TABLE I.

Phage	D × 10^7 cm²/sec (obs.)	η_m	T	D_{20} × 10^7 cm²/sec (corr.)	Particle diameter in mμ
T_3	1.19	0.0101	295	1.19	36.2
T_4	0.798	0.0101	295	0.798	55.0*

* This figure is an equivalent spherical diameter, since this phage T_4, due to its tail, is obviously non-spherical.

fused past the initial boundary was isolated from that in the bottom by rotating the top sections to their cut-off position. The phage contents of the diffusates as well as of the original material in the lowest section were then determined by the usual plaque-count method.

The results are given in graphical form in Fig. 1 and 2, where the ratios of concentration in the diffusates C_D to that in the original material C_O are plotted against the square root of t, the time in hours. It is clear from these figures that C_D/C_O is a linear function of $\sqrt{t}$, a necessary requirement from the laws of diffusion in solutions.

Average diffusion constants were calculated from these data using the equation:[3]

$$D = (C_D/C_O)^2 \cdot \frac{H^2 \pi}{t}$$

where t is the time of diffusion in seconds, and H is the height of the column of liquid above the original boundary, regarding the chambers in the diffusion cells as cylinders. The value of H in these experiments has been 3 cm. Diffusion constants at the temperature of the experiment (22°C) calculated in this way are given in the second column of Table I. Constants for 20°C have been calculated from these with the expression:

$$D_{20°} = D_{22°} \cdot \frac{293°K}{295°K} \cdot \frac{\eta\, m}{\eta\, w}$$

where $D_{20°}$ is the diffusion constant at 20°C, η_m is the viscosity of the medium, and η_w is the viscosity of water at 20°C.

Particle sizes were computed from the well-known Einstein equation for the diffusion of a spherical particle:

$$D = \frac{RT}{N} \cdot \frac{1}{6\, \pi\, r\, \eta}$$

where R is the gas constant, T is the absolute temperature, N is Avogadro's number, r is the radius of the particle, and η is the viscosity of the medium. This yields the diameters of the last column of the table. They are to be compared with the diameters of T_3, 45 mμ, and of T_4, 65 x 80 mμ, as measured from previous electron micrographs.[4]

It is clear that the tail of the bacteriophage T_4 does not contribute to its motion in a liquid medium. The slightest propulsion that such a tail might give the particle would have increased its diffusion constant tremendously since diffusion increases as the square of the distance moved in Brownian motion.

4 Delbrück, M., *Biol. Rev.*, 1946, **21**, 30.

16281

A Free Swing Writer for Recording With Very Light Pressure on a Smoked Surface.

ALBERT E. AFFORD. (Introduced by S. Goldschmidt.)

From the Department of Physiology, School of Medicine, University of Pennsylvania.

The writing device to be described was developed for use in situations where recording on a smoked surface was unsatisfactory with the conventional type of "fixed" writing

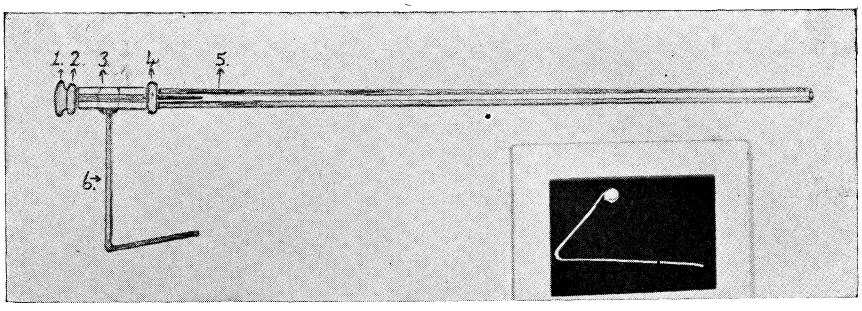

FIG. 1.
The writing device (side view) attached to reed. 1. Pin—length 2 cm. 2. Collar (glass bead), bore 1 mm, O.D. 2 mm. 3. Roller bearing (glass bead), bore 1 mm, O.D. 2 mm, length 6 mm. 4. Collar (glass bead), bore 1 mm, O.D. 2 mm. 5. Straw reed, bore 1 mm, O.D. 2 mm, 8 cm long. 6. Writing point—aluminum wire—gauge 24, 8 cm long. Attached to bearing with sealing wax. Approximate weight 200 mg. The insert shows an end view photograph of the writer.

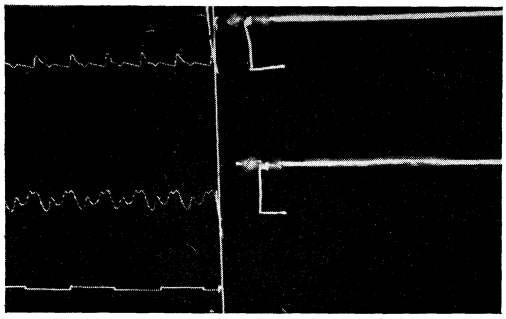

FIG. 2.
Actual tracings and arrangement for recording simultaneously the jugular pulse and the brachial artery utilizing the "free swing" writing lever attached to a tambour (not shown).

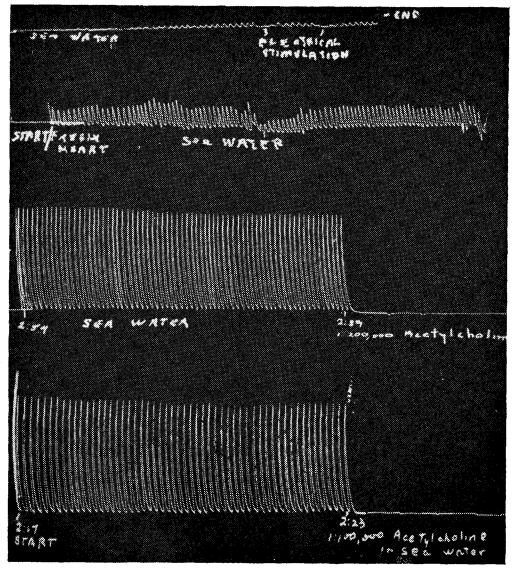

FIG. 3.
Kymograph tracings of excised heart of a clam (*Venus mercenaria*) beating in sea water, utilizing the "free swing" writer attached to light muscle lever.

point, because of frictional resistance. It has proved to be eminently more satisfactory, in the hands of students, than any device heretofore used. This is especially true in the recording of arterial and jugular pulse tracings (Fig. 2) and esophageal, gastric and duodenal movements in man. It alone has given acceptable tracings of the movements of an excised heart of a clam (venus mercenaria) (Fig. 3). The device (Fig. 1) is exceedingly simple and can be assembled in any laboratory. The writer is a short length (4 cm) of aluminum wire (24 gauge) bent to form an angle of approximately 60° in a plane at right angles to its point of suspension. The angle of the wire forms the writing surface. The pressure of the writer on the kymograph paper may be varied by altering the angle and the length of the free end of the aluminum wire; also by placing small bits of plasticine on the free end of the wire. The writer is attached with deKotinsky cement or sealing wax to a short length (6 mm) of glass tubular bead (1 mm bore), smoothed at the ends, which fits and moves freely over a brass-plated pin about 2 cm

long. This pin serves as a shaft or axle for the glass bearing to which the writer is cemented. Very smooth glass beads (1 mm bore, 2 mm long) on either end of the glass bearing hold it in place and prevent side motion. The pin is inserted into the end of a reed (1 mm bore, 8 cm long) such as is ordinarily used in kymograph recording. This reed is attached as usual to the recording tambour. Made and suspended as described above, the writer is free swinging and adapts itself to an uneven surface with uniform and minimal frictional resistance.

Summary. A free swinging writer which records on smoked surfaces with a minimum of frictional resistance is described; its construction is explained and illustrated. Specimen tracings of difficult recordings are illustrated.

16282 P

On New Adrenolytic Compounds.*

G. R. DE VLEESCHHOUWER. (Introduced by C. Heymans.)

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In previous papers[1] we have demonstrated that several so-called sympathicolytic substances have mainly adrenolytic properties. In fact, these substances (benzodioxanes, dibenamine, dihydroergotamine, corynanthine) reverse the epinephrine-hypertension, but do not suppress sympathetic-vasopressor effects.

The present experiments were undertaken with two new synthetic compounds: α-naphtylmethylethyl-β-bromoethylamine HBr (SY-28) and β-(2-biphenyloxyethyl)-n-butyl-β-chloroethylamine HCl (SY-30).†

Some pharmacological properties of these compounds were studied by Loew, Achenbach and Micetich.[2,3,4]

Methods. The experiments were performed on chloralosed dogs. The blood pressure was recorded from a femoral artery. All drugs were injected intravenously and sometimes intra-arterially.

Results. A./α-naphtylmethylethyl-β-bromoethylamine HBr (SY-28).

1. *Effects on blood pressure, heart rate and respiration.* Intravenous injection of 1 mg/kg SY-28 produces an instant, moderate, transient hypotension and no change of heart-rate. The respiration becomes slow and irregular during the injection, but after a few minutes the dog is breathing normally.

Intra-arterial injection of small quantities of SY-28 (the animal being prepared according to the 3-manometers-method[5]) induces a marked and local vasodilatation.

Some hours after intravenous injection of SY-28, one remarks a slow and progressive fall of blood pressure. This corroborates Loew's observations, but we believe this hypotension to be due to a central depressing action of the drug.

2. *Effects upon neuro-vasomotor reactions.* The vasopressor and vasodepressor reflexes of carotid sinus origin are slightly depressed after injection of 1 mg/kg SY-28, while vasopressor effects of epinephrine are completely reversed. Although reversal of carotid sinus vasopressor reflexes never appears, a slow progressive depression of these reflexes has

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† Kindly supplied by Dr. Earl Loew and Parke, Davis & Co.

1 De Vleeschhouwer, G. R., *C. R. Soc. Biol.*, 1933, **115**, 187; 1934, **115**, 1247; 1935, **118**, 792; *Arch. int. Pharmacodyn. et Thér.*, 1935, **50**, 251; PROC. SOC. EXP. BIOL. AND MED., 1947, **66**, 151; in press.

2 Loew, Earl R., and Micetich, A., *Fed. Proc.*, 1947, **6**, 351.

3 Achenbach, P., and Loew, Earl R., *Fed. Proc.*, 1947, **6**, 304.

4 Loew, Earl R., personal communication.

5 Nolf, P., *Bull. Acad. Roy. Belg.*, 1902, p. 895.