the power to the dredge was designed and adopted on the Argyle Dredge, Waikaia, Otago, by Messrs. R. T. Stewart, consulting engineer, and J. W. Stewart, dredgemaster and mine-manager, members of the proprietary. In this instance the surface of the ground being worked is not above the level of the deck of the dredge. The water from which the motive power is derived is conveyed in an open race for a distance of eleven miles to a point 70 chains distant from the scene of operations and 170 ft. higher than the dredge. From this point the water is conveyed through 13 in. steel piping to within about 2 chains of the dredge, where the pipe is reduced in diameter to 9 in. and a swivel-joint connected to end of pipe line. To the other end of the swivel-joint a length of 66 ft. of 9 in. piping is attached, the end of this length of piping being supported on a double-flanged trolly-wheel 2½ ft. in diameter, which runs on a single rail curved to a radius of 66 ft. A second swivel-joint is joined to the end of the pipe supported by the wheel, and to this is connected a length of 75 ft. of 7½ in. piping, the end of which is connected with a ball-and-swivel joint which is bolted to a beam on the bow of the dredge. From this point a distributing-pipe 9 in. in diameter is carried along the deck to the stern of the dredge, branch pipes being taken therefrom to supply the water to the Pelton wheel, which is 4 ft. in diameter, running at 220 revolutions per minute under full load and supplying power for driving all the machinery. The water is directed on to the wheel through a deflecting nozzle having a tip of 1½ in. diameter, a hydraulic jet-pump having a 2 in. jet and a 5 in. throat being used to lift water for the shoot. Its capacity is 2,600 gallons per minute to a height of 18 ft. The dynamo used for lighting the dredge is also driven by water-power, a ½ in. jet being used to drive a small Pelton wheel for this purpose.

The method of supporting the two long spans of piping is by a wire-rope understay, as shown in the illustration. The ground being worked is 30 ft. in depth and of a hard cementy nature containing many large stones which, however, owing to the strength of the machinery and abundance of power, proves no bar to its expeditious and satisfactory treatment. The cost of running the dredge is less than £30 per week.

The application has also been made to the Golden Beach Dredge, Alexandra, which has hitherto been driven by a steam plant. The use of the engine and boiler has been discarded and water installed as the motive power, with a result in its efficiency exceeding the most sanguine expectations of the proprietary. The water is brought to the claim by a 13 in. steel-pipe line a distance of over 4,000 ft., the fall being 240 ft. The depth of the ground being worked is 56 ft., the face standing 36 ft. above water-level. On account of the height of the face above the deck of the dredge a tower was built of four 7-in. pipes, 33 ft. in height, stayed to the gantry by wire-rope stays to prevent swaying, and bolted to the deck at foot. The water is conveyed from the main through two 80-ft. spans of 14 B.W.G. pipe, the one being 9 in. and the other 7½ in. in diameter, the latter being connected to a ball-and-swivel joint bolted to platform on top of tower. The water is conveyed from this point through a 9 in. distributing-pipe down to gantry-level, where it is tapped by a 3 in. branch supplying water to the breaking-down nozzle shown at work in the illustration, this nozzle being used only when necessary to bring a fall down and to obviate the necessity of the dredge working dangerously near the face.

The Pelton wheel which drives main buckets, screen, tailings-elevator 80 ft. in length, and silt-elevator, is 4 ft. in diameter working under a 1½ in. jet. The winches are driven by a reversible Pelton wheel 30 in. in diameter, and the dynamo by a 15 in. Pelton wheel with a ½ in. jet.

The whole of the plant was designed by Mr. R. T. Stewart and erected by him personally.

The illustrations show the dredge and plant from different points of view, and serve to make the description plain to even those unacquainted with dredging machinery.

ACCIDENTS AND FATALITIES.

During the year 1905, accidents occurred by which twenty-one persons employed in connection with the various branches of the mining industry lost their lives. The whole of these accidents, as well as others of a serious but not fatal character, were duly investigated on behalf of the Department.

The following tabulated statement shows the fatalities in connection with each branch of the gold-mining industry in the several inspection districts :—

Class of Mining.	Northern District.		West Coast District.		Southern District.		Totals.	
	Surface.	Underground.	Surface.	Underground.	Surface.	Underground.	Surface.	Underground.
Quartz (including batteries) ...	1	5	1	...	...	...	2	5
Hydraulic and alluvial ...	...	...	4	...	1	1	5	1
Dredging	...	...	2	...	6	...	8	...
Totals ...	1	5	7	...	7	1	15	6
	6		7		8		21	