SIMPLE HIGH ALTITUDE OBSERVATION CHAMBER FOR THE STUDY OF INSECT PHYSIOLOGY

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In correlative studies on insect and human physiology, a simply constructed chamber is used to observe gross behavior patterns and physiologic changes of insects under varying altitudes.

To eliminate the necessity of using motor driven pumps to produce pressures desirable for current studies on anoxia, a large syringe is used as the basic component for evacuating a small but effective high altitude chamber for insects. The pressurizing chamber, therefore, consists of a well fitting, lubricated, 100 cc. Luer syringe supported by clamps to a metal stand for stability. The outlet of the syringe is connected to a three-way stop-

cock; this in turn has a rubber connection to a vacuum gage and an insect observation chamber.

In the prototype currently in use at this laboratory (see Figure 1), a vacuum is produced, the gage is read in inches of mercury and conversion tables are referred to for corresponding altitudes. By proper sealing of all connections, the vacuum pulled on the test chamber can be maintained for 8–10 hours for prolonged observations of insects. The observation chamber may consist of an unfrosted pyrex glass cylinder with a rubber stopper or of

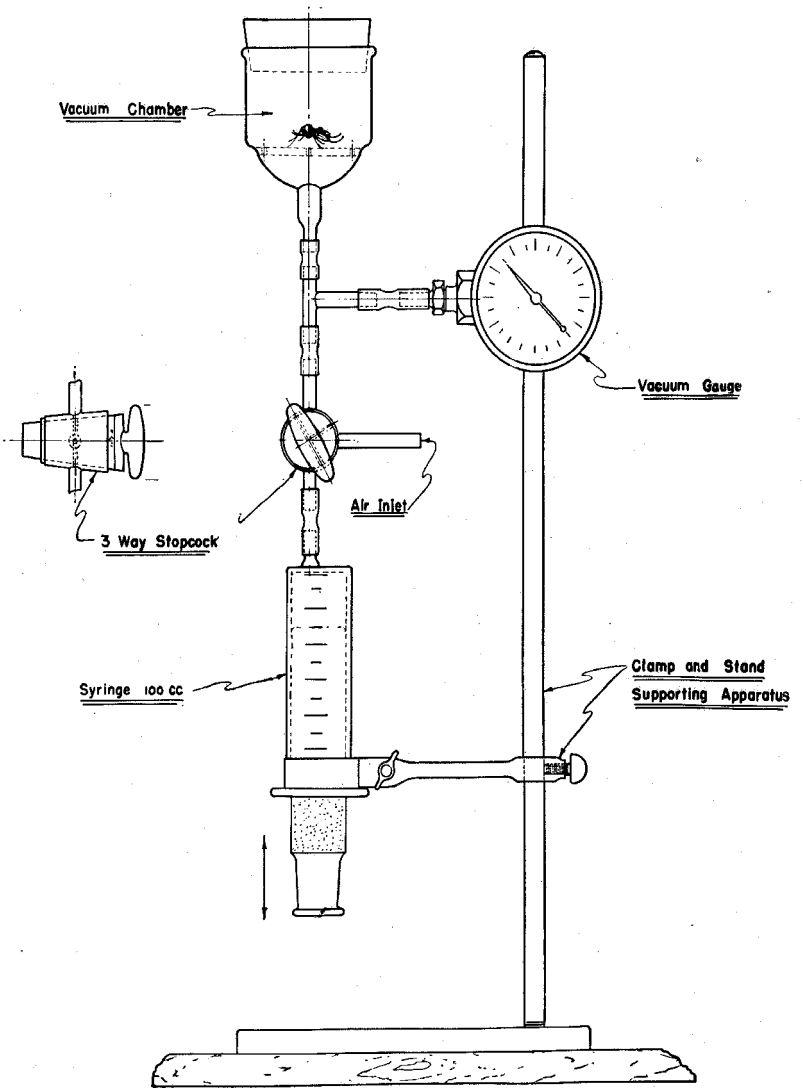

FIGURE 1.—High altitude observation and pressurizing chamber for the study of insect physiology.

a smaller syringe in which the volume can be read directly.

Since the gage is not necessary in the assembly of the altitude chamber, the simplest way to estimate altitude is by volume. The initial volume occupied by the insect is V_1.

The initial pressure is P_1, (the barometric pressure or 14.7 pounds per square inch is of sufficient accuracy). After moving the plunger a volume of V_2 in the main syringe, the final volume occupied by the insect is $V_1 + V_2$. The final pressure to which the insect is subjected is:

$$P_2 = \frac{P_1 V_1}{V_1 + V_2}$$

Referring this pressure or the pressure ratio P_1/P_2 to the Standard Atmospheric Tables of Diehl (1), corresponding altitudes can be obtained. Corrections for temperature can also be made from these tables.

Literature Cited

1. DIEHL, WALTER S. 1925. Standard Atmosphere —Tables and Data. National Advisory Committee for Aeronautics. Rep. No. 218. Washington, D. C.