learnt, by supposing that it is required to place a mill-shaft, or wheel, at one end of a building, exactly parallel to another wheel, or shaft, at the other end: let one extremity of the water level be opened, and a float placed in the pipe on the water; then bring the point of the stem to the centre of the shaft, and there fix it. Proceed with the other end of the water level, to the spot where the other shaft end, or wheel, is to be placed, and opening the other stop-cock without spilling any water, the stem of another float, placed in it, will indicate, with the utmost precision, the exact point where the second wheel, or shaft, is to be placed, in order to be parallel to the first.

Any one who has seen by what tedious methods millwrights in general obtain the levels of their work, and who is at all acquainted with the indispensable necessity of obtaining such levels, for the extensive and complicated trains of mill-gear in large factories, will at once perceive the utility of a water level.

Mill-shafts and wheels are, sometimes, placed in situations where, on account of walls and other obstacles, it is impossible to procure a level for them all without drawing a multitude of lines and cross lines, one from another, and each succeeding line liable to increase the error of the foregoing. Now, by the application of my instrument, all difficulty is at once done away, for the pipes may be carried underneath or round the wall, or other obstacle, and show the truth at once. Neither is distance any impediment to its action; for, supposing a sufficient length of pipes to be procured, and that the points chosen be high enough, a wheel in London might be placed level with a wheel in Leeds.

In land surveying, canal building, and fortification, I trust it will be found equally useful.

The instrument that I have used, has been made entirely of leather, with two copper pipes, one at each end, and the whole filled with water; but to those who would wish to have it in a more polished form, it might be suggested to have it made of brass pipes, one-eighth or three-sixteenths of an inch bore, and eight or nine inches long, with air-tight metal joints, and, instead of floats, to have two small pistons with graduated stems. In this construction, mercury, instead of water, might be used, and the whole contrived to fold up into a small compass, to be carried in the pocket. [*Repertory.*]

On Refining Gold and Silver Articles. By M. CADET DE GASSICOURT.

[From *Annales Générales des Sciences Physiques.*]

SOME refiners of Paris have lately adopted a new method of *parting*, which offers great advantages. It is simple, easy, economical, and much less insalubrious than parting by nitric acid. It consists in six operations.

First operation.—Parting gold. On several furnaces a foot in diameter, vessels of platina are put, receiving each three kilo-

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grammes (about six pounds,) of silver in grains. Into each vessel, which is of an oval shape, six kilogrammes of concentrated sulphuric acid are poured.

Each vessel is covered by a platina cone, having at its summit an opening of about a quarter of an inch, to allow the escape of the disengaged gaseous vapours. A platina pipe may be fitted to this orifice, to convey the gas into a chimney, or else a glass tube to convey it into a Woolf's apparatus.

These platina vessels, placed in a proper situation, are heated for fifteen hours. The disengagement of sulphurous gas, takes place only during two hours. Care is taken to establish a draft in the chimney, which determines the sulphurous gas to rise in the tube or pipe, and not to spread in the laboratory, which would incommode the workmen.

Second operation.—Take the sulphuric solution out of the vessels, and dilute it. When its specific gravity is from 15 to 20 degrees, put in plates of copper to throw down a precipitate.

Third operation.—The silver precipitated by the preceding operation, is melted in a crucible, and cast into ingots.

Fourth operation.—The saturated solution of copper, is evaporated to crystallization.

Fifth operation.—Wash the sulphate of copper with boiling water, separating thus the fine crystals from the small ones, which are re-dissolved and placed anew to crystallize.

Sixth operation.—The metal which, in the platina vessels, resisted the action of the sulphuric acid, is gold.

It is a well ascertained point in metallurgy, that worked standard silver contains one-thousandth of its weight of fine gold. Formerly this gold was lost. At present, 1000 kilogrammes of silver, give, by this process, one kilogramme of fine gold, worth nearly \$500 francs, or about 150*l*. Now, if it be considered how many thousands of kilogrammes of silver are annually cast in coin, in commerce and the arts, we shall be convinced of the immense advantages to the state, arising from the practice of the new methods, for which we are indebted to Messrs. Darcet and Lebel.

On the application of the Moiré Métallique (Metallic Watering) to Tin Foil. By M. BERRY.

[From the Bulletin de la Société d'Encouragement.]

ALL leaves of beaten tin are susceptible of crystallizing, because the hammer has only broken, more or less, the tin crystals; and, without any other preparation, they give a larger or smaller grain.

It is not the same with laminated tin: the crystals are so exceedingly broken, that, on being taken out of the acid bath, the leaves of tin show only an oxydized surface, proving that the porosity is not the same as that of beaten leaves.

The means which I had employed for *moiré* tin-plates, became
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