A GAS THERMOSTAT

A SIMPLE yet efficient device for accurate thermal control of ovens and liquid baths consists simply of the bulb of a flask sealed onto a 10 mm tube which is bent to form a complete loop, and then rises to a gas outlet through a side tube and a gas inlet in the end of the tube. In the loop of the tube enough mercury is trapped to fill each limb slightly less than half full. The gas enters the end of the tube through a smaller tube, which extends down almost to the surface of the mercury. When the bulb is heated, the air in it expands and pushes the mercury against the end of the inlet tube, shutting off the gas flow which normally flows down the inner tube, back between the inner and outer tubes, and out through the side tube to the burner. A by-pass consisting of two glass T's and a screw clamp serves to keep the burner lighted when the mercury shuts off the main flow of gas.

The thermostat operates by simply heating to 10–15° C. higher than the desired temperature. During this heating the mercury is pushed into one limb of the loop, after which the confined air escapes past the mercury. When the temperature is lowered to the operating temperature, the mercury is equalized in the two limbs. The inner gas conduction tube is then lowered until it almost touches the surface of the mercury. Any subsequent change in temperature will vary the flow of gas, causing a compensating heating effect.

This device is ideal for variable operating temperatures, as no adjustments are required to effect the change. With a 250 cc bulb it will maintain the temperature within less than 0.1° C. of the desired temperature.

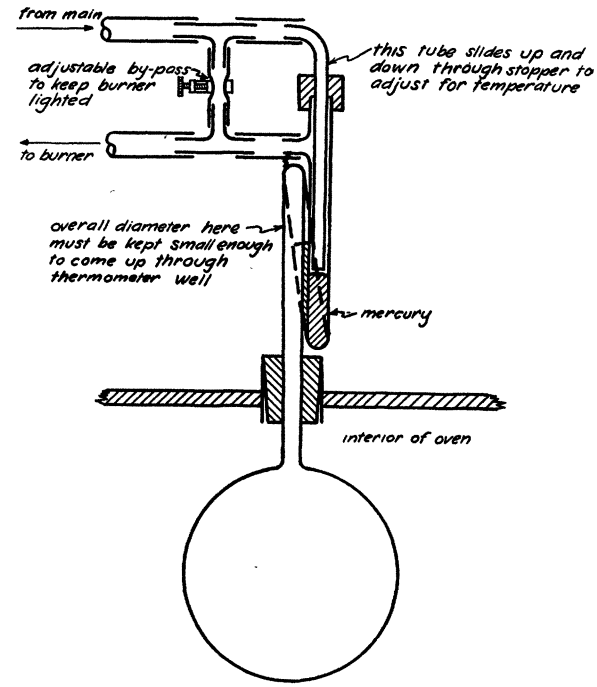

FIG. 1.

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SPECIAL ARTICLES

PNEUMOCOCCUS ANTIBODIES—WHAT ARE THEY?[1]

STUDIES on serum antibodies and antitoxins have followed two lines of endeavor. The first is the isolation and purification by means of well-known protein precipitants, and the second is the dissociation of the antibody-antigen complex. The former has led to concentration of immune sera for clinical purposes, but, so far, has given but little information in regard to the chemical nature of antibodies. On the other hand, study of the dissociation of the antigen-antibody complex has given fruitful results.

Significant work on pneumococcus antibody began with the observations of Gay and Chickering, and of Chickering, in their attempts to dissociate the protective substance from the pneumococcus antibody complex obtained by the usual method of agglutination. They found that by treating the pneumococcus cell-antibody precipitate with sodium carbonate at 42° C., a clear solution was obtained which contained most of the protective antibodies of antipneumococcus serum. These authors showed that this solution contained both protein and antigen. Huntoon and his associates continued this study on a larger scale. But, unlike Gay and Chickering, they claimed that their antibody solution, containing the protective substance of the immune serum, was devoid of agglutinins, was free from protein and, in addition, was resistant to the action of pepsin and trypsin. In interpreting Huntoon's negative results it is well to bear in mind that "test for protein, negative" does not necessarily mean "protein absent," because the usual tests for protein are not highly sensitive.

In our studies the antigen-antibody complex of pneumococcus has been viewed as a definite chemical compound, a resultant new chemical made up of the two reacting components. As shown by numerous investigators, this antigen-antibody compound is but

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