laboratory mammal, produces no depression of any physiological process, and no injury to any tissue.

Food colors as a whole are to be regarded as harmless when the total possible daily consumption of all food colors, in all foods and beverages, does not exceed the maximal harmless dose.

A determination of the factor of safety of a food color of medium toxicity, based on the preliminary results for the maximal harmless dose for the growth of young rabbits, and the maximal possible consumption of the color by man in soda water, gave the following result:

$$\text{F C F S} = \frac{\text{M H D}}{\text{M C}} = \frac{21000}{25} = 840.$$

2982

Smooth muscle response in anaphylaxis. I. Effect of mixtures of antigen and sensitized lung tissues.

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Anaphylaxis, according to present conception, is essentially a cellular phenomenon. Of the tissues that are known to participate in anaphylactic shock, that of smooth muscle has received most attention. It has been shown both in the living sensitized animal[1] and also *in vitro* by the Dale experiment[2] that when certain organs containing smooth muscle are exposed to the antigenic substance to which the animal is sensitized, this smooth muscle responds by contraction. Such smooth muscle contraction is responsible for many anaphylactic symptoms. In guinea pigs, with which these experiments are concerned, anaphylactic death is due primarily to the contraction of the highly developed smooth musculature of the bronchioles with subsequent asphyxia. As this may be entirely a peripheral reaction, as Auer[3] has shown,

[1] Manwaring, W. H., Hosepian, R., Enright, J. R., and Porter, Dorothy F., *J. Immun.*, 1925, x, 567.

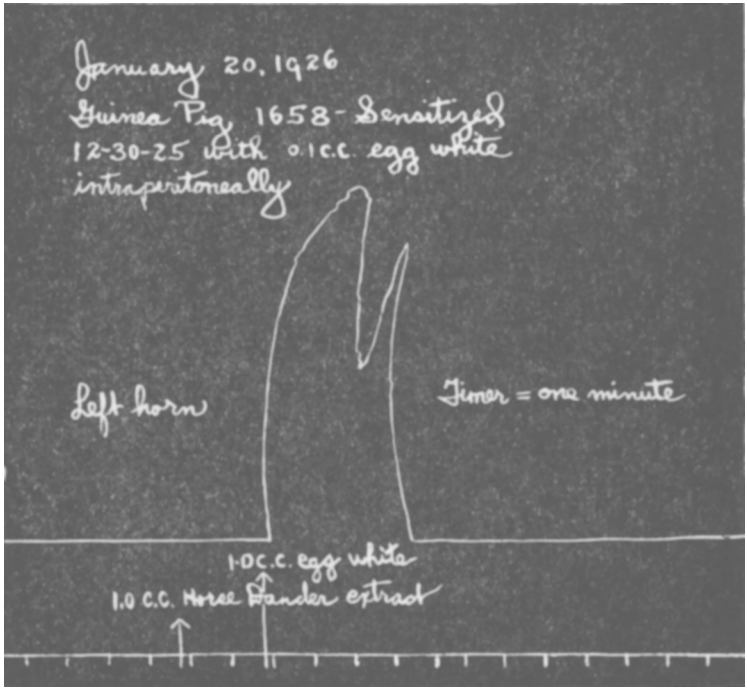
[2] Dale, H. H., *J. Pharm. and Therap.*, 1913, iv, 167.

[3] Auer, J., *J. Exp. Med.*, 1910, xii, 638.

the injected antigen presumably is transported by the blood to the lungs where it finds receptive smooth muscle. Essentially nothing is known, however, about the stimulus which makes smooth muscle contract under these conditions. By utilizing this lung reaction, experiments were attempted to study this problem and the first of these is reported here.

Female virgin guinea pigs of about 250 grams were injected intraperitoneally with 0.1 cc. of egg-white solution with an average nitrogen content of 2.6 mg. per cc.; other lots received 0.5 cc. of horse epithelium extract with a nitrogen content of 0.6 mg. per cc. Both of these were shown to be anaphylactogenic. About twenty-one days later, when optimum sensitivity developed, the animals were killed by fracturing the skull. In each, the uterus was perfused with warm Tyrode solution until free from visible blood. The two anterior uterine horns were then suspended, each in a separate Dale apparatus in which a bath of 250 cc. of

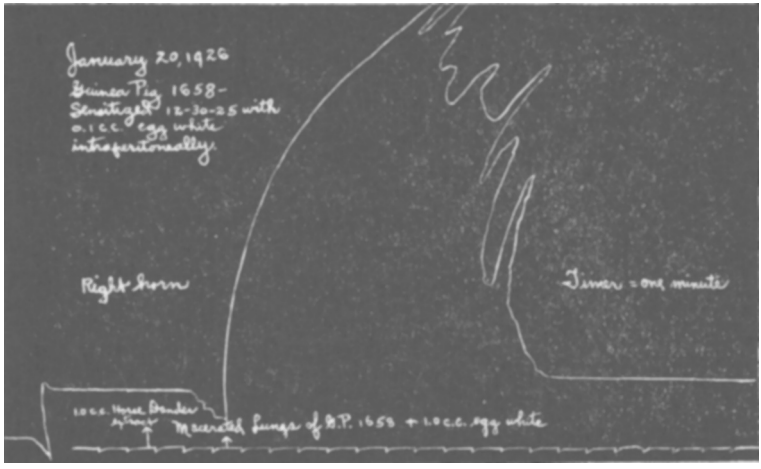
FIGURE 1.



Guinea pig, No. 1658. Left horn. 1.0 cc. of egg white added to Dale bath.

Tyrode solution was used. This was kept at a constant temperature of 37° Centigrade, and a stream of free oxygen was bubbled through it. To one bath containing a suspended horn 1.0 cc. of the homologous antigen was added. In those strips which were sensitive, smooth muscle contraction occurred which was recorded on a kymographic drum and the amplitude of the curve noted (Figure 1). Meanwhile, the lungs from the same animal were dissected from the body and perfused with warm Tyrode solution until as much blood as possible was washed out. The lungs were then ground to a pulp with a mortar and pestle. To this pulp was added the same measured unit of antigen that was used in the Dale bath to detect muscle sensitivity (1.0 cc.) and the mixture ground at room temperature for three minutes. Three cc. of Tyrode solution was added to this mixture to render it partially fluid, and it was then centrifuged at high speed for three minutes. A few cc. of supernatant fluid was drawn off and added to the second uterine horn which, in the meantime, was kept warm and oxygenated in the other Dale bath. To this mixture the suspended muscle strip responded with an amplitude greater than that of the first strip which was exposed to antigen alone (Figure 2.)

FIGURE 2.



Guinea pig, No. 1658. Right horn. Supernatant fluid from mixture of sensitized lung tissue and 1.0 cc. of egg white added to Dale bath.

As controls, ground sensitized lung extract without antigen, when added to a sensitized horn and also when added to a normal horn, caused no contraction in either. Similarly, ground normal lung mixed with antigen when added to a sensitized horn gave a contraction, but not as great a one as compared to that of antigen alone.

When the same experiment was repeated with defibrinated blood and antigen, no exaggerated curves were obtained. On the other hand, liver and uterine tissues both gave curves similar to that of lung tissues.

2983

Type of audiometer for determination of acuity for air and bone transmitted sound.

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A phonograph telephone transmitter is led to the primary of a laboratory induction coil. The secondary of the coil is attached to a loud speaker. A group of individuals may be tested by employing a spoken record, preferably in verse, and gradually shifting the secondary toward the primary until the language is understood. This makes possible a rough separation of the members of the group into those of relatively good and relatively poor acuity. Those with relatively poor acuity may then be re-tested individually by using head-phones instead of the loud speaker; placing the secondary at a remote position and then rotating it across the field of the primary. Or with the secondary in extreme position, a variable resistance may be shunted across the secondary terminals. When the resistance reads zero, nothing passes through the head phones and as the resistance is gradually increased, the threshold may be readily attained and read off in terms of ohms. If the secondary is directly connected to a bone activating telephone receiver such as previously described,[1] the intensity required for bone activation may similarly be empirically determined. The apparatus is suggested as a solution for rapid quantitative testing of school children.

[1] Pohlman, A. G., and Kranz, F. W., PROC. SOC. EXP. BIOL. AND MED., 1923, xxi, 335.