

rence of albumin and sugar, di-acetic acid and acetone. Five specific tests were made on each of the subjects, the first series to establish the "norms" without mental effort. The second series covered a one-hour concentration period. The succeeding tests were for 4, 8, and 12 hours duration, respectively, repeated on 4 successive days. Checks were made preceding and following the 4-day series to establish metabolic levels. In general there appears a slight rise in the metabolic level on the second day of the 12-hour series in 2 of the 3 subjects. On the third day the metabolic level of all 3 continued well above the basal rate, while records from the fourth day show an extremely high level in all subjects. The urine analysis showed fluctuations in specific gravity within normal limits; the reaction was from neutral to acid during the daily interval with no trace of either sugar or albumin in any subject. Acetone was positive after the first day, but with no traces of di-acetic acid. There was no apparent significant change in the hemoglobin content of the blood, and although the erythrocyte and the leucocyte counts show that these elements in the blood increase in numbers during the day these fluctuations are considered to be within normal limits when one day is compared with another throughout the 4-day cycles.

5143

A Simple Spirometer.

FRANCIS MARSH BALDWIN. (Introduced by E. G. Martin.)

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In attempting to carry out the laboratory exercises on the volumetric changes in respiration one often finds large sections of elementary students in classes with perhaps a single rather high priced and somewhat delicate piece of apparatus—the Spirometer. A rather simple and seemingly sufficiently accurate piece has been devised which can easily be assembled by appropriating glassware found at hand.

Two large battery jars, 10 liters capacity, are filled two-thirds full of tap water taking care that the level of the water is the same in each jar. A 1000 cc. graduate cylinder is also filled with water and inverted in one of the jars, taking care that no air is allowed to enter on inversion. The respired gasses to be measured are collected by displacement. The delivery tube for the purpose is assembled and

consists of a glass mouth-piece of 10 mm. bore of convenient length connected to some length of rubber tubing, which in turn is joined to a 'Y' tube of the same size. The 2 tubes of the Y are each connected by rubber tubing to other Y tubes of approximately 7 mm. bore. A third series of Y tubes of approximately 4 mm. bore serve to attach the delivery tubes of 2 mm. bore and which are approximately 30 cm. long. By immersing 8 small delivery tubes to the bottom of the partially filled battery jars and by blowing forcefully as in testing vital capacity in the usual way the gas from one tube is collected in the graduate cylinder. Assuming that each tube delivers approximately one-eighth of the total gas escapement in the experiment the total volume can easily be computed.

The coefficients of correlation found between results in this spirometer and results in the Tyces and Sanborn commercial spirometer are +0.85 and +0.88 respectively, computed on the basis of 154 cases.

5144

Effects of Total Absence of Function on the Optic System of Rabbits.

LOUIS GOODMAN. (Introduced by W. F. Allen.)

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Despite numerous experiments on the various morphogenetic factors involved in the development of the central nervous system, the effect of normal physiological stimulation of an end organ on that end organ and on the corresponding brain centers is still little understood. The rôle of function in post-embryonic growth and differentiation of an established functional nerve tract in mammals has received but slight attention. In regard to the visual apparatus, 2 procedures have been used—extirpation of eyes, and sewing of eyelids. The results of extirpation on the visual cortex vary with the animal used, its age, and the experimenter; but the effects on the optic nerve and superior colliculus are uniform. The interpretation of such results from standpoint of lack of function is physiologically unsound as there are complicating factors of traumatic and secondary degeneration, and Von Gudden's degeneration. The results of sewing of eyelids likewise vary with the animal and the experimenter. Whereas Von Gudden noticed no changes in the cerebral cortices of rabbits whose eyes had been enucleated or eyelids sewn at birth,