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Parlour Conflagrations: Science and Special Effects in Manuals for Amateur Theatricals

*The article analyses the special effects advice contained in nineteenth-century guidebooks for amateur theatricals. Most of the guidebooks include instructions for potentially explosive effects while simultaneously steering amateurs away from technologically complex productions. The article thus analyses the guidebooks within commercial theatrical and popular science publishing traditions, arguing that the technological advice is included to appeal to a broader popular science readership as well as theatre patrons who are interested in the technology of the stage. Eileen Curley is an Associate Professor of English and Theatre at Marist College in Poughkeepsie NY. Her current research focuses on women who used amateur theatricals at the turn of the twentieth century to manipulate proscribed gender roles and gain public power through performance. She has worked on more than fifty shows at academic and professional venues in New York, Iowa and Indiana, primarily as a designer or props master. Her research has appeared in the Journal of American Drama and Theatre, Theatre Symposium, Performing Arts Resources, and in edited collections.*¹

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Introduction

In 1884, A.D. Ames's *Hints to Amateurs: A Practical Guide to Home and Amateur Theatricals* advises readers in search of storm effects for their parlour theatricals to try lightning-by-archery:

A piece of magnesium wire fastened to an arrow, lit and then shot from a bow across the stage from the upper entrance gives a very fine imitation of bolt lightning, but should only be tried by a careful person.²

Ames's book, like other amateur theatricals manuals from the nineteenth century, combines practical advice on staging with some potentially hazardous ideas. These texts—and their instructions for creating lightning, building homemade calcium lights, and rigging existing gas lines to feed home-made footlights—present tantalising possibilities for historians in search of information on parlour theatre technology. Technical theatre leaves few archival traces, and amateur parlour theatre even fewer; thus, unsurprisingly, little evidence of parlour technology implementation can be found in either extant archival materials or accident reports, and the manuals are highly problematic when trying to establish amateur production habits reliably.³ However, their technology sections enable us to place parlour theatricals within contemporary theatrical and scientific publishing frameworks that provide a new avenue for exploring the allure of the parlour theatrical—and which might explain the inclusion of Ames's flaming arrow lightning technique despite its potential to spark a real conflagration. The authors routinely claim that their techniques are adapted from the commercial stage; this air of authenticity was a complex marketing strategy, designed to attract amateur artists and scientists, to convince readers of the safety of the techniques, and to sell chemicals and devices. This dissemination of scientific knowledge through instructions for amateur theatricals reflects contemporary assumptions that amateurs were capable of and willing to learn the science behind the effects. Thus, the manuals, while unreliable indicators of actual amateur practice, capitalised on concurrent fads for amateur theatricals and popular science, rather than merely providing instructions for amateur theatricals.

Amateur and Commercial Scientific Effects

Flaming arrows notwithstanding, much of the advice contained within these texts will appear familiar to modern stagecraft practitioners; over the past two hundred years, the instructions for hanging up drop curtains and building flats have changed in their tools but not in basic approaches. The lighting and special effects advice, however, offers an intriguing look into theatre technology before it had been replaced by safer chemicals and different devices. As the amateur manuals offered insights into commercial techniques, and as theatre has always adopted new technologies that suited its goals, parlour practitioners could explore new scientific developments by creating devices based on contemporary theatre technology. The books provided a chance to learn behind-the-scenes information and to explore new scientific trends, drawing in science enthusiasts and theatre fans that might have had an overlapping interest in the science of the stage.

The manuals gave authoritative weight to these parlour-based experiments by citing the commercial theatre as their source. Ames, like many authors, implies that amateur actors wanted to replicate commercial traditions, and he notes that even his parlour modifications are professionally inspired:

The above list comprises the principal methods of producing storm effects used commonly in the theatres. There are others requiring complicated and

expensive machinery, but those given are simple and practicable, and will be found serviceable by amateurs, and professionals as well, in adding to the success and attractiveness of plays where storm scenes are represented.⁴

Thus, some of the effects he describes are clearly adapted for a smaller venue: “rubbing two boards covered with sandpaper, together”⁵ will make an acceptable wave sound for a parlour, but the noise would never carry in a two-thousand seat theatre. Conversely, some techniques did not need modifications. Amateur and professional versions of snow operate on the same basic principles: small pieces of paper scatter from the flies, dropped by humans or from a snow bag.⁶ Likewise, water effects rely on moving groundcloths or variations on cascade machines – a rotating drum covered with painted, slit cloth that creates the illusion of water in motion.⁷

The instructions for replicating sensational commercial effects provided more overt scientific lessons and drew more fully on contemporary commercial technology. For instance, conflagrations, the large scale building fires used, among other places, in the climactic scenes of popular melodramas such as *The Poor of New York*, require amateurs to learn about lighting throw angles, complex chemical reactions, and wind currents. Some advice was more low-key, emphasising effective placement of lighting instruments and coloured glasses because “[b]urning buildings must be treated as off the stage”⁸ or recommending rear illumination in combination with painting effects.⁹ Townsend, meanwhile, suggested “successive changes of red fire” and “smoke pots” to complete the effect.¹⁰ These techniques parallel the professional ones described by Fitzgerald, who details a conflagration which suggests red glass in front of a limelight, as well as smoke, gas jets to highlight the edges of the scenery, and “a few braziers filled with [...] ‘lycopodium’ [...] placed at the wings, each fitted with a sort of forge bellows, each blast producing a sheet of flame and smoke.”¹¹ An 1891 *Scientific American* article explaining the conflagrations used in Massenet’s operas likewise reveals that the commercial theatres were using much of the same equipment—lycopodium, Bengal lights, magnesium, chlorate of potash, and steam—to create their conflagrations and lightning; the inclusion of recipe mixtures in this article enables amateurs to mix their own combinations and experiment with the science of conflagrations.¹²

Lightning effects were heavily dependent on chemicals and more commonly required in parlour plays than full-blown conflagrations. Some lightning approaches are questionable, even if based on contemporary science. As noted earlier, Ames forgoes commercial techniques, and perhaps common sense, and tells his readers to tie magnesium wire to an arrow, light it, and shoot it into the opposite wing.¹³ Gill likewise offers an alarming suggestion of painting gunpowder and gum-arabic directly on the scenery and lighting it.¹⁴ However, much lightning advice remains consistent with commercial approaches, although some of the equipment is clearly dangerous.¹⁵ While variations on moving and flashing lights are common, most manuals also advocated lightning created through chemical reactions. The standard advice involves throwing or blowing lycopodium powder or gunpowder at a candle

to create a flashy explosion, an approach Fitzgerald calls “a more scientific invention.”¹⁶ As Emerson suggests, magnesium and then electricity gradually replaced lycopodium for this purpose, professionally and in parlours, as both parlour and commercial theatre responded to and adopted new technologies.¹⁷

If flaming arrows travelling past scenery and draperies were not sufficiently worrisome for homeowners, then a home-made calcium light might have made more than a few amateurs pause. Indeed, the light’s potential hazards might explain its absence from most manuals, particularly as calcium lights were available for rent; then again those instructions might have increased book sales. Of all the manuals surveyed, only Burnand’s 1872 *How We Managed Our Private Theatricals* and Burton’s 1876 *Burton’s Amateur Actor* dared advise amateurs on the creation of their own calcium light. As with the other effects, the calcium lights provide scientific lessons, in this case the manipulation of gases and chemicals in a precise balance, after mastering engineering and optics. Burnand devotes six-and-a-half pages to step-by-step instructions and drawings, presumably to help the amateurs not cause a literal conflagration. The novelty of this advice—which requires amateurs to obtain chlorate of potash, powdered manganese, lime, hydrogen, and oxygen—seems to have been a selling point for his guide. The lengthy first subtitle for his guide ended with the phrase: “Instructions for making CALCIUM LIGHTS, etc. etc.,” making it rather obvious that Burnand hoped to distinguish his work from the many others on the market.

Burton’s calcium light instructions also included diagrams and claims of safety, both for his device and its commercial counterpart. His advice is less construction-intensive, as he suggests that a magic lantern be attached to a canister of oxygen, “the hydrogen (carbureted) [...] obtained from the ordinary house supply [and...] house gas [...] conveyed from a tap.” He notes that his condensed gas system “is the method universally adopted at New York theatres, and ought to be everywhere, if only for the reason if its perfect immunity from danger, a serious explosion being a thing impossible.”¹⁸ Yet, history contradicts his claims of safety; countless reports of calcium light explosions and fires pepper the newspapers, from major catastrophes such as the Iroquois Theatre Fire to smaller explosions such as that which killed James Knapp, a Baltimore theatre technician.¹⁹

Selling Science and Theatre

While the publishers were selling the authenticity of their effects, the scientific aspects of amateur theatricals manuals also must be analysed amid a commercial theatrical publishing and supply framework. The major houses that sold these manuals, such as French’s, Dick and Fitzgerald’s, and The Dramatic Publishing Company, used the books to promote their own play inventories and theatrical supplies, including some chemicals and special effects kits. Many items were marketed to both amateurs and professionals, but the companies also had separate sections clearly intended for parlour performances. For example, French’s offered “Articles Needed by Amateurs,” including paper scenery, “magnesium tableaux

lights” and “colored fire in bulk.”²⁰ If we read the manuals as complex commercial products, then it makes sense that companies which sold theatrical paraphernalia would include instructions on how to employ that paraphernalia, even if it is simply not needed for shows which call for an interior set, contemporary dress, and standard make-up, as most of the recommended plays require. The simultaneous inclusion of construction advice and purchasing recommendations suggests that the authors knew that they had multiple audiences: those who wanted to stage a play with a minimum of fuss; those who wanted the fuss but were willing to buy or rent the necessary equipment from various businesses that catered to parlour theatricals; those who wanted to explore the science of the stage without necessarily staging a theatrical; and those who wanted to build and use their own wing and drop sets and calcium lights for productions.

Companies marketed supplies in catalogues, newspapers, and product lists appended to the manuals, but some also included direct references in the instructions for amateurs. Ames is thusly explicit in his multi-mode marketing, noting “the publisher of this book will sell you a fire which is warranted to give entire satisfaction.”²¹ *The Art of Scene Painting by Scenic Artists*, published by French’s for amateurs, includes further references to business partners. An amateur needing help choosing an appropriate backdrop to paint is told, amid painting instructions: “Amateurs need not be at a loss for their subjects, for they can purchase ‘FRENCH’S SCENE FOR AMATEURS,’ (see page 13) giving them an authority for any kind of Scene they may require. Plain, 6d, Coloured, 1s each.”²² Yet, readers are also directed to specific paint suppliers because “Colours are always a difficulty with amateurs”²³ and because French’s did not sell paint. Denier, who also published with French’s, likewise provides external recommendations, after noting that “Theatrical Tradesman [...] as a general thing, do not advertise their goods [...] but content themselves with being found and patronized by regular actors and actresses, and totally ignore the general public, who very often require both their goods and services.” By owning his book, however, readers would benefit from the fact that “Our agent has prevailed on all the principal theatrical tradesmen to insert advertisements [...] in the concluding pages of the book” and that “we confidently recommend them, and assure our readers they will be dealt with liberally and honestly.” A list of tradesmen and women then follows this narrative, amid advice on dealing with a “dull audience.”²⁴ These references enabled amateurs to solve practical production problems and permitted the publishers to maintain mutually beneficial connections with other businesses, all while assuring readers of the trustworthiness of the manuals and the authenticity of the effects and the science behind them.

Companies also tried to simplify some effects by selling kits, such as French’s “Lightning for Private Theatricals. Box containing the necessary material and full instructions for producing the same without danger.”²⁵ Townsend, despite detailing how to create lightning with lycopodium or resin powder blown at a candle, sends readers towards these pre-packaged boxes, arguing that “the best method is to purchase the prepared ‘stage lightning’ which may be had of any dealer. This, used

in connection with a lightning flash box—“which any dealer will supply for a dollar or less—will give an admirable imitation.”²⁶ Kits were ideal for amateurs who wanted to employ effects without mixing their own chemicals or running the risk of improperly measured materials.

Yet, despite the availability of kits, the manuals were also quite clearly encouraging scientific exploration by including recipes and chemical purchasing advice. Gill claims that his “recipes for producing red fire have been repeatedly tried, and are generally used at the best theatres in England and America.”²⁷ He also reminds readers that magnesium lamps can be rented and that “readers living out of town can order the magnesium through any prominent chemist or druggist in our large cities.”²⁸ Townsend presumes that readers will purchase coloured fire from theatrical suppliers and instead offers detailed instructions on how best to ignite it; he recommends using red coloured fire “as it is free from sulphur” and thus less likely to create an unwelcome odour in a smaller space.²⁹

Thus, chemicals, gases and explosives were readily available, and parlour performers, scientifically inclined or not, were assumed to be willing and able to use them for effects, despite the potential that they might cause a literal conflagration. Indeed, the annual explosion of newspaper articles cataloging fires caused by Independence Day fireworks points to an acceptance of their regular use indoors and out, despite safety issues and significant regulations on their sale. Harrison’s passing remark that “common parlour lightning answers very well in the case of a stormy night” suggests that “parlour lightning” was so commonplace that there was no need to discuss it in detail.³⁰ Calcium lights and chemicals appear to have been of the same class as the “parlour artillery” of fireworks and toy cannons, acknowledged but tolerated dangers.³¹

Theatricals as a Path to Scientific Knowledge

These manuals were marketed as instructional books, akin to contemporaneous etiquette guides, but the theatrical technology sections are also part of a larger dissemination of popular science materials.³² As Katherine Pandora notes, scientific materials were made available to the American public through a variety of means; Barnum’s museum, the 1869 construction of the American Museum of Natural History, “newspapers, periodicals, books, lyceums, and local networks served as powerful sources for the diffusion of scientific information and also represented a resilient, decentralized infrastructure for other elaborations of science as a cultural activity within American communities.”³³ Likewise, manuals and explanations of stage effects in periodicals should be viewed, Ann Shteir notes, as part of a “great variety and abundance in Victorian print culture [which] offered readers many formats and points of entry into scientific information, and authors and publishers articulated their target audiences.”³⁴ By selling commercial trade secrets that amateurs might not need in the parlour—and which might well have burned it down—publishers offered scientific theatrical knowledge as part of this broader trend.

Yet, much scholarship on nineteenth-century popular science argues for a more symbiotic relationship between amateur and professional scientific discovery than the manuals suggest, with their rhetorical emphasis on commercial technology. Cooter and Pumfrey's seminal work on the popularisation of science argues that approaching knowledge dissemination as "passive lay consumption of learned products" is problematic because it reinforces a trickle-down transmission of scientific knowledge from elite, professional scientists to lay scientists interacting with science through and in popular culture.³⁵ Technical theatre appears to counter this trend, in part because theatrical manuals rely heavily on transmitting the techniques of the commercial theatre to amateur practitioners, and also because commercial theatre producers often fought to protect their devices as intellectual property and marketed their shows based on their secret technological marvels.

Further, while amateur scientists show clear evidence of the creation and sharing of scientific knowledge with one another through communal mechanisms such as lyceums and mechanics' halls, theatrical knowledge exchanged in such fashion is much harder to quantify. Theatre's ephemeral nature makes it difficult to track knowledge sharing at the amateur level, although some of the authors claim to be sharing techniques and approaches they developed while staging amateur theatricals. By adapting commercial techniques, the authors created new applications of science by devising instruments for parlour use. Yet, there is little extant evidence of knowledge transmission to the professional realm in any unified or direct manner, although some amateur practitioners did join the professional ranks;³⁶ this potential deviation from scientific knowledge transmission patterns might be easily explained by professional theatre's significantly lengthier history. Still, manuals note that readers should adjust techniques to meet their needs and spaces, and while these adjustments might not be seen as the creation of *scientific* knowledge in quite the same way as in scientific disciplines, the potential existed for a level of interaction with science which extends beyond the model of passive transmission from expert to amateur that Cooter and Pumfrey find problematic.

The use of scientific spectacles in parlour theatricals can also be situated in a tradition of popular science wherein people explored new technologies in the home or worked towards an understanding of the science in domestic activities.³⁷ Lieffers, in her discussion of cookbooks, analyses "the more subtle application[s] of scientific modes of thought—including categorization, quantification, analysis and specialized vocabulary—to daily life. Household management guides and cookbooks are a crucial source for the study of such manifestations of science."³⁸ Similarly, theatricals were special events that allowed practitioners to explore and apply scientific knowledge through manipulation of everyday items into theatrical scientific devices. Elements of scientific branches such as acoustics, chemistry, optics, mathematics, and physics all could be learned through home theatricals, and the manuals' instructions provide lessons in both theatrical and scientific terminology. Emerson, for instance, devotes an entire chapter to the creation of lighting equipment using existing home instruments, including instructions and drawings detailing the adaptation of gas and oil lamps into footlights and border

lights, complete with reflectors and dimming frames.³⁹ By following Burton or Emerson's instructions on adapting the parlour gas into footlights, the science of the home lighting system would be laid bare for the practitioner, despite both authors recommending that amateurs employ a gasfitter to follow their rather detailed instructions; Lacy and Burnand, however, merely note that a gasfitter can provide the pipe with holes or jets, leaving the amateur to create and attach footlights.⁴⁰ Likewise, chemical and paint recipes reinforced the need to measure, mix, and follow instructions. Scale was practiced when amateurs purchased or found scenes and gridded them up.⁴¹ Beneath the recipes and instructions and detailed plans—regardless of their implementation—were the presumptions that technical theatre was in part scientific, that the reader was capable of comprehending that science and the instructions, and that what Lieffers describes as “scientific modes of thought” were quite accessible to a popular readership. Emerson likewise believed that amateurs merely needed instructions, as he starts his effects chapter with the note that “[e]ffects are very important factors in the production of a play and yet are often neglected through a lack of knowledge of how to produce them.”⁴² Through theatricals, amateurs could practice scientific techniques or establish themselves as scientifically knowledgeable, while not necessarily aspiring to professional standing.⁴³

Despite this nineteenth-century assumption that amateurs could learn science at home, Pandora describes a “renegotiation at century's end of what constituted authoritative scientific activity,”⁴⁴ with the amateur practitioner increasingly perceived as less capable of comprehending science than professional scientists. Theatricals are problematic here, too, as the growing popularity of community-based and academic theatres in the early twentieth century resulted in continued publication of technical advice books, many significantly more detailed than their nineteenth-century counterparts.⁴⁵ Of course, this detail responds to an increased need to fill community theatres with scenery and troubleshoot a built-in theatrical lighting system. A devaluation of technology as more mechanical than artistic also may be at play here, as lighting design was still in its infancy, stock scenery was falling out of use but still accepted, and theatre technology, despite its powerful effects and clear use by commercial theatres, was operated by stagehands who still struggled to gain the cultural respect afforded to scientists.

Conversely, this assumption that amateurs could handle chemical special effects and the creation of lighting equipment contrasts quite remarkably with the advice on other elements of design and technology, such as scene painting which is explained but clearly presented as an art form that amateurs can at best hope merely to imitate. As the Pollocks note, “[a] clever amateur may be able to paint a large landscape on a piece of linen or canvas, which will serve for most of the scenes without alteration. But scene-painting is an art in itself.”⁴⁶ *De Witt's How to Manage Amateur Theatricals* likewise recommends hiring a professional painter and implores that readers “should not attempt a drop curtain” because house lighting and pre-show time will allow an audience to see all of the errors: “It will be far better to have a fine drop, painted by someone who understands his business,” but

the guide still offers painting advice knowing that some will choose to paint their own scenery.⁴⁷ For special effects advice, however, the occasional call for a professional is usually limited to gasfitters and other discussions of safety, and the suggestions are still accompanied by instructions for using gas, which has been in households for decades at this point.⁴⁸ The advice suggests that domestic science, perhaps, is something all can learn, whereas art requires mastery beyond the skills of the amateur theatrical practitioner. This divide between commercial and amateur theatre, and particularly between the work of artists and that of stagehands, thus, seemingly differentiates theatricals manuals from other scientific materials in the period.

Historiographical Issues

Yet, while the presence of scientific instructions in theatricals manuals shows that such knowledge was valued, and while the wealth of books published reveals a keen interest in theatricals, whether or not the scientific techniques were implemented is still difficult to ascertain. Leiffers encounters the same dilemma with cookbooks that theatre historians face with theatricals: “What goes on in the cultural space of the laboratory differs from what goes on in the cultural space of the cookbook, which differs again from what goes on in the material and social space of the home.”⁴⁹ As temporary events in multi-use spaces outfitted with often repurposed and potentially disposable scenic elements, nineteenth-century parlour theatricals present particular challenges to scholars interested in the technology of the event. Temporarily reassigned domestic equipment and spaces might have left little trace of the parlour theatrical after the event, and historians are further challenged when those items and the record of their use in theatricals are then lost. Thus, the evidence for parlour theatricals more often exists not in the physical residue of production, but in the detritus that can be archived-- scrapbooks, programs, newspaper accounts, ads, and eventually photographs.⁵⁰ Indeed, the abundance of amateur theatre manuals stands in stark contrast to the dearth of reliable evidence of amateur special effects use.

When faced with scarce physical materials in archives, it can be tempting to use the sometimes elaborate instructions for theatre technology found in amateur theatre manuals and periodicals as indicative of production trends. Inherent contradictions between the technological advice and the requirements of the suggested plays for performance, however, seem to undermine that avenue of inquiry. The texts usually recommend that amateurs choose domestic dramas, encouraging them to use existing furniture and clothing in productions; shows that require elaborate effects are rarely discussed. Yet, the manuals simultaneously provide instructions for conflagrations, storm scenes and home-made pyrotechnics—effects better suited to popular nineteenth-century melodramas than the staid cup-and-saucer plays and light farces promoted by the same manuals.

Despite the assumption that amateurs can handle the scientific effects and that they are replicable in a parlour, authors and publishers wrote simplified

versions of popular plays that required significant scenic investiture, such as *Blue Beard*, “with regard to the scenic exigencies of the drawing-room.”⁵¹ Even potentially effects-heavy children’s theatre finds itself edited in volumes such as Sarah Annie Frost’s *Amateur Theatricals and Fairy-Tale Dramas* so that the shows “can be made effective with modern furniture and dress.”⁵² Likewise, French’s list of burlesques and extravaganzas for home performance are described as “those pieces least dependent on scenic effects,”⁵³ which suggests that even the publishers assumed that amateurs did not want to worry about needing elaborate equipment for their parlour theatricals, even when the commercial counterparts of those particular shows employed much technology.

The contradictory assumptions of the authors are occasionally quite blatant, suggesting again that the books had multiple competing audiences and that the scientific aspects were not there simply to support the productions. Generally, the advice follows that given by the Pollocks: “the less scenery is used the better things will go in an ordinary amateur performance.”⁵⁴ Gill urges his readers to consider their geographical proximity to materials providers in a manner which implies that they need professional assistance for elaborate shows: “It is recommended only, when, as in large cities, resources of every kind are at hand, and it is desirable to produce something very brilliant.”⁵⁵ Townsend is more blunt: “Elaborate scenic effects are not desirable in amateur entertainments. It requires the services of a trained, skillful man to handle the complicated scenery and stage effects.” A handful of lines later, he reiterates that readers should choose plays that need “nothing difficult in the way of scenery or stage effects.”⁵⁶ Sometimes, advice on spectacle comes immediately after the recommendation not to do plays requiring it: “In private theatricals I would not advise staging any play requiring a water scene; yet a fair imitation of waves may be produced by shaking a strip of green cloth by persons on each side of the stage.”⁵⁷ And yet, all of the manuals surveyed contain advice on special effects.

Admonitions such as Townsend’s (noted above) to hire professionals may also be a nod towards safety, as many of these devices were potentially dangerous, more so than regular fireworks and other chemical toys. Authors offered safety precautions occasionally, such as in Gill’s instructions for coloured fire, which warns that “[t]he oxymuriate must be powdered by itself, and mixed with the other ingredients, carefully, on paper; otherwise it will explode, to the imminent danger of the operator.”⁵⁸ Wires are advised across footlights in most manuals thus far surveyed— be they footlights created by candles or by attaching a tube with holes to the gas supply in the parlour. As noted above, Burnand, when discussing the hook up of gas to a line of home-made footlights, “recommend[s] the employment of a gas fitter here, to avoid the chance of a mishap of any kind.”⁵⁹ Thus, despite this acknowledgement that certain tasks might be best left to professionals, manipulations of household gas lines and the use of chemicals are treated as a seemingly routine affair that amateurs were expected to handle with ease.

Indeed, given the explosive nature of the materials used and the amateur standing of the operators, remarkably few accounts of parlour theatre fires caused by amateur theatrical equipment have been located to date—an absence which notably contrasts with both the frequency of theatre fires in the period and the extensive reporting on them. After all, parlour theatres may have been using gas jet lighting and other explosive equipment near flammable items, just as in the commercial theatre, and the size of the space used might create even more hazardous conditions due to the sheer proximity of people, scenery, and equipment. In his 1896 analysis of theatre fire statistics, William Gerhard looks at theatres which burned before the widespread implementation of electric light in theatres, a period which parallels the amateur theatre under investigation here. Gerhard offers a lengthy list of common fire sources—a list that contains numerous conditions, hazards and behaviours that could easily be found in both parlour and commercial theatres, particularly since gas-related problems are most common.⁶⁰ The basic tools were just as dangerous in one setting as in another, but his analysis of the patterns reveals potential reasons for the seeming discrepancies. For instance, Gerhard notes “that the greatest danger from fire to a theatre is during the two hours following a performance, and not during the performance as would naturally be supposed.” He credits “greater watchfulness” as a reason, and notes that fires that are sparked during the show “do not break out at once, but smoulder for a while.” The second most dangerous time of day, he continues, is “immediately before the performance [...] which is explained by the fact that at this time the gas flames are lit which illuminate the scenery.”⁶¹ Thus, fires at the two most common times in the commercial theatres in the period of Gerhard’s study were caused by newly ignited gas flames and smouldering sparks which caused fires to erupt after the theatre was largely empty.

Yet, in a parlour theatre, Gerhard’s two most common types of fire might, because of the scale of the space, quite simply be easier to notice and put out quickly. Even a large ballroom was significantly smaller than a commercial theatre, making it easier to see smoke before fires became unmanageable. The temporary nature of the event might also enable operators to prevent post-show fires because the materials were taken down, assuming strike occurred that evening. The fear of the unfamiliar and the risk of fire could lead to more care being taken with parlour equipment, as well. Yet, while the scale of the space might have reduced the likelihood of some fires, the nature of the equipment and potential inexperience of the operators still suggests that more parlour theatrical fires should have occurred than seem to be recorded.

Certainly, some materials such as touchpaper, parlour lightning and similar “chemical toys” were like modern-day sparklers, spectacular but unlikely to cause significant damage; indeed, contemporary materials note that “[t]he use of these toys in teaching rudimentary chemistry to children and young people is quite incommensurate with their danger.”⁶² Other chemicals had the potential to cause fires such as the 1880 theatre fire caused by “the explosion of a box of what are known as magnesium pellets, used to [make] a representation of lightning,”⁶³ and

the magnesium-based photographic flash fire during a 1904 Strollers Club event.⁶⁴ For some of the more complex devices like footlights and calcium lights, homemade machinery and novice operators would, it seems, be more likely to cause problems than commercial theatres with experienced stagehands and equipment. Indeed, Gerhard notes that theatres were more likely to burn during their first five years of operation.⁶⁵ A parlour theatre would, of course, require fewer devices to achieve effects, but the reduced number of devices does not limit the flammability of the materials used, the potential inexperience of the operators, and the increased danger of using fireworks indoors or a calcium light made in part out of a wooden box. Further, the size of the space may increase the likelihood that an amateur actor would accidentally knock over a lamp or footlight.

The lack of parlour accident reports might suggest that amateurs were not using extraordinarily dangerous techniques in their theatricals, pointing instead to the inclusion of this advice in the manuals as a marketing novelty or a nod to home scientists; after all, the press did not shy away from reporting deaths caused by prop mishaps, such as accidental shootings. Likewise, in the records of theatre disasters caused by gas, magnesium, and exploding calcium lights, markedly few mentions of amateurs appear, and the preponderance of those follow the pattern of the Boyertown theatre in 1908—rented theatres which caught fire while amateurs used them.⁶⁶

Yet, fire reporting systems are problematic as well, as there seems to be no category for “Home theatricals fire” in the major U.S. urban reports surveyed. Instead, reports include events such as “Mrs. K. B. Throckmorton, white, age 60 years, slightly burned on hands December 23, 1904, at box 268, caused by lace curtain coming in contact with gas jet.”⁶⁷ Fire causes in Boston in 1895-1896 likewise include numerous events which might have occurred during a theatrical event such as “careless use of lamps, candles, etc.,” “explosion and igniting of chemicals,” “fireworks,” and “incendiary.”⁶⁸ Notably, these reports also do not include clear evidence of science experiments going wrong, either, so fire reporting methods might simply have obscured the number of conflagrations caused by parlour theatricals and home science experiments. Compared to reports of fires caused by fireworks, which sometimes garnered their own columns particularly round 4 July, theatricals fires appear to be underreported, but the discrepancy may simply be a function of popularity and timing; concentrated widespread fireworks usage cannot be compared to theatricals, even in their heyday. Reports on fireworks and cannon explosions, however, point to the possibility that theatrical technology likewise might have caused fires, as reports such as “children setting off fireworks caused a small blaze at 11:25 am in the apartments of Morris Silverstein” and “Firecrackers caused a blaze in the parlour of Mrs. A. Stein’s residence” were not uncommon.⁶⁹ Clearly, some accidents did happen and were reported; a woman in St. Louis suffered burns “when her dress caught fire, presumably from a spark from an electric switchboard,”⁷⁰ but the scarcity of reports may well be a result of reporting systems rather than amateurs not choosing to use the effects.

Conclusion

Reading the manuals as a commercial venture—simultaneously a profit-maker through book sales and as a marketing campaign for other theatrical supplies or books—provides a potential avenue for explaining the discrepancies between the recommended plays, light domestic comedies and farces, and the technological effects advertised in the books. Burnand's 1872 volume simultaneously markets successful—and thus perhaps safe—amateur theatricals alongside potentially dangerous special effects in its title: *How We Managed our Private Theatricals; Or, A Guide to the Amateur Stage. [...] Instructions for making CALCIUM LIGHTS, etc., etc., with numerous Illustrations and Diagrams, to which is added PENELOPE ANNE, A Roaring Farce for Home Performance. Penelope Anne*, notably, is set in a hotel room and requires nothing more elaborate than furniture and props such as a dishware, a portmanteau, a pipe, and a newspaper. And yet, Burnand's technological section contains instructions on a variety of effects not needed in the play, including the Calcium Light. Burnand is not alone in following this pattern, as most manuals that recommend plays and provide technological instructions tend to mirror this divergence between the needs of the play and the technological advice provided.

Thus, the technical advice implies that the manuals cannot be viewed merely as instructional texts for the particular recommended plays, but rather as guides for amateur theatricals more broadly. And, by including instructions for scientifically based special effects that are not required by the recommended plays, the publishers and authors also positioned theatricals manuals amid an existing market for home science aficionados. If they include instructions for spectacular effects, then presumably people would be drawn to trying them out. Certainly, I looked into purchasing the equipment for the techniques outlined in these books, and while the Patriot Act and my lack of a pyrotechnics licence prevents me from seeing how many of the special effects actually could work, the tools of the trade—lycopodium powder, magnesium wire, home lighting gas, and other explosives—were much more readily available in the nineteenth century.

Lacy, in the introduction to the special effects section for his *The Amateur's Guide*, also points to an audience's basic fascination with spectacle as a reason for including this type of advice: "I propose in this chapter to instruct my readers in the art of contriving those mechanical illusions and effects, which, at different periods of our lives, have excited our wonder and delight; to tell them, in fact, how to terrify the audience by the vivid flash of mimic lightning, and the hoarse rumbling of the most artificial thunder."⁷¹ And indeed, the popularity of new scientific technology overlaps with the popularity of theatrical spectacle, as can be seen in scientific displays at major events such as World's Fairs and local events as well.⁷² Theatre provided a means of bridging science and entertainment by drawing on broader societal fascination with new technologies, and theatricals manuals provided the instructions for experimenting with those technologies in the parlour.

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² A. D. Ames, *Hints to Amateurs: A Practical Guide to Home and Amateur Theatricals* (Clyde, OH: Ames Publishing, 1885), 18.

³ Indeed, scholarship on amateur theatricals manuals neglects technical theatre, reflecting the research challenges in theatre history more broadly. For selected other references to manuals and theatricals, including discussions of acting, drama and morality, copyright law, and tableaux, see, for instance, Karen Halttunen, *Confidence Men and Painted Women: A Study of Middle-Class Culture in America, 1830-1870* (New Haven: Yale University Press, 1982); Melanie Dawson, *Laboring to Play: Home Entertainment and the Spectacle of Middle-Class Cultural Life, 1850-1920*, (Tuscaloosa: University of Alabama Press, 2005); Michael Meeuwis, "'The Theatre Royal Back Drawing-Room': Professionalizing Domestic Entertainment in Victorian Acting Manuals" *Victorian Studies*, 54.3 (2012): 427-437.

; Eileen Curley, "A Shot Over the Bow: William Gillette and Amateur Play Piracy," *Journal of American Drama and Theatre*, 22.3 (2010): 23-41.

; Monika M. Elbert, "Striking a Historical Pose: Antebellum Tableaux Vivants, Godey's Illustrations, and Margaret Fuller's Heroines" *New England Quarterly*, 75.2 (2002): 235-274, Florence C. Smith, "Introducing Parlour Theatricals to the American Home" *Performing Arts Resources* 14 (1989): 1-11.

⁴ Ames, *Hints to Amateurs*, 19.

⁵ Ames, *Hints to Amateurs*, 19.

⁶ Ames, *Hints to Amateurs*, 19; Olive Logan, "The Secret Regions of the Stage," *Harper's New Monthly Magazine*, April 1874, 637; W. D. Emerson, *Practical Instructions for Private Theatricals*, (Chicago: Dramatic Publishing Company, 1899), 46; J.R. Grismer, "20,255," in eds. Terence Rees and David Wilmore, *British Theatrical Patents 1801-1900* (London: Society for Theatre Research, 1996), 149.

⁷ W. D. Emerson, *Practical Instructions*, 46-48; Olive Logan, "Secret Regions," 634-636.

⁸ C.E. Burton, *Burton's Amateur Actor* (New York: Fitzgerald Publishing Company, 1876), 41.

⁹ De Witt's *How to Manage Amateur Theatricals* (New York: De Witt Publishing House, 1880), 15.

¹⁰ Charles Townsend, *Private Theatricals: A Concise Manual* (Chicago: Denison and Company, 1891), 28.

¹¹ Percy Fitzgerald, *The World Behind the Scenes* (London: Chatto and Windus, 1881), 53.

¹² *Scientific American*, "Science in the Theater," 65.3 (18 Jul 1891): 39. Such articles that explain science in commercial theatre also speak to the fascination with the science of the stage.

¹³ Ames, *Hints to Amateurs*, 18.

¹⁴ William Fearing Gill, *Parlour Tableaux and Amateur Theatricals*. (Boston: J. E. Tilton, 1866), 287-288.

¹⁵ See for instance: Olive Logan, "Secret Regions," 637; *New York Times*, "Explosion in a Theatre," 11 Dec 1880, 3.

¹⁶ Fitzgerald, *World Behind*, 62.

¹⁷ Emerson, *Practical Instructions*, 49; See also McDonald W. Held, "Special Lighting Effects on the Late Nineteenth-Century American Stage," *Furman Studies* (Spring 1950): 61-77.

¹⁸ Burton, *Burton's Amateur Actor*, 26-27.

¹⁹ *New York Times*, "Calcium Lights Condemned," 27 Jan 1878, 10.

²⁰ *International Descriptive Catalogue of Plays and Dramatic Works*, (New York: Samuel French, 1885), 44-48.

²¹ Ames, *Hints to Amateurs*, 16.

²² *Art of Scene Painting by Practical Scenic Artists* (London: Samuel French, 1879), 6. TS 239.221.8 Harvard Theatre Collection, Houghton Library, Harvard University.

²³ *Art of Scene Painting*, 4.

²⁴ Tony Denier, *The Amateur's Hand-Book and Guide to Home or Drawing Room Theatricals*, (New York: Samuel French, 1866), 44.

- ²⁵ *Art of Scene Painting*, 15.
- ²⁶ Townsend, *Private Theatricals*, 27.
- ²⁷ Gill, *Parlour Tableaux*, 284.
- ²⁸ Gill, *Parlour Tableaux*, 13.
- ²⁹ Townsend, *Private Theatricals*, 27.
- ³⁰ Charles Harrison, *Theatricals and Tableaux Vivants for Amateurs*. (London: L. Upcott Gill, 1882), 17.
- ³¹ *New York Times*, "Independence Day," 3 July 1873, 2. See also *New York Times*, "Independence Day," 3 July 1874, 2.
- ³² In addition to manuals and periodicals, theatrical science also appears in books on magic and magic lanterns, including an entire section dedicated specifically to "Science in the Theater" in Albert A. Hopkins, *Magic: Stage Illusions and Scientific Diversions, including Trick Photography* (London: Sampson Low, Marston and Company, 1897). See also W.J. Chadwick, *The Magic Lantern Manual* (London, UK: Frederick Warne and Company, 1878); James Wylde, *The Magic of Science: A Manual of Easy and Instructive Scientific Experiments* (London, UK: Richard Griffin and Company, 1861).
- ³³ Katherine Pandora, "Popular Science in National and Transnational Perspective: Suggestions from the American Context," *Isis* 100.2 (2009): 355.
- ³⁴ Ann B. Shteir, "Elegant Recreations? Configuring Science Writing for Women," in *Victorian Science in Context*, ed. Bernard Lightman (Chicago: University of Chicago Press, 1997), 239.
- ³⁵ Roger Cooter and Stephen Pumfrey, "Separate Spheres and Public Places: Reflections on the History of Science Popularization and Science in Popular Culture," *History of Science* 32 (1994): 238.
- ³⁶ For instance, David Belasco and William Fearing Gill both worked with or as amateurs and transferred some of that knowledge into their commercial ventures and publications.
- ³⁷ See, for example, Shteir, "Elegant Recreations?" 236-255 and Caroline Lieffers, "'The Present Time is Eminently Scientific': The Science of Cookery in Nineteenth-Century Britain," *Journal of Social History* 45.4 (2012): 936-959.
- ³⁸ Lieffers, "'The Present Time,'" 937.
- ³⁹ Emerson, *Practical Instructions*, 34-40.
- ⁴⁰ See Burton, *Burton's Amateur Actor*, 24-25; Emerson, *Practical Instructions*, 38-40; Thomas Hailes Lacy, *The Amateur's Guide* (London: Samuel French, 1873), 16; Francis Cowley Burnand, *How We Managed Our Private Theatricals* (New York: Happy Hours, 1872), 13-14.
- ⁴¹ For one explanation of this process, see Emerson, *Practical Instructions*, 54-56.
- ⁴² Emerson, *Practical Instructions*, 41.
- ⁴³ This notion parallels Kuritz's assessment that "Artisans and craftsmen wanted to share in this knowledge in the belief that a larger acquaintance with science would not only enhance their skills but would also dignify their position and role in society" (260). Hyman Kuritz, "The Popularization of Science in Nineteenth-Century America," *History of Education Quarterly*, 21.3 (1981): 259-274.
- ⁴⁴ Pandora, "Popular Science," 356.
- ⁴⁵ See, for instance: Browne, Van Dyke. *Secrets of Scene Painting and Stage Effects*, New York: E. P. Dutton and Company, [19--?]; Krows, Arthur Edwin, *Equipment for Stage Production: A Manual of Scene Building*, New York: D. Appleton and Company, 1929; Knapp, Jack Stuart, *Lighting the Stage with Homemade Equipment*, Boston: Baker's Plays, 1933; Selden, Samuel and Hunton D. Sellman, *Stage Scenery and Lighting: A handbook for non-professionals*, New York: Crofts, 1930.
- ⁴⁶ Walter Herries Pollock and Lady Pollock, *Amateur Theatricals* (London: Macmillan and Company, 1879), 49.
- ⁴⁷ De Witt's, 5, 10.
- ⁴⁸ See Burton, *Burton's Amateur Actor*, 24-25; Emerson, *Practical Instructions*, 38-40; Lacy, *The Amateur's Guide*, 16; Burnand, *How We Managed*, 13-14. As electricity becomes commonplace, electrical advice likewise follows a progression from recommending hiring a professional to eventually instructing amateurs on wiring plugs.
- ⁴⁹ Lieffers, "'The Present Time,'" 948.
- ⁵⁰ For a theoretical assessment of some challenges of researching amateur theatre, see Claire Cochrane, "The Pervasiveness of the Commonplace: The Historian and Amateur Theatre," *Theatre Research International* 26.3 (2001): 233-242.

- ⁵¹ Peter the Friar, "Dedication," *Blue Beard, or Fatal Curiosity, Semi-Burlesqued. For Private Theatricals*. (London: Chapman and Hall, 1855), 3.
- ⁵² Sarah Annie Frost, *Amateur Theatricals and Fairy-Tale Dramas* (New York: Dick and Fitzgerald, 1868), 3-4.
- ⁵³ Denier, *The Amateur's Hand-Book*, 84. This 1866 advice continues to be given in later editions published in the UK and NY and edited by Thomas Hailes Lacy.
- ⁵⁴ Pollock, *Amateur Theatricals*, 55.
- ⁵⁵ Gill, *Parlour Tableaux*, 301.
- ⁵⁶ Townsend, *Private Theatricals*, 64.
- ⁵⁷ Townsend, *Private Theatricals*, 28.
- ⁵⁸ Gill, *Parlour Tableaux*, 284.
- ⁵⁹ Burnand, *How We Managed*, 14.
- ⁶⁰ William Paul Gerhard, *Theatre Fires and Panics: Their Causes and Prevention*, (New York: John Wiley and Sons, 1896), 21-24, 28. These problems extend to gas lines, gas fittings, gas equipment and the relationship of the gas jets to scenery, costumes, and people.
- ⁶¹ Gerhard, *Theatre Fires*, 9.
- ⁶² "Chemical Toys," *Library of Universal Knowledge* (New York: American Book Exchange, 1880), 740.
- ⁶³ *New York Times*, "An Explosion in a Theatre," 11 Dec 1880, 3..
- ⁶⁴ *New York Times*, "Panic Follows Fire in Strollers Club," 29 Feb 1904, 12.
- ⁶⁵ Gerhard, *Theatre Fires*, 6-7.
- ⁶⁶ For a sampling of calcium lights that caused commercial theatre fires, see for instance, *The World*, "Nearly All Theatres in Peril, Says Sturgis," 31 Dec 1903, 5, *New York Times*, "Explosion in a Theatre," 19 Jan 1883, 1; *New York Times*, "Explosion in a Theatre," 7 Feb 1876, 8. For Boyertown, see for instance, *New York Times*, "167 Bodies Found in Theatre Ruins," 15 Jan 1908, 1. ; *The World*, "180 Lives Lost in Flame-Swept Opera House," 14 Jan 1908, 1-2.
- ⁶⁷ *Report of the Chief of the Fire Department of the District of Columbia* (Washington: Government Printing Office, 1905), 22.
- ⁶⁸ *Annual Report of the Fire Department, for the Year 1895* (Boston: Rockwell and Churchill, City Printers, 1896), 4. New York, Washington, and Chicago reports reveal the same potentially ambiguous categories.
- ⁶⁹⁶⁹ *New York Times*, "Crackers Cause Many Fires: Most of Them Were Slight, but They Kept the Firemen Busy," 5 Jul 1896, 5. For a sampling, see also: *New York Times*, "Accidents in Two Cities: A Brooklyn Boy Killed by his Cannon Exploding," 5 Jul 1893, 5; *New York Times*, "Fires Yesterday," 5 Jul 1869, 8; *New York Times*, "Independence Day Fires," 5 Jul 1876, 5.
- ⁷⁰ *The Rock Island Argus*, "Society Woman is Seriously Burned," 3 Mar 1916.
- ⁷¹ Lacy, *The Amateur's Guide*, 22.
- ⁷² See, for example: Carolyn Marvin, *When Old Technologies Were New: Thinking about Electric Communication in the Late Nineteenth Century* (Oxford: Oxford University Press, 1990); Fred Nadis, *Wonder Shows: Performing Science, Magic and Religion in America* (New Brunswick, NJ: Rutgers University Press, 2005).