of CO_2 will flush out any air present in the rubber tubing and the 3-inch hypodermic needle. The needles are then inserted through the rubber vaccine stopper into the 250 cc medicine bottle containing 100 cc of medium, and 10 cc of the patient's blood. The valve is then turned so that the CO_2 will flow into the syringe, pushing up the plunger until the required amount is indicated on the barrel. The valve is once more adjusted so that the CO_2 will flow from the barrel of the syringe into the medicine bottle, displacing

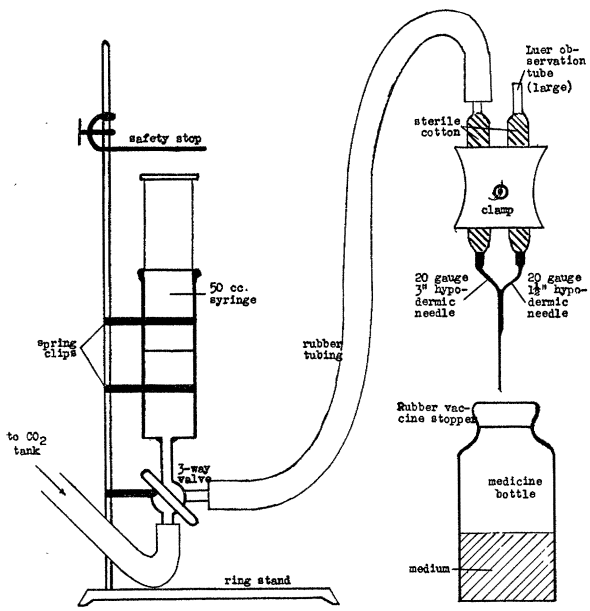

FIG. 1.

air which is forced from the bottle through the shorter hypodermic needle.

The weight of the plunger is sufficient to force the CO_2 out of the syringe if the plunger slides smoothly. Only a smoothly sliding syringe should be used if the volume is to be accurately measured. A safety clamp above the plunger will prevent it from shooting out when the CO_2 pressure becomes greater than the required ½ pound gauge pressure.

The three-way valve may be fused to the syringe or it may be fused to a collar which slips on the syringe. The latter is preferable since syringes of different sizes may then be used. The apparatus can then function in other ways. For example, without the needles, it may be used for conducting a measured amount of O_2 into an anaerobic jar during the preparation of staphylococcus enterotoxin. It may also be used to supply CO_2 to anaerobic jars for the culture of the gonococcus on solid media.

The needles may be sterilized as a unit together with the clamped Luer tubes.

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TRAPPING SNAILS OF THE GENUS CAMPELOMA

AN efficient method of collecting the snail *Campeloma* sp. in streams was found during a study of the life history of the trematode worm *Cercariaeum constantiae* Mueller. Since *Campeloma* habitually burrows, the collection of these snails in quantity by screening consumes much time and is hard work. While collecting these snails in the Huron River near Ann Arbor, Michigan, I noted that they were frequently found in considerable numbers around dead and decaying organic matter. To determine the time required to accumulate a quantity of snails, a dead fish weighing a pound was placed in the mud where earlier collections had been made. Ten days later, an area of approximately one foot square and six inches deep around the fish yielded 78 *Campeloma*, a number far exceeding those taken in similar, but unbaited, situations.

Dr. G. R. La Rue suggested the use of dung in place of dead fish, as he believed that these snails might be coprophagous and become infected by eating trematode eggs voided in feces. Accordingly, small cloth packets of feces were planted in the muck and found to be equally as effective as the dead fish, and more conveniently handled. Dung of dog, cat, ferret, muskrat and chicken was tried. After a few preliminary experiments, chicken dung was used exclusively. It was dried before use, which eliminated objectionable odors and permitted it to be packaged in quantity and stored to be used as needed. Dried dung was as effective as fresh.

To make a snail trap, a quantity of dried chicken dung is placed in the center of a cloth nine inches square, the corners twisted together and tied with heavy cotton twine, leaving free enough to tie to a stake. Double thickness of washed cheesecloth is ideal; heavier cloth resists rotting for a longer time but also retards the passage of the fecal extract. The twine should be capable of resisting rotting in water, since these packets remain effective until their contents are gone. The packets are tied to stakes and placed in suitable habitats for *Campeloma*.

Choice of location is important. In streams these snails frequent shallow, mucky situations and plantings should be made here; gravel areas in deep water should be avoided. When properly planted, the packet should be half-buried in mud with the stake projecting above the water level far enough to be easily recognized. In areas frequented by many people, the plantings should be inconspicuous to prevent possible interference. This can easily be accomplished by using dark-colored cloth and stakes made of tree branches; in summer, willow is especially suitable because the leaves remain green and willow looks natural along the banks of streams.

The trap remains effective for approximately six weeks, but to get best results the location should be changed every ten days or two weeks. The snails are collected by removing the trap and screening the mud from an area about 15 inches square around it by means of a wire net (Fig. 1). The net consists of a frame of one quarter inch steel bar fashioned in the shape of an equilateral triangle one foot on a side, and having a tang three inches long at the apex mounted in a handle with a ferrule. Galvanized wire screen of three sixteenths inch mesh is soldered to the frame. The screen gradually deepens from the leading edge to form a bag two inches deep at the apex of the triangle. The leading edge is protected by a band of galvanized sheet iron three inches wide folded over the frame and soldered. The completed screen is very sturdy and will withstand hard usage.

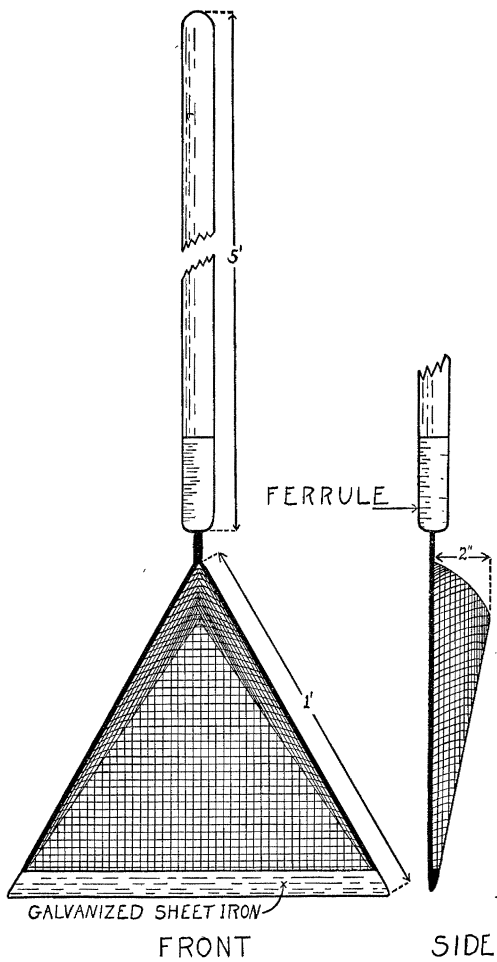

FIG. 1. Front and side view of collecting net.

It was suspected that in streams the current might carry the fecal extract which the snails followed to its source at the trap. This idea was tested by planting marked snails at various distances, two to 15 feet, upstream, as far as 20 feet downstream, and ten feet across the stream from a trap. In collections made at weekly intervals for five weeks, 28 of the 67 snails (41.7 per cent.) planted upstream, 24 of the 86 (26.7 per cent.) planted downstream, and 2 of the 9 (22.2 per cent.) planted across the stream were taken at the trap. Practically the same number of snails moved to the trap from 15 feet upstream and 20 feet downstream as from 2 feet up- and downstream. My data indicate that the snails move at random. Once arrived at the trap, however, they tend to stay as long as the food supply lasts.

In lakes the traps proved ineffective. Experiments to determine the reason for this have not been carried out. All the lakes tried had bottoms of sand underlaid by muck which perhaps provides sufficient food for *Campeloma* to nullify the effects of food concentrated at traps. Traps should be tried in lakes with clean, sandy bottoms.

In the streams tested the traps are specific for *Campeloma*. Other species of snails are not taken in the traps and only occasional bivalves, *Alasmidonta calceolus* and *Sphaerium* sp., have been collected from them.

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