thence to the Kapitea Hill. The terrace has a general elevation above the river of 200 ft., and, in order to afford sufficient fall to convey the gravel from the leads into the river, tunnels, used as channels for that purpose, have been constructed. These channels or tunnels are commenced at a considerable height above river-level, and have a gradient of from 4½ in. to 6 in. in 12 ft.; this fall being sufficient to run off the gravels and boulders when a requisite flow of water is available. From these channels tail-races are driven towards the claims to be worked, the tail-races having a much steeper gradient than the channels. When a tail-race reaches the most advantageous point in the ground a shaft is sunk from the surface to meet the tail-race tunnel, the upper end of the tail-race being usually from 20 ft. to 30 ft. deeper than the bottom on which the wash-gravel lies. On communication from the surface to the tail-race being effected, the water is laid on, and the whole of the gravel surrounding the shaft washed down until the bottom on which the lead-gravels lies is reached, the gold being saved as the mass passes along the tail-race into the channel. When a tail-race is commenced it is made with an easy angle from the channel, so that the current may not be impeded by the material flowing from the tail-race to the channel. As soon as the required space is made around the shaft the larger stones and boulders are stacked on the bottom, sluice-boxes are introduced, into which the gravel is washed from the faces, and in these boxes the greater part of the gold is retained. As the claim gets worked it presents the appearance of a large paddock or excavation about 30 ft. or more in depth, on the bottom of which immense piles of boulders are stacked, with lines of sluice-boxes leading to the various parts of the face, at which the hydraulic nozzles are at work undermining the gravel and washing it into the boxes. The larger stones are stacked, and only those that are manageable permitted to pass through the boxes, down the shaft, and into the tail-race, to be discharged into the main channel.

In order to work a claim to advantage there are several faces which are operated on alternately, the man at the nozzle being employed at one face, whilst the rest of the party are stacking boulders from the other faces. The sluice-boxes are paved with blocks of wood set on end. These blocks, which are sometimes cut from round logs, were formerly used from 12 in. to 18 in. in depth, so that on the one end becoming worn and uneven the block could be turned, and again present an even surface. The method now most commonly in use is to cut the blocks, 7 in. or less in depth, from squared logs, so that when the surface becomes too much worn the blocks are removed and replaced with fresh ones. The tail-races and channels are for their whole length laid with boxes, the bottoms of which are paved with blocks, the boxes varying from 22 in. to 32 in. in width. A footway is generally left by the side of the boxes, for persons employed in looking after the races, and in repairing, cleaning up, or renewing the blocks.

The channels are maintained by trustees, who are entitled to the whole of the gold saved in them; while the gold recovered in the tail-races leading into the channels belongs to the owners of the claims who use these tail-races.

The water for sluicing is obtained from the Government water-race, and is supplied to the claimholders at the rate of 7½d. for each sluice-head per hour, the sluice-head being 60 cubic feet of water per minute. Flush-water is supplied free for the purpose of keeping the boxes in the channels clear. This is measured out in proportion to the whole quantity that may at one time be used by all those sluicing their tailings into the channel.

The channels that have been constructed up to the present are—Nos. 1 and 3, length 77½ chains; No. 2, 35 chains; No. 4, 42½ chains; and No. 5, 55 chains in length. There are also other channels, owned by and under the control of private parties, such as McGrath and Moynihan's, situated between Nos. 2 and 3 channels, but having its discharge at a height above the entrance to those channels. Carlsson's channels, one situated between Nos. 2 and 3, the other running parallel with No. 5 channel, have also a higher discharge, which permits of the *débris* being deposited on top of the tailings already accumulated from the other channels. Another channel, to command some ground near Larrikin's, is being constructed by McGrath and Moynihan. There are also several shorter channels held by private owners. No. 1 channel did good service in the past, but is now worked in conjunction with No. 3, both being used as one channel. No. 5 is only just completed, and some time must elapse before the claims are connected with it. These five channels have been constructed at various periods, largely with the aid of subsidies from the Government.

The water supplied to the claims and channels is from the main race and branches, but chiefly from the Kapitea Hill branch. This race runs along the hill in an open ditch, from which water-mains lead to the Nos. 3 and 4 channels and the groups of claims that use them. Open ditches convey flush-water to each channel, and this leaves the whole of the water in the mains to supply the nozzles in the claim-workings. All the ground-sluicing is carried on similarly to what has been described.

The immense quantities of gravel and boulders that have been discharged into the Teremakau River for a period of upwards of twenty years have filled up the bed as well as the beaches of the river, and difficulty is now experienced in getting rid of the *débris* from present operations. The No. 5 channel commands those parts of the lead at the back of and towards the town, but, in order to work a further extension of the lead seawards, other channels must be opened to discharge into the river further down; and on the success of the claims at No. 5 being assured, a No. 6 channel and others will doubtless be taken in hand. The cost of these channels has been very great; the opening of others will also be expensive; and, as new channels cannot be constructed with a fall such as the others have, a much greater quantity of water will be required for flushing purposes. The supply from the Kumara Water-race, which is being augmented by the Wainihinihi extension, as well as by the conservation of the rainfall at Kapitea, will be sufficient for carrying on more extensive operations in ground-sluicing; but, should it become impracticable for the outfall channels to be used for that purpose, the gravels are not sufficiently gold-bearing to be profitably dealt with by hydraulic elevating. With the exception of those parts of the leads which were first worked out by mining,