bulb combined with optical equipment, which made the projector the main means of stage lighting. The projector is governable by remote control by using dimmers. It may be placed far from the performers and trained to light designated areas only. To make the stage light as natural as possible, projectors had to be installed above the audience. As the theatres had been built before the advent of electricity, the only place the new projectors could be put in from of the stage was on the tiers of boxes and galleries found in old opera houses. But lamps fixed on the ballustrades of the upper balconies were unable to light the inner part of the stage, the proscenium arch cutting off the beam. The main problem posed by the old theatres was the lack of lighting positions which would provide steep enough angles so that the shadows cast by the actors would not be projected on the cyclorama and scenery. The lower tiers provided an angle too obtuse, while the access to the auditorium ceiling was in most cases rather difficult. Indeed it was only after World War I, when theatres designed for electrical lighting were built, that lighting bridges above the auditoriums provided positions from which all the stage could be reached by the projector beams.

This also marked the point of departure in lighting technique, where the methods used in Europe and those developed in America took different directions. While in Europe an electrician was assigned to nearly every piece of equipment – to direct its beam and adjust the colour filters - in the U.S., because of the high cost of manpower, the preferred solution was to install many more lamps, to be used selectively, rather than change their angles or gels manually during the performance. The amount of equipment placed on and above the stage itself grew proportionally smaller, as more and more lamps were placed above the audience in "front of house".

With the predominance of front-of-house lights, the plastic, three-dimensional quality of the lighting was lost to a great extent. Footlights were used less and less, until they became just a filler or were used to provide a "stagy" effect. The front-of-house light cast a realistic illumination on the actors' faces, while the strong and well-defined beam of the followspot created a rather unrealistic halo round the stars. This artificial highlighting of the main protagonists was plausible in the basically unrealistic and hierarchical atmosphere of ballet. The over-all, "shallow" traditional lighting fitted into the symmetrical, formal choreography of classical ballet, as did the "aristocratic" highlighting of the principal ballerina and her partner, the premier danseur, by the followspot, even in scenes that called for romantic moonlight. So there hardly existed any incentive to develop special lighting for the dance.

But modern dance demanded a different approach. The real breakthrough came when Jean Rosenthal began designing the lighting for Martha Graham's works. In order to emphasise the plastic, three-dimensional quality of the movement, the dancers' bodies had to be isolated from the backdrop. Rosenthal wished to light the dancers without any "spill" falling on the cyclorama.

I remember how startling and unusual the lighting of Graham's company looked, when they toured Israel for the first time in the 50's. The dancers were like sparkling jewels against a dark background. They reminded one of diamonds in a velvet showcase. (The simile isn't arbitrary, as for example Gordon Craig, the great visionary of modern staging, strove for a similar effect, when working for Stanislavsky in Moscow at the beginning of the century, and used black velvet to isolate the actors from their surroundings.)

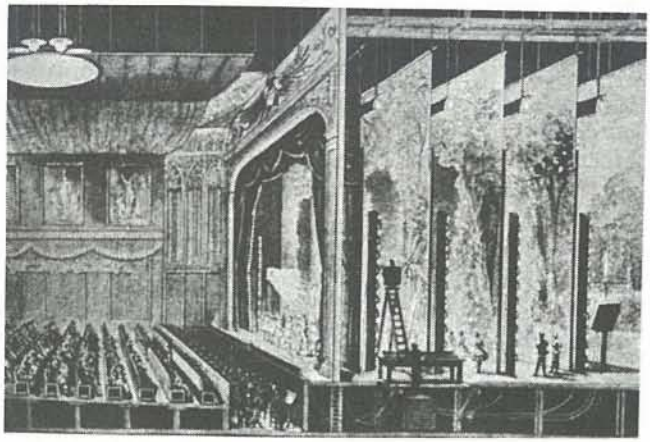
To achieve her aim, Jean Rosenthal used very steep angles of light. All her front-of-house light was moved from the lighting bridge, balconies or auditorium-ceiling to two large stands placed close to the proscenium and the dancers were lit mainly from the sides of the stage and from above.

Rosenthal (who died in 1969) was succeeded by designers who went even further, abolishing nearly all the equipment in front of the curtain and moving all the lamps into the stage itself. All this was made possible by new types of bulbs, which would not fuse even when shining straight down. All the light now came from above, from the side or from the back.

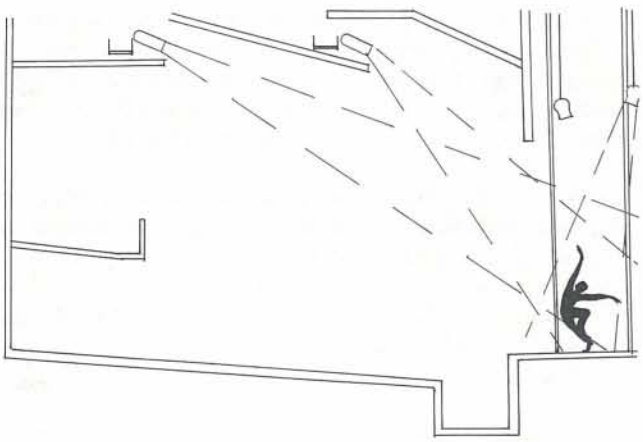
The conclusion one reaches when looking at a modern dance lighting design, is that in fact the sources of light have been moved back exactly to where they were when gas or candles provided the illumination.

The wheel has turned 360 degrees. If one imagines the stage from the side, one may reconstruct the progress of the lighting positions, first front, to the tiers of boxes, then up to the lighting bridges, then close to the proscenium, only to return to the stage itself, as of old.

Of course, as all historical development is dialectical, the turning wheel of lights did not revert to its previous position but rather returned, like a spiral, on a higher level. ■

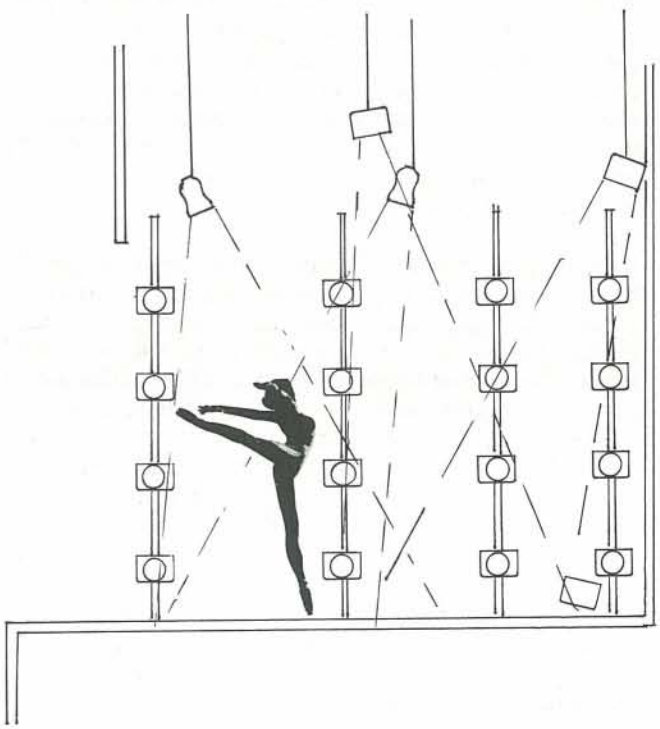


Gas lighting replaced by electricity without changing the placement
Munchen, 1881), all the apparatus is inside the stage.

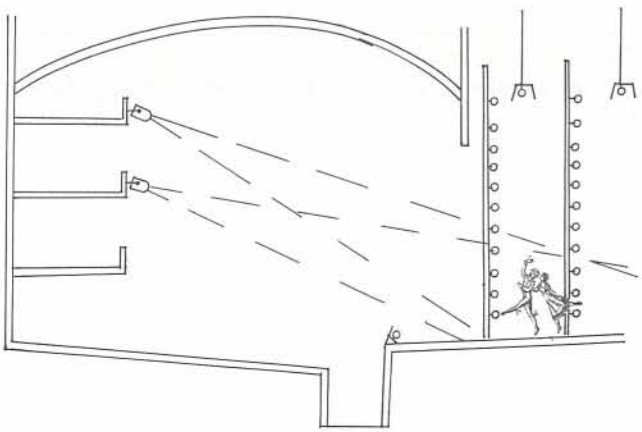


Modern theatre set-up with lighting-bridges.

Contemporary dance stage lit entirely from inside the stage.



Electrical lighting in an old opera-house, utilising the existing balconies.



THE WHEEL OF LIGHTS

by Giora Manor and Benzion Munitz

Some time ago I had to wait for an interview with a choreographer during a lighting rehearsal. Setting the lights on a modern stage takes a long time, even when using a computerised control board. There are endless possibilities for the lighting designer to choose from, and words are too imprecise to explain what the choreographer has in mind, so the process is mainly one of trial and error. Sitting and waiting, I had a lot of time to think, and remembering lighting rehearsals in which I took part some 40 years ago in the same theatre, I noticed that the choreographer and his designer were not using any front-of-house lamps at all. The entire lighting apparatus was contained on stage, above and to the sides of the dancing area.

In other words, the dancers were lit from a sort of cage surrounding them from above, from the wings and from backstage. Behind the traditional "legs" there were stands on which projectors were mounted, flooding the stage from left to right and vice versa. From above, other lamps were trained on them, shining straight down or at acute angles. From the back more lamps provided the back-light which creates the halo one associates with film or television lighting.

Looking at the arrangement, I remembered illustrations depicting the lighting apparatus in theatres of the era preceding the invention of the electric incadescent light bulb. As long as candles were the source of stage illumination, all the light came from chandeliers suspended above the stage, from rows of candles on "trees" placed behind the wings and of course from the footlights, which created the unrealistic light from below which became the symbol and even a synonym for the stage.

The advent of gaslight in the 19th century did not alter this arrangement. Gas burners were installed instead of the candles, without changing the placement of the light sources. The advantage of gaslight lay in the possibility of controlling the flow of gas from a central control board, dimming or brightening the lights at will.

All the light was diffuse, spreading evenly over the stage. The brightest lights were those closest to the actors or dancers – the footlights. The footlights, coming from below, reversed the natural order of shadows on the actors' or dancers' faces, highlighting them beneath the chin, the nose and the eyebrows, and casting a relative shadow on the prominent features, such as the nose, upper lip and eyelid. Special make-up techniques had to be used to restore a realistic distribution of light and shadow.

Until about 50 years ago there was no special lighting design for dance. In fact, the strong footlights, which made the legs brighter than the face, was quite welcome in ballet, where, after all, the feet carry the main burden of expression. As a French diplomat put it: "Les visages sont si tristes, mais les derrières sont si gais." (Their faces are so sad, but their bottoms are so gay.)

The invention of electric light did not, at first, cause any radical change in the lighting apparatus and methods in the theatres. The new bulbs were installed more or less where the gas jets used to be. The pipes were replaced by cables and the faucets regulating the flow of gas, by switches. At first the technicians were opposed to the introduction of electric equipment, as the regulation of the gas-flow offered them more flexibility in balancing the different light sources and creating effects than the still primitive dimmers at their disposal.

The real revolution came only after the invention of electric lamps, which are able to concentrate their beam by the use of mirrors or lenses and thus can be directional and cast light from greater distances. The precursor was the lime-light – another word which became a synonym of the stage and its traffic. In this type of lamp, which was in use as early as the middle of the 19th century, calcium is heated until it gives off a strong beam, fired by burning acetylene gas. This was replaced by the electric arc light, in which carbon sticks are burned. The arc light gives a very strong beam of intense white light which can be dimmed only by the use of coloured filters.

The real, fundamental change came with the incandescent