighting: Art and Technology in Seventeenth-Century Amsterdam," in *Flammable Cities: Urban Conflagration and the Making of the Modern World*, ed. Uwe Lüken, Greg Bankoff, and Jordan Sand (Madison: University of Wisconsin Press, 2012); and "The First Modern Fire Department," *The Fireman* [London] (1 June 1892): 222.

<sup>5</sup> "W.H." letter to editor, "Trials of Fire Apparatus at Experimental Fires," *Fireman* (1 November 1902): 96.

<sup>6</sup> Sara E. Wermiel, "Did the Fire Insurance Industry Help Reduce Urban Fires in the United States in the Nineteenth Century?," in Lüken et al., *Flammable Cities*, 238.

<sup>7</sup> Edwin O. Sachs, "Fire Protection in Europe," *Engineering* (14 January 1898): 4.

<sup>8</sup> Nat Brandt, *Chicago Death Trap: The Iroquois Theatre Fire of 1903* (Carbondale: Southern Illinois University Press, 2003); Anthony P. Hatch, *Tinder Box: The Iroquois Theatre Disaster, 1903* (Chicago: Academy Chicago Publishers, 2003); and David Anderson and David Wilmore, *The Exeter Theatre Fire* (Royston: Entertainment Technology Press, 2002).



- <sup>9</sup> Sachs singles out the 100 most significant fires of the later nineteenth-century in *Modern Opera Houses and Theatres*, Vol. 3 (1898; repr. New York: Benjamin Blom, 1898), 133. Sachs's lists built on the work of the late August Foelsch of Hamburg and was published, in anticipation of *Modern Opera Houses and Theatres*, in an unwieldy oversize folio rushed into print in July 1897 following the Paris Charity Bazaar fire. Edwin O. Sachs, *Fires and Public Entertainments: a Study of some 1100 Notable Fires at Theatres, Music Halls, Circus Buildings and Temporary Structures during the last 100 Years* (London: Charles and Edwin Layton, 1897). Dr. Coquet also compiled statistics of deaths in fires from 1751: "Statistics of Death by Fire in Theatres," *Fireman* (1 December 1887; repr. from *The Builder* [London]): 109. The Ring Theatre's capacity was 1,800 and on the night of the fire, 1,200 were inside. Tallies of the Ring fatalities vary: Sachs stipulates 450 dead and Yates 386. Sachs, *Modern Opera Houses*, 3: 135; and W.E. Yates, *Theatre in Vienna: A Critical History, 1776-1995* (Cambridge: Cambridge University Press, 1996) 155.
- <sup>10</sup> Sachs, *Modern Opera Houses*, 3:160-9; and Kristem McCleary, "Inflaming the Fears of Theatergoers: How Fires Shaped the Public Sphere in Buenos Aires, Argentina, 1880-1910," in Lücken et al., *Flammable Cities*, 258-9.
- <sup>11</sup> Jürgen Osterhammel, *The Transformation of the World: A Global History of the Nineteenth Century*, trans. Patrick Camiller (Princeton: Princeton University Press, 2014).
- <sup>12</sup> *Ibid*, 243, 248.
- <sup>13</sup> Ernest Woodrow, Sachs's business partner, co-authored the first volume. The three volumes were handsomely produced, including 220 plates, and cost 15 guineas. Sachs's executed designs were few: he was responsible for the reconstruction for the stage at Drury lane 1896-98 and stage and auditorium at Covent Garden in 1901. David Wilmore, "The Houses That Sachs Built," in *Edwin O. Sachs Architect, Stagehand, Engineer & Fireman: His Life and His Satellites*, ed. David Wilmore (Summerbridge, Yorkshire: Theatresearch, 1998). He designed theatres for commissions in India (1901) and Cairo (1907, not executed), factories in Kent and Dalston, and a small number of residences. Wilmore 187; see also Iain Mackintosh, "Predecessors and Successors to Sachs' Parallèle," in Wilmore 56-70.
- <sup>14</sup> This includes libraries in London, Glasgow, Liverpool, Berlin, Bremen, Hamburg, Strasbourg, Stuttgart, Cincinnati, Detroit, Ithaca NY, Minneapolis, New York City, Toronto, and Tokyo, as well as private subscribers among the leading London theatre managers and in Germany, Bombay, Brussels, Budapest, Buffalo, Cape Town, Chicago, Melbourne, Palermo, Prague, Stockholm, and Zurich.
- <sup>15</sup> "Hydraulic 'Bridges' at Drury-Lane Theatre," *Engineering* (17 June 1898): 754; and "Scenic Art and Stage Mechanism," *Engineering* (15 April 1898): 480.
- <sup>16</sup> "Dates and Events," 128-9; and "Forthcoming Events," *Fireman* (1 June 1899): 229.
- <sup>17</sup> Shane Ewen, *Fighting Fires: Creating the British Fire Service, 1800-1978* (Basingstoke: Palgrave, 2010), 103-4.
- <sup>18</sup> Paris was an important and interesting location because of international attention on the Paris Charity Bazaar fire (4 May 1897) in the Rue Jean Goulon, in which 121 people died including the Duchesse d'Aleçon and Comtesse de Mun. Sachs gave a paper about the fire at the Architectural Association on 22 October 1897. See "The Paris Bazaar Fire," *Fireman* (1 December 1897): 104. The Comedie Française also burned 8 March 1900.
- <sup>19</sup> Its objects were: "to direct attention to the urgent need for increased protection of life and property from fire by the adoption of preventive measures, and to bring together those scientifically interested in the subject who are prepared to undertake independent investigations and tests of materials, methods, and appliances." "Fire Prevention Exhibition at the Agricultural Hall," *Fireman* (1 June 1901): 224. Reports were published by the British Fire Prevention Committee as "Red Books." See "The Berlin Fire Congress and the British Fire Prevention Committee," *The British Architect* (13 May 1901): 391; and Edwin O. Sachs, ed., *Facts on Fire Prevention: The Results of Fire Tests Conducted by the British Fire Prevention Committee*, 2 vols. (London: B.T. Batsford, 1902).

- <sup>20</sup> There was simultaneous translation of papers between German, French, and English; of course, this only helped speakers of those languages integrate into the internationalist project. "The Berlin Exhibition. Report of the Royal Belgian Federation," *Fireman* (1 January 1902): 123.
- <sup>21</sup> "Fire Brigade Exhibition at Berlin. Opening Ceremony," *Fireman* (1 July 1901): 4.
- <sup>22</sup> "Fire Prevention Committee's Visit to Berlin," *The British Architect* 14 (June 1901): 428-9.
- <sup>23</sup> Edwin O. Sachs, *A Record of the International Fire Exhibition Earl's Court, London, 1903 Organized under the Auspices of the British Fire Prevention Committee and under the Management of the London Exhibitions, Limited Comprising Particulars and Illustrations of the Principal Historical Exhibits[,] the Leading Mechanical and Constructional Exhibits Together with a Report on Some of the Exhibition Events* (London: The British Fire Prevention Committee, 1903) 41-2.
- <sup>24</sup> This built upon a long tradition of theatricalized volcanoes; the novelty was the addition of an ethnographic exhibit. Diana Looser, "The Fiery Pacific: Volcanic Eruptions and Settler-State Theatricality in Oceania, 1780-1900," *Theatre Survey* 55.3 (2014): 362-92.
- <sup>25</sup> Sachs, *A Record of the International Fire Exhibition*, lxvi.
- <sup>26</sup> Lynn Kathleen Sally, *Fighting the Flames: The Spectacular Performance of Fire at Coney Island* (London: Routledge, 2006).
- <sup>27</sup> Osterhammel, *The Transformation of the World*, 317.
- <sup>28</sup> Ira H. Woolson, *Report of Proceedings of the International Fire Prevention Congress Convened in London, England, July 6th to 11th, 1903* (New York: Martin B. Brown, 1903) 16.
- <sup>29</sup> *Ibid* 109-10.
- <sup>30</sup> "The Fire Service Commission's Visit to Central Europe," *Engineering* 78 (23 September 1904): 411.
- <sup>31</sup> The British deputation of ten, led by Sachs, also included Horace Folker (National Fire Brigades Union), Ellis Marsland (British Fire Prevention Committee), Lt-Col. Fox (chief officer London Salvage Corps), and James Sheppard (North British & Mercantile Insurance Company). Their itinerary 13-28 August 1904 featured:
- 13 August depart London
  - 14-15 August Vienna: visit HQ of Fire brigade; demonstrations of equipment; visit Fire Museum; ambulance stations; water supply; Imperial Hofburg Theatre (guided by official of Lord Chamberlain's office and chief engineer and fire master of the building); town hall and Rathskellar; other brigades
  - 16 August Pressburg: visit Hungarian Fire Brigades' Union; fire station, castle, town hall, city park
  - 17-20 August Budapest: fire station; brigade headquarters; royal palace, park, night turn-out of fire brigade; military parade, Congress at town hall; municipal waterworks; banquet; visit to Royal Opera House; scene of Parisien Store fire; volunteer ambulance society's station; flour mill ; open-air banquet; Procession of St. Stephen on Palace Hill; Hungarian Fire exhibition; returned to Parisien Store; houses of Parliament
  - 21 August Balaton lake (rest)
  - 22 August return journey to Vienna; inspect retail stores, Schoenbrun palace and Imperial Museum; Fire Brigade headquarters
  - 23 August Salzburg: cathedral, castle
  - 24 August Salzburg and Munich: fire brigade stations; Munich Opera House (witness Wagner's *Tristan and Isolde*)
  - 25-26 August Munich: fire Brigade headquarters with municipal control and fire survey department; Spaten Brewery and warehouses, Railway carriage works; Messrs. Emden's and Tietz's retail warehouses; Villa Lembach picture gallery; law courts
  - 26 August Nuremberg: Municipal Theatre tour by the architect Herr Seeling of Berlin; Municipal Museum; fire brigade headquarters, rathaus and rathskeller; night duty call; retail stores; city walls
  - 27 August: Frankfort: met by British Vice-Consul; West End fire station; Municipal Theatre (designed by Herr Seeling); Messrs. Schmollers' retail store; town hall; palmgarten
  - 28 August Cologne and return journey: Market Hall, district fire station

- Edwin O. Sachs, Horace S. Folker, and Ellis Marsland, *The Record of the Special Commission Formed by the British Fire Prevention Committee to Visit the Principal Cities of Europe on the Occasion of the International Fire Service Congress at Budapest, 1904* (London: British Fire Prevention Committee, 1904) passim.
- <sup>32</sup> Sachs, Folker, and Marsland, *The Record of the Special Commission*, 42.
- <sup>33</sup> "Technical Notes of Foreign Visits: The Fire Service Commission's Visit to Central Europe," *Engineering* 79 (2 June 1905): 698.
- <sup>34</sup> "Eos," "Fire-Service at Home and on the Continent," *Chambers's Journal* 8 (1905): 521.
- <sup>35</sup> "The International Fire-Service Council," *Engineering* 79 (12 May 1905): 615. A uni-lingual project was pursued in weekly installments of the *Fireman* in the mid-1880s and resumed in the 1 October 1906 issue. Whereas the initial "Dictionary" varied in technicality (including the chemistry of combustion as well as the mechanics of extinction) the later "Glossary" was emphatically limited to practical knowledge of fire-fighting.
- <sup>36</sup> Edwin O. Sachs, letter to editor, "The Milan Exhibition," *Fireman* (1 August 1906): 37.
- <sup>37</sup> Leader, *Fireman* (1 August 1906): 21. A letter from "Anti-Humbug" echoed the point about practical experience versus the learned but theoretical paper-givers, "The Milan Congress" *Fireman* (1 September 1906): 56.
- <sup>38</sup> The usefulness of such tests is denied and fire brigade officers' attention to them disparaged in a leader, *Fireman* (1 October 1902): 61.
- <sup>39</sup> Amy Hughes, *Spectacles of Reform: Theater and Activism in Nineteenth-Century America* (Ann Arbor: University of Michigan Press, 2012) 31.
- <sup>40</sup> "The Paris Bazaar Fire," 104.
- <sup>41</sup> "Fire Prevention Committee's Visit to Berlin," 428-9; "Fire Prevention Committee's Visit to Hamburg and Antwerp," *The British Architect* (21 June 1901): 446-7; and Sachs, Folker, and Marsland passim.
- <sup>42</sup> "The Antwerp Conflagration," *Engineering* 78 (2 September 1904): 315; Andrew Saint, "Some Thoughts About the Architectural Use of Concrete," *Architectural Association Files*, no. 21 (1991): 8; Edwin O. Sachs, *The Fire at the Iroquois Theatre, Chicago 30th December, 1903* (London: British Fire Prevention Committee, 1904).
- <sup>43</sup> Osterhammel, *The Transformation of the World*, 710-11.
- <sup>44</sup> Saint, "Some Thoughts," 8.
- <sup>45</sup> Edwin O. Sachs, "Fire Protection," *Journal of the Society of Arts* (7 December 1894): 43-58; and Robert Duplock, "The Society and the Provision of Public Fire Protection," *Royal Society of Arts Journal* 144, no. 5474 (1996): 33-5.
- <sup>46</sup> "The Prevention of Fire in Theatres," *Fireman* (1 December 1901): 104.
- <sup>47</sup> "Fictitious Fireproof Materials," *Engineering* 78 (30 September 1904): 439-40; see also Edwin O. Sachs, "Fire Protection in Europe," *Insurance Engineering* (August 1901): 127-37.
- <sup>48</sup> Patricia Cusack, "Architects and the Reinforced Concrete Specialist in Britain 1905-08," *Architectural History* 29 (1986): 183-96; and Saint, "Some Thoughts," 3-12; and Edwin A.R. Trout, "Concrete Publications Ltd. and Its Legacy to the Concrete Industry," *Construction History* 19 (2003): 10
- <sup>49</sup> Edwin O. Sachs, *Fire Precautions and the Coronations Celebrations: Begin a Report on the Special Fire Prevention Work of the British Fire Prevention Committee for June 22nd and 23rd, 1911* (London: British Fire Prevention Committee, 1911).