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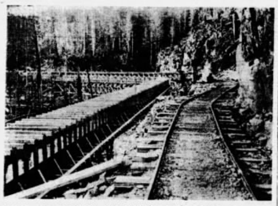
THE POWER PLANT AT JORDAN RIVER

SOME DETAILS ABOUT A BIG UNDERTAKING

How Vancouver Power Company is Solving Difficult Problem—Heavy Work

In view of the great importance to this city of the undertaking of the Vancouver Island Power Company's new power plant at Jordan river, the following description of the work which appeared in a recent issue of the B. C. Mining and Engineering Record will be of interest:

It has always been recognized that the city of Victoria has been badly located so far as a convenient water supply and source of hydro-electric power are concerned. The water supply has hitherto been the worst of any city on the Pacific coast outside San Francisco. Although Goldstream has been available for 15,000,000 gallons daily, and as a limited source of water for power, the fact that it was owned by a private company with whom the city council failed to make an agreement acceptable to the citizens has delayed the improvement of the civic water service until a supply can be obtained from Sooke lake.



FLUME AND TRAMWAY, VANCOUVER POWER COMPANY'S ENTERPRISE, JORDAN RIVER.

The question of power has been a more difficult matter to solve. Under the advice of the engineer, Wynn Meredith, who successfully carried through the Buntzen lake installation of the B. C. Electric Railway Company at Vancouver, the Vancouver Island Power Company, a subsidiary organization of that company, placed engineers in the field for three years exploring all possible sources of power supply within fifty miles of Victoria. As a result it was decided to adopt the Jordan river as a source of power for operating the electric railway system of the city and suburbs, and for the supply of power and light for civic and industrial purposes, and for domestic use.

The Jordan River.

This river takes its rise in the high mountains forming the backbone of Vancouver Island, on the watershed between the Cowichan valley and the west coast. The river enters the Straits of San Juan de Fuca at a point forty miles from Victoria, and from its mouth to its source at the Jordan Meadows, is about 24 miles in length. Its volume is increased by numerous tributaries, draining an area subject to heavy rainfall and deep snow, with long, wide valleys capable of being formed into immense reservoirs, from which can be furnished a supply of power sufficient to meet the needs of the city and suburbs for many years to come. The discovery of a source of power with such natural advantages for providing for the prospective demands of the future is a matter on which the Vancouver Island Power Company are to be congratulated. For a distance of six miles, from within a mile of its outlet to the heart of the mountains, the Jordan passes through a rugged, rocky defile, through which it must have appeared impossible to the uninitiated that a power line could be laid. But engineers scoff at such difficulties, and the visitor to the plant sees a well-built line laid from the power station on the river flat near the sea shore to the lower reservoir, and the tramway and flume constructed along the rocky cliffs on the mountain side for a distance of six miles to the head of the present flume.

How the Work Was Carried Out

A. B. Carey was the engineer in charge of the original exploration, and when the work was started E. Carpenter was placed in charge of it as resident engineer. Main camps for the accommodation of the workmen were established on the beach, at the mouth of the river (known as No. 1), at the lower dam, two miles from the power house (known as No. 2); at a point seven miles further up the river (known as No. 5), and at Bear creek, ten miles up the Jordan river, just beyond where it turns to the northwest (known as No. 10). A tramway was constructed from the side of the power house to Camp 5, where is the head of the present flume. The tramway between the power-house site and the top end of the pipe line, a distance of a mile and a half, is on a steep incline, and operated by winding engines and cables, one at the power house and the other at the top of the incline.

The remainder of the tramway follows the easy grade of the flume, so that the cars running over it can be operated by horses. The tramway is seven miles in length altogether. From the upper end of the tramway a wagon road was constructed to the site of the big dam on Bear creek, four miles further on, the country here allowing of an almost level grade.

The Flume.

The flume is six feet wide by five feet in depth, with a grade of 6 per cent., and extends from the lower or forebay dam to camp 5, where it heads in the upper dam on the Jordan river. This dam is 50 feet in length with overflow for flood water. The diversion of the water from Jordan river at this point is supplemented by another flume from Wye creek, an important tributary coming in from the west. The main flume traverses the canyon for a length of six miles, supported on strong trestle works and following the sinuosities of the river, the path for the flume and tramway being at times hewn out of rocky promontories, or supported by trestles, crossing gluches scores of feet in depth.

The Dams

Are four in number. The lower dam or forebay is situated at the top of the ridge overlooking the sea, and is at an elevation of 600 feet above the river at this point. This dam closes the mouth of a former river basin, and makes a reservoir capacity of 15 acres to be held in reserve in case of a break down of the flume. Two earthen dams of a height of 40 feet have been constructed here. The second dam is at the point of diversion of the water from the main river by means of the flume. The third dam is at the head of the Wye creek supplementary flume, and the fourth dam is in course of construction on Bear river.

This latter dam is an immense undertaking, the dam being 997 feet in length, 50 feet in height and 50 feet wide at base. It is intended for storage purposes, and is so located as to secure the water from a large catchment area, where snow lies late in the year—to July at least. The width of the valley and its great length of almost level stretch make it a remarkable natural reservoir site. To construct the dam a hydraulic plant has been installed, and the earth and gravel from which it will be constructed will be washed from a hill on the west side, and conveyed by a flume built over the site of the dam. Test pits have been sunk on the hill which is to be washed down for this purpose, and the adaptability of the ground to hydraulicing was proved before the installation of the plant. The base of the dam was sunk 20 feet below the bed of the creek and filled with clay. Its construction involves the removal and placing some 200,000 yards of earth. When completed this dam will give a storage capacity of about 400 acres, and by the construction of subsidiary dams along the valley of Bear river, this storage capacity can be increased to an immense extent. W. W. Alberts, of the Lake Buntzen staff, is in charge of the work.

UPPER DAM, VANCOUVER POWER COMPANY'S ENTERPRISE, JORDAN RIVER.

The Pipe Line.

The pipe line between the lower dam and the power house is two miles in length. It consists of a combination of lap-welded pipe of German manufacture, and double rivetted lap, supplied by the Jena-Orten-Boving Company, of London, Eng., through their agent for British Columbia, Mr. Kent, and their local engineer, D. L. A. Aplin. The size of the pipe is graduated from 44 inches to 30 inches in diameter, and by means of a Y, two pipe lines may be carried to the power house when required, though one has been laid for the present, and will suffice for some time. This pipeline delivers the water to the wheels of the power house with a fall of 1,150 feet, and a pressure of 500 lbs. to the square inch.

The Power House

is built of reinforced concrete, and its foundations have been sunk to a depth of 40 feet. Although these foundations were laid on what appeared to be a solid formation, and great precautions were taken to ensure stability, it was found after it had been erected that the north end was sinking. A drilling plant was secured, and holes drilled, with the result that the depression in the building was found to be due to a bed of peat, 12 feet thick, underlying the stratum on which the foundations were laid. This shows the old bed of the Jordan river to have been about 100 feet lower than the present level, and can only be accounted for by the recent sinking of the west coast of Vancouver Island. Several Indian relics were found in the sinking of the foundations. Steps have been taken to strengthen the power house by driving steel piling to bedrock and reinforcing it with concrete, the necessity for this work delaying the time by which it had been expected to supply power.

The Power Plant

consists of two generating units, directly connected to Pelton wheels, transformers, etc. The unit in readiness for operation has a capacity of 6,000 h.p. From this the current will be stepped up to 35,000 volts by means of transformers. For conveying it to the city of Victoria and Saanich peninsula, a line of 40 miles in length is required, and this has been constructed of strong poles, carrying three cables of aluminum wire, well insulated and supported by metal cross-arms. The transmission line follows for the most part the Sooke road, a branch line running off from Victoria to Saanich and the Vancouver Portland Cement Works at Tod's Inlet. These works alone have contracted for 1,500 h.p. as soon as it is available. The transmission line has been constructed through one of the heaviest belts of timber in British Columbia, the work of felling the timber and clearing the right-of-way having been one of the heaviest parts of the undertaking. The electrical plant is supplied by the Allis-Chalmers Bullock Company.

To provide the lumber for the tramway, flume and buildings, a sawmill of a capacity of 30,000 feet a day was installed at camp 2, and was run for a year at full capacity.

The Jordan river plant provides in its initial development for 6,000 h.p., and will later be increased to a maximum of 24,000 h. p. This will prove an important factor in the extension of electric railway construction in Victoria and suburbs and also in the development of industries, which will be provided by a reliable supply of cheap power. The plant went into operation on September 16.

FREAK CAMERAS.

Rocket Method is Latest for Securing Aerial Snapshots.

Like the true mirror of the passing times that it is, the camera is taking to the air. The latest device is a combination of camera and rocket. The rocket goes off, carries the camera up with it, at the climax of the flight the shutter automatically snaps, and buoyed up by a parachute frill that has in the meantime expanded, the camera gently descends. The thing has been developed in Berlin, and just at present it is quite the rage there for people to have bird's-eye views of themselves taken. So far the rocket camera is not known to have been placed upon the English market, but, with aeroplane travel becoming so frequent, it will doubtless be eagerly awaited by people who wish to assure themselves that they look presentable from above.

Of course, aerial photography is by no means new. "There are many ways of getting a camera into the air," the manager of one of the largest photographic firms in London told a London Standard representative. "The only difference between an aerial camera and an ordinary one is in the shutter. There are many ways of arranging that the shutter shall open at approximately the right moment, though, of course, the photographer always has to face a considerable chance that he may not get the precise subject he wants. One method is to have a clock attachment that works the shutter after a calculated interval. Then a time fuse has been used, and one good method has been to control the shutter from afar by a long wire and lever acting on the principle of the Bowden brake.

"These devices are for photography from kites," said our informant. "The late Lieutenant Sully was a pioneer in this work for military purposes. Many people have been working on kite-suspended cameras for years, notably in France. There is even a book on the subject—'Photographie par cerf-volant.' Some most excellent results have been obtained. Then Major Mantell, of the English Ordnance Survey, has employed photography from captive balloons as an aid in surveying. In Germany good pictures have been obtained from a little camera strapped to the breast of a carrier pigeon."

It appears, in fact, that everybody is liable to be "taken unawares" nowadays. Possibly the largest thing in cameras is the Atalanta camera, constructed for use on aeroplanes. It looks like a miniature naval gun, is aimed and fired like a gun, has a range of fourteen miles, and works with an extremely rapid shutter. Germany has bought a number of these cameras for use on its aeroplane fleet.

"But I take it that this rocket camera is in the nature of a toy," continued

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