A SIMPLE AIR BATH FOR LABORATORY USE.

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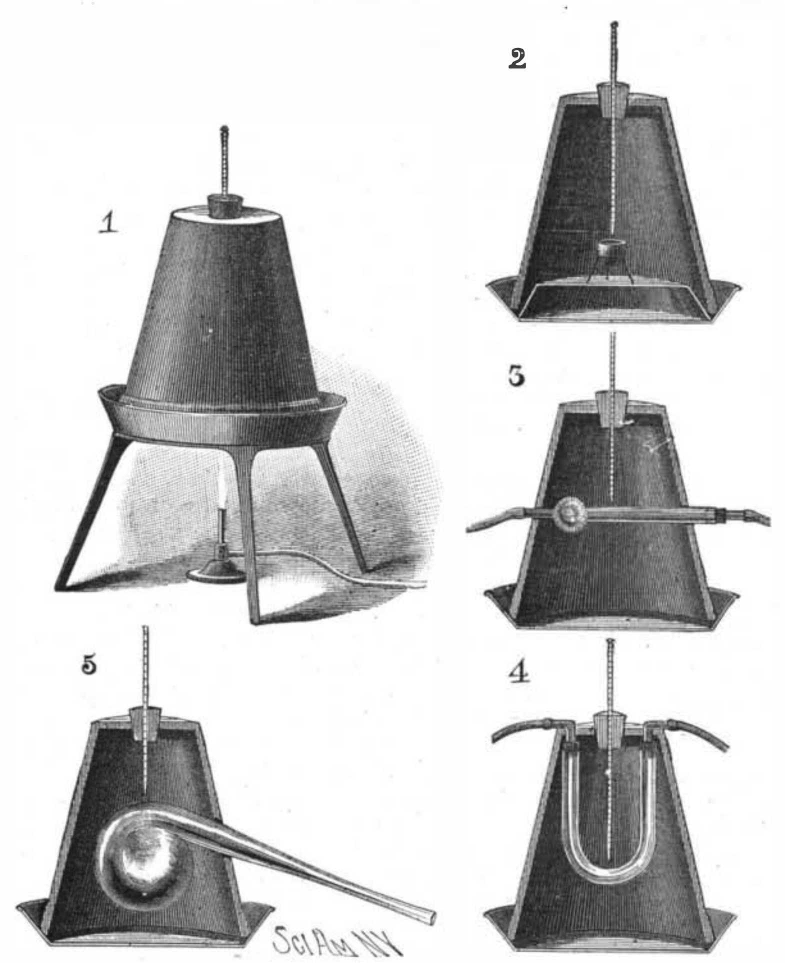
The air bath ordinarily used in chemical laboratories for drying precipitates, for making determinations of water by loss, and for similar purposes, is usually a rather expensive piece of apparatus. The iron or copper closet, with its door, tubulure for thermometer, shelves, stand, etc., works no more satisfactorily because of its somewhat elaborate or difficult construction. In the cuts is shown a simple substitute for this apparatus, that as regards simplicity cannot well be excelled, while its other good features certainly operate to commend it. It consists of an inverted flower pot sustained upon an ordinary tin pan or sand bath, the whole being carried by a tripod or retort stand. The aperture at the top serves to receive a perforated cork, through which a thermometer is passed. An ordinary Bunsen burner is used to heat it. As the sand bath directly over the burner becomes very hot, it is advisable to invert a second smaller sand bath within the first, as shown in Fig. 2. This prevents too direct a radiation of heat from the hot metal. Upon this the little stand or bent triangle supporting the crucible or watch glass containing the substance to be heated may be placed. The thermometer should be thrust down through the cork until its bulb is near the substance to be dried, so as to obtain a correct indication of the temperature at that point. The entire arrangement is shown in external view in Fig. 1.

To place a vessel in it or to remove one, the flower pot is lifted off the sand baths. It will be observed that its porous nature provides a species of ventilation, while its composition assures it against corrosion. It even protects the plates below to a considerable extent, as drops of water or other fluid cannot run down its sides as it cools.

But convenient as it is in the role of air bath for simple drying operations, it will be found more so where drying tubes or retorts have to be manipulated at constant temperature. The flower pot can be perforated at any place, and holes of any size or shape can be drilled and cut through it with an old knife, file, or other implement. Thus in Fig. 3 it is shown in use for drying a substance at constant temperature in a straight drying tube. The holes to receive this tube can be drilled in a few minutes. The arrangement as shown is of the simplest kind, but if the usual bath was used, it would require a special tubulation to be introduced or contrived for the tube to pass through. Flower pots cost so little that there need be no hesitation in preparing them for special uses.

In Fig. 4 a U tube is shown as being heated, while in Fig. 5 a retort occupies the bath, and is in use for fractional distillation or other operation requiring a constant temperature. In all cases it is better to use the second bath inverted within the chamber. It conduces greatly to the maintenance of an even temperature throughout the whole space. A hint may also be taken from the heavy drying plate formerly perhaps more used than at present. If for the light metal pans a heavy plate one-eighth inch or more in thickness is substituted, the temperature will not be subject to as rapid variations, and less difficulty will be experienced in keeping a constant temperature. The tray furnished with the next large size of pot may be used instead of the sand bath upon which to rest the inverted flower pot. This gives an absolutely non-corrodible construction.



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When the bath is in use for drying substances, its top, which is at a rather low heat, affords an excellent place for drying precipitates wrapped in their filter papers. It acts in two ways. It is generally just hot enough to dry them with reasonable quickness without danger of spurting, and it also acts by capillarity to absorb the water directly. It represents in the last respect the porous tile or blotting paper—appliances too little appreciated by chemists here. It must be remembered that the drying of a precipitate by evaporation leaves all the impurities of the wash water concentrated therein, while capillary absorption removes a great part of both wash water and its impurities, thus conducing to the accuracy of the work.

THE *Medical Record* says: The alkaline bichloride treatment of yellow fever, as suggested by Dr. Sternberg, was carried out during the epidemic at Jacksonville, and Dr. Sollace Mitchell reports that it was very effective. The formula finally used was:

℞. Sodii bicarbonat.................................... gr. x. —lx.
Hydrarg. bichlorid.................................... gr. 1/30.
Aquæ puræ. .... ℥iv.

M. Sig.—Give ice cold every hour during the day, and every two hours during the night.

The bichloride has a powerful diuretic effect on the kidneys, lessening the albuminaria. The alkaline corrected the acidity of the intestinal contents.

Cavalry Riding Drill.

The first riding lesson usually takes place in the "riding school," where, as the floor is covered with "tan," the recruit who comes off will fall softly. The military authorities don't want their recruits laid up in hospital. The first lesson consists of leading the horse around the riding school; so that the axiom of learning to creep before walking is slightly modified here, for the recruit learns to walk his horse before riding him. When he has led his horse around for a while, the horse's head is brought in from the boards (*i. e.*, the walls of the school), and the recruit is taught to "stand at ease" and to step from side to side of his horse's fore feet in measured paces. Then comes the "mount;" and usually the unfortunate recruit has no sooner got up on one side than he rolls over on the other, owing to the vagaries of his horse, who knows that he has a recruit in hand and takes advantage of it. Presently the order is given to "march;" and away file the horses around the school walls, many of the recruits thinking that horseflesh is very perverse in rubbing its side against the school wall with the recruit's leg for a buffer. The day when I got my first riding lesson many of us started off by pulling on our horses' mouths, and got (to quote our rough rider) "all over the shop like a pack of sheep." After a few turns round—during which the "rough" taught us the aids to horsemanship in the preliminary stages of the "walk"—we learned that we were not to "pull our horses' heads off," but to handle the reins gently by feeling them with our wrists and not with our whole arms. All we had to do (we were told) was to sit there and keep our bodies upright with our chests forward, by hollowing the back and drawing in our stomachs, as well as to keep our "chins off our stocks" and our heads up.

We began to see that learning to ride was no trifling job. When it came to fixing our legs, getting them well back, raising our toes and sinking our heels, we got more to do than we ever bargained for. Your teacher is a hard man to please; and I'm sure that by sheer practice recruits at Canterbury have got all their stomachs pressing up against their diaphragms. Otherwise how do they muster such small waists and such pigeon-like chests? The fact is that lungs, heart, liver, stomach, and spleen are all packed together chestward, like a tin of Australian mutton. Whether nature ever intended such cramming is a question that the military authorities don't study. Make your men as wooden as possible—never mind nature—is their dictum; and certainly they are listened to. After we had done a little walking around the riding school, we got more confidence; and thought, no doubt, that we should like a bit of a "trot," just to see what that was like. When it did come to trotting many of us fell off, or nearly fell off, and we went hobbling around the school—to quote our rough-rider again—"like a lot of stuffed dolls riding yer horses from nose to croup." And certainly many of us were more often on our horses' withers and haunches than on the center of their backs, and we had our arms more often round their necks than holding our reins. The "rough" called us to a halt, and even here we were at fault. Some of us pulled too much, or we pulled too little, or we pulled awry, with the result that our horses were "all over the shop." When at last we had stopped, our friend the "rough" again let us know a bit of his mind about our first appearance as cavalrymen. He "never saw such a bloomin' lot of asses in all his born days; my old mother could ride better than you," etc. He had probably told the same yarn to generations of recruits; but really we believed that we were a set of out-and-out duffers.

After a few months' riding drill the cavalryman learns to ride his horse at all paces; and when he can take him through the turns, circles, and windings of the *ménage* drill, and knows how to use his "arms" mounted, he is fit to call himself a real cavalryman, and is ready to go and fight his country's wars when he gets the chance. If the reader wants to learn more of cavalry equitation, he had better join. A few months' drill will teach him all that he will care to learn.—*St. James's Gazette.*

Coloring of the Steam Jet.

The following notes on the phenomena of the steam jet are contributed by Von Helmholtz to *Wiedemann's Annalen*. In the course of his experiments he noted that a jet of steam escaping from a hole of one or two millimeters diameter, lighted obliquely and observed upon a black background, is invisible at the lower extremity, and presents toward the top the well-known whitish appearance. This aspect may be modified in many ways. If an electrified point is brought near the steam, the jet immediately becomes azure blue, or, according to the power of the electrical machine, purple, red, yellow, green, etc. These tints are intimately connected with the dimensions of the liquid drops, and hence it follows that the electrical point has the power of provoking condensation of the supersaturated vapor which is found at the lower part of the jet. The same result is obtained by bringing near to the steam jet a platinum wire made incandescent by an electric current, or silver, iron, copper, or brass wires simply made red hot in a flame, or even glass heated below the red, or an organic matter, wood, paper, etc., in a state of slow combustion. The products of any flame whatever, with the exception of the flame of pure alcohol, directed upon the jet steam by the aid of a chimney or by simply blowing, produce a very energetic effect. Finally, traces of certain chemical substances introduced into the steam jet cause the same modification. Among these are hydrochloric and nitric acid; but concentrated sulphuric acid especially shows the phenomenon. It is known that solid dust particles provoke the condensation of supersaturated vapors, but their presence cannot be invoked here to explain the preceding facts.

Helmholtz is of opinion that they may be attributed to a molecular concussion, the effect of which may be compared to that of mechanical concussion upon superheated or supersaturated liquids. A flame, for example, is the scene of closely approximated and extremely varied movements, and the chemical atoms which are incessantly passing in it from one combination to another are found in every kind of unstable condition. These movements and changeful states of equilibrium leave their traces in the products of combustion at a certain distance from the flame properly so called, and determine the observed phenomena. The luminous effect produced as the extremity of an electrified point and the presence of ozone in its vicinity show that this point is the cause of concussions comparable to those provoked by active combustion, and the analogy between the two phenomena is found again in the fact that they both furnish means for making electricity pass through gas. As to solid incandescent bodies, they can act either through the emission of solid particles from their surfaces or by the chemical concussions which they communicate to the surrounding gases.

A Far-sight Machine.

Mr. Edison is reported, in a conversation with a reporter who solicited his ideas on the subject of the projected world's fair in New York City, as saying that he would take an acre of space in such a fair and completely cover it with his inventions, of which he has no less than 70 now under way. "One of the most peculiar, and now promising good results," said Mr. Edison, "is what I may call a far-sight machine." By means of this extraordinary invention, the *Electrical Review* says, he hopes to be able to increase the range of vision by hundreds of miles, so that, for instance, "a man in New York could see the features of his friend in Boston with as much ease as he could see a performance on the stage. That," he added, "would be an invention worthy a prominent place in the world's fair, and I hope to have it perfected long before 1892."