

Gravett, Howard L.    Thermal control    Temperature is controlled with great exactness in the Experimental Zoology Laboratory at the University of Illinois. Electric incubators are housed in especially constructed high- and low-temperature rooms. While experiments are being run it is possible to keep these rooms from varying more than one degree from 25° and 15° C. Under these conditions the incubators housed in them can be held constant to within 0.3° of the required temperature.

The incubators used are made by the Chicago Surgical and Electrical Company. The heat unit is a high resistance wire coil and contact is accomplished by the bending of a diaphragm. A twelve-inch General Electric dish fan with lengthened shaft so that it could be installed with the motor outside and the blades inside of the chamber has acted in a satisfactory manner in keeping the air stirred. The only attempt to control the humidity is to keep an open vessel of water in each incubator. A Thycoos, ribbon type, be-record thermometer made by the Taylor Instrument Company of Rochester, New York, is used for a continuous record of the temperature.

The constant temperature rooms are cooled by air blown over brine coils and the high-temperature room is varied by steam coils. Both systems are under automatic control installed by the Johnson Service Company of Milwaukee.

Department of Biology, Amherst  
Collego. Constant temperature  
and humidity control.

With the assistance of a grant from the Rockefeller Foundation, the laboratory has now com-

pleted the installation of a constant temperature room especially designed for Drosophila work. The room is about 15' x 8' x 8' and is built into a storeroom on the basement floor. The walls and ceiling are 3" cork insulation attached on the inside of 4" studding, and two coats of water-proof cement plaster are applied over the cork. The outside is covered with fir sheathing, so that a 4" air space is enclosed. The room is air conditioned by an air duct on the end wall, and outlets on the side walls. The air conditioning apparatus was furnished by the Carrier Co. and is capable of maintaining the room at any temperature from 5° C to 50°  $\pm$  2° C with a relative humidity of from 20% to 100%  $\pm$  5%. At present the room is being maintained at 15° C with a relative humidity of 65%. Water and electric current are available within the room.

Within the room are placed 12 unit incubators, similar to the two shelf type developed by Bridges and Plunkett. Each contains an 8" fan run at low speed. Temperatures from 16° C to 40° C can be maintained over long periods within any of these units. The heating elements are electric bulbs and the thermoregulators are toluol or alcohol filled, controlling the heating elements by single relays amplified by a vacuum tube. The relay apparatus was furnished by Lovett Garceau, Diamond Hill, R.I., at \$20.00 each. The temperature at any point in these incubators varies not more than 0.2° C over an indefinite period.

The humidity is controlled by the percentage humidity in the room itself.

In addition to the incubator chambers maintaining temperatures above that of the room, there has been installed a large four door Frigidaire. Within this have been introduced five distinct insulated compartments with double glass doors (about 14" x 10" x 15") each with a heating element enclosed in lamp cylinder of asbestos. The temperature is controlled by toluol filled thermo-regulators operating the heating element through Dunco Relays (Struthers Dunn, Inc., Phila. #CS-1022-\$11.00). The Frigidaire cooling system maintains a temperature of 4°-8° C around the insulated chambers, and temperatures up to 15° C are maintained within the chambers with a variation of less than 0.2° C over long periods.

The system is somewhat unique in that the room as a whole is held at an intermediate temperature with a series of 17 compartments at accurately controlled temperature above and below that point. Such a system is much less expensive than that of keeping the room at the lowest point, and the various intervals are more easily maintained. It has now been in operation for three months and seems to be entirely satisfactory.

A series of Wheatstone Bridge Resistance Thermometers which will make a printed record of temperatures and relative humidities of six separate compartments simulatacously (with an accuracy of #0.25° C) is now being installed.

The room is large enough for a series of shelves and a table for microscopic work, so that observation as well as other types of work can be carried on.

The total cost of the whole installation was close to \$4000.00. The room and equipment were planned by the members of the department. Further details can be furnished by writing to H. H. Plough.

#### Medvedev, N.N. Thermal control

As experience shows, the best solution of the incubator problem is the construction of one big room-like thermostat instead of a number of them for personal use or for the use of some workers. The small incubators are used only in special work, when high or low temperatures are desirable.

The thermal control system of Frank that we adopted, after much experience, may be generally recommended as a very precise and cheap one. It consists of two regulators (see figure), one of which (2) keeps the desirable temperature (e.g. 26° C); the second regulator (1) is an extra one and breaks all contact when the temperature in the incubator accidentally reaches 2-3 degrees above the point desired. This complete breakage of the current is brought about by the spring (3), being so designed that it breaks the current at a definite temperature but does not close it again automatically. The spring (4) on the other hand, breaks and closes contact automatically. Both regulators (1,2) as well as the breaking parts (5,6) are made from bimetallic plates.