Equipping your CHEMICAL LAB

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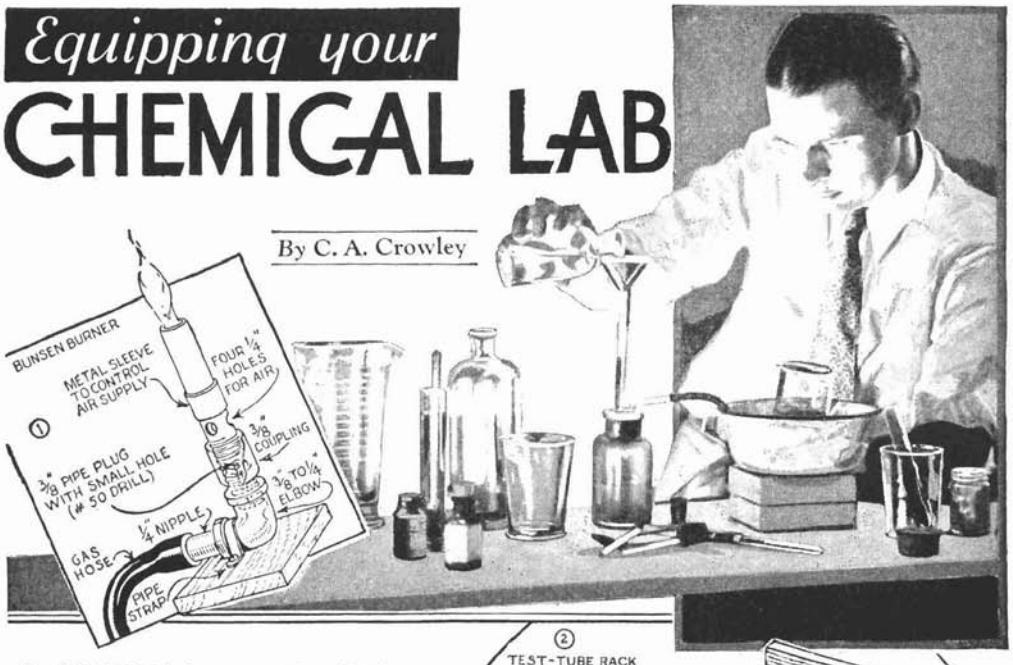
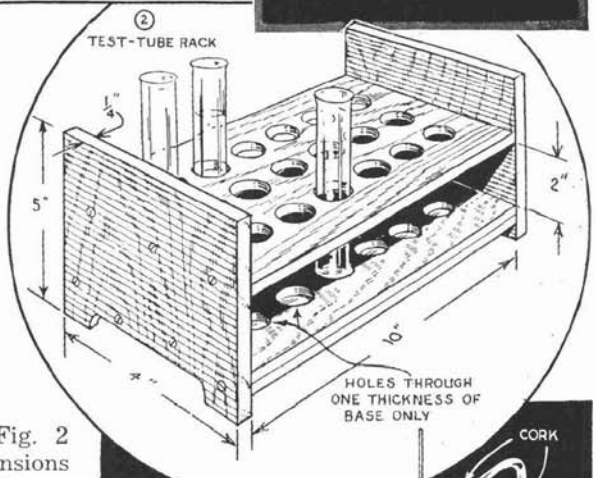
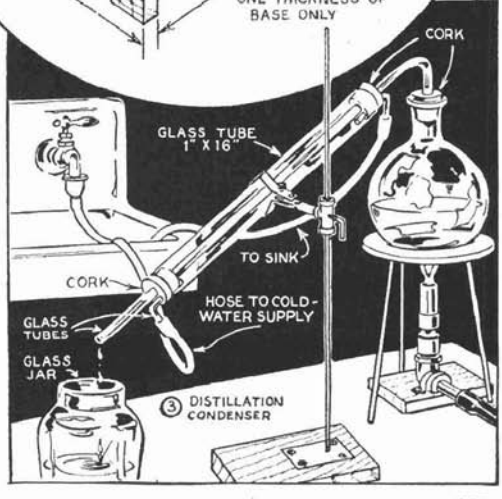
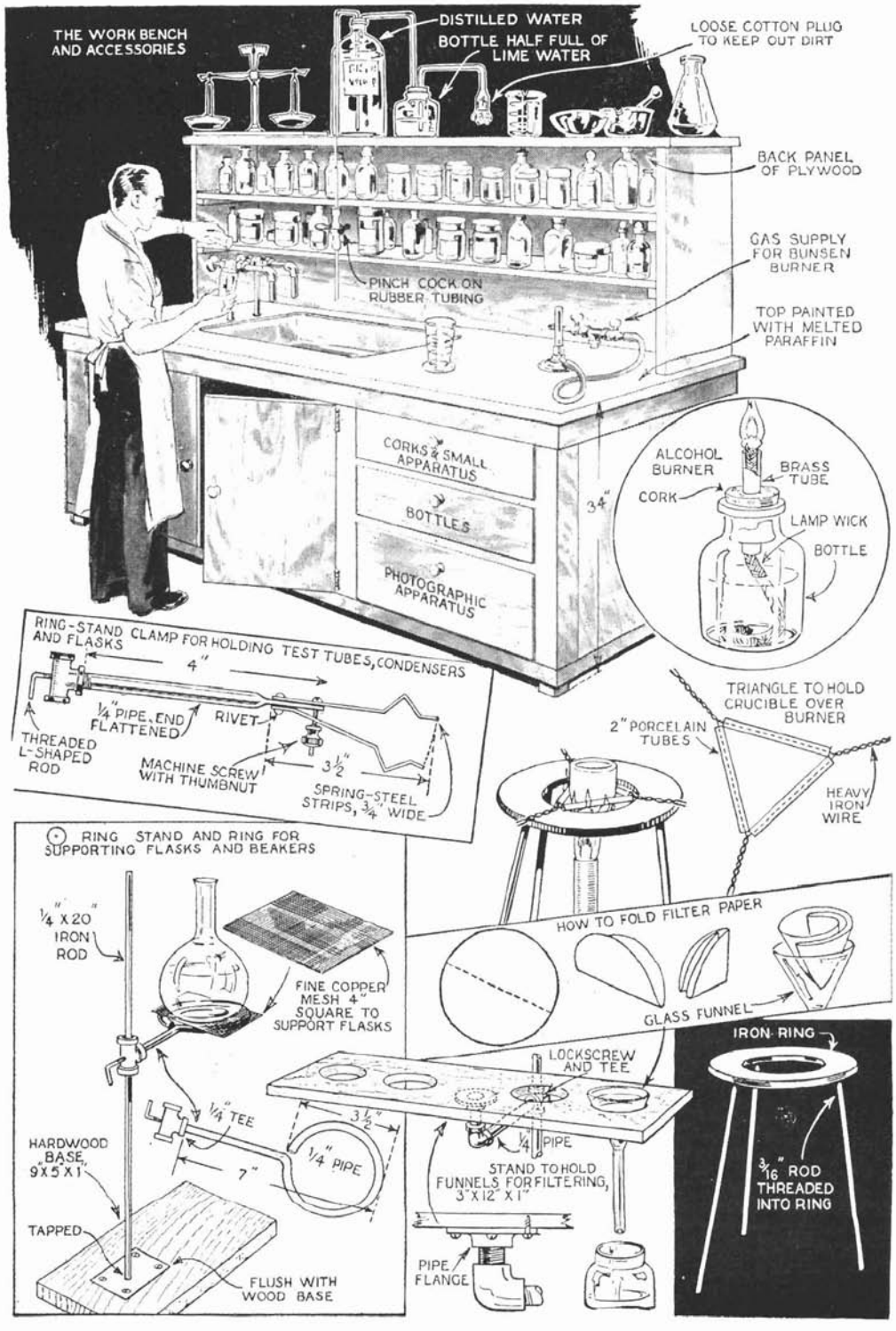


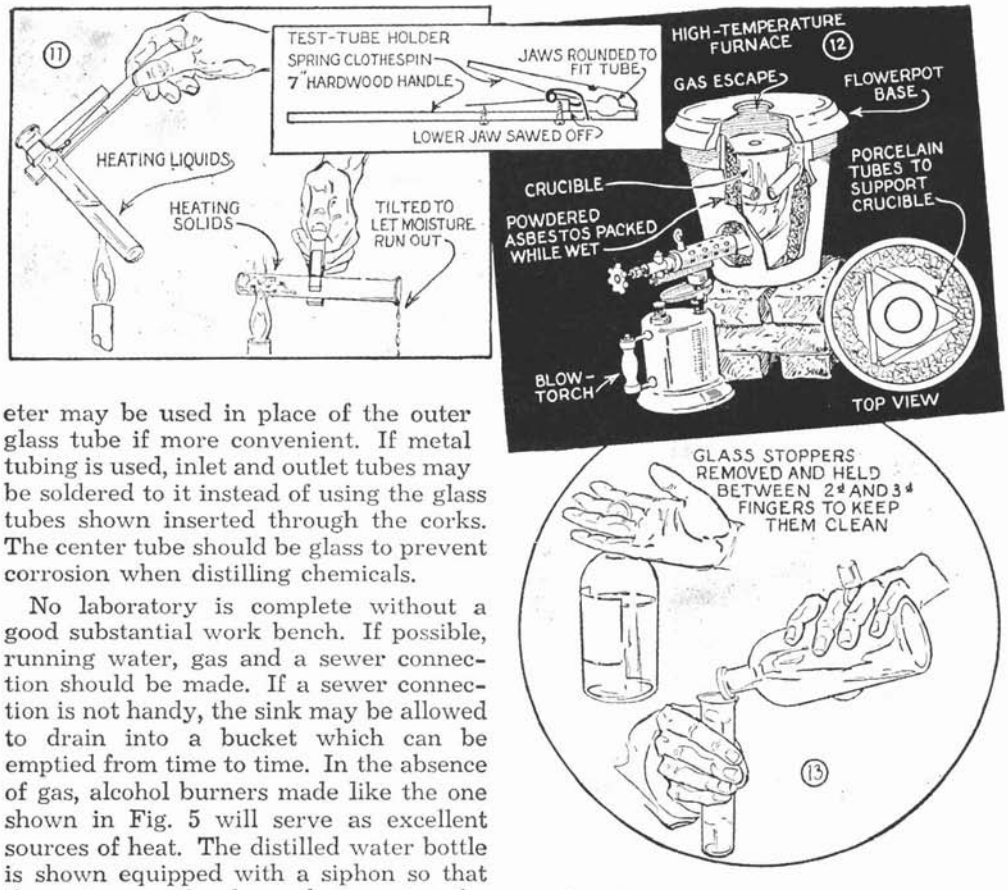
A SIMPLE laboratory in which many miracles of chemical magic may be made to take place at your command can be easily assembled at almost no expense. In Fig. 1 you will find complete details for making an efficient Bunsen burner from pipe fittings and a few other odds and ends. The hole drilled through the pipe plug to admit the gas should be small. The sleeve, which is slipped over the burner tube, permits the flame to be adjusted so that it is very hot and almost colorless. Fig. 2 shows a test-tube rack. The dimensions may, however, be varied to suit. The top board and the upper section of the base board are lightly nailed together, laid out and drilled with a bit of the proper size to accommodate the tubes. Holes ¾ in. in size are convenient. The boards are next drilled while still nailed together. After drilling they are separated and mounted between end pieces as shown. An undrilled third piece of wood, the same size as those drilled, is mounted under the bottom drilled piece to support the tubes.

A distilling condenser of homemade construction is shown in Fig. 3. Gas pipe or thin-walled metal tubing, 1 in. in diam-






THE WORK BENCH AND ACCESSORIES
DISTILLED WATER
BOTTLE HALF FULL OF LIME WATER
LOOSE COTTON PLUG TO KEEP OUT DIRT
BACK PANEL OF PLYWOOD
GAS SUPPLY FOR BUNSEN BURNER
PINCH COCK ON RUBBER TUBING
TOP PAINTED WITH MELTED PARAFFIN
CORKS & SMALL APPARATUS
BOTTLES
PHOTOGRAPHIC APPARATUS
34"
ALCOHOL BURNER
BRASS TUBE
CORK
LAMP WICK
BOTTLE
RING-STAND CLAMP FOR HOLDING TEST TUBES, CONDENSERS AND FLASKS
4"
¼" PIPE, END FLATTENED
RIVET
THREADED L-SHAPED ROD
MACHINE SCREW WITH THUMBNUT
3½"
SPRING-STEEL STRIPS, ¾" WIDE
TRIANGLE TO HOLD CRUCIBLE OVER BURNER
2" PORCELAIN TUBES
HEAVY IRON WIRE
RING STAND AND RING FOR SUPPORTING FLASKS AND BEAKERS
¼" X 20" IRON ROD
FINE COPPER MESH 4" SQUARE TO SUPPORT FLASKS
¼" TEE
3½"
¼" PIPE
7"
HARDWOOD BASE, 9"X5"X1"
TAPPED
FLUSH WITH WOOD BASE
HOW TO FOLD FILTER PAPER
GLASS FUNNEL
LOCKSCREW AND TEE
¼" PIPE
STAND TO HOLD FUNNELS FOR FILTERING, 3"X12"X1"
PIPE FLANGE
IRON RING
3/16" ROD THREADED INTO RING



eter may be used in place of the outer glass tube if more convenient. If metal tubing is used, inlet and outlet tubes may be soldered to it instead of using the glass tubes shown inserted through the corks. The center tube should be glass to prevent corrosion when distilling chemicals.

No laboratory is complete without a good substantial work bench. If possible, running water, gas and a sewer connection should be made. If a sewer connection is not handy, the sink may be allowed to drain into a bucket which can be emptied from time to time. In the absence of gas, alcohol burners made like the one shown in Fig. 5 will serve as excellent sources of heat. The distilled water bottle is shown equipped with a siphon so that the water may be drawn by pressing the pinch cock. The second bottle, attached by glass tubing, washes the air and thus prevents contamination of the pure water. Fig. 6 shows details for making serviceable burette clamps such as are used to support distilling condensers and flasks on tripods over burners for heating. Fig. 3 shows one of these clamps in use. Details for making the tripod are shown in Fig. 10. This illustration also shows a simple method of making a ring which can also be attached to the stand for supporting apparatus. In Fig. 7 are shown details for making a triangle and crucible stand, which is very handy for heating dry chemicals.

The proper method of folding filter paper and inserting it into a funnel is shown in Fig. 8 just above the details for the filter rack. Filter racks of this type are supported on a ring stand. The unit is assembled from pipe fittings and a piece of wood bored as shown for the funnels.

When heating substances in test tubes breakage is avoided by following the suggestions shown in Fig. 11. Fig. 13 shows the proper method of removing stoppers from bottles to prevent their becoming dirty and thus contaminating the contents of the bottle when replaced. When intense heat is required it may easily be produced by directing the flame of a blowtorch into a hole cut in the side of a flowerpot as shown in Fig. 12. It is very convenient for melting metals and making alloys.

Solution to Color Electric Lamps

Electric lamps and other glass objects may be evenly stained to any desired color by either dipping or painting them with one of the following preparations: First dissolve bleached shellac, 3 oz., powdered rosin, 1 oz., and gum benzoin, 1 dr., in denatured alcohol, 10 oz. Then add in alcohol-soluble aniline dye.

Door Knobs Serve as Pestle in Emergency

Amateur chemists who need a pestle for crushing crystals of various kinds, will find that a pair of discarded door knobs and a strong bowl serve the purpose. A little friction tape wound around the knob held in the hand will improve the grip.

Glass Etching Simplified

Your name, initials or any other design can be etched on glass by using a simple paste solution and a stencil. The etching paste consists of an acid solution, which is mixed with a quantity of Mallinckrodt roach-killing powder, containing 95 percent of sodium fluoride. If this specific powder is not available at your local druggist, he will be able to obtain it for you.

First make up the acid solution which consists of glacial acetic acid, 3 parts; distilled water, 3 parts; sulphuric acid (add cautiously), 1 part. Then add the powder until you get a smooth paste. This will produce a mat finish when applied to glass. The etching paste must be mixed in a lead or wax-impregnated container. If a very small quantity is to be mixed you can do it on a sheet of waxed paper. It is applied to the glass with a toothpick-and-cotton swab or with a lead spatula. Be careful not to allow the paste to touch the skin, as it will cause burns and for this reason it is advisable to wear rubber gloves. Should any get on the skin, wash off immediately with running water.

Then get a suitable stencil to cover the portion of the surface to be etched. The stencil can be stuck to the glass with rubber cement. Next, apply a coat of yellow beeswax over the entire surface not covered by the stencil. One method of applying wax is by means of a brush. Dip this in turpentine, rub it on a cake of wax and then apply it to the glass. The wax must dry before the stencil can be removed. Another method of applying wax is to spray it, using equal parts of paraffin and yellow beeswax over both stencil and work, the wax being dissolved in gasoline to make a solution suitable for spraying. In using the spray gun, the wax will run if it is held too close to the stencil; if too far away, the deposit will be in tiny beads. The correct distance is found easily by trial. Suitable stencils can be obtained at any paint or wallpaper store, if you do not wish to cut your own. Small paper doilies make excellent stencils and are available in many designs. Masking tape also comes in handy for straight lines and blocking off areas.

A wax china marking stencil can be used to draw on glass and will form a good etching resist when you want the lines instead of the background to be protected. Cut pieces of adhesive tape into small stencils such as stars, moons and other tiny figures, and stick them directly to the work as a resist. Coat the back of the tape with wax and cover the adhesive side with waxed paper while cutting the design. The waxed paper will peel off readily afterward. Another practical resist is a soft, heavy cord soaked in melted wax. Shape it to form the required design and stick it to the glass while the wax is warm.

By following this simplified process, anyone can make glass etching an enjoyable hobby. Only ordinary skill is required and there's no end to the number of attractive designs that can be etched in mirrors, tumblers, plates and other dishes. Even silhouettes of yourself or members of your family can be copied from photographs and used to provide a personal touch.

Corrosive Acids Filtered Safely

A piece of glass wool will serve as a filter when straining dirt or sediment from corrosive acids. If a funnel is used, it's a good idea to attach the wool to the end of a glass stirring rod, with copper wire, for easy handling.