

An Electrical View of the Chicago Auditorium.

BY F. DE L.

Typical, outwardly, of the boundless enterprise and financial solidity of her leaders, and, within, of the refined and artistic sympathies of her feminine society devotees, Chicago's Auditorium stands forth a monument to the wisdom and business capacity of its projector, Mr. Ferd. W. Peck, and his able co-laborers.

The dedication of this palace of art, of song, of hospitality and of commerce made the closing of the year memorable in Chicago. And to all of the tens of thousands who have gathered within the inner walls to admire and dream of the wonders of the Auditorium proper has the genius of originality appeared strikingly in the perfect distribution of the thousands of soft Edison lights, arranged so that every recess is as clear and bright as though the sunshine were streaming through some vast opening. Incandescent lamps glint and reflect and reappear in a thousand forms in the Mexican onyx, the marble, the mahogany, found in pillar and wainscoting and mosaic flooring—lamps that reveal the merit in those forty-five life-size figures that appear in the great painting in the proscenium arch; lamps that peep out of plaques; that droop down in clusters like ripe fruit; that intertwine about pillar and post, and that shed their roseate glow on the splendid canopy formed by the high, vaulted roof, resting on graceful arches, each one a perfect ellipse and each one growing smaller and smaller as it approaches the proscenium, so as to form a trumpet-shaped interior that renders perfect the acoustic properties of the hall.

In closing his annual report to the directors of the association President Peck said: "You, gentlemen, constituting about three hundred public-spirited citizens of Chicago, have stood together to erect the most magnificent temple adapted for such grand, broad and varied purposes, which the world has ever seen. You have a right to congratulate yourselves and to be proud of your liberality and your work and its vast benefits to your city and to your country." Yet without detracting one iota of honor from all that is due to others, may not the electrical fraternity justly claim a fair share of credit for the success of at least that dream in decorative effects? For without the incandescent electric lamp would the directors ever have been justified in allowing the walls to be finished in such soft and lovely tints, or permitted such delicate tracings and such rich drapery and canary-colored plush and silk hangings, if all were to be quickly rendered lustreless by the destructive effect of gas lights? It is said that, if the leaves of 23-carat gold used in the interior decoration were laid side by side they would cover in area nearly an acre and a half, and so perfect has the work of application been done that a renewal will not be rendered necessary under ordinary circumstances for fifty years, and that the effect will grow more beautiful with age. Would all this have been possible had not the incandescent lamp been made a commercial success?

There are nearly five thousand 16 c. p. lamps required in illuminating the great hall proper. Think of the disastrous effect that the same number of gas jets would create; of the deposition of carbon soot that would have to be removed every year or two; of the effect on the rich paintings caused by the impurities in the gas, and of the discomfort and actual suffering that would be caused by the heated atmosphere. Thus it is that the electrical fraternity can claim a fair share of credit for having made possible the Auditorium as it stands in all its grandeur.

Within the building are two separate and distinct plants, furnishing light, heat and power, both being under one general management. The total dynamo capacity of the combined plants is 12,550 sixteen c. p. lamps, a number greater than is contained in any single building in the world. And not only is it the largest isolated plant in the world, but the capacity is also far greater than that of hundreds of local central lighting stations, in fact, but a dozen of the larger cities have stations of greater capacity. Probably a fair comparison is that the total capacity of all the central stations in either of the neighboring States of Indiana or Iowa, according to the statistics shown in the American Directory, does not equal that of the Auditorium plants. Again, the total number of lamps placed therein is greater than is the total number employed in all the isolated and central station plants in any one of many States.

The larger of these two plants is employed in furnishing the necessary service to the great audience hall and adjoining offices, and contains three 125 h. p. high speed, compound Williams engines (without condensers), and one 125 h. p. Ideal engine, each belted to a No. 32 110-volt Edison dynamo of a capacity of 1,400 sixteen candle power lamps respectively, and two Bullock straight line engines of 60 h. p. and 25 h. p. respectively, belted to a 720 light and a 180 light dynamo. Leather link belting is used throughout. On the great switchboard are Andrews switches having a carrying capacity of from 1,000 ampères down to 250 ampères, or less. From this board rise the mains, carrying the current for the 3,400 lights within the great audience hall proper, to the switchboard of special design that swings on hinges and heavy rollers, and which is placed in the rear of the last section of the great iron curtain that will be raised only on special occasions, when the full width of the stage is required. On the face of this board are placed nearly one hundred Andrews switches, controlling the lighting of the lamps in the various circuits.

The total depth of the stage from the footlights to rear wall is 69 feet, and from the curtain line to the rear wall 62½ feet, leaving an apron of 6½ feet. The clear width between side walls is 98 feet, giving the total available surface stage room of 6,862 square feet, an extent more than equal to the demands of the most sumptuous of practical productions. Though the total proscenium opening has a width of 75 feet, which can be utilized on special occasions, such as the holding of conventions, the curtain width will be but 47 feet.

There are on the stage proper 1,200 lamps, not including those placed in the dressing rooms, and an idea of the general distribution may be obtained from the statement that there are 150 footlights, 330 border lights in six circuits, of red, of green and of white lamp bulbs, and an untold number of lamps in the thousand-and-one other places around the stage. In the orchestra pit are 100 portable lamps attached to long cords, allowing one lamp to each seat.

Beyond the stage, but controlled therefrom, are a total of about 2,000 sixteen c. p. lamps, placed somewhat in the following order: 49 lamps droop from the flat ceiling above the gallery seats; 73 are placed in the second balcony; 78 are distributed through the first balcony; 106 on one circuit and 68 on a second circuit, that lend their rays in giving the visitor to the foyer the first glimpse of that wonderful interior; 145 lamps are tastefully displayed in 29 clusters of five each on the larger balcony rail and 72 on the smaller rail, while 110 lamps are so distributed as to reveal the rich draperies of the boxes. Above the nine stained glass panels over the parquet are placed clusters of 12 lights each; in the first proscenium arch 217 lamps are so placed as to bring out all the beauty in the allegory of "Nature's Song of Life," this number being divided into five circuits that can all be closed or opened by one switch; the second and third arches each contain about 200 lamps, and the fourth arch about 100, or a total of nearly 700 lamps in the arches. For lighting the stairways, but not controlled from the stage, 250 lamps are employed. Then there are the lamps in the ladies' parlor, the gentlemen's smoking-room and the inglenook.

Every lamp socket in the house is tagged with a number that corresponds to the number recorded on Mr. Fanning's diagram. Thus if a lamp filament burns out, the bulb is quickly replaced with a new one. If in the arches, all needed renewals can be replaced during the performance, without attracting the slightest attention, by an attendant who enters above and behind the circuit and withdraws the socket from its receptacle.

Among the special electrical and scenic effects are the various imported devices made by Hugo Bahr, of Dresden, Germany, which are excellent in many respects and show a decided advancement over anything yet placed on the American market to serve the same purpose. Yet the apparatus as a whole is somewhat unwieldy; and so Mr. J. J. Fanning, the electrical engineer in charge of the entire electrical equipment of this grand theatre, has devised a few simple and inexpensive accessories. For instance, flashes of lightning can be drawn from the face of an old rasp file, having an insulated handle with a long cord attached, by the aid of a heavy copper wire or other similar metallic object connected in circuit with the necessary resistance. The flashing that indicates the charmed circle is quickly made by the actor passing his sword around a narrow metal surface being placed on the floor, both being connected in circuit. In the Bahr apparatus the ripple of the waves of the great ocean—or other body of water—are reproduced true to nature by slowly moving three glass plates, less than one foot square, having alternate waving lines of dark color traced or grained thereon. These plates are placed within a special form of small stereopticon and the incandescent light graduated to the desired depth. The realistic lightning that attracted so much attention during the operatic season just passed is produced in somewhat the same fashion. A large wooden wheel inclosing several prepared plates having the special form of lightning, whether the so-called "chain" or "forked," etc., traced thereon, is fitted over the lense tube of the stereopticon and slowly revolved by hand, the desired effect, magnified many times over, being secured as the glass passes in front of the incandescent light. This lamp may be a special form of focusing lamp supplied with plain carbon pencils 5/16 of an inch in diameter and operated by hand. One "moon" is a plaque of porcelain within which is placed an incandescent bulb that receives the necessary current through the duplex conducting cord that is also utilized in causing pale Luna to slowly move upward. The fireflies are small coils having contact surfaces of carbon that emit an electric spark on the breaking of the circuit.

The application of electromotive power is confined principally to the driving of the ventilating fans and to the operation of the bellows system used in the service of the grand organ. There are employed for this service three Thomson-Houston motors of 5, 7½ and 15 h. p. respectively, three C. & C. motors of about the same power and two Eddy motors of 10 and 15 h. p. respectively. To a line of shafting driven by electric motive power are connected three large bellows, erected under the main floor of the Auditorium, and arranged so that either one or all three may be worked in unison or separately, an automatic belt shifter permitting single, double or triple action of the bellows that force the air into wind chambers from which a smooth and constant flow of air is obtained by means of regular

This great Roosevelt organ is said to surpass all the organs in the world in the purity and volume of tone and number of improvements, while it is the equal of other organs in size and in the number of stops. The cost is said to be about \$50,000, and a summary of the number of stops, pipes and accessories used in each part is as follows, and represents all that can be done in the way of perfect organ construction at the present day:

	Stops.	Pipes.
Great organ.....	20	1,611
Swell organ.....	23	1,733
Choir organ (carillons).....	17	1,210
Solo organ (chimes).....	15	854
Echo organ.....	11	842
Stage organ.....	4	244
Pedal organ.....	19	630
Total speaking stops.....	109	
Couplers.....	10	
Mechanical accessories.....	13	
Adjustable combination pistons.....	25	
Pedal movements.....	20	
Total.....	177	
Total pipes.....		7,124
Total bells.....		69
Total pipes and bells.....		7,193

The organ is practically concealed in the proscenium and is supplemented by two others, one an echo organ, erected within the dome and immediately above the centre of the parquet, distant about 100 feet from the organist; the other a stage organ, placed within a swell box sufficiently high on the stage wall to allow of walking beneath it. A striking feature of the stage organ is a set of twenty-five brass tubes that serve as chime bells. On being struck by hammers controlled and operated from a keyboard by the closing of an electric circuit, they give out a full and resonant tone, rich in harmony and far more realistic than if bells of usual shape were employed. In addition to these chimes there are a set of brilliant-toned carillons, formed of forty-four steel bars, operated in a similar manner. The keyboard controls seven different departments of the organ, namely, the great, pedal, swell, choir, echo, solo and stage. The keyboard extends below the floor of the hall, and contains the delicate combination action and electric circuit-closing apparatus.

The smaller electric light plant that will serve the hotel, and which is located on the Michigan avenue side of the building, consists of three Williams high-speed compound engines of 125 h. p. each and an Ideal engine of 100 h. p., each engine driving a No. 32 1,400-light Edison dynamo, while a Bullock Straight Line of 40 h. p. drives a 450 light dynamo.

The hydraulic system in the Auditorium is worthy of reference in closing this sketch, as it is perfect in all its details and is said to be the largest isolated hydraulic plant in the world. At the base of the system are some twenty-five pumps of the Worthington compound and high-pressure type, having an aggregate capacity sufficient at ordinary speed to raise from 19,000,000 to 20,000,000 gallons of water every twenty-four hours, or an amount greater than is probably consumed daily in any city of less than 200,000 population, so that the average allowance of water per inhabitant is 100 gallons per day. These pumps supply all the water required for house-supply purposes, for feeding the great tanks placed in the tower, 180 feet above the sidewalk, and for the cooling apparatus. Nineteen Worthington rams furnish the power that, by the throwing of a lever or series of levers, moves the "bridges" and the "traps," the larger and the smaller of the iron curtains, the "flies" and other accessories, all of iron or steel, and amounting in weight in the aggregate to over 500 tons.