many of the characteristic chemical and serological properties of virus protein, may be obtained. As a whole, the preliminary results indicate that only slight changes occur in the protein molecule on inactivation by the four methods mentioned. Although there is always a possibility, as with any apparently pure substance, that the crystalline tobacco-mosaic virus protein may consist of two closely related components, one active and the other inactive, the available evidence indicates that the virus activity is a specific property of this high molecular weight protein. It appears likely, therefore, that the slight changes in the protein, which result from treatment with formaldehyde, hydrogen peroxide, nitrous acid or ultra-violet light, cause it to lose its ability to infect susceptible plants.

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SUPERIOR INFLUENCE OF THE MOTHER ON BODY SIZE IN RECIPROCAL HYBRIDS

IN previous papers[1] it has been shown that in rabbits and in mice, when races of unlike body size are reciprocally crossed or reciprocally backcrossed, the maternal group of larger body size produces offspring of larger body size. In other words, the mother has greater influence than the father on the body size of the offspring. This might be supposed to be due either to cytoplasmic influence of the egg or to an influence exerted by the mother during gestation. The latter alternative seems to be excluded in the case of some amphibian crosses recently described by Käte Pariser,[2] in which a similar difference is found between reciprocal crosses produced by subspecies of Triton of different body size, but in which the development of the young takes place outside the body of the mother. The crosses made by Pariser were studied primarily with reference to the sex ratio and problems of sex determination, but incidentally they throw light on size inheritance.

The superior influence of the mother is shown with especial clearness in the reciprocal crosses between *Triton palmatus* and *Triton alpestris*. The mean body lengths of metamorphosed individuals of the respective parent species are, *T. palmatus* 26.0 mm, and for *T. alpestris* 37.2 mm. Hybrids produced by *T. palmatus* mothers have a body length of 25.3 ± 0.4 mm, whereas those produced by *T. alpestris* mothers average 29.1 ± 0.3 mm. The difference between these means, 3.8 ± 0.5 mm, is nearly 8 times its probable error, and so, highly significant. It follows that the cytoplasm of the *alpestris* egg at the time of fertilization must contain sources of growth energy much superior to those found in the cytoplasm of the *palmatus egg*. Whether it is legitimate to explain their presence there as a result of previous activity of maternal nuclear material remains to be demonstrated, if indeed this further question is capable of experimental solution. But at any rate an immediate effect of the maternal cytoplasm is clearly shown.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A LOW COST ELECTROCARDIOPHONE FOR TEACHING PURPOSES

MANY teachers, particularly those teaching physiology and physical diagnosis, recognize the electrocardiophone as an extremely valuable instrument with which to demonstrate heart and respiratory sounds to a large group of students. Until just recently, however, such equipment has been both complicated and costly, keeping many from enjoying its advantages. Recently a new type of microphone has appeared on the market which has opened the field for a simple and inexpensive electrocardiophone. The cost should not run over fifty dollars for the entire instrument.

It is the purpose of this article to describe such a unit, the outstanding features of which are simplicity, compactness and low cost, and which will do almost anything which the more complicated instruments will do.

The basis of this electrocardiophone is the crystal type microphone as sold under the Brush patents. This microphone operates on the piezo-electric principles as defined by Curie in 1880. Thus, if crystals which exhibit pyro-electric properties are subjected to compression or tension, opposite charges of electricity appear at the ends of the crystal; thus a small alternating voltage is generated between two metal places glued at opposite ends of the crystal. The material used for these crystals is Rochelle salts. When a sound is impressed on the crystal the bending strain will set up a voltage between the ends. This voltage is then applied to the grid of a pre-amplifier tube. No polarizing voltage or magnetic field is needed and no input transformer is used. The audio output is almost as large as that obtained from a highly damped carbon microphone. There is no background noise, and the frequency response is good enough. Several carbon microphones were tried and found to be less satisfactory, since the vibrations caused by body movements produced a good deal of rattle and

[1] *Proc. Nat. Acad. Sci.*, 20: 621–625, December, 1934; *Genetics*, July, 1936 (in press).

[2] *Rev. Español de Biol.*, 5: 11–93, 1936.