physectomized thirty days previously and which were in satisfactory condition. Five of these rats were injected intraperitoneally with 10 microcuries of radioactive P in the form of 1 cc (15 mg) of an isotonic solution of Na_2HPO_4. The remaining five were given an equivalent dose of ordinary Na_2HPO_4. Within 48 hours after the injection of the radioactive P all five of the animals were dead, while the condition of the hypophysectomized controls remained unchanged.

The hypersensitivity of hypophysectomized rats to the injection of radioactive isotopes is in marked contrast to the response of adrenalectomized animals to similar doses of radioactive material. The major part of our experimental work in adrenal cortical physiology has been on adrenalectomized animals. We have injected radioactive Na and K into approximately 200 such animals and in no instance seen evidence of hypersensitivity to these substances.

Hypophysectomized rats are also more sensitive than normal animals to x-ray irradiation. Nine rats hypophysectomized three weeks previously were given 250 roentgens; this dose is well under the lethal dose for normal animals, which is approximately 700r.*; all the animals succumbed, but the median survival period was 10.6 days, as contrasted with a survival period of less than 2 days following the injection of radioactive isotopes.

It would seem established that hypophysectomized rats are abnormally sensitive to radiation, particularly when injected with radioactive isotopes, and it is to be noted that adrenalectomized rats tolerate radioactive isotopes at dose levels invariably fatal to hypophysectomized animals.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A SIMPLE MECHANICAL THERMOREGULATOR

THE regulation of temperature in a bath by controlled cooling, rather than by the usual method of controlled heating, is not a new principle,[1] but simple apparatus designed for precise temperature control has not been available hitherto. Advantages claimed for this regulator over the customary electrical type are comparable sensitivity at lower cost, with greater dependability and simplicity.

Since a small stream of cooling water is constantly introduced into the bath, an overflow or syphon is provided to maintain the level. If desired, a small coil of copper tubing may be used to provide the necessary heat transfer between the cold stream and the bath liquid, thus permitting the use of non-aqueous bath media.

A heater is used continuously, and may be of any type: immersion, lamp, steam coil or even a gas burner placed beneath the bath, provided it furnishes a steady heat input. Customary precautions should be taken to insure adequate stirring and insulation of the bath.

If variation in the pressure of the tap water (cooling water) prohibits the maintenance of a constant, steady stream to the regulator, a simple constant-pressure reservoir should be employed, furnishing water at one to three feet hydrostatic pressure.

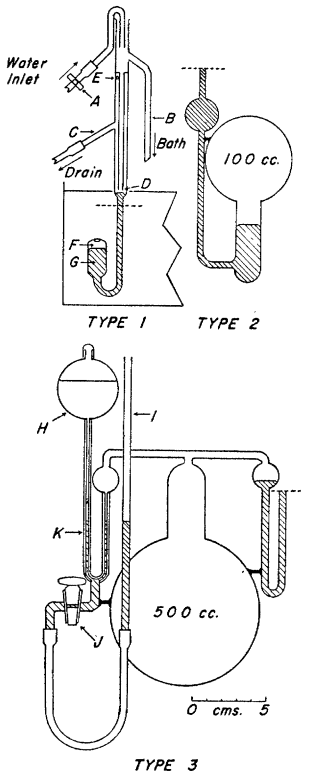
The operation of the thermoregulator is self-evident from the sketch of Type 1. After bringing the bath to the desired temperature and removing excess mercury from the stem with a micropipette, if necessary, several minutes are allowed for equilibration of temperature within the regulator. Then with the mercury level below the orifice, D, in the stem, a steady stream of water is introduced into the top of the stem, its magnitude (controlled by screw-clamp, A) such that outlet C will easily handle it without overloading. Mercury is introduced into the stem from a micropipette until the orifice, D, begins to be occluded and water starts to flow into the bath through B. If the heat input to the bath is of the proper value, a steady stream of drops (or at most a thin stream of water) will hold the temperature stationary. Water must at all times be flowing simultaneously from both B and C when the bath is in equilibrium. The vent, E, prevents syphoning at C. Adjustment of the temperature to the last few hundredths of a degree may be done by varying screw-clamp A. When the bath temperature begins to fall, the regulator decreases the amount of water flowing into the bath, and *vice versa*. In permanent installations, screw-clamp A may be profitably replaced by a stopcock.

By reversing the connections at B and C, a supply of hot water entering at A will regulate the temperature of the bath through controlled heating.

Three types of bulb to be attached to the control

[1] D. F. Othmer, *Ind. and Eng. Chem., Anal. Ed.*, 3: 139, 1931; L. C. Beadle and F. A. Booth, *Nature*, 140: 279, 1937.

* The x-rays were generated by a 220 KV Maximar unit, which has been installed in the Crocker Radiation Laboratory through the generosity of the General Electric X-ray Corporation.



head are shown below the dotted horizontal lines in the sketches. Type 1 is quite compact; the expansive medium is a liquid, F, with its vapor phase, standing over mercury, G, as shown. The liquid should boil 5–10° above the bath temperature (carbon disulfide is suitable for 35–40°), and a small bubble of air is included to preserve the vapor phase. The sensitivity of this type is about ± .01°, but a 5 mm change in barometric pressure may change the temperature 0.3°.

Type 2 is filled completely with a liquid of high coefficient of expansion, *e.g.*, ethyl acetate. It is not influenced by changes in barometric pressure; the sensitivity is ± .03°, but may be improved to ± .01° by inserting metal foil or wire gauze in the bulb.[2]

Type 3 is recommended for large baths where high sensitivity (± .003°) with ease of alteration of temperature setting is desired. The setting is changed by transferring solvent in the reservoir, H, to or from the expansion bulb through a capillary (1 mm internal diameter) bend, K, which is closed by mercury from the manometer, I, during operation. The stopcock, J, which sustains the mercury column, does not leak, since it only comes in contact with mercury. For quite large baths (100 liters), the diameters of the tubing used in the control head should be multiplied by one and one-half. A rubber sleeve is slipped over the water-filled portion of the control head immersed in the bath to prevent undesirable heat loss from the bath to the stem.

[2] R. D. Stiehler, SCIENCE, 83: 40, 1936.

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USE OF LATEX DRY ADHESIVE FOR KYMOGRAPH PAPER

SURFACES that stick fast to "themselves," but to nothing else, are familiar in envelopes where a turned-down margin separates the latex-treated flaps before use. Adhesion is immediate without moistening.

In the class laboratory we have found during two years' experience much satisfaction in the use of a similar method for wrapping kymograph cylinders. The liquid preparation can be rapidly applied with a brush to a large number of sheets. These are laid out on the bench so that each projects beyond the next a half-inch or more according to the circumference of the drum used, which must of course determine the appropriate coincidence. After drying in place, the set of sheets is inverted and the opposite ends are similarly treated. Stacked flat, the sheets can not adhere; but a sheet wrapped about the drum is firmly sealed in place by mutual contact of the prepared surfaces. The latex seal resists the heat of smoking and does not loosen, yet is readily separated for clean handling of the completed record. Sheets remain adhesive after months in storage. The method not only saves time for the student, but contributes distinctly to neatness in technique.

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WALTER, HERBERT E. *Biology of the Vertebrates; a Comparative Study of Man and his Animal Allies.* Second edition, revised. Pp. xxv + 882. 736 figures. Macmillan. $4.00.