In the Laboratory

A Modification of the Ergograph

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The ergograph is used in physiological and psychological laboratories where it is desired that muscle work be measured and recorded. These instruments are costly and are usually designed to record upon a single type of kymograph or at one height. The ergograph to be described is relatively simple to construct, is durable, and can be adjusted readily to record at any height upon various types of kymographs.

An essential feature of the instrument (Fig. 1) is a metal base on one end of which is a wrist support, consisting of a curved wooden block with adjustable metal plates to contact the wrist, and a hand grip. On the other end of the base is a rigid vertical rod. The rod is arranged with a pulley proximal to the hand, another at the top, and two on the distal side. The ring into which the finger is fitted is connected to one end of a stainless steel, flexible, twisted cable

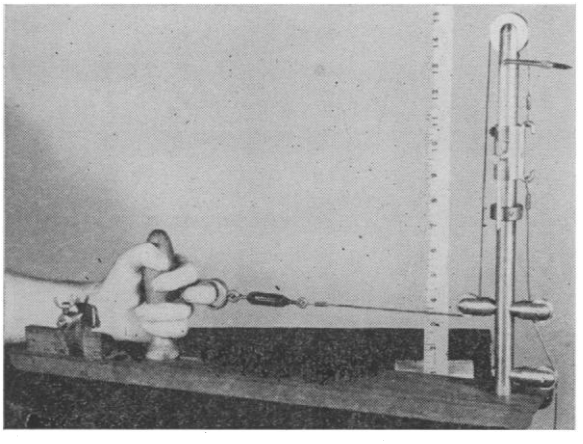

FIG. 1

by means of a turnbuckle. The cable then extends beneath the proximal and over the uppermost pulleys to end in a loop which is slipped onto a hook on the upper part of the sliding sleeve. This sleeve is constructed with a key or pin which slides in a groove in the rod, permitting free movement up and down but preventing rotation. The sleeve carries on its surface a post with a knurled setscrew which tightens against the stylus to permit vertical and lateral adjustments. The end of the stylus is slotted and has a piece of flexible X-ray film fastened in place by means of a sliding collar. The looped end of a second stainless steel cable extends from the lower hook on the sliding sleeve and across two pulleys, ending in a hook on which the desired weight is hung. A collar is fixed at the desired height on the vertical rod by a setscrew and serves to arrest the sliding sleeve.

Operation: The wrist is laid in the support and the hand support gripped. The hand grip is then fixed at a comfortable position, the wrist support adjusted, and one finger placed in the ring. The desired weight is suspended from the hook on the end of the second cable. The stylus is adjusted vertically or laterally until its X-ray film tip touches the flat surface of the kymograph. Exercise is then performed at the rate which is desired, and a kymographic record is obtained of a definite weight being lifted through a measured distance.

Use of Wetting Agents in Histological Fixatives

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The quality of a tissue fixative is thought to be enhanced not only by a careful balance of its component ingredients but also by its speed of penetration (*2*). In the past, rapid penetration has been achieved by the addition of such substances as urea, acetic acid, and certain wetting agents (*1*).

To test the validity of the hypothesis that speed of penetration improves the quality of a fixative, a series of carefully prepared, well-known fixing solutions were employed, and to these, three wetting agents were added.

METHODS

Nine widely used fixatives were selected as follows: Zenker's, Carnoy's, Helly's, Bouin's, Allen's, Gilson's, Orth's, and Vandegrift's fluids (*3*), and 10 per cent formalin. All of the above solutions were modified in three ways by the addition of the following aliphatic substances: Tergitol-7; Tergitol-4; and Tergitol-08 (*4*) in the ratio of 3 drops to 100 cc. of fixative. Because of the known characteristics of these three agents in decreasing surface tension, it was hoped that the speed of penetration would be increased.

Because of their histological differences, homogeneous nature, large size, and ready availability, the tissues selected were sheep cerebrums and human liver. Pieces of tissue one inch square were cut and placed