and are so far made of the ordinary market mild steel. A harder steel, if obtainable, would be more durable and cheaper in the end. The best size of perforation for hopper-plates has been a matter for experiment by myself and others, variations from $\frac{1}{4}$ in. to $\frac{5}{8}$ in. having been put to working-tests. It is proved that holes of less than $\frac{3}{8}$ in. diameter unduly limit the discharge through the plates, are liable to choke, and that there is no advantage whatever to be gained by their use. The discharge through $\frac{7}{16}$ in. holes is sufficient in amount, and the fine shingle particles which pass through with the sands, and seldom exceed $\frac{1}{4}$ in. in diameter, are not troublesome in their size or quantity; in fact, many consider that they are of benefit in keeping lively the sands on the tables. With holes exceeding $\frac{7}{16}$ in. in diameter, the size and quantity of small shingle becomes excessive, and the water passes away so rapidly as to prevent material from being carried forward over the plates. The hopper-plate box should be graded so that, as nearly as possible, the water and fine stuff will just disappear through the plates as the 'hopperings,' or coarse shingle, slide into the stone-shoot, which is a steeply inclined box carrying the hopperings into a tail-race or tip-head. Owing to variations in the water and gravels it is impossible to make this process fully automatic, but it can be made nearly so, and requires very little attention. This depends upon the proper adjustment of the grades and length of the hopper-box to suit (*a*) the quantity of water in use, (*b*) the nature of the stuff, and (*c*) the state of the hopper-plates, which varies greatly as the holes get bevel-edged and worn. Much adjustment is obtained by using plain unperforated plates to blind a suitable length of hopper-surface at its upper end, or by narrowing it at the sides.

"In the latest plant I have devised and introduced an improvement by making the grades of the hopper-box easily adjustable. Instead of being built in and fixed to its framing, the hopper-box is formed in sections hinged together, so that it can be adjusted to whatever combination of grades best suits the conditions of the time. Instead of hopper-plates, bar screens or grizzlys have been tried, but these get choked with the thin flat stones common in beach-wash. As some amount of water and sand find their way over the hopper-plates and down the stone-shoot, it is necessary to insert screen-bars in the upper part of the shoot to save this, and to carry the sand either to a separate table or to one of the main tables. The stone-shoot grade is too steep for hopper-plates, and the grizzly is thus necessary.

"The tail-race from the sluicing-face should widen out and have a low grade at its junction with the hopper-box—say, 6 in. to the box, or 1 in 24—and for a short distance the hopper should have the same grade, gradually increasing as the stone-shoot is approached.

"The sand-box is placed directly under, and in line with, the hopper, and receives the water and sand discharged through the hopper-plates. In some plants the sand from the hoppers is received on boarding arranged like a pent roof, with its ridge under the centre-line of the hopper-box. This boarding divides the sand and water into halves, shedding one on either side, where it is received into long parallel troughs acting as sand-boxes for each wing of tables respectively. The objection to this halving operation is that an equal number of tables must be kept going in each wing, while with the central box any inequality in the number of tables on each wing does not matter. The central sand-box must have a length proportional to the number of tables to be served, the distance between centres of outlet-gates being about 18 in. The best width is 10 ft. clear, of which a width of 2 ft. on each side is 1 ft. in depth from the top of the box, and the central width of 6 ft. is 2 ft. 6 in. deep. In this central portion are fitted longitudinally two vertical boards or partitions fully 2 ft. wide, held in slides so that they can be adjusted to a sufficient height above the bottom of the box, usually about 7 in. to 9 in. These boil-boards are placed about 3 ft. apart. A shrouding of match-boarding extends from each side of the hopper-box to the level of the top of the boil-boards, where the sides are drawn in to a distance of about 2 ft. from each other. Similar boarding extends from the ends of the hopper-boxing into the sand-tank, the whole of the sand and water thus being delivered into the space between the boil-boards. By this means the water in the sand-box is kept in a constant 'boil,' with the sand in suspension and unable to settle. In the shallower wings the agitation is less, though enough to prevent settlement. Gates consisting of wooden slides, with an opening of about 8 in., are placed in the wings, and regulate the discharge into the ducts leading to the table. In long sand-boxes it is necessary to control the discharge of stuff into the sand-box, so that the sand is distributed throughout its length, but in short boxes this is unnecessary. A clean-water flume should be fixed round and into the box, so arranged that water can be let into any duct for streaming down its table or for filling the sand-tub. In some cases tail-water from the amalgamator water-wheel provides this flushing-water. From the regulating-gates of the sand-box the water and sand is led to the various tables by ducts having a cross-section 8 in. by 8 in. in clear. These ducts can be made in separate boxes, with 8 in. by 2 in. bottoms and 10 in. by 1 in. sides, or by laying down a floor of 6 in. by 1 in. T. and G. boards, and subdividing this into boxes with 8 in. by 1 in. partitions. Experience of both methods is in favour of the separate boxes.

"The ducts require setting to a gradient of 1 in 24, or steeper if there is much heavy sand, with vertical drop-boxes to adjust the surplus fall. The ducts discharge on to the top member of each table called the 'V' piece. This portion of table is fixed permanently level, is in length about three-quarters of the width of the washing-table, and in its own width tapers from duct-width to table-width. It is not used for gold-saving, its function merely being to convert the narrow duct current into a regular shallow stream of full table-width.

"The washing-tables themselves should always be made adjustable for fall, which requirements can be attained by simple and cheap means. It was the usage to make the tables fixtures, at grades supposed by their builders to be suitable, but which in practice had to be repeatedly altered and rebuilt at great expense. The hinging of the table to its 'V' piece in such manner as would obviate loss of water and sand can be effected by simple devices. A prime essential for any satisfactory washing-table is that the fall of the table can be