It will readily be seen that the lamp is simple to operate and of great efficiency. It is hoped that it will prove to be of value in extending the use of ultraviolet light in biological and photochemical investigations.

CAMBRIDGE, MASS.

NOTES.

A Simple Stone-frame Chemical Hood.[1]—In the equipment of three of the laboratory rooms recently fitted out at the Bureau of Standards, a somewhat novel type of chemical hood has been installed, the design of which is being considered for general use in the equipment of the chemical building which is now being planned for the Bureau. It is believed that this hood solves a number of difficulties which have been met by other chemists in so satisfactory a way that a description of it will be of general interest. Fig. 1 shows the general

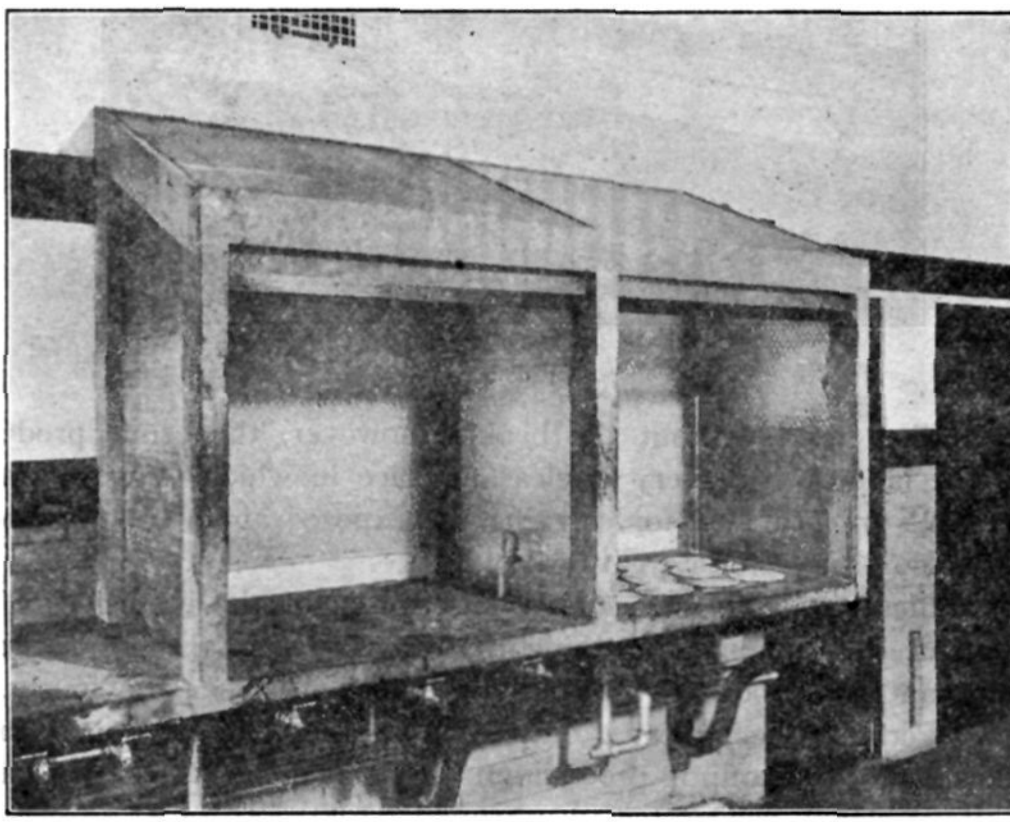


Fig. 1.

character of the simpler form of hood which has been used. This hood has the following advantages:

(1) It is simple, neat in appearance, of light weight, well lighted and, for a stone-frame hood, comparatively inexpensive.

(2) The inside of the hood, except the floor, is almost entirely of glass. There is no wood or metal at any point within the hood nor are there

[1] Published by permission of the Director of the Bureau of Standards.

any exposed joints of the stone frame; hence the hood is practically as resistant to chemical action as an all-glass vessel.

(3) There are no doors or other movable parts, hence no mechanism to break or get out of order. The hood is so designed as to give efficient ventilation when sufficient fan capacity is provided. The shape of the hood with low roof sloping to the front favors efficient ventilation, reduces to a minimum the surface upon which vapors condense in cold weather, and makes all parts of the hood, both inside and out, readily accessible for cleaning. For extreme conditions, where doors are required, the second form described below may be utilized.

(4) There are no horizontal surfaces within the hood upon which dust can collect and no edges from which condensed steam or acids are likely to drip or spatter into vessels within the hoods.

(5) A false back or baffle plate is provided which very effectively distributes the draft over the face of the hood and provides openings which can be adjusted for fumes both lighter and heavier than air. This baffle plate also prevents any dirt which falls or is blown down the flue from entering the hood and contaminating solutions.

(6) The glass, which forms the sides, partition, baffle plate, top, and front, slides into place after the frame is complete and requires no fastening. Any piece can, therefore, be removed for cleaning or can, if broken, be replaced in a few minutes.

For use in laboratories where a hood with doors is required, the design of the front of the hood shown in Figs. 1 and 2 is changed to that shown in Figs. 3–6. In this form, the horizontal stone strip across the front of the hood, which supports the front edge of the roof glass, is shaped as shown in section in Fig. 5, in order effectually to prevent dust from the roof sifting down inside the sliding door. Channel irons are attached to each side of the wooden sash of the doors and extended down through the base of the hood into the pipe supports. Chains attached to the lower ends of these channel irons run over pulleys just under the hood base to counterweights hung in any convenient manner at the back of the hood. The counterweights may be placed inside of the rear pipe supports, if desired. By the use of this system, the doors are counterweighted by a mechanism that is entirely out of the way and almost entirely out of sight without the cost or waste of space made

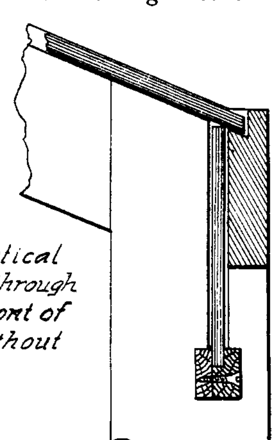


Fig. 2. Vertical section through top of front of hood without doors.

necessary by boxing-in, as is usually done in stone hoods, and without suspending the counter weights from any unsightly superstructure.

The frames of these hoods are fastened together with dowels inserted in holes drilled into the stone from the outside of the hood so that the dowel will not be attacked by acid fumes. The back of the hood is set directly against the wall, which is preferably covered with glass or glazed tile.

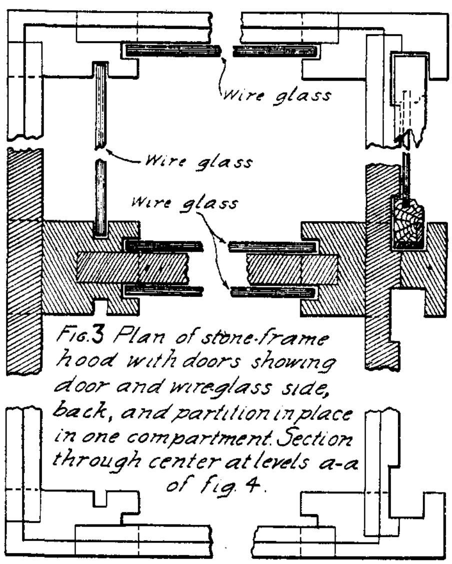


Fig. 3 Plan of stone-frame hood with doors showing door and wireglass side, back, and partition in place in one compartment. Section through center at levels a-a of fig. 4.

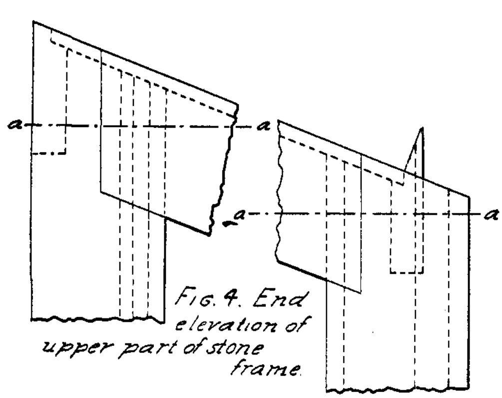


Fig. 4. End elevation of upper part of stone frame.

A separate vent through the wall may be placed for each compartment or a single vent may be made in the middle of the hood to draw equally from the two compartments. The height of the vent and the width of opening above and below the baffle plate determine the relative amount of air drawn from the top and bottom of the hood and may be varied to suit the character of the fumes which it will generally be desired to remove. In the hoods placed in this Bureau, openings of four inches and six inches are left, respectively, above and below the baffle plate.

The two-compartment hoods without doors have been in use for nearly two years and have given perfect satisfaction. Fumes of all densities are removed with equal facility; and with an efficient ventilating fan in operation no fumes from any part of the hood escape into the room.

Anemometer tests were made to determine the volume of air required to give good ventilation. These tests were made in the front of the hood, both compartments of which were ventilated by a single duct, with only about one-third the normal front opening, the assumption being made that the reduction in front opening would not seriously affect the amount of air which would pass out through the comparatively small vent. It was found that about two hundred cubic feet per minute passed through each compartment and that neither the total amount of air nor its distribution between the two compartments was materially changed by removing the baffle plate from one compartment. This volume of air would require a velocity of about thirty feet per minute over the full hood opening. Immediately following these tests, and with a full front opening, clouds of sulfur trioxide were liberated in various parts of the hood and were removed rapidly without contaminating the air of the laboratory. Many other similar trials have been made with clouds of smoke, ammonium chloride and bromine vapor. In every case the ventilation has been satisfactory.

The ventilation is always much better in a compartment with the baffle plate in place than with the baffle plate removed. While the hoods have been in use, the amount of air passing through them has usually been considerably less than the volume noted in these tests. It seems evident from our experience with these hoods that no doors are needed for hoods of this type to insure adequate ventilation if efficient fan capacity is provided.

I wish to express by indebtedness to Mr. R. S. McBride for criticism and help in the design of these hoods and to Mr. C. A. Stutz and the members of the Chemical Building Committee of the Bureau of Standards for the tests made upon the hoods.

E. R. WEAVER.

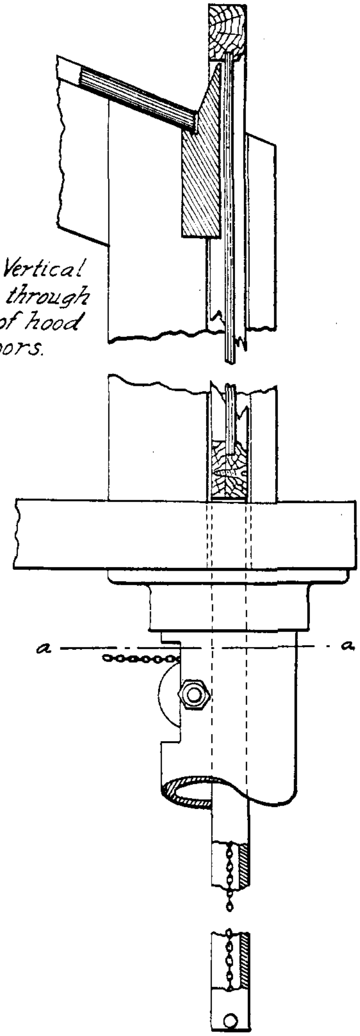


FIG. 5. Vertical section through front of hood with doors.

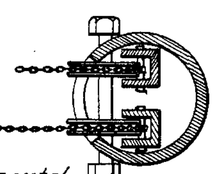
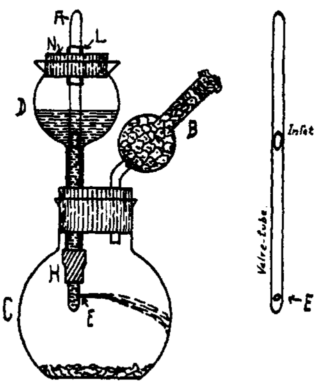


FIG. 6. Horizontal section of front center support at level a-a of fig. 5.

A Simple Laboratory Apparatus for the Determination of Carbon Dioxide by Loss.—The following piece of apparatus was designed to meet the need, in this laboratory, of an apparatus of the Schrötter type. It is easily constructed, and is much simpler and less expensive than the Schrötter apparatus, and hence better adapted to general laboratory use. The acid inlet is more compact and efficient than that in any other similar simple apparatus. The action of the sliding valve-tube *A* absolutely prevents any escape of vapors except through the $CaCl_2$ tube *B*. The thin cork stopper *N*, with the glass tube *L*, the bore of which is only slightly greater than the diameter of the valve-tube, prevents any evaporation of acid in the thistle tube *D*.



Acid is placed in the thistle tube *D*, the cork stopper *N* is put in place and the apparatus is weighed. The sample is added to flask *C*, and the apparatus is again weighed. The valve-tube *A* is pushed down until the small opening *E* comes below the rubber tube *H*. When the desired amount of acid has been allowed to flow into the flask, the valve-tube *A* is raised, thus sealing the exit *E*. No CO_2 can escape except through *B*. After reaction has ceased, the flask is gently heated for a short time, *A* is lowered and air is drawn through the apparatus to remove all CO_2 generated. The apparatus is allowed to cool, is weighed, and the percentage of carbon dioxide is calculated from the loss in weight.

As the apparatus was designed as a substitute for that of the Schrötter type it seemed best to run a series of parallel experiments with the two pieces of apparatus. Baker's C. P. $BaCO_3$ was used, charges of 0.5 g. $BaCO_3$ being employed, with 10 cc. HNO_3 (1 pt. con. acid to 1 pt. water). The percentages obtained with the Schrötter apparatus were in all cases lower than the theoretical. The percentages obtained with the above apparatus were uniformly high. In the cases of both pieces of apparatus an accuracy of 0.1% was attainable, which for apparatus using this principle is sufficient.

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A Simple Buret Reader.—The author, while recently engaged in work involving many titrations, was led to investigate, incidentally, the different forms of buret readers available.

Various devices, including floats and lenses, were found to possess rather marked disadvantages. Floats are very limited in application owing to the fact that they must be made to fit the buret perfectly if accurate results are to be obtained. Lenses are cumbersome and generally require holders of more or less elaborate construction.

The reader, shown in Fig. 1, was finally devised and found to be entirely satisfactory. It consists of a disk of ordinary mirror glass (*A*), about 35 mm. in diameter (shaped roughly with a pair of pincers, and the edges smoothed on a grind-stone), with the silvering scraped from a rectangular section (*C*), about 4 × 10 mm. A fine diamond-line (*a a′*) extends across the face, perpendicular to the long axis of the rectangle, as shown.

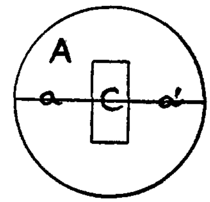

Fig. 1.

In use, the reader is held flat against the back of the buret so that the rectangle includes the meniscus; the diamond-line, in a horizontal position, being made to coincide with the graduation next below the meniscus. The reader is rotated somewhat, so that the reflections of the graduations are seen to one side. The eye is then moved up or down, the reader being also moved slightly, till the reflection of the graduation, on which the diamond-line is set, coincides with the diamond-line. In that position, the line of sight is normal to the buret, and paralax is avoided. As the meniscus is always in very nearly the same position, relative to the transparent rectangle back of it, the lighting is constant and the meniscus always presents the same appearance, making accurate reading easy.

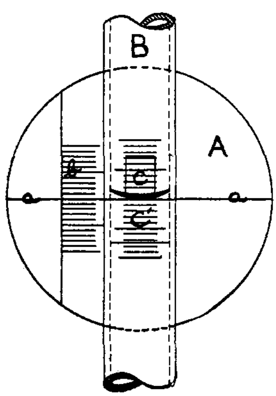

Fig. 2.

In Fig. 2 is shown, somewhat diagrammatically, the appearance of the reader in use. The diamond-line is shown at (*a a*). The illumination is shown by the relative shading. The upper part of the rectangle is shown at (*C*) sharply defined, while the lower part (*C′*) is magnified by the solution in the buret. The reflections of the graduations on the buret are shown at (*b*).

The advantages of this type of reader are the following:

1. Simplicity of construction.
2. Sharp, black and constant meniscus.
3. Elimination of errors due to paralax.

Obviously, this reader can be used with various types of calibrated tubes, besides burets, containing either solutions or mercury.

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