account, especially upon dredges working in the beds of large streams. The heaviest loss occurs with gold in a fine state of division or in thin scales. No matter how carefully and concientiously ground may be tested by shaft-sinking and the value of its gold contents ascertained, there is always a discrepancy between the prospecting results and those obtained in dredging over the same areas. The failure of the dredge to secure the same results as the cradle is due to the loss of fine gold caused by passing much larger quantities of material over similar widths of concentrating-tables in the same time.

It is never attempted in prospecting to approach as nearly as possible to the conditions under which the same material will be treated by a dredge, nor, on the other hand, has any serious attempt been made to reduce the quantity of material lifted, so that the dredge can be compared to the cradle. The breadth of concentrating-tables is of greater importance in gold-saving than the length, although the latter is an important factor. For this reason comparisons between the tables of dredges and the sluice-boxes used in hydraulic mining cannot be made. It is doubtful whether some sluicing plants in use in Otago, with their narrow boxes, are as successful as the dredges in saving the finest gold.

In the following table the working-conditions of the apron of a quartz-mill is added. It is only of value in that the gold saved on these tables is in its fine state of division similar to the gold lost from the dredge-tables. The question of matting *versus* amalgamated plates need not be taken into account, as all the gold saved at the Phœnix and some other Otago mills was caught first on blanket-strakes, and the concentrates subsequently amalgamated in barrels. The following are the particulars of the tables on some of the latest dredges, and the conditions under which the washdirt will be passed over them at a time when the dredge is running with full buckets :—

Dredge.	Capacity of Buckets, in Cubic Feet.	Rate of Discharge per Minute.	Diameter of Pump, in Inches.	Capacity of Pump, in Gallons per Minute.*	Width of Tables, in Feet.	Material lifted per Minute, in Cubic Yards.	Material passed over Tables per Minute, in Cubic Feet.†	Material passed over Tables per Foot of Width per Minute, in Cubic Inches.	Water passed over Tables per Minute per Foot of Spread.‡		Proportion of Sand to Water.	Remarks.
									Gals.	Cub. In.		
Fraser's Flat	7	10	12	2,300	21	2·6	35	2,800	98	27,168	1 to 9·43	Fine material. It is estimated that one-half the quantity lifted will pass through the perforations on to the tables.
Olrig ..	4¾	10	10	1,600	18	1·76	8	768	80	22,180	1 to 28·8	Manuherikia ordinary river-drift.
Leviathan ..	4¾	10	15	3,800	81	1·76	31·6	674	42	11,645	1 to 17·2	A littoral deposit of shingle and black sand. It is estimated that 66 per cent. of the material lifted will pass over the tables.
Waimumu§	4½	12	12	2,300	28	2	9	555	74	20,519	1 to 37	Before alterations; valley deposit.
Mokoia and Buller Junction	5	12	12	2,300	15	2·2	10	1,152	138	38,270	1 to 33	River-gravels.
Ordinary quartz-mill practice‖	..	..	..	..	..	..	..	36	4·4	970	1 to 27	

It will be seen by the above table that the quantity of solid matter contained in the pulp as it passes on to the matting varies between one to nine and a half and one to thirty-seven times its bulk of water, and that the mean of the five dredges is one to twenty-five. Very few, if any, dredges treat their washdirt under the ideal conditions given above. In most instances nearly all the fine material that passes the perforations in the screen does so in the first 6 ft. or 7 ft., and the pulp frequently passes over the first two or three strakes in waves of thinly diluted mud as each bucket discharges, comparatively clean water running over the balance of the tables. The result is that the larger proportion of the fine material passes the matting diluted with probably six to eight times its bulk of water. Most of the gold saved is caught on the first three mats, and nearly all the gold that escapes is lost in passing over them. Any fine or scaly gold that remains in the screen until the first three mats are passed, and then falls with the comparatively clear water, is in nearly every instance arrested.

The most experienced miners sluicing the black-sand deposits on the West Coast are in favour of a large supply of water, and a fall to the strakes approaching 2 in. to the foot. They use plush-covered tables, but increase their spread to such an extent that the quantity of sand passing over each foot of width is less than could be attempted on a dredge, and every care is taken to see that the gold-bearing sands are spread evenly over the whole breadth of the tables.

* The lifting-capacity of the pumps is based upon Tangye Brothers' calculations. † The quantity of material passed over the tables in dredging ordinary river-gravels is estimated at one-sixth of that lifted. This estimate is based upon cradle trials of different gravels, the hopper having $\frac{5}{16}$ in. perforations. ‡ Ninety per cent. of the water lifted is presumed to pass over the tables, the balance leaving the screen with the heavy material. § The Waimumu drift is a valley deposit; the estimate of the quantity passing over the tables is very low, probably one-quarter to one-fifth of the quantity lifted would be nearer the truth with this dredge. ‖ With regard to battery practice, Rose says the water used per stamp is 1¾ gallons in Colorado, 2½ gallons in California, and 5½ gallons on the Rand. The above table is based upon 3½ gallons per minute, and the crushing-power of a stamp 2 tons in twenty-four hours.