

PLAYABILITY

A Reinvention of Contemporary Lighting Practice Drawing on Fred Bentham's 1930s Light Console

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In this essay, I describe a research project in which I attempted a partial reinvention of the role of the theater lighting designer, as it is found across most of the English-speaking theater world. A central part of my proposal is that the person I term the 'lighting artist' should perform the lighting live during the performance rather than making all creative decisions in advance for automated, computerized replay. My proposal draws inspiration from the ideas of Fred Bentham (b. 1911) and his radical 1930s lighting control system, the *Light Console*. It is this relationship between past practices and present research that I want to focus on in this essay.

Frederick Bentham in 1932 began working for Strand Electric,¹ the major manufacturer of stage lighting equipment in the UK from the 1930s until the 1970s.² When Bentham joined Strand, stage lighting was primarily expected to provide illumination, with most theatre practitioners according it a quite limited role as an expressive element of the performance. Lighting control was an essentially mechanical affair: electrical resistance dimmers were controlled by levers linked via shafts to wheels to give 'master' control of multiple dimmers. Strand Electric's *Grand Master* (fig. 6) was typical in that it incorporated both the dimmers and the control inter-

1 Strand Electric was an independent company for most of Bentham's working life. It became part of the Rank group of companies shortly before Bentham retired, later returning to independence as Strand Lighting before having a complex history of ownership and restructuring up until the present.

2 Bentham recorded his professional life in his autobiography *Sixty Years of Light Work* (Bentham 1992), and wrote about his own work and ideas extensively in *Tabs* (the house journal of Strand, which he edited for many years), *Sightline* (the journal of the Association of British Theatre Technicians, which he also edited for several years), and in his books *Stage Lighting* (Bentham 1950) and *The Art of Stage Lighting* (Bentham 1968). However, because much of the written record of Bentham's work was written by Bentham himself, and because he was both highly opinionated and an accomplished self-publicist, it is important to be cautious when interpreting that record. The material presented here on Bentham's impact on the development of stage lighting in the UK and internationally is largely based on this body of work, tempered by the counter-views of other industry professionals where appropriate.

face in a single unit so large (over 2 meters tall) and heavy that it had to be positioned backstage, typically on a ‘perch’ position above one of the wings. Because the operators could see little—if anything—of the stage itself or the effect of the lighting, there was no opportunity for them to make a creative contribution to the making of the performance, and—with some notable exceptions—little interest on the part of directors and other theater creatives in them doing so.



Figure 6. Electric Strand’s Grand Master lighting control. Photograph courtesy of Andy Collier.

Bentham held the *Grand Master* type controls in contempt, later writing: “[g]ood and complicated lighting was done in those days, but ... I have never held *Grand Master* controls in anything but contempt as a contribution to lighting and, in consequence, as soon as I became active in this field, set about providing an alternative.”³ Within three years of starting work at Strand, Bentham had created his alternative: the *Light Console* (fig. 7).

3 Bentham 1976, 50.

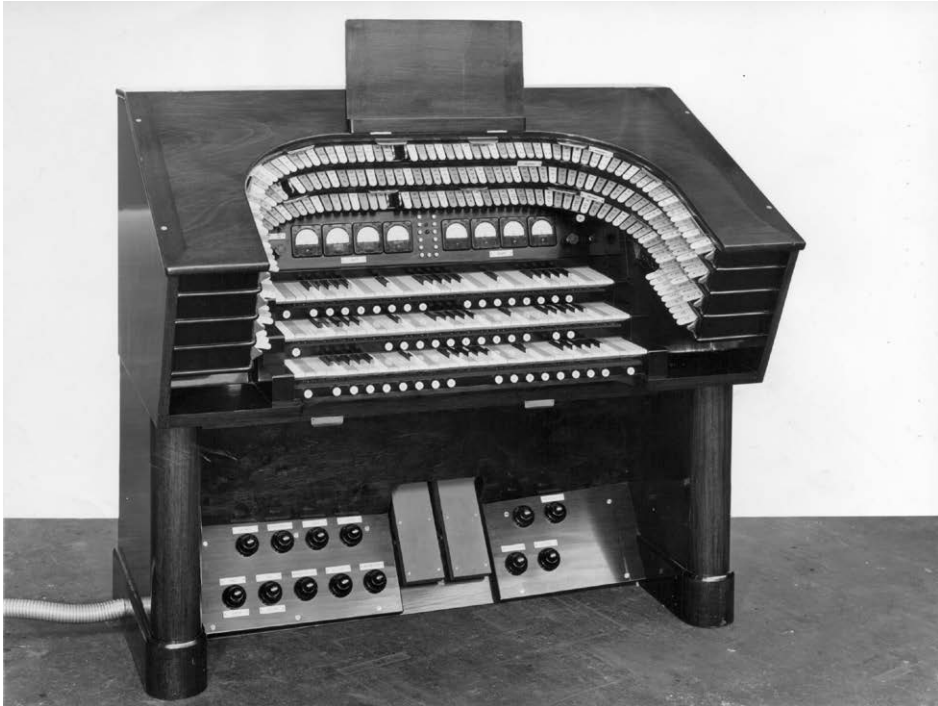


Figure 7. Bentham's Light Console. Photograph courtesy of Andy Collier.

It seems Bentham was motivated not only by his dislike of the *Grand Master*, but also by his passion for a particular form of performance called color music—the live performance of lighting, usually with a simple, abstract stage setting, to pre-recorded music, typically classical or jazz.⁴ To perform color music, Bentham needed a lighting control system that was, in his terms, ‘playable’ like a musical instrument, and which could be separated from the large, heavy, and heat-producing dimmers so that the operator could be in the auditorium and see the stage. Bentham wrote that for a lighting control to be ‘playable’ it “must have the instrumental quality

4 It is not clear where Bentham got the idea of color music. From his work at General Electric Company before he moved to Strand, he was certainly familiar with the sometimes elaborate lighting installations in cinema auditoria which ingeniously mixed colored lighting from concealed sources washing onto ceilings and walls. In his autobiography he says that he found a “like mind” in Adolphe Appia (Bentham 1992, 45), and Appia’s theories on the relationship between theater, music and light may have been influential. In Bentham 1957, 299-319, he gives a brief history of color music, listing several theorists and practitioners in the UK and internationally, but it is difficult to know how much he was aware of in the early 1930s. Equally, histories of other color music exponents rarely mention Bentham’s work.

which permits improvisation, composition and finally interpretation when repeating the result,” as well as allowing “a single operator to reach everything without leaving his seat”.⁵

Ingeniously, Bentham adopted the cinema organ technology that had developed during the cinema building boom in the 1920s and 30s, which in practical terms provided a ready-made control interface and sophisticated control logic based on electric relays that would have been prohibitively expensive and time-consuming to develop from scratch. Philosophically, Bentham was drawn to the organ console for its instrumental rather than *engineering* approach: he wanted to be able to *play* light expressively, as a musician plays music.

With the *Light Console*, all stage lighting was brought under the control of a single, comfortably seated operator, who could select any combination of lights for immediate control. Whilst it remained conventional for theatrical performances to work out the lighting plot on the console in advance of the performance (as with the *Grand Master*), the *Light Console* also made it possible for a practiced operator working with a known lighting rig to improvise lighting *in the moment* in response to stage action or—in the case of Bentham’s color music—to music. The *Light Console* was the first theater lighting control to offer such *playability*, and it proposed a new virtuosity on the part of the lighting operator.

The *Light Console* also meant a radical departure from previous control systems because it separated the control interface from the dimmers themselves, hence freeing the design of the interface from the constraints of the mechanical dimmers.⁶ The operator could now be placed front-of-house where she or he could see the activity of the stage and (potentially) take a creative part in its making: he became a lighting artist.

For all its radical intention, however, and Bentham’s considerable influence on the development of lighting technology at the time, the *Light Console* cannot be considered a success. Only sixteen theaters were equipped with them, and the need for a highly skilled operator who had to learn the show was widely seen as an unnecessary burden, not a creative opportunity. Later controls were designed to eliminate the creative input of the operator and give it to the emerging figure of the lighting designer, and today almost all theater lighting is done with pre-recorded states replayed at the press of a button. This brings us to the central question underlying my

5 Bentham 1971, 51. He further described his instrumental approach in Bentham 1976, 50.

6 The *Light Console* achieved this separation by exploiting the electro-magnetic clutch (invented by Moss Mansell in 1929 but largely neglected until taken up by Bentham), linking controls to dimmers with an electrical connection, rather than the previous mechanical rods or tracker wires.

research: how to reinvigorate the idea of the artist-operator playing an instrument?
How to establish the lighting artist as essentially a performer, not a designer?

RESEARCH I: RESTORING THE LIGHT CONSOLE

I began my research by investigating historical systems, most particularly Bentham's *Light Console*. Jim Laws, owner of what is perhaps the United Kingdom's most significant private collection of historical theater lighting equipment, offered me on long-term loan the smallest *Light Console* made, built in 1946 for the Theatre Royal in Bristol (fig. 8).



Figure 8. Paul Weston (colleague of Bentham, left) and Fred Bentham (right), with the Bristol Theatre Royal Light Console in 1989. Photograph courtesy of Jim Laws.

While I did not have the dimmer bank or the relay rack that were essential to the operation of the console as originally designed, my research was focused on the *functionality* of the console as a *user interface*. While I did undertake some cosmetic work, this was not at all a museum-style restoration intended to return an artefact to its original aesthetic or technical condition. The much-contested ideas of

'authenticity,' 'preservation,' and 'conservation' were not relevant here. Instead, my aim was to be able to operate lighting using the original controls, connected to modern dimmers and lighting rig. The *Light Console*'s interface was based on an only slightly modified cinema organ, and the visible console was essentially 'dumb'; it consisted of a series of organ style keys, stops, and pedals, connected electrically to the remote relay rack that provided the controlling logic that in turn controlled the motor-driven mechanical dimmers. For research purposes, all the 'behind the scenes' technology was replaced with a computer running custom-written software to replicate the control logic. The operation of the keys, stops, and pedals of the *Light Console* was captured via a MIDI (Musical Instruments Digital Interface) connection, and the computer was connected to the modern dimmers by the standard DMX (Digital MultipleX) lighting communication protocol.

The operation of the *Light Console* was tested through a series of lighting exercises, operated by myself, by specialist lighting students at Rose Bruford College, and by several lighting professionals including some who had been familiar with the *Light Consoles* when they were still installed in theaters. The key research findings arising from this process were as follows. Firstly, operators who were familiar with modern lighting controls generally had a strong desire to look at a display screen to check the state of the control system. The *Light Console* has no such display, and the operator who adapted most readily to it was one who was used to operating by looking primarily at the stage, not at a display screen. The *Light Console* must be learnt, as an instrument must be learnt, so the operator knows the controls well enough not to have to look at them.

Secondly, Bentham argued that the operator has ten fingers and two feet, and should use them. We found that this principle works, and the 'feel' for the operator is important. For example, the organ-style foot-operated 'toe piston' feels different to a key press operated by a finger, even if the effect in lighting terms is the same. This experience with the *Light Console* led to the realization that the physical design of the interface could suggest and encourage certain kinds of expression through the lighting. This experientially acquired understanding became very important in my later research and is a matter I shall return to.

Thirdly, the physical design of the interface can also suggest and encourage particular *qualities of attention* on the part of the lighting operator. The *Light Console* determined the physical posture of the operator and the need to concentrate on the light on stage in order to understand the system state of the controls as well as the visual effect being achieved. Again, this experientially acquired understanding was strongly influential in the later research.

RESEARCH II: THEOLUX

In the second phase of my research, my focus shifted from the historical to the re-invention of the contemporary: an investigation of the idea of the lighting artist as someone whose role and working practices are more like those of the performer than the designer. It is not possible to describe all aspects of this research here, but a central element was the development of a new, custom-designed theater lighting control interface intended for ‘live’ operation. In this sense, ‘live’ means that some creative decisions, particularly in relation to the timing of lighting changes, are deferred until the moment of performance, rather than being determined in advance as part of a design process.

Drawing on the findings of my research with Bentham’s *Light Console*, I wanted my new console—which became known as *Theolux* (fig. 9)—to offer a variety of expressive interface ‘idioms,’ or ways of operating the lighting. The interface was to be a playable instrument, encouraging a heightened sensitivity to the performance on the part of the operator, and allowing me to investigate the physicality of the operator in relation to the expressive potential of the interface.



Figure 9. The *Theolux* lighting control interface.

At a technical level, *Theolux* built on what I had learnt in making the *Light Console* operational. Once again, the interface was essentially ‘dumb,’ with a series of buttons, switches, and faders connected to a computer running bespoke software, which in turn was connected to a conventional set of dimmers and lighting rig. With *Theolux*, the stage lighting is created as a series of discrete affects which I have called ‘threads.’ The total stage picture at any one moment is composed of combinations of threads, which can be mixed at will by the operator. *Theolux* provides a variety of means to control the intensity or brightness of each thread, and the means chosen by the operator to make any particular change is determined by the particular esthetic quality of change desired.⁷

The controls to manipulate the threads are divided into two groups: the Impulse Controller and the Chord Controller. With the Impulse Controller the lighting artist has a choice of faders to change the intensity of the lighting threads: one small pair that gives fingertip control for precision, and one large, long-throw, floor-mounted lever that requires the lighting artist to use their whole arm, shoulder, and upper body to make the change. Thus the Impulse Controller affords the lighting artist a choice of sub-controllers that have different physical actions and so different intended esthetic qualities in terms of the lighting change produced.

The Chord Controller is somewhat different, in that it allows the lighting artist to start and stop changes of thread intensity independently for each thread. A conventional two-octave musical instrument keyboard provides the principal control interface, with each of the twelve keys of each octave corresponding to a thread. The speed of change is determined by a foot pedal. Releasing the keyboard key stops the change of intensity of the thread, leaving its intensity at its current value. By using a ‘chording’ action with several fingers of two hands, the lighting artist can control combinations of threads, varying the speed of change with the foot pedal in the same way as the speed of a car is controlled by the accelerator pedal.

RESEARCH III: PASSAGES

The third phase of my research was to create a piece of theater in order to test *Theolux* in performance conditions. Working with a production team comprising staff and students at Rose Bruford College, together with a professional director, I cre-

7 I describe the conceptual basis of my ‘threading’ model, and how it differs from the conventional model of stage lighting control, in Hunt 2011.

ated a forty-minute devised performance. Entitled *Passages*, the performance was developed through a devising process involving the director, actors, myself as lighting artist, and other members of the company. This process led to the making of a performance ‘text’ that was fixed at the macro-scale, while allowing for small, local variations of timing or expression from performance to performance. My concern here was with the subtleties of expression that can take place as audience, performers, and light interact and respond to each other: a focus in the moment of performance not on ‘what happens’ (which has been pre-agreed) but on ‘how it happens.’ As lighting artist I was present in the rehearsal room throughout every rehearsal day with *Theolux* and a lighting rig. The lighting ‘score’ was developed alongside the other performance elements throughout the rehearsal period.

The research findings from the *Passages* project were diverse and numerous, so for the present purposes I want to describe just two examples that are relevant here. Firstly, I found that—as I had anticipated—my experience of operating a lighting change with the Big Lever was qualitatively very different to the fingertip control offered by the small faders of the Crossfade Pair. Operating the Big Lever felt like an expansive, ‘lean back’ gesture, in contrast to the intensity of the ‘lean forward’ gesture working the Crossfade Pair. Correlating with my own subjective experience, the particular quality of the lighting change from the Big Lever was identified by at least one audience member. Rob Halliday, an experienced lighting professional, wrote in response to seeing *Passages*,

I loved, loved, loved the fade up of the par cans on the paper, which I believe was the cue you used the big lever for. That fade had such an incredible sense of damped dynamic, which I know would take endless amounts of fiddling to achieve in a ‘programmed’ way (and then would be wrong at the next performance). I long to be able to achieve that once per production. To be able to achieve it once a night would make life so much better!⁸

Halliday, as an expert spectator, identifies a *quality* in the dynamics of the lighting change that in his view was specific to the Big Lever.

My second example of the kinds of research findings arising from the use of *Theolux* to light *Passages* concerns the different experiences I had using the faders of the Impulse Controller, and the keyboard and foot pedal of the Chord Controller. During one section of *Passages*, several minutes long, the lighting was constantly changing in relation to the ongoing stage action. I used the keys of the Chord Controller to select the different lighting elements and the foot pedal to control the rate

8 Personal e-mail correspondence with Rob Halliday, 11 August 2009.

of change. My subjective experience of performing the lighting for this section was one of ‘steering’ or ‘guiding’ the various lighting elements towards a projected end point, while checking that the immediate balance within the lighting was right at each moment. I was constantly checking the progress of the lighting against the progress of the actors through the scene, not just in terms of pictorial composition, but in terms of emerging dramatic and aesthetic qualities: lighting unfolding, as a part of an unfolding performance. I would contrast this sense of futurity, of my attention being as it were drawn ‘forward’ along a timeline into the future, with my perception of using the different levers of the Impulse Controller, where my attention was more on the affective quality of the rate of change in that moment—a sense of being in the immediate *present*. Where the Impulse Controller gives the lighting artist a sense of intensely focused control, sustainable for short periods, the Chord Controller gives a sense of guiding lighting affects that are changing ‘on their own,’ nudging and tweaking them towards a constantly shifting desired composition (of all the performance elements, not just of light). My desire constantly ran ahead of the actual, drawing it along.⁹

CONCLUSION

Through my research I found that it is possible, by strategically combining the roles of designer and operator, and by developing the lighting ‘score’ through rehearsals using a control interface designed to enable the lighting artist to perform the score live in performance, stage lighting can be given an enhanced expressive role. Beyond these findings, however, my research suggests wider conclusions in relation to the theme of revaluing theatrical heritage. Firstly, it is clear that ‘restoration’ may be about function more than appearance. To discover what I learnt about the *Light Console*, it didn’t matter that it was not restored to museum standards, or that I made it work using modern electronics and software—the *interface* and the operator’s relationship to it were the important aspects of this research. Secondly, to fully understand specific historical objects they need to be used, not just observed and written about. While this may seem obvious at a time when there is more and more practice-based historical research, the point is worth underlining, especially

9 I describe in more detail my findings in relation to Theolux as a ‘playable’ instrument in Hunt 2013.

when it comes to appreciating the relationship between artifacts, practices, and the subtle nuances of performance aesthetics that may be inaccessible in any other way. Thirdly, theatrical artifacts are closely bound up with the ideas of what performance should be and how it should be made that circulated at the time. An artifact such as the *Light Console* may embody a radical conception of performance practice on the part of its maker, not merely a technical innovation. Again, certain insights can only arise from the use of those artifacts. Fourthly, we can examine the ideas of the past through *new* objects and practices that are informed by the past whilst being firmly located in the present. The *Theolux* and *Passages* research projects were motivated by a desire on my part to reform *current* theater lighting practices rather than to carry out an investigation into the past as such, even though this was part of the research process. Thus examining objects from the past can both inform our understanding of the past and also propose ways to shape the future, bringing new meaning and value to our theatrical heritage.