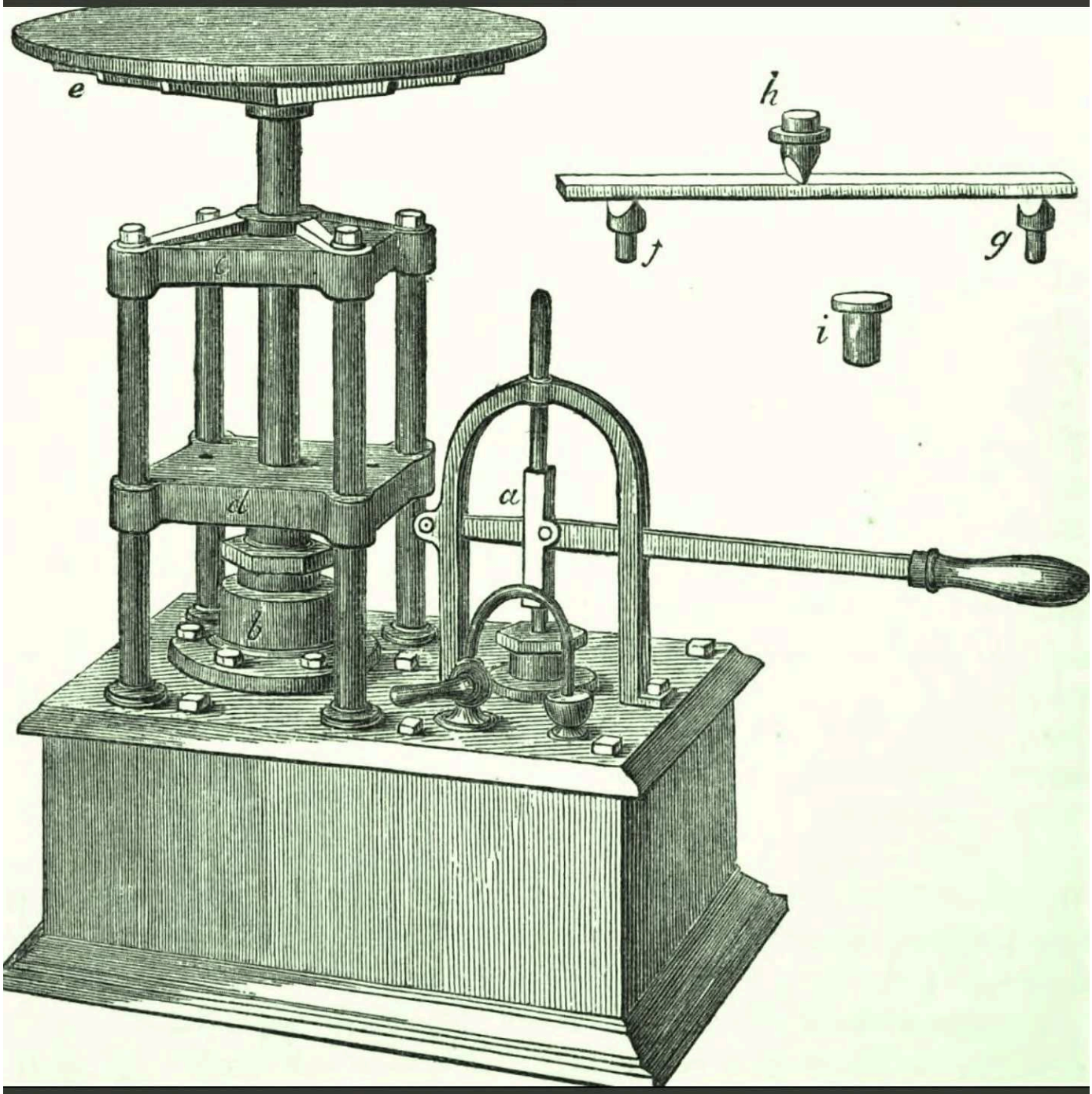

Scientific handicraft

John Joseph Griffin

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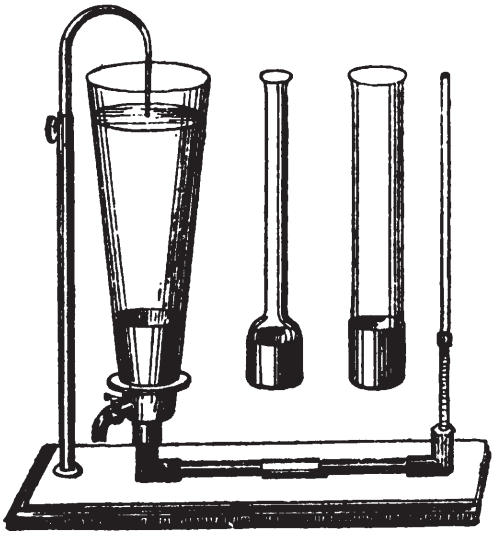
London, July, 1873.

column of water capable of bringing into equilibrium the weights on the balance is exactly equal in the two vases, although their forms and capacities are different.

"We repeat the experiment with the third vase, and find that the result is the same, not only with it, but with any other vase the lower orifice of which has the same diameter."—*Salleron.*

248. *Haldat's Apparatus*, for showing that the pressure of liquids depends upon the height and the extent of surface of the bottom of the columns, and not upon the capacities of the vessels. The apparatus is represented by fig. 248. It consists of three large glass vases, mounted with brass collars and screws of uniform size; it has a bent horizontal iron tube terminating at one end in an iron cup, to which the glass vases can be screwed one at a time, and at the other end with a vertical glass tube upon which slides a small brass ring. There is an upright brass rod with a moveable point to mark the surface of the liquor in the jar that is in operation. *Price of the set*, 2*l.* 2*s.*



248.

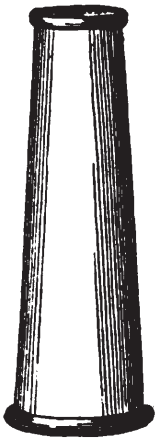
249. When the apparatus is to be used for an experiment the horizontal tube must be filled with mercury, which must be poured into the cup where the stopcock is fixed, but not so much of it as to cause it to run into the stopcock. The mercury then rises to a corresponding level in the narrow tube at the other end of the apparatus. One of the glass jars is then to be screwed on to the mercury box, and the brass pointer is to be adjusted, as shown in the figure. Water is then to be poured into the jar until it rises to the point of the indicator. When this is observed, the mercury will be found to have risen in the narrow tube at the other end of the apparatus; and the exact point to which it has risen is to be marked by means of the sliding ring. The water is then to be run off by the stopcock. Meanwhile the mercury in the narrow tube sinks down to its original level; but the position of the sliding ring is not to be altered. The glass jar is next to be removed and exchanged for another, which in its turn is to be filled with water till it rises to touch the point of the indicator. It will then be seen that the mercury has again risen in the narrow tube up to the sliding ring. The operation is to be repeated with the third glass jar, and it will be attended with the same result,

namely, that the three vessels when filled with water up to the brass pointer, all drive the mercury in the narrow tube up to the same level.

Note on Haldat's Apparatus.—In most books on Physics this apparatus is represented as sharing with Pascal's vases the property of demonstrating the truth of Pascal's principle, laid down in paragraph 245. We think it fails to give any such demonstration, and that it rather belongs to the apparatus described as illustrating paragraph 212, which treats of the level assumed by two different liquids in communicating vessels. The proof of this is, that for every inch which the mercury rises in the narrow tube of Haldat's Apparatus, the water must rise 13·6 inches in the large tube, whatever may be the form and capacity of the wide tubes, and whatever the area of their bases. The exact correspondence of the diameters of the bases of Haldat's vases does not *hinder* the performance of his experiments, and does not *help* it. Read paragraphs 212 to 216.

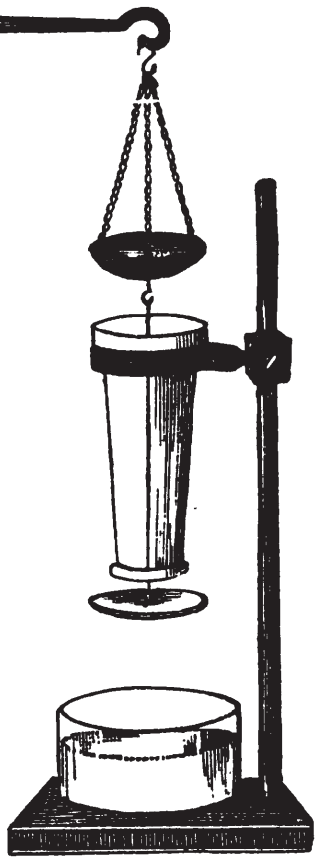
Apparatus for determining the Pressure on the Base of a Cone of Water in a Vessel without a fixed bottom.

250. *Cone.*—Fig. 250 represents the vessel employed for this purpose. It is a conical glass tube, 10 inches long, of 2 inches interior diameter at one end, and 2½ inches at the other end; or very nearly of these dimensions. Each end is made as level as possible, has a broad welt, and is finely ground. *Price* 3*s.* 6*d.*



250.

251. *Cone mounted for use.*—Fig. 251 represents the glass cone mounted for use. It is supported by an iron collar, attached to a strong iron support. The cone is protected by slips of caoutchouc tied on under the iron collar, without which it cannot with safety be screwed up tight. A ground disk of plate glass, 3 inches in diameter, is supported by a thread to the hook of a balance pan, namely, the small pan represented in fig. 122, which shows the balance that is suitable for



251.