

A Current Pump of the Clutha.

Of old the lift pump was a feature on every river, for man at a very early stage of his existence found out the secret of making rivers pump up their water for the irrigation of the soil or the supply of power for machinery. In this country there was much trust in the water wheel of old ideas in the early goldfield days. But when the dredge industry got into the big bucket stage there was an end to the old wheel. Power had to be got from outside the river and the old wheel sank out of sight. But engineers have not allowed the old idea to die. The swift current of the Clutha, water gone mad in many places it is, kept their minds on the alert for possibilities. They knew the strength of the old Moly-

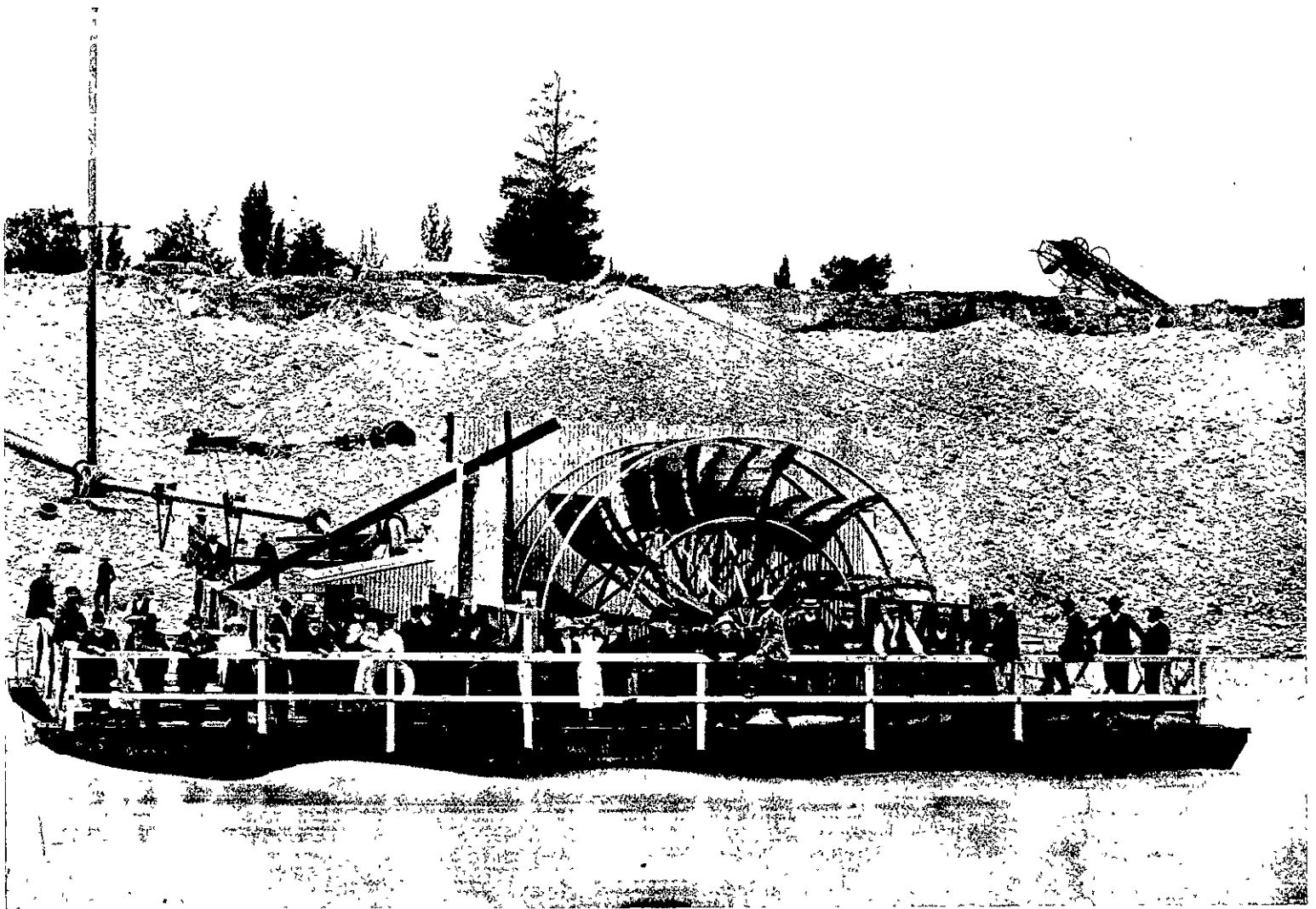
water is beyond anything that can be used if every acre of the Clutha valley were to be irrigated from the Lake to the open country of Inch Clutha. Men have talked water power for these regions and whispered of loans of a million. But here we have a cheap pump worked by the river. It is a story of the Aladdin series. One is positively afraid to speculate on the results of the universal employment of these wheels. Without going into details of thousands or millions sterling, it is pretty certain that there will be boom in mining which will make men think of the old days of Roaring Meg and Gentle Annie, when the valley was alive from Alexandra to Queenstown. Messrs. Payne, Morgan and Milne are the trio who worked on the pump which invokes thoughts like these. From the fact that the pump is called after Mr.

(a.) The curvature of the blades (of a somewhat similar form of Poncelet's undershot wheel) which form, it is claimed, offers increased resistance to the current, and both enters and leaves the water with less commotion than the straight floats of former types of wheel.

(b.) A movable shutter at the up-stream end of the wheel is operated by a hand winch, and acts as a brake by restraining the current from the wheel when required.

(c.) The magnitude of the wheel—viz., 19.77ft. diameter—and the depth of the floats or blades submerged. In no former machine of which there is any record has the diameter of the wheel exceeded 16.4ft. (*Vide* "Spon's Dictionary of Engineering.")

(d.) The reduced number of blades or floats. The current-wheel operates between



PAYNE'S PATENT CURRENT PUMPING-PLANT, ON THE CLUTHA RIVER, AT ALEXANDRA, N.Z

(*Mines Record*)

neux, which discharges every twenty-four hours almost as much water as the Nile, and has a volume and velocity exceeded by few rivers in the world, and by none in Australasia. A drainage it has of 8000 square miles, and it discharges into the sea one million cubic feet of water per minute, in ordinary times. What it does in spate Heaven only knows. But the ordinary million is good enough.

Three Otago engineers have had the problem of this river's utilisation by the ordinary wheel in mind for many years. After much study and experimenting they have devised current wheels of great efficiency and power on scientific lines, and the air of Central Otago is full of the predictions of the glory to come to the invention from electric plants, from irrigation, and from sluicing. Naturally, for the supply of

Payne, one can see who had the chief share in the development of the new water power.

PAYNE'S PATENT CURRENT WHEEL PUMPING PLANT.

The following account is from the pen of Mr. Frank Reed, mining engineer of the Mines Department. We take it from the *N.Z. Mines Record*:—

The current-wheel pumping plant recently installed by the Alexandra Lead Gold-Dredging Company (Limited) on the Clutha River, at Alexandra, by Mr. F. W. Payne, of Dunedin, is the pioneer current-pump of Australasia, and is probably the largest and most powerful unit of this class of machine ever constructed. The special features of this machine, designed for the purpose of obtaining greater efficiency than former types, are—

two parallel pontoons, the stream flowing between them. This machine was installed for the purpose of raising water, which it efficiently does, to an elevation of 51ft. 6in. above the river-level for sluicing the auriferous gravel, river-banks, and terraces. The following is a summary of the results of a series of careful tests of this machine, together with the principal dimensions:—

Velocity of stream (8/1/09), 6.24 miles per hour.

Theoretical horse-power of stream, 69.4.

Brake horse-power of current-wheel, 35.

Horse-power in water discharged by a centrifugal pump, 14.6.

Efficiency of current wheel, 50.4 per cent.

Efficiency of centrifugal pump, 41.7 per cent.

Combined efficiency of complete plant from river current to discharge weir, 20.64 per cent.