

EXPLANATION OF THE PLATES.

PLATE 1.

- Fig. 1. An iron or brass mortar placed on a stand.
 2, 3. Marble and Wedgewood's ware mortars, with their respective pestles.
 4. A levigating stone and muller, consisting of *aa*, the muller, which is generally made of porphyry; and *b*, the table or slab, of the same substance, highly polished.
 5. A compound sieve, consisting of *b*, the lid; *c*, the body of the sieve; and *d*, the receiver.
 6. A rasp.
 7. A perforated support for phials, and for funnels.
 8. A graduated glass measure capable of holding four fluid ounces.
 9. A graduated measure for one fluid ounce.
 10. A minim measure open at both ends.
 11. A ribbed glass funnel.
 12. A compound syphon, placed in the situation in which it is used; *e*, a vessel containing the fluid which is to be drawn off into *i*, another vessel; *g*, the body of the syphon; *h*, the mouth-piece; *f*, the board for supporting the syphon in shallow vessels.
 13. A separatory, for separating fluids of different specific gravity. The mixture is introduced through the central mouth, which is then to be corked. By inclining the bottle to one side, and at the same time stopping the orifice on the opposite side, the fluids will separate; and when the finger is removed, the heavier will run through the lower orifice or neck before any of the lighter escapes.
 14. A separatory funnel, for separating essential oils from the water with which they come over in distillation.

PLATE 2.

- Fig. 1. The common still fitted to a portable furnace. The still consists of two parts; *a*, the head or capital; *b*, the body, which is partly sunk in the furnace. From the top of the head rises the curved pipe, *c*, which enters the upper part of *d*, the serpentine or worm, placed in *B*, the refrigeratory.
 2. A *Black's furnace* (portable furnace); *f*, an opening for admitting the fuel into the body of the furnace, and receiving the sand-bath *n*; (fig. 3.) *e*, the chimney, which may be lengthened by the addition of iron tubes: *ggg*, rings intended to support an upright iron wire, or pillar, which has a corresponding one on the opposite side of the furnace, and a cross strong wire being stretched between

them serves to suspend any vessel over the furnace: *h*, an earthen or iron tube, which passes through the body of the furnace, and issues at the opposite side, intended for procuring hydrogen gas; or into the hole on one side, if the opposite hole be shut, the muzzle of a pair of bellows may be inserted; *k*, an opening closely fitted with a sliding door for receiving a muffle; *l*, a sliding iron plate which may be made to cover any number of holes opening into the ash-pit, so as to regulate the draught of air; *m*, the door of the ash-pit.

Fig. 3. *n*, An iron pot, intended for a sand-bath; *p*, a cover for this pot, or for the opening into the body of the furnace when the pot is not used; *o*, a stopper, which fits accurately the perforation in the centre of *p*.

4, 5. Different kinds of crucibles; *a, a*, the lids; *b, b*, the bodies of the crucibles; *e, e*, the stands or supports.

PLATE 3.

Fig. 1. A Wedgewood's ware evaporating dish.

2, 3, 4, 5. Parts of a water-bath, for preparing extracts, invented by Dr. Powell. *a*, fig. 2. a common tin vessel, with *b*, a projecting spout, through which the steam may pass, and additions of water be made when necessary: *a*, fig. 3. upper concave surface of the cover, or evaporating pan, the edge of which projects over that of the vessel; *b*, its handle. Figs. 4, 5. Sections of two different evaporating pans, one much deeper than the other.

6. Mr. Paul's alcohol blow-pipe. *a*, A hollow frame of wood, five inches in its longest dimension, supporting the pillar, *d*, and the two lamps, *b, c*; the rim, *e*, slips upon the pillar *d*, as low as the shoulder of the latter will permit; but it may be raised or lowered at pleasure, and kept fast by the screw peg, *f*. The rim supports *g*, the boiler, which is a hollow piece of thick brass, which will hold about f3j of alcohol, and has four openings; three, *h, i, k*, at the top, and one at the bottom, to receive the tube *o*. The latter is long enough to reach to the level of the outside of the boiler, and consequently the alcohol in the boiler cannot readily boil over into the tube; and the opening *k*, which corresponds with it, is closely shut by a screw stopper, hollowed out a little beneath, to allow the free passage of the vapour down the tube. By the contiguity of *o* to the lamp *b* the vapour is prevented from condensing, and as it passes on through the globe *q q*, into the jet tube *r*, it is directly kindled by the flame of the lamp *c*; and the united flames being violently propelled sideways, a long pencil of blue flame is formed, and remains as long as any alcohol is left in the boiler. The boiler is filled at the opening *h*. The central hole, *i*, is nicely fitted with a brass plug, kept down by a thin slip of iron, *l*, which is confined at one end between two flat screws, *m, n*, on the top of the upright pillar. This

acts as a safety-valve, to prevent the vessel from bursting when the vapour cannot escape quick enough at the jet-pipe *r*.

7. A precipitating jar.
8. An iron ring, for cutting glass vessels by means of heat.

PLATE 4.

Fig. 1. Fire-tongs.

2. A muffle.
3. A glass-retort.
4. A proof bottle, for extricating gases without heat.
5. A small matrass, with a twisted wire for holding it.
6. A ribbed glass funnel.
7. An apparatus for digestions.
8. A set of aludels.
9. *a*, A tubulated retort. *b*, An adopter, for extending the distance through which the volatilized matter must pass before it enters, *c*, the receiver.
10. A glass alembic and globe receiver. *a*, The head or capital covering; *b*, the cucurbit or boiler, the bottom of which is made thin, in order to bear a lamp heat: *c*, the receiver into which the beak of the capital enters.
11. A common flask.
12. A retort funnel.

PLATE 5.

Fig. 1. Woulfe's APPARATUS, consisting of the following parts:

- *a*, an iron or brass stand, with a sliding ring, for supporting the retort; *b*, a tubulated retort; *c*, a tubulated receiver, placed on a wooden tripod, *m*; *d*, Welter tube of safety; *f* the conducting tube; *h*, other conducting tubes; *e*, *g*, receivers; *k*, a pneumatic trough, containing *i*, an inverted jar; *l*, a small Argand's lamp.
2. *a*, *b*, *c*, *d*, A range of round receivers, which may be used in the same manner as Woulfe's apparatus; *e*, a safety tube.
3. A machine for dividing equally any mass intended to be rolled into pills.

PLATE 6.

STEAM LABORATORY AT APOTHECARIES' HALL.

- Fig. 1. A copper boiler with a safety-valve, float-stone and other appurtenances of the steam-engine boiler.
2. The steam-pipe, which entering the laboratory, ramifies in every direction below the pavement of the laboratory. It is marked 2 throughout.
 3. and 4. The boilers and stills which it supplies; they are of block-tin and copper, with an outer casing of cast-iron, there being a cavity between the two vessels, for the passage of the steam. *aa*, Worm-tubs belonging to the stills.

5. Cast-iron pipes, conveying the condensed water through the syphon into the hot water cistern 7, whence it is occasionally forced into the boiler by the process 8.
 6. Small vessels constructed similarly to those marked 3, for distillation in glass retorts.
 6. The chimney of the boiler which passes under the floor of the laboratory; *ee* valve boxes.
- Fig. 2. Represents a section of the boiler: 1. the steam boiler; 2. the main steam pipe; *c*, the safety-valve; *d*, waste pipe; *k*, registers of the steam-cocks; 3. evaporating boilers; 5. the condensed water-pipe.
3. Section of the steam-boiler, shewing the connexion of the steam and condensing pipes, with four smaller evaporating pans.
 4. *w* and *v*. Are top and side views of a valve-box, attached to the extremity of the main steam-pipe at *e*, fig. 1. in order to carry off any water produced by the condensation of the steam in the main without suffering steam to escape.
 2. Termination of the steam main; *g*, the cork float, which when raised by water in the box, opens the cock, *h*, and suffering it to run off the float subsides and closes the cock; *i*, fig. 5. is a cock by which the air is suffered occasionally to escape from the steam-pipes.

Similar boxes are attached to several of the condensing pipes of the other vessels.

PLATE 7.

The annexed plate represents an elevation of one side of the STEAM LABORATORY; the ground plan of which was given in the last plate; the figures and letters of reference are the same as before.

2. The main steam-pipe.
3. An evaporating boiler.
4. The stills. 5. The condensed water-pipe. *k*, The steam cocks with their registers.
- a*, The worm tubs.
- n, n*. Pipes carrying off hot water from the surface of the worm tubs, the place of which is supplied by cold water entering below, from the back *l*.

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