IN THE FIELD OF ELECTRICITY

Novel Design in Electroliers.

A LAMP always made a room look homelike, and when it was relegated with other old-fashioned things to the attic, the house seemed empty. With the introduction of the electrolier some of the old-time cheerful atmosphere has returned, for the electrolier is really a lamp lighted by electricity instead of oil.

Like its predecessor, it comes in all shapes and sizes, but in more dignified forms. Art and utility combined have produced a lamp which pleases the eye as well as serving its purpose.

A simple library table or desk electrolier has real bronze standards and a Phanomen art glass globe.

In the daytime the latter is a beautiful peacock blue, but when the light is turned on the globe is a faint greenish yellow. The effect is pleasing, especially to one who reads or writes much by lamp light.

Austrian art glass is also much used for globes on electroliers. An artistic one represents a pond lily leaf with a lily all in bronze. A light is hidden in the heart of the blossom, and over it is an Austrian glass in the shape of an inverted lily pod.

An elaborate bronze piano electrolier shows a Bacchante upholding a grapevine. The leaves and tendrils are in bronze, while the green grapes are of Austrian glass. The fruit hangs in clusters, and skilfully hidden in each bunch is an electric light. When turned on, the light glows softly through the green grapes, and makes them stand out in bas relief as naturally as in life.

This same idea is carried out in electric light shades, which are simpler and less expensive. Instead of glass grapes, wax ones, which are as realistic, are used. These come in red and green. They are suspended around a liberty silk shade to match, and clipped to the electric light bulb.

One of the prettiest conceits in the electrolier line was seen recently at a luncheon. From the center of a bowl of tulips on the table glowed as many electric lights through the yellow transparency. The tulips were artificial, but they looked real, both in texture and coloring. A baby bulb about the size of an egg was used inside each tulip, and the effect was charming with the yellow and white decorations.

Drop electroliers for over the couch, or the cosy corner are a great convenience, as are also those which can be suspended from a hook on the wall wherever most needed. The latter can be carried about from one room to another and attached where it seems desirable.

People who live in hotels and apartment houses, and suffer from lights so high that they can scarcely see to read by them, will appreciate the electrolier fixtures, which need not be left behind, but can be packed away in the trunk when migrating to new quarters.

Apparatus for 11,000 Volts.

The handling of current at 11,000 volts at the new power station of the street railway company, Providence, is effected by an interesting group of electrical apparatus grouped around a two-gallery switchboard thirty-one feet above the engine room floor. The electrical conductors from the generators are carried overhead on the under side of the ceiling in a well lighted gangway in the basement. The high tension busbars are located here; each is encased in separate brick housings supported on a slate platform, and connections to and from them are made in oilbreak brick housed switches on the engineroom floor. These are operated by relay switches on the switchboard, the switches actuating the main switches through worm and wheel gearing driven by small direct-current motors, one on the brick enclosure of each switch. There are five alternating current feeders and the conductors pass out of the building opposite the second story of the switchboard, where there are cutout copper bar switches mounted on marble panels, with branches to the lightning arresters grouped underneath the first gallery. A feature of the switchboard construction is in the 3½-inch pipe conduits built in pilasters against the outside building wall for the passage of the conductors. At the bottom the pipes are set into special cast iron sockets, which give smooth, rounded surfaces into the marble cap of the pilaster. The high tension feeders are carried horizontally through the building wall in the center of an 8x8-inch opening in it and outside under the cover of heavy slate hoods are the tension insulators and the beginning of the transmission line. The alternating current feeder panels have recorded watt meters and three ammeters, the latter showing the state of balances of the load on each phase. The generator panels have only one alternating current ammeter, but have both an indicating and recording watt meter, together with an ammeter for field current. For the motors of the electric-driven exciters there are two banks of three delta-connected transformers on the slate platform in the basement. These step down to 460 volts and the motor panel of the switchboard contains the relay switches for cutting in and out the high tension current of the transformers, the switches being the motor operated oilbreak type. The direct current board at present provides for thirty feeders in fifteen panels. Each panel carries two ammeters for the two feeders, but only one circuit breaker. The generator panels have one switch on the switchboards in the negative side, and one circuit breaker in the negative side, while on a pedestal at each machine there is a positive switch and the equalizing switch.. The total direct current output is measured on a large recording watt meter on a panel between generator and feeder panels, and this panel also carries a totalizing indicator ammeter. The positive feeders are 50,000 circular mills and the negative returns 1,000,000 circular mills. The switchboards are equipped with standard instruments, they are of Vermont marble two inches thick, mounted on three-inch longitudinal timber stringers. The switchboard structure is of steel framing with slate floors.—Boston Transcript.

Automatic Telephony.

The fact that the companies engaged in the development of the telephone business are devoting a grêat deal of effort and money to the perfection of the automatic central switchboard indicates a belief on the part of those who are best able to form an intelligent opinion that a revolution is imminent which will dispense with human agency in connecting and disconnecting the instruments. This activity, we are told, is not confined to the independent companies which are more or less successfully encroaching on the field of the telephone business. The Bell company is understood to be carrying on extensive experimentation to establish the value of the many patents it owns for automatic telephony in one form or another, and in a small eastern town it now maintains an automatic exchange which is said to have given very good results. But the greatest enthusiasm in this direction, naturally enough, is displayed by those who are anxious to break into this field and make headway against the established "monopoly." The Western Electrician says:

"There are working automatic exchanges in Chicago, Grand Rapids, Mich.; Dayton, O.; Fall River, and other cities. The service given, in Chicago at least, seems to be satisfactory to those who use the telephones. But the mere fact that one is able to make connection and talk clearly through a new automatic exchange does not indicate that the problem has been solved. There are many other things to be considered, involving financial questions, the every-day working efficiency of the apparatus, and its adaptability to the various demands that are made on the modern telephone exchange. Today over 99 per cent of telephone conversations are made through manually operated boards; the automatic have still to stand the test of time. But the fact remains that a growing number of telephone men are asking whether a change is impending."

A change of this kind is rarely expected until it is imminent, and in view of the number of ingenious inventors and capable adapters at work upon the problem it may be concluded that the stake involved is large. If an automatic switchboard can be built which will meet the needs of practical service, telephony will undoubtedly receive a great impulse. If the system can be so arranged that for what goes wrong the user of the transmitter has only himself to blame, there will be less complaining, and the atmosphere of telephone booths will be less sulphurous.—New York Times.

African Water Power.

A company has been formed to exploit Victoria falls, in the Zambesi, and will build a hydro-electric generating station, with the expectation of supplying power to the Waukie coal fields, Buluwayo, the Gwelo, Sebakive and Hartley gold fields, all of which are within 300 miles. The falls are over 400 feet high, and, while the total amount of energy running to waste at Niagara is 7,000,000 horse power, the corresponding figure for the Victoria falls in the wet season is 35,000,000. The railway has now been completed to within seventy miles of the falls and will reach them before the end of March.

An idea of how the river comes to form this gigantic waterfall is given by a writer in the Pall Mall Gazette: "What happens is this—a broad river with a comparatively slow current suddenly hurls itself into a narrow crack or fissure in the earth which reaches across its bed from bank to bank. This fissure is of an average width of 300 feet and a depth of 400 feet, and has one narrow outlet 600 feet wide by which the water collected in it can escape, and this nearer to one end than the other. As can easily be imagined, the volume of water collected at the bottom of the fissure is enormous, and having only a small exit comes rushing and surging out with great force.

"Immediately after leaving the fissure the gorge into which the water flows makes a sharp bend. This still more increases the agitation of the water, and the name—'Boiling Pot'—given to this bend is most expressive. At the Boiling Pot the river begins a tortuous course of some thirty miles between cliffs 400 feet high. This gorge, or canyon, is about 600 feet wide throughout its entire length, and zigzags backward and forward until the river widens out again. At present only two places in this gorge are known where it is possible to descend the otherwise perpendicular cliffs to the level of the water.

"It is impossible to describe the feeling of awe experienced as we gaze from a height of 400 feet down at the troubled waters below. The waves jostle one another in their haste to escape, and throw up shoots of spray, which, caught by the strong draught coming out of the chasm, are carried high into the air. The roar here is terrific. We shout exclamations at each other, but few are heard. We step back for a moment to look round on the panorama about us. On the left the long line of falls stretches away into mist to the east and west. Opposite, the dark perpendicular cliffs, shining with moisture, are only 600 feet away. To the right is the narrow gorge, down which the water is running like a mill race, and below the Boiling Pot, over which is suspended a brilliant rainbow. Words fail to give an idea of the scene.

"Following round the top of the cliff, away from the falls and along the gorge, we come to a surveyor's flag and a narrow clearing through the scrub. This is where the bridge for the railway from the south is to be thrown across the gorge. We learn that the length of the bridge is 650 feet. There will be three spans, two short ones of unequal length and the big central span of 500 feet. It is roughly calculated that rail level to water level is 420 feet. This may be called low water level, as the river is about at its lowest in August, and high water level will be about forty feet less, or 380 feet. This measurement will make the bridge the highest in the world.

"A mile or so below the bridge we come to where the gorge makes its first bend. For a mile it has been running straight in one direction, and then for no apparent reason doubles back at an acute angle. This is repeated time after time until some thirty miles below, the Zambesi broadens out again into a wide river."

Paper Used for Insulation.

A new process of covering wire is employed in Providence. It is used in the insulation of flat or ribbon wire, and paper is the material used. The paper is applied to the wire longitudinally; its lateral edges are hemmed around the lateral edges of the wire and brought together along one face of the wire, thus forming a longitudinal straight seam. The paper strip is first formed into an envelope, which is opened longitudinally. The wire is inserted and the envelope is then closed around the wire. The paper is twice the width of the flat copper wire and nearly covers the metal when it is folded around it. Both strips lead from a reel to the covering apparatus. The paper strip first passes between the peripheries of a pair of rolls. The upper roll has a smooth surface of a width just sufficient to take in the paper strip and is flanked by flanges. The lower roll has two V-shaped ridges, separated from each other a distance about equal to the width of the wire to be covered. These rolls while turning are pressed together so that the ridges score the under side of the strip as it passes between them. The scoring defines the lines on which the strip is afterward bent, and insures accurate folding as well as preventing buckling during the folding process. Wire insulated in this manner is not intended to be handled very much as "wire," but is adapted for winding at once into electrical coils, in which one convolution resting upon another holds the paper securely upon the wire. The main difference between the insulating process described and those commonly employed is that the insulation is applied longitudinally to the wire instead of being wound around it. Hence the rapidity with which the work can be done is increased.

Biggest Head of Water.

The Everett (Washington) Railway and Electric company has commenced the construction of a power plant to generate 15,000 horse power at Lake Isabel, on the Great Northern, thirty-two miles east of Everett. The plant will be unique in that the head of the water used will be the greatest in the United States.

The intake for a thirty-two-inch pipe will be thirty feet below the surface of Lake Isabel. The pipe will be 12,000 feet long, with a fall in that distance of 2,500 feet. Owing to the enormous pressure, a special steel pipe has been ordered, decreasing in diameter to twenty inches near the nozzle. The diameter of the nozzle itself will be only five-eighths of an inch. Using a Pelton wheel this five-eighths stream will develop 10,000 horse power.

Later another stream and wheel will be installed, developing 6,700 horse power. The pressure on the steel pipe will be 1,100 pounds to the square inch. The speed of the water leaving the nozzle will be 25,000 feet, or more than four miles, per minute. The plant will cost $600,000, and is to furnish the power for the street railways and factories of Everett.

The only plant in the world to exceed this in its head of water is one in Switzerland, having a head of 3,780 feet. In California there is one with a head of 1,900 feet.