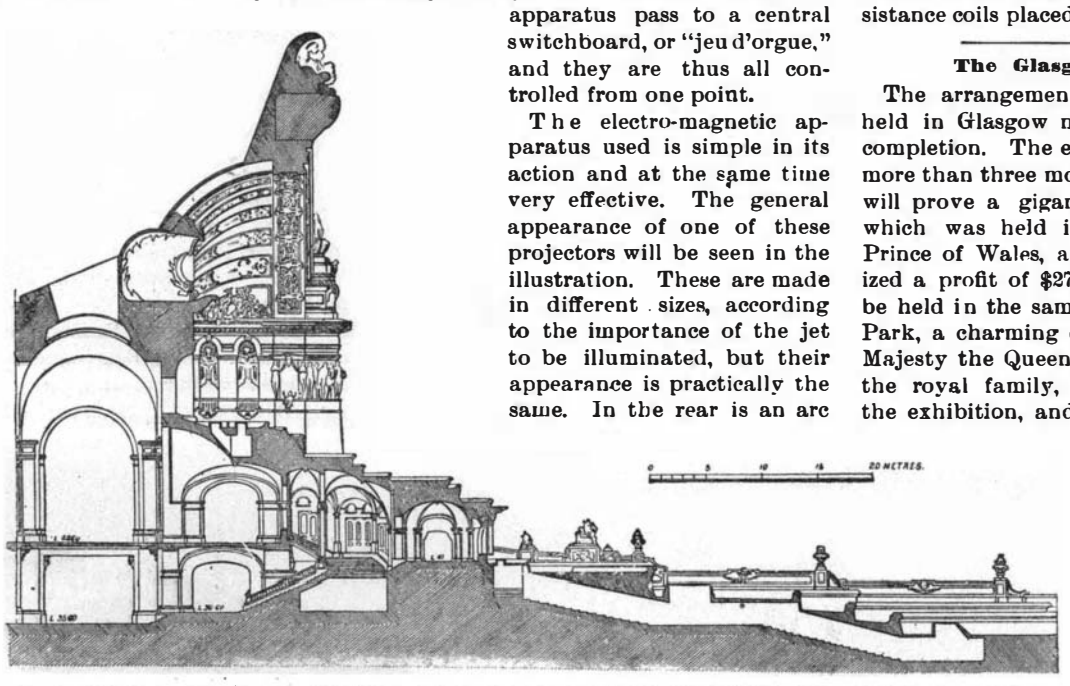
ELECTRICAL PALACE AND FOUNTAIN AT THE PARIS EXPOSITION.

The Electrical Palace and Fountain occupy one end of the Champ de Mars and constitute the central feature of this part of the Exposition grounds. By day, the ensemble presents a highly decorative effect, but it is at night that it appears to best advantage, when the crest of the Electrical Palace is outlined by thousands of incandescent lamps of varying colors, and the various cascades and jets of the fountain are brilliantly illuminated.

One of the great difficulties which confronted the projectors of the Exposition was to mask the great Machinery Hall of the Exposition of 1889. It was decided not to remove it, but to conceal it in such a way as to make it harmonize with the surrounding buildings. This was done by covering the entire front by a Château d'Eau or large fountain. It consists of a lofty hemispherical structure, the concave side facing on the gardens, forming at the same time the chief architectural and central feature of the Palace of Electricity and the apparent source of the cascade. The façade of the Electrical Palace is surmounted by an ornamental crest formed of repoussé metal work arranged in various designs; some of these are formed by the addition of stained glass. The general tone of the metal work is buff and white, which harmonizes well with the façade of the electric fountain, which is of cream white staff. At the top of the crest is a series of white globes containing incandescent lamps of different colors, below is a similar series of globes, and the form of the crest is outlined by incandescent lamps which are distributed over it. The whole may be illuminated in red, yellow, blue or white, by a suitable arrangement of circuits, or different combinations of color may be secured. A number of arc projectors placed in the rear illuminate the stained glass designs with striking effect. At the highest point is a group representing the Genius of Electricity drawn in a car by hippogriffs; in the rear of the group is an immense star formed of a gilded metal frame carrying glass brilliants strung upon wires.

The central niche of the façade is surmounted by an arch in handsome relief designs. The central niche extends back to a considerable depth; it is also very handsomely ornamented by appropriate relief designs and groups. In the center is the grotto from which proceeds the main cascade. Below the grotto are a series of basins descending in a succession of different levels and finally reaching the main basin. The water is elevated to the height of the grotto, from which it falls, forming the principal cascade, into the succession of basins below. One of the basins of the descending series has been made somewhat larger than the others, and is provided with a series of parabolic jets which are directed toward the front.



THE PARIS EXPOSITION—SECTION OF THE ELECTRICITY BUILDING AND CHATEAU D'EAU.

In order to produce an effective illumination of the cascades it has been found necessary to divide these into drops, as a sheet of water illuminated by lamps placed in the rear would not appear luminous in itself, while the drops reflect the light, and the cascade thus appears illuminated. The borders of the basins are provided with an arrangement to separate the water into drops, consisting of an iron support or comb which holds a succession of glass strips. The water which falls from the upper basin, forming the main cascade, as well as the cascades of the succession of basins below, are all divided in this way into separate sprays. These are illuminated by a series of incandescent lamps which are placed underneath the borders of the basins and back of the cascades. A series of corrugated reflectors placed back of the lamps direct the light upon the sprays. For the illumination four colors are used—red, yellow, blue, and white; the lamps of different colors are arranged alternately, and for each color there is a separate circuit which passes to a mechanism in the basement, which allows each color to be thrown on at will. An arrangement is also provided by which it is possible to pass gradually from one color to another, these being mingled and giving a series of intermediate tints. In the grotto is a large spray which is formed by three circular pipes, one above the other, pierced with holes. Upon the pipes are mounted incandescent lamps with reflectors to direct the light into the spray, which is thus brilliantly illuminated. These pipes are arranged upon a hinge which allows the two upper pipes to be lowered when the spray is not in action, rendering them invisible from the front.

In the main basin are a number of vertical jets, arranged in groups on each side. The main basin has a well-laid cement floor, along which proceed the two main supply pipes which branch from the center toward the front; from the main pipes are branches formed of lead pipe which supply the jets. The four fountains in the rear on each side have a central jet with three others grouped around it; the large fountains in front have each eleven jets.

The illumination of the parabolic and vertical jets of the fountain is carried out by means of arc lamps and reflecting mirrors, placed in the basement underneath the fountain, the light being projected up either vertically or at an angle according to the character of the jet. The parabolic jets are illuminated at their commencement and also where they fall into the basin by two separate windows, each with its own apparatus, these being arranged to always give the corresponding colors.

Underneath the fountain is a very extensive basement, where all the arrangements are provided for the water supply and the lighting. The basement has been constructed with cement walls and floors; the ceiling is braced at intervals by pillars. In the rear, below the central niche, are the two main pumps for the water supply. These are driven by electric motors, and the volume of water furnished to the fountains is over 350 gallons per second. The water passes from the pumps to two large pipes, about two feet in diameter, which proceed toward the front, where the branch pipes lead to the different parts of the fountain. The main point of interest in the basement is the installation of reflecting apparatus with arc projectors for illuminating the jets and giving the different colors. The light is sent up through heavy glass panes, laid in the cement floor of the basins; the mechanism of the different color screens has been arranged so as to be entirely automatic, and is operated by an electro-magnetic system. The wires of all the apparatus pass to a central switchboard, or "jeu d'orgue," and they are thus all controlled from one point.

The electro-magnetic apparatus used is simple in its action and at the same time very effective. The general appearance of one of these projectors will be seen in the illustration. These are made in different sizes, according to the importance of the jet to be illuminated, but their appearance is practically the same. In the rear is an arc lamp with its parabolic reflector, and in front of this is a series of color screens. These are formed of a brass framework holding the panes of glass, leaded together, this arrangement being used to avoid cracking by the heat of the arc. Each frame is made in two halves, which are hinged together so that when the upper half closes it draws the lower half with it. There are thus three sets of shutters, one for each color, red, yellow, and blue. The closing of the shutters is carried out automatically by the magnetic arrangement seen to the right and left. One of the frames carries a projecting arm, to which is fixed a core of soft iron; this passes into one of the solenoids at the side. When the current is sent into one of the solenoids, the core is drawn in and the two halves of the shutter are brought together. When the current is cut off, the shutters fall apart by their own weight. Each of the solenoids thus operates a different color, their circuits being quite independent. When all the shutters are closed, the light is practically cut off, and when all are open the fountains are illuminated in white. For the illumination of the parabolic jets, one apparatus is placed under the orifice of the pipe and somewhat in the rear, as shown in the diagram, and thus illuminates the beginning of the jet. In front are placed a number of windows at the point where the spray falls, and each window has a separate apparatus. The vertical jets are lighted by mirrors placed in front of the projectors at an angle of 45°, sending the light up vertically through the windows.

The circuits of all the solenoids are brought to the central "jeu d'orgue," a view of which will be seen in the illustration; the sectional view shows its general method of operation. Above are a number of horizontal levers which pass to the rear, where they carry two pins which fall into mercury cups, thus making contact. They are drawn down by a rod attached to each, which passes below and is fixed to the rear of a lever. The front of this lever projects forward and resembles a piano key in appearance; there is thus a succession of these keys, each of which closes a different circuit. Below the keys revolves a cylinder of metal around which are fixed a number of screws, whose heads form projecting points. These strike the keys and cause the levers to be operated in succession according to a given arrangement. In this manner the solenoids of all the apparatus are operated at once, and all the jets are illuminated at once with a predetermined arrangement of color. The cylinders are turned by a hand-wheel and gearing in the center, and the different changes of color may be made in more or less rapid succession. Below the keyboard is a set of levers by which all the solenoids of each color may be operated independently of the keyboard; thus one lever throws on all the reds, etc. A third lever works all the solenoids at once, thus giving either extinction, with all the shutters down, or the white light of the arc, when all are raised. The fourth lever is used to lift all the keys to allow the cylinders to be changed. A number of these cylinders have been provided, each giving a different play of color.

The circuits of the incandescent lamps for the illumination of the cascades and the other parts of the fountain, as well as those upon the crest of the Palais d'Electricité in the rear, pass to a similar "jeu d'orgue," provided with cylinders giving a certain arrangement of color. The incandescent circuit has, besides, an apparatus which permits a gradual lowering of brilliancy and a gradual passage from one color to another. This consists of a flat metal table upon which are arranged a number of contact-bars, across which are moved three sets of contact-brushes by means of an appropriate mechanism operated by a motor. To the contact-bars are connected the terminals of a series of resistance coils placed below.

The Glasgow Exhibition of 1901.

The arrangements for the great exhibition to be held in Glasgow next year are rapidly approaching completion. The entries for the exhibits were closed more than three months ago. It is anticipated that it will prove a gigantic success. The last exhibition, which was held in 1888, and was opened by the Prince of Wales, attracted 6,000,000 visitors and realized a profit of $270,000. The present exhibition will be held in the same place as the last, Kelvin Grove Park, a charming expanse of sixty-seven acres. Her Majesty the Queen, and the other chief personages of the royal family, have extended their patronage to the exhibition, and it has also received the support of the élite of English society, and of the principal scientists of the country. The scope of the exhibition is to present a full illustration of the produce and manufactures of the British Empire, its dependencies, dominions and colonies, together with an adequate representation of other countries. Naturally, since Glasgow is the focus of the shipbuilding, engineering, and manufacturing industries of Scotland, the collection and exhibition of machinery will be exceptionally prominent. For the accommodation of this section a tremendous building has been erected.

Probably the most striking buildings, however, are the new art gallery and museum, in which are to be placed the art and science collections of the Corporation of Glasgow. This building was really intended as a memorial of the 1888 exhibition, and, indeed, the profit derived from that show constituted the nucleus of the vast sum that has since been collected to defray the expense of its erection. The buildings have cost $1,000,000 to construct, of which sum $650,000 has already been subscribed, and it is anticipated that the profit to be derived from this exhibition will be sufficient to reduce the balance of the cost. The executive council have arranged to form a loan collection of pictures and sculpture to illustrate the progress of art during the nineteenth century. The Queen of England has promised to send appropriate specimens from the royal collections, while the Prince of Wales has also consented to loan several artistic treasures.

The river Kelvin, which meanders through the grounds in which the exhibition will be held, will be utilized for the purpose of exhibiting naval shipbuilding and life-saving apparatus, water carnivals, and so forth. Lectures of scientific and topical interest will be delivered by various authorities, while recreations of every description and musical entertainments will also be provided. The exhibition will be opened on May 1, 1901, and will remain open for six months. It is not yet arranged as to whom will perform the opening ceremony, but it is believed that it will be accomplished as before, by a member of the royal family.

A HOUSE was recently moved in Wellsville, Ohio, by electric power taken from a trolley line. The house was being moved along the street where there was an electric car line. Two cars were hitched to the house by a rope, and it was quickly pulled to its new destination.

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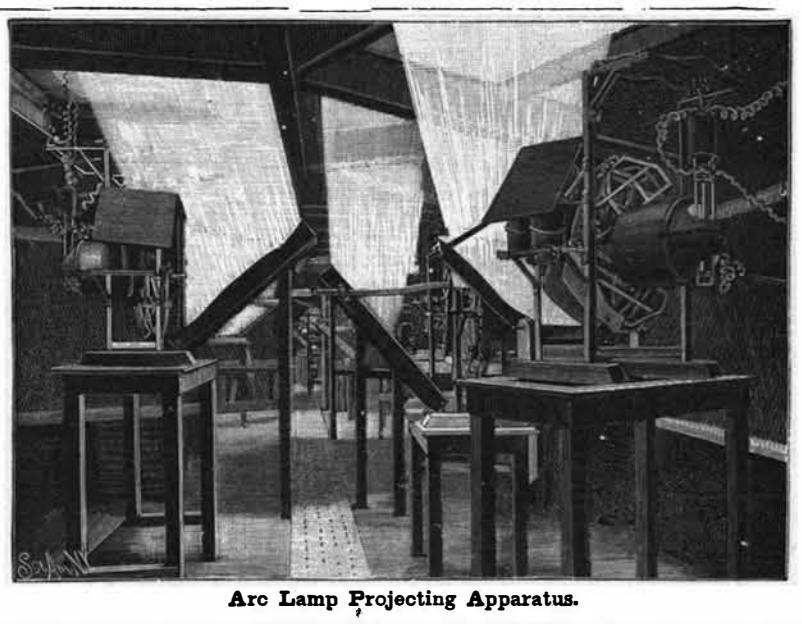
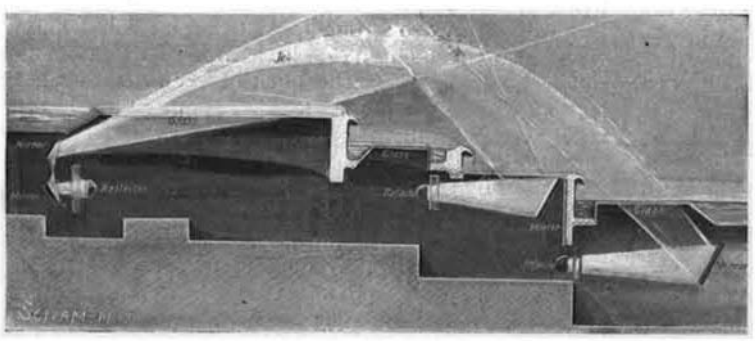
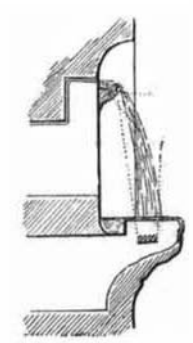
Palace of Machinery, Showing Basin and Luminous Fountains.



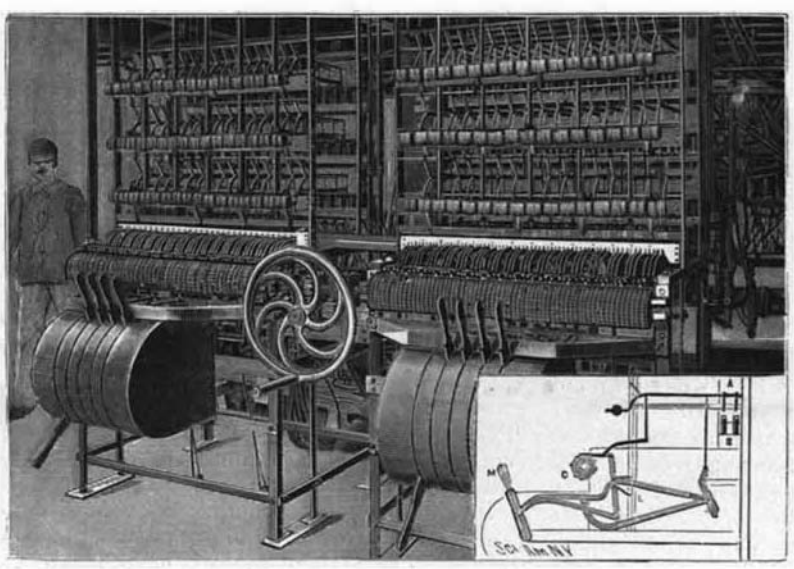
Arc Lamp Projecting Apparatus.



Lighting of Parabolic Jets.



Cascade Lighting.



The "Jeu d'Orgue," or Arc Light Controlling Drums.

Façade of the Palace of Electricity, Showing the Château d'Eau and Luminous Fountains.

THE PARIS EXPOSITION—THE ELECTRICAL FOUNTAINS OF THE PALACE OF ELECTRICITY.—[See page 231.]