behalf of the Mexican Public Health Department the biology and distribution of the simulid flies concerned in the transmission of the microfilariae of *Onchocerca caecutiens,* I made the same observation as Strong in Guatemala on the concentration of microfilaria about the point of the bite and suggested also in my report, read before the III Congress of the Pan-American Medical Association, Mexico City, July, 1931, and published on September 10, 1931,[1] the same method for diagnoses of Onchocera infestation in man, in dissecting engorged simulid flies. It is very interesting to know that Professor Chas. F. Craig[2] has made the same observation with respect to the transmission of *Wuchereria bancrofti* by *Culex quinquefasciatus* in the Philippines. It would be an easy task for medical officers stationed in tropical Africa, where microfilaria-infections are frequent, to add more observations to the reported cases.

ALFONS DAMPF

LABORATORIO ENTOMOLOGICO,
OFICINA FEDERAL PARA LA
DEFENSA AGRICOLA,
SAN JACINTO D. F.,
MEXICO

BULBS FROM HOLLAND

I EXPECT that by now you have learned of the fictitious nature of the "Hollandia's World-Famed Flower Bulbs" advertisement which appeared in SCIENCE in September, and in other American magazines. It was exposed in the Report of the Chicago Better Business Bureau for November 4. According to the report:

> A fraud order was issued by the Post Office Department against Bulb Nurseries "Hollandia" and Harry Bruhl, its director at Voorhout by Hillegom, Holland, for fraudulent practices in the sale of flower bulbs. A previous fraud order was issued on March 18 against L. H. Straathof and others of Hillegom, Holland, upon evidence showing that under those names a scheme to defraud was being conducted through United States mails.

From an American bulb grower's view-point, this advertisement is of concern because it mentions the "certificate of health" supposed to accompany these bulbs. As a matter of fact, our great American bulb-growing industry has been made possible through the establishment of quarantine regulations necessitated by diseases harbored in foreign grown bulbs. The better Holland growers have tried to control these troubles but with varying success. Plant disease control largely depends on efficient crop rotation. This important measure is exceedingly difficult in a locality where usable land is limited and has given rise to certain rather artificial methods of culture. For example, it is a Holland custom to attain partial crop rotation by deep spading and turning the soil upside down, thus creating a "new" field. From a phytopathological view-point such methods can not compete with those possible in American bulb areas where land for rotation is unlimited and climatological factors more favorable.

Competent observers have pointed out that the success of the Holland bulb growers is not attributable to favorable climatic and edaphic factors but to the industry of the growers who have overcome unfavorable circumstances by what may be considered artificial methods. These methods have produced fine bulbs, but we feel that out of fairness to American growers it should be pointed out that the standard of American grown bulbs on a disease-free basis is equal to or higher than that which obtains abroad.

FRANK P. MCWHORTER

OREGON STATE COLLEGE

SCIENTIFIC APPARATUS AND LABORATORY METHODS

THE "ROTETTE" OR AN APPARATUS FOR HANDLING SMALL QUANTITIES OF LIQUIDS WITH RAPIDITY AND PRECISION

IT was found in using the pipette previously described[1] that even higher precision was attained by mounting the pipette in bearings at a convenient angle. In this arrangement it could be used directly as before or it could be connected to another tube, either fixed or movable, by means of a rubber tubing. This greatly extended the usefulness of the device since larger quantities of mercury could be safely handled, though there was still a limitation due to the weight of the mercury and its tendency to surge when large quantities were employed.

The employment of a helical glass tube in place of the two bulbs previously used greatly simplified the problem and extended the practical limits as to quantities for which it might be adaptable. With the helical tube it is no longer necessary to have a volume of mercury equal to the volume of liquid to be handled, since only enough mercury to fill the lower half of one turn of the coil is required. The controlling factors are diameter of tubing and of coils and the number of turns. A proper choice of these makes it possible to control the volume desired. With this form the volume displacement is proportional to

[1] *Medicina, Revista Mexicana:* Vol. xi, Year XII, No. 151, pp. 753–761 (see p. 757).
[2] SCIENCE, 1952, May 27, 1932, pp. 561–2.
[1] E. L. Harrington, SCIENCE, p. 201, Aug. 22, 1930.

the angular rotation and it may be stopped in any position, since it is symmetrical about the axis of the helix.

"Rotettes" of the new form were constructed for hand use, as shown in Fig. 1, and also for mounting

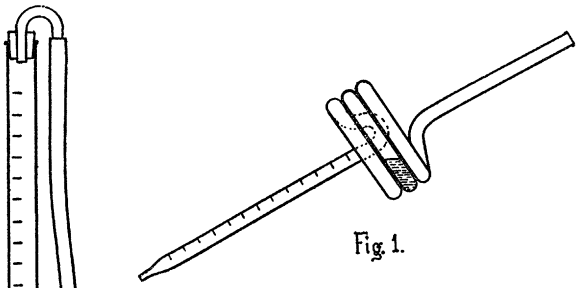


Fig. 1.

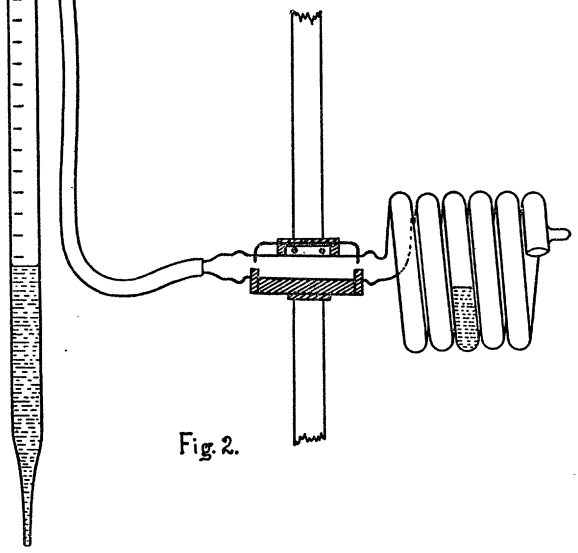


Fig. 2.

on bearings, as shown in Fig. 2. The advantages of the small form have been discussed.[2] Among these may be mentioned the elimination of the rubber bulb, with all its objections, the necessity of "sucking" directly with the mouth and the difficulty of controlling the outflow of liquid by holding the finger over the upper end of the pipette. In addition may be mentioned the better manual control afforded. It will be observed that the bend leading from the coil to the lower tube is elevated so that the mercury can not run out, even when the pipette is held vertically. In using this form one has merely to hold the rotette at about the angle shown. A rotation in one sense about its axis elevates the liquid, while the reverse rotation ejects it.

When more than a few cubic centimeters are involved, the form shown in Fig. 2 is generally to be preferred. Rotettes with capacities up to 50 cc (but using only 5 or 6 cc of mercury) have been constructed. In this form it has many uses, and a number of advantages over burettes, etc.—among which may be mentioned the following:

(1) It makes for higher precision in operations of the titration type. It is easy to "split" drops without the tedium involved in other methods.

(2) It obviates the use of stop-cocks, pinch-cocks and many other special devices now employed. This is a very important improvement, for leaky cocks, stuck or frozen cocks, contamination by cocks and stop-cock grease, difficulties in cleaning, limitations as to flow, the difficulty of getting "just a drop," are all eliminated.

(3) It eliminates the funnel-bottle method of filling, for the burette is filled directly from the supply container, quickly, and the remnant left after a determination may be returned or ejected just as quickly.

(4) It eliminates the "sucking" of fluids into pipettes, with its dangers to person, and the resulting contaminations by mouth fluids and breath-borne vapors. This makes it possible to put or to hold the rotette in the best position for visibility. The rotating member can be placed in a convenient position, even though the receiving tube has to be introduced into awkward places.

(5) It saves time, since burettes, etc., can be filled to the mark desired without the usual delay or "fiddling." In letting the liquid down, the rate of flow is subject to controlled variation between the full stream of the outlet and a slow dropping. This enables one to "go fast" until he nearly reaches the critical level. It is so easy to restore the liquid to the original level that one need not use long and awkward burettes to avoid having to refill frequently. After practice one learns how much of a turn is required in a certain test. Another great saving in time is gained in the cleansing of the burettes, since the absence of stop-cocks makes cleaning a simple matter. By the same operations cleaning solutions, distilled water, etc., can be introduced without even taking down the burette. When burettes are filled the old way, one has to wait until the liquids have drained down in order to avoid a zero error—with the rotette the surface need not be raised above the zero. With the old method it takes so much time to get the surface just to a mark that students are often tempted to call it "good enough" and to try to carry corrections in the mind. With the rotette a quick adjustment to a line is possible.

(6) It lessens the dangers of contamination. In addition to the points mentioned above it is obvious that stop-cock grease is soluble in many liquids one might want to handle, and in any event one can hardly know when a stop-cock has been really cleaned.

[2] *Loc. cit.*

With stop-cocks, pinch-cocks, rubber tubing, etc., eliminated, one has merely an open tube to clean. The burette is never open at the top to catch contaminating solids or fumes, and no funnels are needed.

(7) It can be used for liquids too viscous to flow readily through a stop-cock, *e.g.*, agar agar—which must often be handled in measured quantities, and handled at a temperature where stop-cock grease would become thin. With the rotette the lower outlet can be made a size suited to the liquid and to the speed employed. The rotette can be used equally well with liquids which attack either stop-cock grease or the ground surface of the glass itself, such as, *e.g.*, KOH or NaOH which so often cause cocks to freeze.

(8) A rotette can not wear out—and while in use it saves the price of a stop-cock on every burette with which it is employed. The burettes without stop-cocks are not only cheaper, but are less fragile—for most of the breakages of burettes are due to stop-cock troubles rather than to accidents. One of these mounted over a stock bottle might facilitate obtaining the definite quantities that may be required in routine tests.

(9) It can be used in places where stop-cocks would be inaccessible, as well as in hot, corrosive or poisonous liquids.

It would appear that the rotette is especially well suited for all types of burette and pipette work, for rapidly measuring out fixed quantities of liquids for routine tests in chemical, biological and clinical laboratories. As the movement is wholly rotational it lends itself to mechanical operation as a rack and pinion arrangement provided with stops would adapt it to the commercial or laboratory filling of vials with definite quantities of liquid. Or, similarly, it could be arranged for foot control in which case both hands would be free for other operations, which would be a very great advantage in many situations.

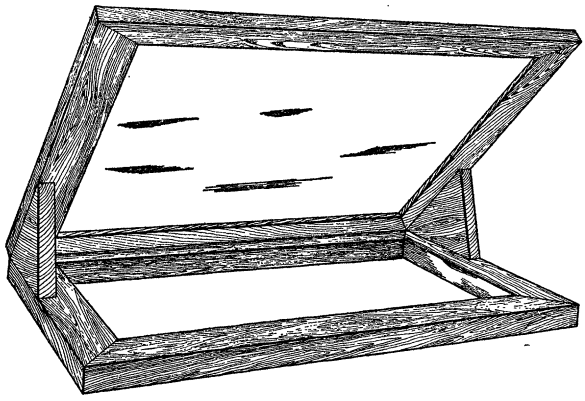
Suggestion: When connecting the rubber tubing to the burette the mercury should be in the middle coil, as this minimizes the twist that must be given the former in use. The tubing should be one of the smaller commercial sizes, preferably heavy walled to prevent kinking.

E. L. HARRINGTON

UNIVERSITY OF SASKATCHEWAN,
CANADA

MIRROR DEMONSTRATION APPARATUS

IN many lecture rooms the top of the instructor's table is above the line of vision of persons seated in the audience. Demonstrations which must remain flat upon the table are therefore often out of sight of, or at best imperfectly seen by, observers in the lecture room. The difficulty attendant upon demonstrating certain materials to large groups of students can be overcome by the device represented in Fig. 1.



A wooden frame holds a mirror at an angle with the table top. The object to be demonstrated is placed inside the base of the frame under the mirror; the reflected image is then visible to students seated in all parts of the room. The angle of the mirror will be determined by the height of the table top above the horizontal line of vision of the audience. In our laboratory, a mirror (size 40×50 cm) held at a 40° angle gives good results with groups of seventy students. Spot lights may be directed upon the demonstration area from the sides or from above without interfering with the visibility.

The apparatus is particularly useful in demonstrating artificial "amoeboid" action induced by the interaction of various chemicals; in these experiments it is essential that the dishes remain stationary and in a horizontal position. The apparatus is also useful in showing the peculiar movement of waltzing mice; other uses will doubtless suggest themselves to the reader.

The writer is indebted to the department of graphics in Dartmouth College for the perspective drawing in Fig. 1.

W. BYERS UNGER

DARTMOUTH COLLEGE

THE USE OF PHENOSAFRANIN FOR STAINING FUNGI ON CULTURE MEDIA OR IN HOST TISSUE

THE work of Mangin (1890) first brought out the use of phenosafranin as a differential stain for pectose and lignin. This stain is frequently used in dilute aqueous solution as a desensitizer for panchromatic film. It gives a dark red color in the alkaline condition, which may be removed by means of alcohol or an acid alum solution. This stain has been found useful in mycological studies for both fresh and preserved material and also in the examination of bacterial colonies growing on an agar substratum.