died immediately after the injection, three lived longer than three hours, *i. e.*, between 3 and 20 hours (died in night), one lived eighteen, one twenty-three, and one thirty-six hours; one lived two days, one nine and one 16 days, and six rabbits survived. The meaning is quite unmistakable; the injection of sodium iodid undoubtedly reduced the mortality or postponed death in a palpable manner. We may add that the favorable effect of the iodid seemed to be more manifest in white than in gray rabbits.

The experiments seem to demonstrate also that sodium iodid antagonizes essentially the tetanic effects of morphin, while the depression is perhaps even more manifest in the iodid animals. However, we shall not discuss these particulars for the present.

We experimented also with mice. For mice we can only say for the present that iodid seems to retard perceptibly the onset of convulsions and the fatal outcome of morphin poisoning.

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On the nature of the semi-permeable membranes which surround the fibers of striated muscle.

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The view that the fibers of striated muscle are surrounded by semi-permeable membranes has received a wide acceptance among physiologists, and there has been a good deal of speculation regarding the nature of these membranes. The hypothesis that they are composed of lipoids has received much attention. Artificial lipoid membranes, however, have been found to be either impermeable both to water and to dissolved substances or else nearly equally permeable to water and to dissolved substances. It is a general rule that artificial membranes composed of pure colloids are either impermeable to both water and dissolved salts; or else nearly equally permeable to water and salts, and impermeable only to colloids. The best known artificial membranes which are semi-permeable with regard to salts dissolved in water are composed of precipitates of insoluble salts such as copper ferrocyanide and calcium phosphate.

The animal body can present the conditions necessary for the precipitation of calcium phosphate, as, for instance, in the case of bone formation. The striated muscle fibers contain considerable amounts of dipotassium phosphate, and are surrounded by lymph which contains calcium chloride, so that it is far from inconceivable that thin layers of calcium phosphate might be precipitated at the surfaces of the muscle fibers.

I have examined some of the properties of celloidin membranes impregnated with calcium phosphate. Celloidin membranes free from precipitate are quite permeable both to water and to dissolved salts. Such membranes were filled with a dipotassium phosphate solution and immersed in a calcium chloride solution. Under these circumstances they become impregnated with calcium phosphate, and at the same time they become markedly semi-permeable with regard to salts dissolved in water. That is to say that if they separate salt solutions of different osmotic pressures, water passes rapidly from the less concentrated to the more concentrated solution.

Celloidin membranes impregnated with calcium phosphate were filled with a 1.3 per cent. solution of dipotassium phosphate and immersed in isotonic solutions of various substances: it was then determined whether or not water passed through the membrane from the outer solution to the inner one against a moderate hydrostatic pressure. Such experiments were tried with solutions of NaCl, KCl, $CaCl_2$, cane sugar, alanin (an amino acid), glycerine, urea, and ethyl alcohol. The results indicated that the membranes were highly impermeable to salt, sugar, and amino-acid, somewhat permeable to glycerine and urea, and highly permeable to ethyl alcohol. In all these respects they resemble the muscle membranes with the possible exception of the case of KCl. There is some reason to believe that the muscle membranes are more or less permeable to KCl.

The supposition that calcium phosphate plays a part in giving to the muscle membranes their semi-permeable properties would explain two great classes of facts—those facts, namely, which show that muscles rapidly lose their semi-permeable properties in acid solutions; and those which show that calcium may play an important part in maintaining the semi-permeable properties

of muscle. Precipitates of calcium phosphate are rapidly dissolved by acids, and would dissolve slowly in neutral calcium-free solutions. In view of these considerations I propose to devote some time to the study of the osmotic properties of calcium phosphate precipitates, as well as to those of precipitates of calcium carbonate and of magnesium phosphate and magnesium carbonate.

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The mechanical factors of excessive artificial respiration and a consideration of their relation to the acapnial theory of shock.

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It has been claimed that the most important factor in the causation of shock is diminution of CO_2 within the blood, and that this diminution is a regular consequence of all influences resulting in shock. That CO_2 possesses important physiological functions cannot be denied. An investigation therefore of the true significance of a diminution of its normal amount within the blood is important and bears a special relation to various methods of artificial respiration utilized in thoracic surgery. The present experiments were undertaken for the purpose of investigating the effects of acapnia and the relation of some factors concerned in its production to shock. In all of them dogs were used. The first series was performed for the purpose of studying the effect of variations in intrapulmonic air pressure upon the blood pressure. The thorax was opened laterally, a T-tube connected with a water manometer was tied in a small bronchus, and the heart enclosed in a Henderson cardiometer in series with a recording tambour. The blood pressure was recorded from the carotid artery. The thorax was closed and the animal was subjected to intratracheal insufflation from an apparatus provided with an exhaust valve which reduced the pressure to approximately zero about four (4) to twelve (12) times per minute. The blood pressure averaged 150 mm. Hg. when the intrapulmonic air pressure was not allowed to exceed 6 mm. Hg.