

plates, will take a front rank as chief agent in gold extraction."—J. S. McARTHUR, in *Journal of the Society of Chemical Industry*.

BOHM'S CYANIDE PROCESS.

Mr. Bohm is at present engaged in erecting a plant at the Waihi Company's works at Waihi. Cyanide of potassium is used in combination with sodium salt. Indeed, the solvent may be said to be the same as that used by the Cassell Company, but the application is entirely different with regard to the filtration process. Mr. Bohm proposes to use a vertical cast-iron cylinder, hung on trunnions in the centre, having a filter at both ends, so that when the material settles in too compact a mass for the solution to percolate through, the cylinder can be turned upside down. The solution is also forced upwards instead of being put on top of the ore in large vats as in the case of the Cassell process.

The same gentleman has also patented a hydraulic chlorination plant for gold-ores which is similar to the plant he uses in leaching. A description of both processes by Mr W. D. Bohm, M.R.I.F.C.S., together with plans showing the plant and arrangements, were handed me by that gentleman. The plans are annexed hereto to illustrate the following description:—

"Cyanide Plant.

"Fig. 1 represents a sectional elevation of plant, and fig. 3 a plan in which the vessel *A*, which is made in various sizes, capable of holding ten to twenty tons of concentrates, represents the leaching vat. The powdered ore is placed in this vessel, the cover *a* being removed by means of the screw tackle *a*¹, and run on one side along the beam *a*², and the solution of cyanide, or other solvent, is withdrawn from the tank *B*¹, in which it is prepared, and forced by the pump *C* through the pipe *c*¹ into the lower end of the vat. After passing through the ore the solution overflows, and is conducted by the pipe *c*² back into tank *B*¹; a constant circulation being maintained in this way until the precious metals are in solution.

"The suction-pipe *c*¹ of the pump *C* is then withdrawn from the tank *B*¹, and connected with a water supply, and sufficient water is forced through the ore-vessel to wash out the precious solution. The strongest portion of this solution is run into tank *B*¹, and the washings into tank *B*².

"Fig. 2 shows a section of the filter-vat with its removable covers *a*, and filters *a*³, and supply- and overflow-pipes running into the plug *b*¹ of the hollow trunnion *b*, which is so arranged that on reversing the vessel by means of the worm and worm wheel *b*³, the plug *b*¹ remains stationary, and a continuous upward flow of the solution still continues, but in the opposite direction in the ore vat, so that the filter which was uppermost, the working filter, is now undermost, and receives the solution on its opposite side, causing it to be washed free of slimes, while the filter taking its place offers a free and clear surface which will not tend to choke for some time. Once or twice reversing during one treatment is generally sufficient to insure the rapid working of one charge of difficult ore.

"Directly the solution begins to run into tank *B*² it is allowed to flow off through the pipe *d* into the precipitators *E*, and from thence into the tank *F*¹, from which it is returned to the tank *B*¹ by the pump *D*, through the pipes *e*, passing on its way through the filter *H*, which retains any portions of precipitated bullion which might be carried in suspension by the solution.

"While the washing of the ore is finished and the exhausted charge being tipped out and replaced by a fresh one, the solution in *B*¹ is tested and made up to round normal for re-use, an apparatus *K* being fitted up in the bullion-room for that purpose. The washings after passing through the precipitator are pumped back to *B*², and employed in the place of water for the subsequent charges.

"The bullion is washed off the metallic precipitant in the revolving screen *C* in water, and the product subsequently treated by heat in a reducing atmosphere, and washed and melted. Any waste or redundant solution or washings are run into the storage tank *I*, and are subsequently allowed to percolate through the poor-ore tank *J*, and its precipitator *J*¹, and thence run to waste.

"The poor ore or mullock is tipped into the vessel *J*, which is fitted with a permeable false bottom *L*, the flow of solution being regulated by the combined float and spreader *M*, so that no attention is required for this tank until the charge is finished, then, by opening the hinged end *N*, and turning down the removable block *O*, the tank can be discharged by allowing it to tip forward, the speed being controlled by the differential pulleys *P*.

"The chief characteristics of this hydraulic-leaching plant are extreme rapidity and economy of working. Ores which are impermeable by the old percolation method may be treated with comparative ease, and very little power is required to effect this. No further handling of the ore is necessary after it has once been placed in the filter-vat, and the expense of power necessary for driving heavy mining apparatus is obviated.

"Hydraulic Chlorination Plant.

"Fig. 1 represents a portion of a plan of a 6-vat chlorination plant, and Fig. 2 a sectional elevation of a vat with its connections.

"The crushed roasted concentrates or other ore are mixed with a proper proportion of chloride of calcium, and charged into the vat *A*, its cover being removed, or the ore may be placed on top of the calcium chloride, a layer of ore being first put on the lower filter cloth at *b*, to preserve it. An acid solution is then forced through the mixture by the pump *D* through pipe *d*, until it overflows through *e* into the tub *B*; the resulting chlorine solution is then circulated by means of the pump until all the gold is in solution, the overflowing solution is filtered at *a* by a cloth stretched over concentric grooves with radial channels cut in wood, the height of the solution in the barrel *B* being maintained above the dipping end of pipe *e*. The vessel *E* contains the supply of acid, and is so arranged that a measured quantity can be drawn off. Pipe *F* connects with the acid-main, and pipe *G* with the water-main.