test-tube. The lower end of the inlet tube is drawn out to form a short nozzle (d), which is bent sharply upward. A spiral of glass tubing (c), open at both ends, fits loosely over the upturned nozzle. As the carbon-dioxide laden air stream passes through the nozzle and enters the spiral in the form of bubbles, some of the absorbing liquid also enters the spiral. This results in a continuous circulation of liquid, both through the spiral tube in which the absorption takes place and in the test-tube itself.

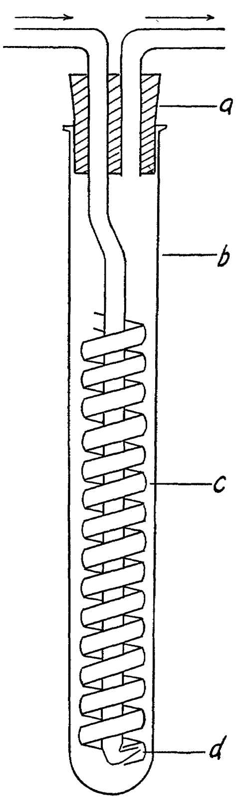

FIG. 1. Details of absorption vessel: (a) two-hole rubber stopper; (b) test-tube; (c) glass spiral; (d) nozzle at end of inlet tube.

The spiral may be formed of glass tubing softened in the flame of a blast lamp and turned around a piece of brass tubing of the proper size. A slight taper on the brass tube makes for ease in the removal of the glass spiral after turning.

Two sizes of these absorption vessels have been constructed and used in respiration studies. The smaller one holds 25 ml of solution and consists of a 22 × 175 mm test-tube with spiral and inlet tube made of 6 mm tubing. The spiral is 18 mm in diameter and 105 mm in length. The larger vessel utilizes a 25 × 200 mm test-tube with proportionately larger spiral and inlet tube. This absorption vessel holds 50 ml of solution. In all cases, the volume of the absorbing solution should be sufficient to cover the top of the spiral but should not be so great as to cause liquid to be forced up into the outlet tube when in operation.

Potassium and sodium hydroxide solutions of 0.10 and 0.05 normality have been successfully used as carbon-dioxide absorbents with this apparatus. Solutions of barium hydroxide are not recommended because of a tendency to block the inlet nozzle with precipitated carbonate. At the end of a run, the absorption vessel is disconnected and tilted so as to drain out the alkali solution through the outlet tube into a small flask. This flask should then be stoppered to protect the solution from atmospheric carbon dioxide. Aliquots may be pipetted from this solution and titrated in the presence of excess barium chloride against phenolphthalein with dilute standard hydrochloric acid (0.10 or 0.05 N). The addition of barium chloride in excess results in the precipitation of the absorbed carbon dioxide as barium carbonate previous to the titration. Acid titration values thus obtained give a measure of the unused hydroxide and, in comparison with corresponding values obtained with the original solution, give an accurate index of the carbon dioxide absorption.

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A SIMPLE METHOD OF REMOVING SCALES FROM LARGE LEPIDOPTERA

CONSIDERABLE difficulty is usually experienced in removing scales from the bodies of large thickly clothed Heterocera in preparation for morphological study. The following method has been used successfully by the writer with specimens of the tobacco hornworm (*Protoparce sexta* (Johan.)). This method can be used effectively with either fresh or dried specimens, although fresh specimens are denuded more easily. The wings are removed and the scales are dislodged from the body by brushing with a small toothbrush. A child's brush with moderately stiff bristles, all of approximately equal length, will be found best for this purpose. Stroking is most effective over the soft chitin of the abdomen, while a reciprocating motion produces better results on the head and thorax.

Fine scales on the legs and wings can not be removed readily by brushing. These parts may be cleaned easily by placing them in a 5.25 per cent. solution of sodium hypochlorite for a short period. They should be removed and rinsed in distilled water not over two hours after immersion in this solution.

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