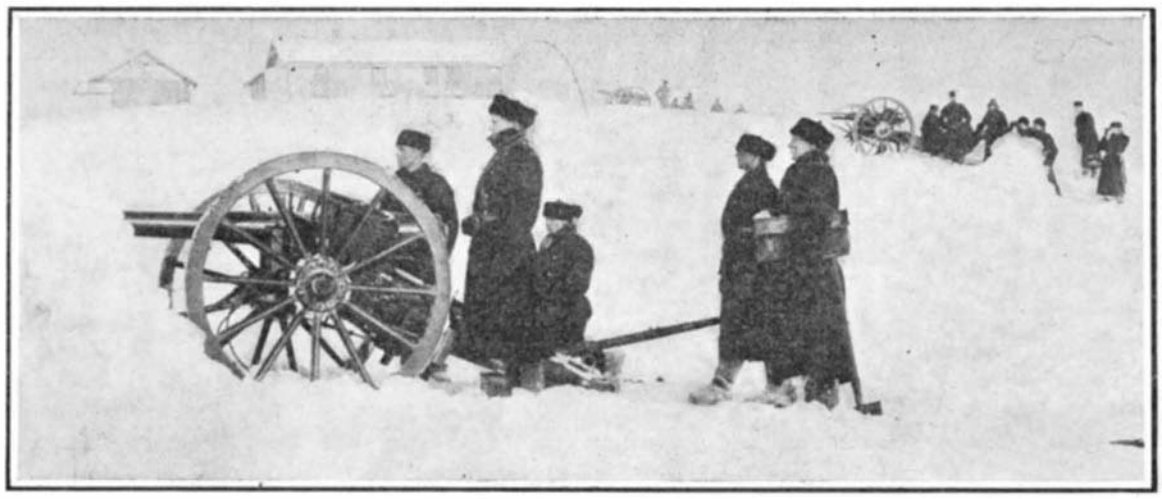
THE SKI IN PEACE AND WAR.

As the days in the summer are long and bright in the land of the Vikings, so they are dark and short in the winter, and the winter is long and dreary, especially to people reared under a more southern latitude. As a beaming light in all these gloomy seasons stands the Norwegian sport, which may be divided into four groups: skiing, skating, coasting, and sleighing.

Skiing is the national sport of Norway, and by its prestige, the one most devotedly pursued. The ski has been used here for centuries, if not as a sporting implement, then as a necessary means of locomotion from one part of the mountainous country to another, where snows lie deep and highways lie buried or are unknown; and while the ski to this very day in several districts serves a practical purpose, it is mainly its connection with the sport that has made it known as the "human wings." As there may be a great many who do not know what a ski is, it may be stated that the ski consists of a narrow plank of wood, rounded and curved upward at the toe, furnished with straps or thongs in the center, or somewhat behind the center, for fastenings to the foot. The popularity of the ski sport is increasing with every season.

As example of the popularity of the ski sport may be mentioned that the Princes Gustav and Vilhelm have a ski hut in the Jothunheimen (the loftiest mountain regions of Norway) which they visit every year for several weeks. The two princes took part lately in a ski leaping competition in Sweden, and shared glory and defeat with the boy from the farm and factory.

To get a clear conception of what this sport really is, the ski must be tried. "Holmenkol" day is to Norway what the Derby day is to England. The twenty-five to thirty thousand spectators form from the early morning a continuous stream of humanity from Christiania up to the heights of Holmenkollen, a distance of about four miles. Various means of locomotion are utilized on the occasion, such as ski, electric railway, sleighs with ordinary horses and the horses of the apostles. The leaping contest generally starts at one o'clock and lasts about three hours. This year the number of competitors was 244, whereof 26 had previously taken prizes in the Holmenkol races. The slope itself is 186 yards in length, and rises to a height of nearly 160 feet above the plain (lake), while the platform of snow, or "hop," from which the leap is made, is situated about two-thirds of the way down. Notwithstanding its apparent steepness, the angle of the upper portion, that above the "hop" or ledge from which the men bound, is only about 15 degrees, the lower part 24 degrees, but the descent on ski only occupies from seven to nine seconds, of which two to three seconds may be in the air during the leap. Presently the sound of a bugle is heard, and a dark speck is seen descending toward the center of the declivity, where the ledge or platform whence the leap is made is built. Then, like a ball rebounding from the ground, there arises, and stretches into the semblance of a man, a figure which, making a curve in the air, alights on the slant beneath, shoots downward on the level with lightning speed, and finally pulls up by a rapid and graceful turn, facing the hill he has so speedily descended.



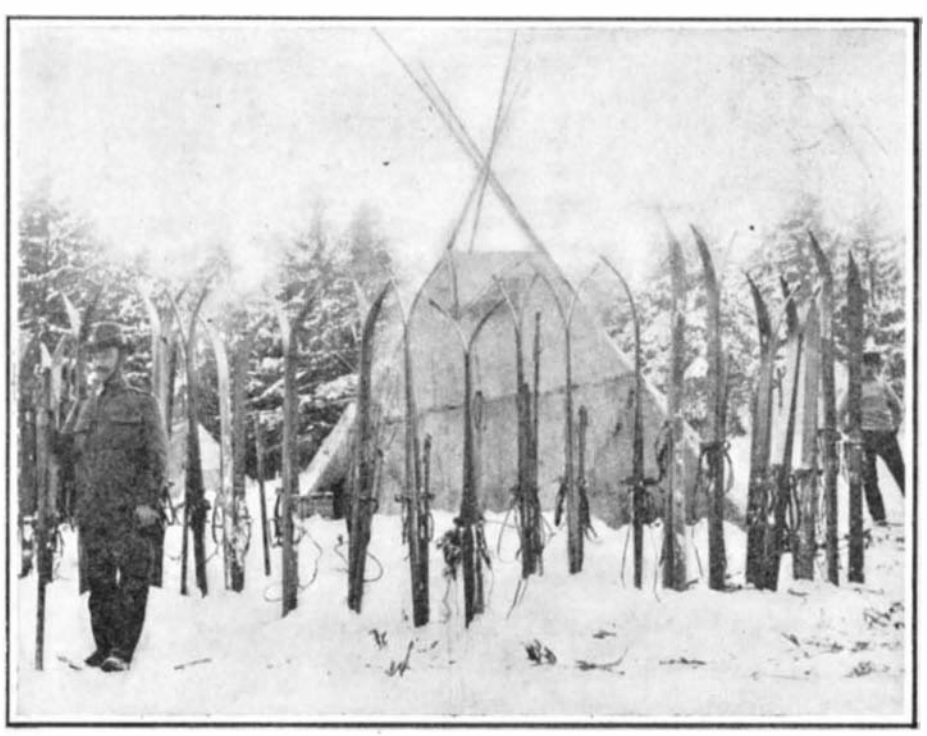
Winter Training of the Artillery.

Words cannot adequately describe the features of such a contest, or the sensations of an observer when he sees the men swooping through the air, and effectually performing a feat which seems impossible of accomplishment. It must be seen in order to be understood, and even then, the stranger who views it for the first time leaves the spot filled with appreciation of the daring exhibited by the Norwegian youths, but still more or less bewildered by the spectacle. Not long ago a ski runner jumped over a carriage which came in his road.

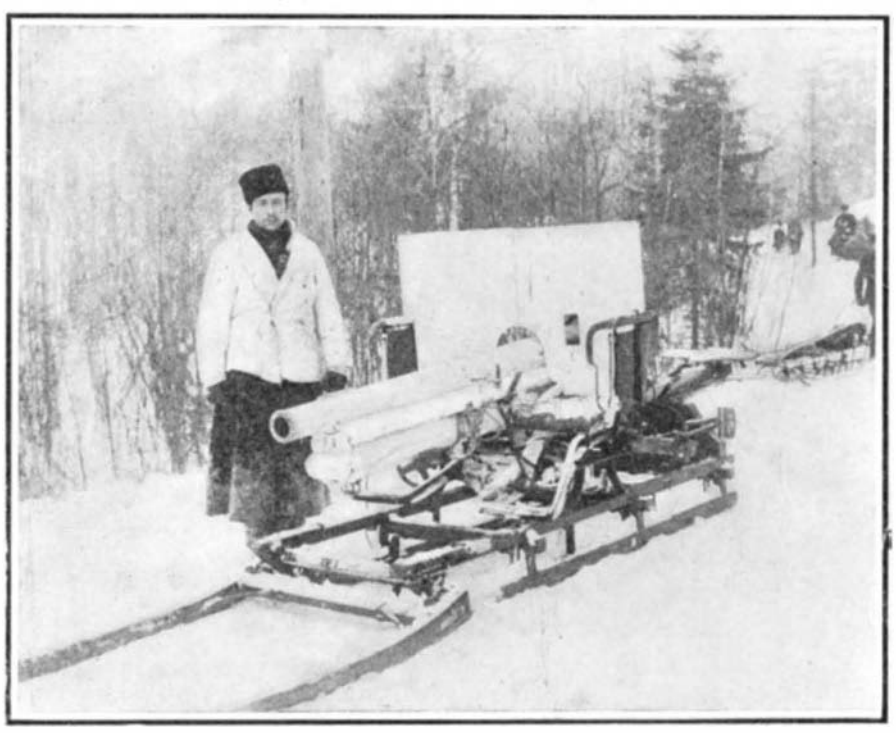
The art of skiing is part of the military training in Norway. The army has a ski corps as well as a bicycle corps.

The Ski Corps Leaving the Barracks.

Winter Camp of the Ski Corps.

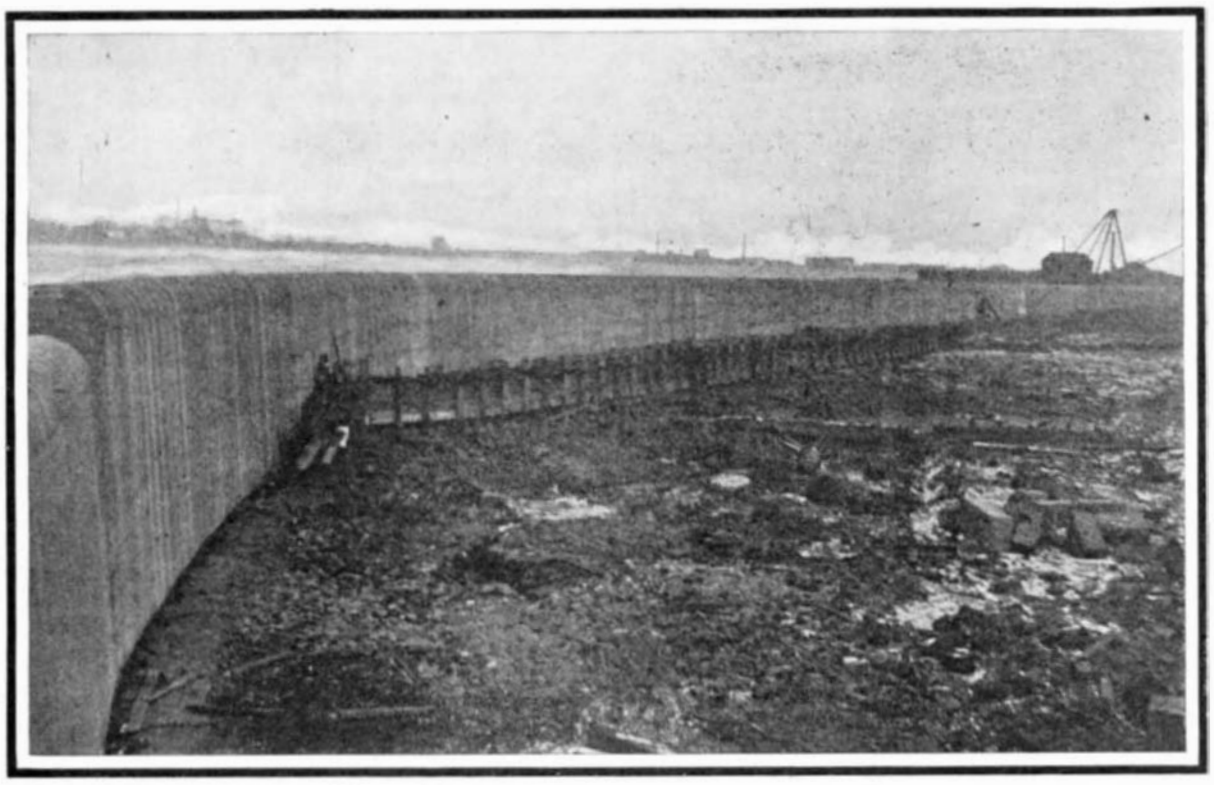


Skis Stacked Outside of Tents.



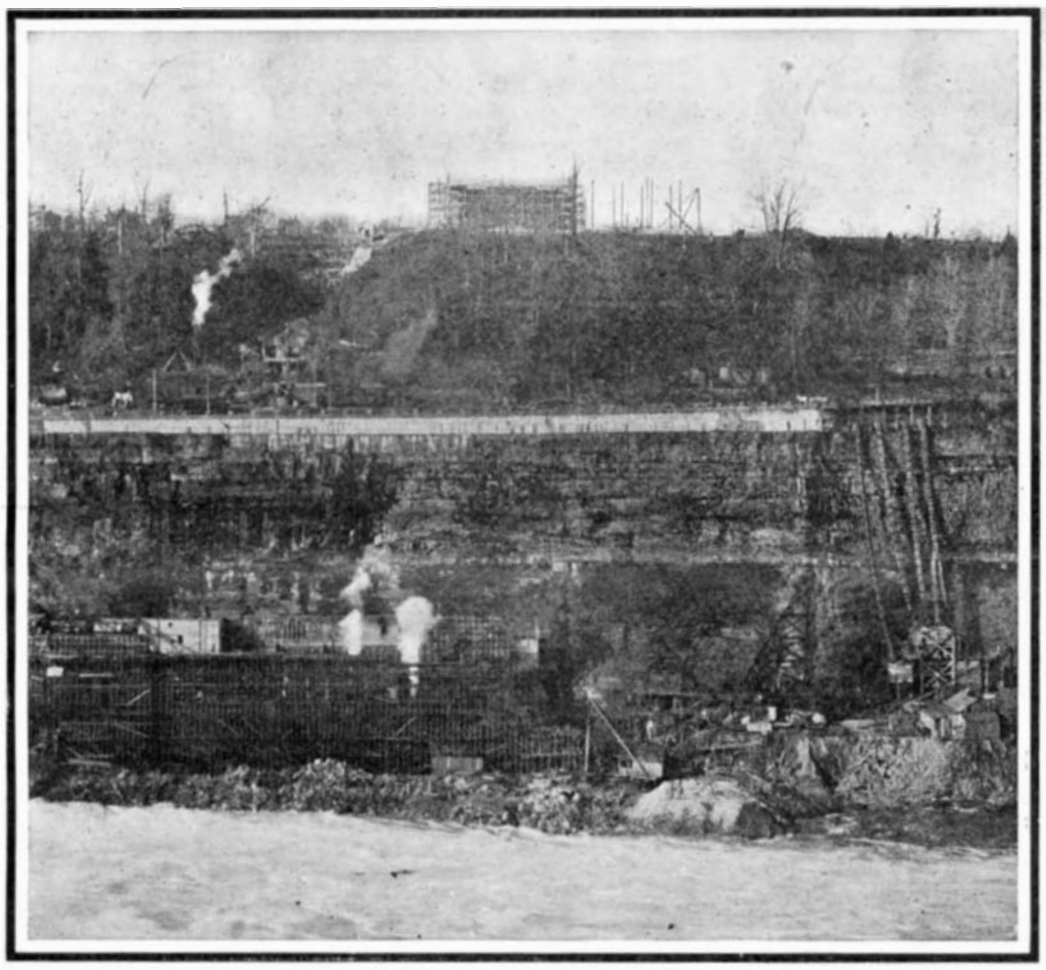
A Machine Gun and Its Sled Carriage.

THE SKI CORPS OF THE NORWEGIAN ARMY.

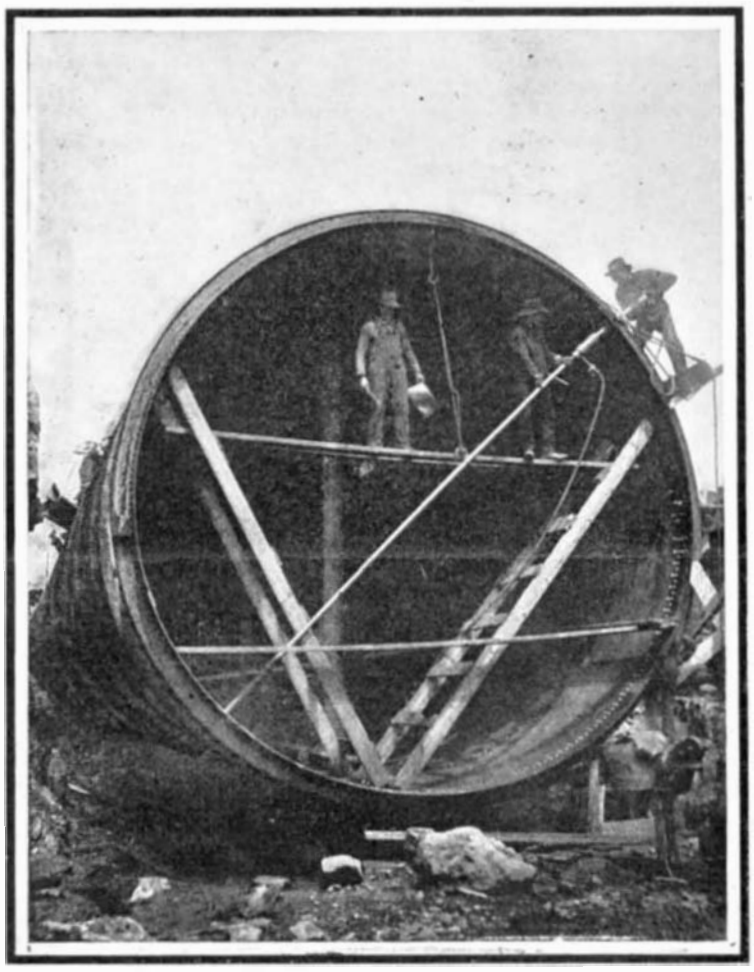


The Great Concrete Wall for Diverting Water of the Upper River.

Site of Power House, Seen From Canadian Side.

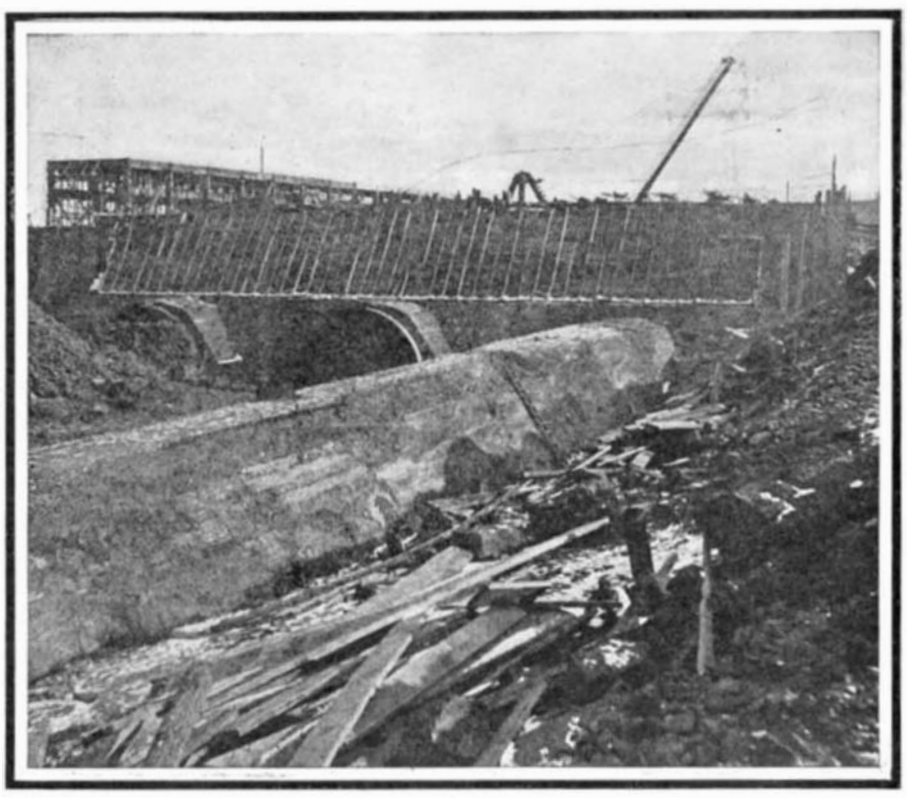


Ontario Power Company's Power House at Water's Edge Below the Falls.



Riveting Re-enforcing Rings on a Flume Section.

Laving One of the 18-foot Steel Flumes. These Will Everywhere be Buried From Sight.



Intake of the 18-foot Flumes at Gate House, Showing Method of Concrete Protection.

CONSTRUCTION OF THE ONTARIO POWER COMPANY'S 180,000-HORSE-POWER PLANT AT NIAGARA.—[See next page.]

It is, however, only officers and petty officers who receive training on ski, for the reason that the Norwegian soldiers are drilled only in summer. This fact, however, would be no serious drawback in case of actual duty in the field in winter, because the Norwegian army includes several companies, where every man that ever wore the king's uniform has from childhood known how to handle a pair of ski to the best advantage. For the last two or three weeks all the cadets and all the pupils of the petty officers' schools have been going through extensive drills out in the country. Some of them have slept twenty-four nights in succession in tents on the snow-covered field.

It may be that military ski training would not be of much practical value to some other countries, but it is certain that in a country like Norway it would be absolutely essential for the movement of troops in many parts of the country in winter time.

ONTARIO POWER COMPANY'S POWER PLANT AT NIAGARA FALLS.—II.

There are three power projects under way in Queen Victoria Park on the Canadian side of the river at Niagara Falls, the combined output capacity of which is to be 415,000 electrical horse-power. Of this stupendous amount of electrical energy, the Ontario Power Company proposes to develop 180,000 horse-power, which is the largest amount yet contemplated for any single installation at Niagara Falls. It is within 25,000 horse-power of the total output of the two great power houses of the Niagara Falls Power Company on the New York side at Niagara.

In the development of the Ontario Power Company there are features quite new in the Niagara region, and none of the work done in developing power there has been more interesting than that of this company. The Ontario Power Company was second to select its site and method of development on the Canadian side, and its plan at the start called for the diversion of the waters about Dufferin Islands in order that the forebays might be constructed at the point selected. To accomplish this, huge wing dams were constructed, and when completed a vast area of the river bed was unwatered.

This company's plan called for the construction of an outer and an inner forebay above the Dufferin Islands, the point being about a mile above old Table Rock. From the inner forebay it is planned to run three steel flumes to Table Rock, where the water of the flumes will empty into an open relief or spillway, from which it will be carried through penstocks to the turbines located in the power station at the water's edge in the gorge, very close to the foot of the Horseshoe Fall.

To develop the 180,000 horse-power contemplated, the Ontario Power Company will divert about 12,000 cubic feet of water every second from the river above the Horseshoe or Canadian Fall. This diversion will be made at a point where the upper rapids begin. In passing from the main stream to the outer forebay, the diverted water will meet an ice fender or curtain, which is expected to prevent much of the ice that flows down the upper Niagara from Lake Erie in winter time entering the forebay. The ice curtain will drop to within a few feet of the river bed, and it is expected that the powerful currents of the locality will sweep the ice from the face of the curtain. The depth of water at the intake will be about 13 feet. The area of the outer forebay is about eight acres, while that of the inner forebay is about two acres, making ten acres in both forebays, all of which covers the normal river bed, a considerable amount of which was blasted away in order that a sufficient depth of water might be obtained. In the construction of the forebays, piers and various foundations, a vast amount of concrete work was done.

At times of high water the river wall of the outer forebay will act as a spillway. At the lower end of the outer forebay the walls are connected by a screen house 320 feet long, while at the lower end of the inner forebay the gatehouse is located, and is 120 feet in length. The water will be about 20 feet deep at the screenhouse and 30 feet deep at the gatehouse. Should any ice or debris reach the gatehouse section of the inner forebay, it will be discharged through an ice run five feet wide.

The three steel flumes will tap the water supply at the gatehouse, the flow being regulated by steel gates. One of the flumes has already been laid. It is made of ½-inch steel plates, and has an inside diameter of 18 feet. Every 4 feet the plates are strengthened by 8-inch steel deck beams riveted to the upper section. In order that the presence of the big steel pipe might not mar the scenic features of the park, the commissioners of Victoria Park directed that it be laid in a trench excavated for its entire length of over 6,000 feet. Previous to being covered by earth a conductor was placed to carry off any electric currents that might cause electrolysis, and the upper surface of the flume was sheeted with concrete in order that any unequal earth pressure might be reduced.

Each 18-foot penstock is expected to supply about 4,000 cubic feet of water per second, and this water will be caught up in eight penstocks and carried to the station, making 24 penstocks in all that will pass from the top of the bank through tunnels excavated through the high bank, in order that they may not be in view of sightseers on either side of the river, to the power house. Six of the penstocks connecting with each flume will be nine feet in diameter, while two others will each have a diameter of 30 inches. The large penstocks will supply the turbines of the generator sets, and the small penstocks will supply the wheels of the exciters. At the power house the nine-foot penstocks branch out so as to supply water to the twin turbines that will be used. These turbines will make about 187 revolutions per minute, and will be direct connected to generators of 10,000-horse-power capacity. Tail races under the power house carry the discharge water from the turbines to the lower river.

The generators will deliver three-phase current of 25 cycles and 12,000 volts. They will be controlled by apparatus installed in a transforming and distributing station located on the bluff back of Victoria Park 255 feet above the power station and over 500 feet back from it. It is provided in the agreement made with the park commissioners that all the power must be used outside of the park limits, but if there is demand for it, one-half of the product of the station must be delivered to Canadian consumers. The Ontario Power Company has made a contract with the Niagara, Lockport and Ontario Power Company whereby it is to deliver 30,000 electrical horse-power at the international boundary line at or near the Niagara whirlpool by July 1, 1905, and an additional 30,000 electrical horse-power at the same point by January 1, 1907. This contract extends to April 1, 1950, and may be extended sixty years longer, or to 2010. On its part, the Niagara, Lockport and Ontario Power Company is to erect a transformer station on the American side of the river, and it is to construct a transmission line as far east as Rochester, N. Y., by July 1, 1905. From this, one is led to believe that a portion of the product of the Ontario Power Company will be transmitted to Lockport, Medina, Albion and other places in western New York.

For its rights in Victoria Park, the Ontario Power Company pays an annual rental of $30,000 a year, and in addition will pay at the rate of $1 per horse-power for all power sold above 20,000, up to 30,000 horse-power; 75 cents per horse-power for all above 30,000, up to 40,000, and 50 cents per horse-power for all sold or disposed of above 40,000 horse-power.

The engineers of the Ontario Power Company are Messrs. P. N. Nunn and L. L. Nunn, while the resident manager is Mr. Banker R. Paine.

The New Chinese Trade-Mark Law.

The increase of business of our Western merchants with the Far East, and the difficulties experienced in protecting trade-mark rights, familiar enough in the Occident, but little known in the Orient, have led to the enactment of new trade-mark laws in Asiatic countries. The old laws, while satisfactory under the old conditions, were not suitable under Western changed business methods. When there are few middlemen, and most of the business done is an exchange between manufacturer and consumer, the value of a trade mark is not apparent; for the consumer knows whose goods he is purchasing, and if the manufacturer has a reputation for the quality or quantity of merchandise sold for a fixed price, the consumer may go again to the man whose goods he previously found to be satisfactory. Where, however, the goods are sold in quantities to middlemen or storekeepers, the consumer is unable to determine whose goods he is purchasing when there are no labels or trade marks on the wrappers. With the extensive use of trade marks without changes in the laws to protect this new species of property, there was considerable opportunity for fraud. For some time, it has been customary for Western merchants to protect their trade marks in China by registering them in the consulates of the home countries, the consuls of the different countries recognizing the property rights of the registrants, and enforcing them against infringers who were citizens of their respective countries, and the China Foreign Office enforcing rights when the infringer happened to be a Chinese. The many offices at which registration could be secured, and the unsettled procedure which was followed in proceeding against infringers, led to the passage of the new Chinese law, under which the trade marks of all merchants doing business with China should be registered. The new law provides for the grant of registration to the first person filing an application, the only exceptions being in cases where the applicant has protected his mark under the old procedure, by securing a registration at a consulate, and where registration has been secured in the home country of the applicant. To secure the benefit of these exceptions, the applicant should file his Chinese application within six months of October 23, 1904. When the home registration is secured after October 23, 1904, the proprietor of the mark has four months in which to file his Chinese application with the priority of the date of the home registration. As the time in which merchants may file their application in China with the priority of October 23, 1904, will shortly expire, many applications are being filed. When the applicant is unable to take advantage of the provisions which enable him to claim the date of the passage of the new law or the date of his home registration as his date of priority in China, his application is dated as of the day on which it is filed.

Ample provisions are made for the enforcement of the rights granted by the new registrations.

The Current Supplement.

Dr. Alfred Gradenwitz opens the current Supplement, No. 1519, with an illustrated article on a gigantic electric crane, which has a maximum lifting power of 225 long tons. Mr. R. C. Carpenter writes on some recent experiments with materials which retard the activity of Portland cement. "Leather from Seal Skins" is the subject taken by Mr. Charles H. Stevenson for discussion. The optician will read with interest an article on the raw materials used in silvering. Napier has designed a launch for the British Admiralty, capable of carrying six officers in full dress out to a vessel anchored in any weather, even half a gale of wind, at a considerable speed, without being inconvenienced by spray or water. A portable oil engine with a reversing gear is described and illustrated. The plant is capable of moving over heavy and difficult country where roads are practically non-existent. An article of speculative interest is that entitled "The Molecule, the Atom, and the New Theory of Matter." A list of prizes proposed by the Paris Academy of Sciences for 1905 is published. Capt. Winkler of the German navy succeeded in ascertaining the meaning of the Marshall Islands sea charts after repeated failures. As the islanders are beginning to use European methods of navigation and to discard their own, the knowledge of these charts will probably disappear in a few years. A paper from his pen in the Supplement will therefore be read with considerable interest. A sixth paper by Prof. N. Monroe Hopkins on experimental electrochemistry is published. The subjects discussed are "Faraday's law," "Voltameters," "Experiments with frozen electrolytes," "Heat convection in electrolytic conduction." Dr. Kohnke's paper on the mosquito question is concluded, the present installment being devoted to answering the question "How Do Mosquitoes Transmit Disease?" The usual science notes, electrical notes, and engineering notes appear.

Passage of the New Trade-Mark Law by the Senate.

The Senate has passed Mr. Bonynge's trade-mark bill, and sent it back to the House for the acceptance of a few minor changes. In all likelihood the new law will go into effect on April 1, 1905. This law will work a most salutary improvement in American trade-mark conditions. Particularly important are the provisions which permit the owner of a mark that was not registrable under the old law, because it was descriptive or geographical, to register under the new law, provided the mark has been used ten years.

Furthermore, there is nothing to prevent trade marks registered under the old law from being renewed under the new law six months prior to their expiration. The advantages of this procedure from a legal standpoint are the following: An infringer can be more surely followed and more heavily punished under the new law; and the injunction obtained against him is operative in every circuit court of the United States without a rehearing. The provisions of the law have already been fully discussed in these columns by ex-Assistant Commissioner of Patents Greely, the father of the bill.

The British War Office has adopted a novel blank firing attachment for machine guns that has been invented by Mr. Ramsay, one of the experts to the firm of Vickers, Sons & Maxim. By means of this attachment, a machine gun can be fired at a very rapid rate without incurring any risk of injury to the barrel or mechanism of the weapon. It also allows the gun to be put through all its various evolutions in slow time in exactly the same manner as when it is discharging automatically, by means of a belt loaded with dummy cartridges, thereby affording a ready means of instruction. With this new attachment it will be rendered possible to discharge some 200 rounds per minute, whereas at present, by using the service blank cartridge and loading by hand after each round, it is impossible to fire more than 60 rounds per minute. It will now be possible for Maxim guns to participate effectively in field maneuvers or field-day exercises, which has hitherto been impossible, owing to the serious disadvantage in loading.