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THE TROLLHÄTTAN HYDRO-ELECTRIC POWER STATION, SWEDEN.

The Trollhättan Falls are situated in the Göta River, which connects Lake Vänern, the largest lake in Sweden, with the sea. The Vänern covers an area of 5,570 sq. km. (2,180 sq. miles), and it is the largest of the European lakes but two. The aggregate difference in level between the sea and Lake Vänern is about 44 m. (144 ft.), of which some 33 m. (108 ft.) occur in the Trollhättan Falls, which comprise a series of cascades. The legal position as to the ownership of the water rights was exceedingly complicated at the time their value began to dawn upon the people, but in the year 1901 the Swedish State became the undisputed owner of the greater portion of Trollhättan's vast water power. Through subsequent purchases the State has acquired the waterfalls at Vargön, between Lake Vänern and Trollhättan Falls, and those at Ström and Lilla Edet, below the Trollhättan Falls, so that the State now controls the entire water

The regulating dam across the river, is situated at the threshold of the upper fall on the firm rock. The dam is constructed with four openings, separated by piers of granite. The two central openings each have a free width of 20 m. (65½ ft.), and are closed by means of bear-trap or roller-dams. The most westerly opening, which was first constructed, and which is placed at the side of the river course proper, is 19.7 m. (64 ft. 8 in.) wide, and is closed by means of five sluices, 3.7 m. (12 ft.) wide, which are constructed of iron with wooden boarding; these sluices are divided in two, in the direction of their height, and can be drawn up or let down at will. They are not fitted with anti-friction rollers. The eastern outlet is 3.4 m. (11 ft. 2 in.) wide, and is fitted with a similarly constructed door. Both the roller-dams and the sluices can be operated by electric motors as well as by hand-power, and all the outlets can be

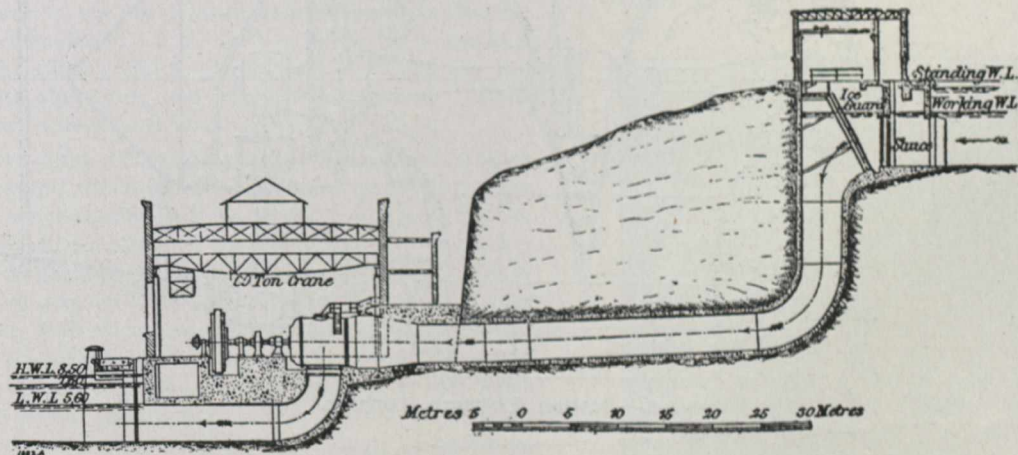


Fig. 1.—Section Through Penstock and Power House.

power of the Göta River. The present low-water volume is 320 cub. m. (11,520 cub. ft.) per second, and the high-level volume of water is about 900 cub. m. (32,400 cub. ft.) per second. Through the regulation of Lake Vänern, the low-level volume of water, however, can be materially increased, and for the future the States may reckon on having at its disposal in its falls in the Göta River an aggregate of not less than about 200,000 horse-power, and this, too, in a district having excellent means of communication and at no great distance from Gothenburg, the leading commercial centre on the west coast of Sweden, and in the midst of a populous part of the country. The State power-station at Trollhättan is constructed for the exploitation of 250 cub. m. (9,000 cub. ft.) water per second, representing 80,000 turbine horse-power. This important installation, which is located on the eastern bank of the river, was taken in hand towards the end of 1906, and occupied some four years in construction. A description of this development appeared recently in London "Engineering," from which these notes have been abstracted.

closed for repairs by means of steel needles or tube-pins, resting partly against the bridge-way on the pillar and partly against the sill. This construction of the dam has been chosen on account of the quantities of ice which, during the winter, are carried down by the river. If there be ice when there is plenty of water in the river, the ice makes its escape through the fully-opened central outlet. With lower water-level the ice is led away under the partly raised rollers or through the sluices.

The intake of the water to the power-station lies about 120 m. (394 ft.) above the dam, and consists of six openings, 12 m. (39 ft. 6 in.) broad, separated by brick piers. In front of the openings is placed a securely anchored floating ice-guard, which is made of strong timber and fitted with a screen commencing 90 centimetres (36 in.) below the surface of the water. As there is no loose floating timber in the river, there consequently is no risk of any timber diving under the guard; no wreckage guard will, at first, be erected, as a guard always gives trouble when coated with ice, and the ice-guard is expected to yield sufficient protection.