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THE EDISON EXHIBIT AT THE PHILADELPHIA ELECTRICAL EXHIBITION.

The accompanying engraving, made from a sketch taken by our artist at the International Electrical Exhibition at Philadelphia, is a faithful representation of the Edison exhibit, than which nothing in the great hall has attracted more attention. The Edison Company sought to represent a miniature counterpart of every detail of their system with a mechanical and artistic finish that should render it worthy the name it bears. How well they have succeeded every one who visited the Exposition is aware. To those who have not, this brief sketch may, perhaps, give a general idea of its most salient features, and the thoroughness which distinguished it.

Facing the main entrance, a circular structure of artistic workmanship marks the general headquarters. Within the dazzling glow of incandescence bursts from a circle of callies jutting outward from a mass of roses, and japonica, and chrysanthemum, and gladioli hanging from the ceiling, and—

"From the arched roof,
Pendent by subtle magic, many a row
Of starry lamps and blazing cressets fed,"

not with naphtha and asphaltum, as were the lamps in Milton's pandemonium, but with an invisible current, which, generated by dynamos at the other end of the great hall, is led by devious routes through subterranean passages. Near by a towering cylinder, glazed with mica, blazes with incandescence lamps, while colored lamps, fed by the same current, hang in festoons around it.

The various and ingeniously contrived parts which go to make up the Edison system are here displayed, not as models the practical workings of which must be explained, but at work in their several capacities.

Here is the plant fed from a central station, intended for cities or sections thereof, such as that one in successful operation in New York city; and there the isolated plant intended for great manufactories and the like. The dynamos occupy a section of their own at the northern end of the building, and notwithstanding the great currents they are generating, which feed several thousand lamps scattered throughout the building, their movements are so noiseless that the average visitor, though he be in their vicinity, would scarce suspect they were in active operation; a low rumble being all that can be heard even when close to them.

Opposite the Edison headquarters, and on the other side of



THE EDISON ELECTRICAL DARKY.

the common thoroughfare, is placed a section of the much talked about and little understood underground apparatus of the Edison system. It is intended for and has served to

make incandescent lighting, not a possibility, but a practicality.

By it the current may be efficiently distributed for lighting and for power. For the most part it is constructed of wrought iron piping, in which are laid the copper electric mains through which the current is transmitted. These conductors are insulated with species of tape devised purposely for them, and to still further guard against contact they have here and there a serving of rope. Around the mains and inside the pipes is poured an insulating material which possesses the double advantage of hardening without cracking. The three wire system devised by Edison for his underground apparatus is a fair exponent of his genius in simplifying complicated and expensive mechanisms. Instead of the four wires which heretofore were thought necessary to carry the current from two dynamos of equal power, he uses only three. The central wire of the three is run from the connection which is made between the positive pole of one dynamo and the negative pole of the other dynamo; the two outside wires representing the remaining positive and negative poles.

There is no current through the central main while the dynamos are working evenly, the opposing currents having a neutralizing effect, the one upon the other. Instead of the 100 volt current which the outside mains should carry, they would, if joined together, carry nearly 200 volts. This is presented in the three wire system by means of the connection that is made with the central main from the mains on either side of it. In the three main system, the wires need not be of as large diameter as where four mains are used, and hence, as may readily be seen, still another saving of copper is effected.

The apparatus by which the Edison lamps are freed of air before being sealed is fashioned after the style of the Sprengel air pump—a column of mercury while falling driving the air before it. The life of the Edison lamp often extends beyond one thousand hours, which, if used on an average of five hours per diem, would insure its successful operation for more than half a year. This does much to sustain Mr. Edison's assertion that by means of his apparatus he can reduce the vacuum in his lamps to one one-hundred-thousandth of an atmosphere. After his pumps have done their work, a current of electricity is sent through the filament of the lamp to eliminate what air, if there be any, may have become mechanically entangled.

(Continued on page 246.)



THE PHILADELPHIA ELECTRICAL EXHIBITION.—THE EDISON EXHIBIT.

(Continued from first page.)

The Edison electric meter, by which the amount of electric light used in any dwelling or office may be determined, is shown and explained at the Exposition. Before entering a building, the current is transmitted through a resistance already known. A shunt circuit leads into the jar of a battery, the plates of which are zinc and the charging fluid the sulphate of the same. The same amount of current which enters the building is transmitted *via* the shunt circuit to the depositing jar, the amount of zinc deposited on one pole and taken from the other being a measure of the current which has entered. The weighing of the plates completes the operation, and enables the Edison Company to ascertain the amount of electricity they have furnished the consumer.

Upon a series of tables ranged along one side of the Edison exhibit are shown the various discoveries made by the wizard affecting telegraphy. These are so varied and so well known throughout the civilized world as to make any attempt at further description unnecessary.

One of the electrical comicalities of the Exhibition was the illuminated colored gentlemen who politely distributed cards to astonished visitors. The Edison Company conceived the idea of so locating one of their lamps that it could be seen by all, and to do this most effectually they placed it upon a helmet surmounting the head of the colored party. Two wires led from the lamp under his jacket, down each leg, and terminated in copper disks fastened to his boot heels. Squares of copper of a suitable size for him to stand naturally upon were placed at intervals

be that sell arc lights without pretending to sell incandescent. The United States Company, however, as shown by their exhibit, are prepared to supply everything in the way of electric lighting, arc and incandescent.

Around their headquarters were to be seen hundreds of small and large incandescent lights, whose soft, mellow light bid defiance to the night, while a multitude of the United States arc lights, fastened to the overhanging arches of the roof, cast down their powerful rays upon the surrounding exhibits.

At the headquarters of the United States Company, near the main entrance, five dynamos belonging to their system were placed. These were inactive, so as to permit of inspection.

Over at the north end of the building ten of these dynamo machines were kept constantly at work, in order to supply current to the almost innumerable lamps of all descriptions this company kept aglow on the floors and arches of the Exposition buildings. The character of the current generated by these machines is one of the peculiarities and advantages of the system. The current is continuous and free from pulsations which, when the mains are properly insulated, renders it comparatively harmless. In both the arc and incandescent systems, as exhibited, the regulation of the machine is wholly automatic. The lights may be turned off when no longer required, and a corresponding change is immediately apparent in the current generated, and in the amount of power required for driving the dynamo.

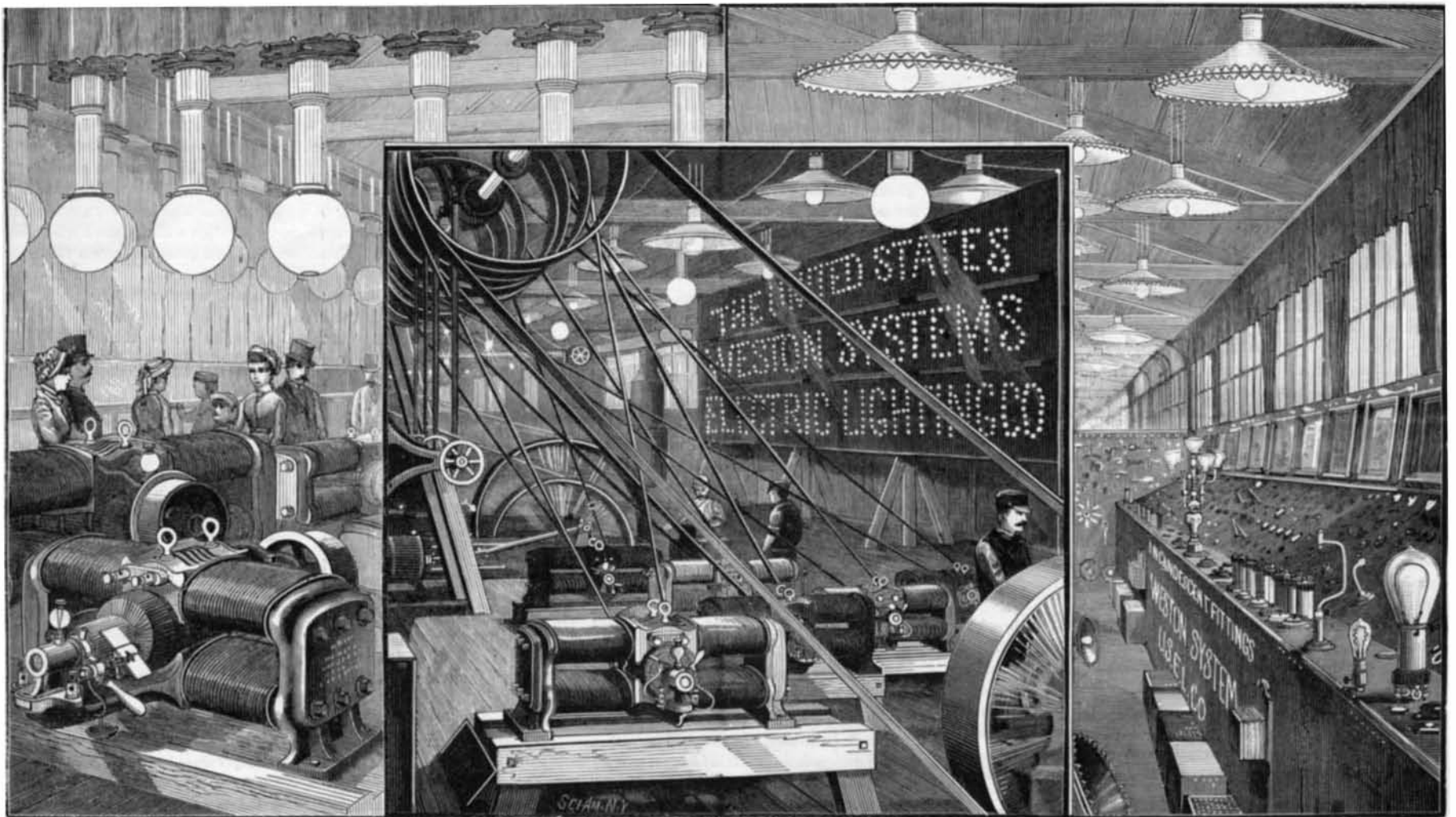
The large incandescent lights shown in the company's exhibit

this switchboard, they can be coupled together. By means of this switchboard any of the outside circuits can be coupled to any of the dynamos, and readily changed from one battery of dynamos to another without, to an important degree, interfering with the others. Again, at the will of the operator, the dynamos can be put on any particular engine, and should certain shafting meet with an accident, other shafting can be connected by the aid of a series of clutches. By means of this switchboard, whatever combinations of circuits with combinations of machines are required can readily be made. A series of cables connect the circuits with the machines. At the extremities of the cables plugs are affixed, one extremity connecting with the circuits, the other with the machines. The dynamos are carefully guarded against the assault of lightning by being furnished with lightning arresters. The lamps are adjusted to each circuit by means of an extension of the circuits from the switchboard in regular order, and the lamps can be removed or returned without injury to the outside circuit.

The testing of lamps upon the circuit where they are to be employed also proved an interesting feature of the exhibit. As a whole, the United States system is very complete, and their friends may well feel proud of the interesting display which they have made, and the prominent position they have held in the exhibition.

Salmon Canning in British Columbia.

The Delta Cannery is the largest in British Columbia.



THE PHILADELPHIA ELECTRICAL EXHIBITION.—UNITED STATES ELECTRIC LIGHT CO.'S EXHIBIT.

in the floor, and were electrically connected with the dynamo. So with each heel in contact with a plate he was enabled to make and break the circuit leading to his lamp, the movement required being so slight as not to attract attention, and his hands being free to handle the cards. Many nervous persons were startled by the sudden flashing of the light, and so great were the crowds that continually surrounded this individual that he was frequently obliged to change his quarters in order to keep the passages open. As a further improvement it was the intention to place copper strips under a carpet and provide the heels with sharp points, so that each step would be illuminated. This simple exhibition led many folks from the rural districts to inquire as to the cost of such an appliance, as it was just the thing they wanted "to carry around the house."

THE UNITED STATES ELECTRIC LIGHT CO.'S EXHIBIT AT THE PHILADELPHIA ELECTRICAL EXHIBITION.

Those who have visited the Exposition and not seen the exhibit of the United States Company missed at the same time one of the most important as well as most interesting apparatus to be found in either of the halls or any of the corridors or galleries therein. It was, however, not difficult to find, for, as a matter of fact, parts of it pervaded almost every nook and cranny of the great hall. No expense was spared by the projectors to make an effective showing, and not content with exhibiting the more salient points of their system, they caused to be established a complete plant, wherein even the details of filament manufacture and the mercury process of exhausting the air from their lamps were practically demonstrated.

There are some companies that sell plant and not light, others that sell light and not plant, while still others there

it attracted much attention by reason of their novelty. They were from sixty to one hundred candle power, and, unlike arc lights, cast no shadows. Being vacuum lamps, like the smaller incandescent lamps, they require no attention. There is no pulling up and down every day and renewing of carbons, as in the arc light systems; it being only necessary to switch on the current to light them, and switch it off to extinguish them.

The Weston arc light system is used by the United States Company, and the Maxim incandescent system as improved by Weston. Each of the three forms of electric lighting requires a greater or lesser modification of the dynamo, though all are constructed on the same general principle.

The arc lights of the exhibit were generated by five dynamos each having a capacity of from five to fifty lights. The current from these machines showed an electro-motive force of 1,500 volts, while that from the dynamos furnishing the large incandescent lights showed an E.M.F. of 160 volts.

One of the most interesting features of the exhibit was the making of the incandescent lamps, or rather the vacuum making and the sealing.

The delicate carbon loops are attached on either side to platinum and placed within a vacuum, where a mercury pump is made to withdraw the air, and in its place is forced the vapor of gasoline, which leaves a slight deposit of carbon upon those parts of the loop which offer the greatest resistance, and thus the resistance is made equal all around. After this it is placed in its lamp, which is sealed after the air has been exhausted.

All this was publicly demonstrated at the United States Company's exhibit.

The Weston switchboard, as exhibited, is a model of simplicity. The circuits from the dynamos being brought to

Commencing operations only five years ago, its business has assumed such proportions that it now employs a force of over 400 men—280 Chinese and 160 Indians—and a fishing outfit consisting in part of 38 boats and nets, 2 seines, 1 steam tug, and 4 scows. The cannery covers a space of 160 by 120 feet, is two stories high, and in some respects is the best furnished on the Pacific Coast. It is provided with a boiler 16 feet long and 4 feet in diameter, 12 tanks, 2 retorts of 3,360 cans capacity each, filling and soldering machines, 4 lacquer baths, and every convenience for the rapid and thorough performance of the various operations necessary to secure the highest degree of perfection in the preparation of this most excellent article of food. Chinamen, under the supervision of experienced white foremen, are employed for the canning process and Indians for catching the fish, receiving from \$1.25 to \$2 per day, the net tenders the latter amount.

The daily catch per boat ranges from fifty to three hundred salmon, the fleet sometimes bringing in twelve or fifteen thousand. This season (1882) the run has been so extraordinary that the Delta Cannery put up 1,280 cases in a single day, and 6,600 cases in six days. Messrs. Page and Ladner, the managing partners of the firm, showed me their product for the last month, amounting to the enormous quantity of 25,000 cases, or 1,152,000 cans, covering every available space of the immense lower floor to the height of over five feet, the largest number ever packed by any one establishment during the same period of time. Two hundred and fifty barrels of salmon, or about 13,000, were also salted within the month. The company ship their goods direct to London and Liverpool through the firm of Welch, Rithet & Co., of Victoria.—*Newton H. Chittenden, in Guide to British Columbia.*