this P. C. B. filtrate directly into the nerve in the amounts mentioned caused no paralysis.[1]

Conclusion. These experiments indicate that the production of poliomyelitis is accelerated or intensified when poliomyelitis virus is combined with P. C. B. filtrate and injected subserosally or directly into the gastrointestinal tract. Two other sets of 2 animals each subsequently experimented upon in the same manner gave the same results.

7709 C

Comparative Study of Effects of Preparations of Posterior Lobe of Pituitary Gland on Water Interchange in Frogs.

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One of us (Steggerda[1]) demonstrated that frogs given injections of pitressin absorbed considerable amounts of water in which they were kept, an increase of nearly 15% of body weight being reached in from 4 to 5 hours. Experiments in which the cloaca was tied off to prevent elimination of water and experiments similar to those described by Adolph[2] in which a comparison was made between frogs used as controls and frogs without skins led to the conclusion that pitressin has a specific effect on the permeability of the frog's skin.

With these results in mind we carried out experiments comparing the effects of solution of pituitary U.S.P. (we used pituitrin, Parke-Davis), and its separate components, pitressin, and pitocin, respectively, on the absorption of water by the frog, *Rana pipiens.* The results are here presented. We shall also report our observations on the localization of the absorbed water, and present data on the influence of pitocin on the rate of loss of water by the frog.

At the beginning of each experiment frogs weighing 40 to 50 gm. were placed in a container and nearly submerged in water at room temperature. After 30 minutes the frogs were removed, dried with gauze as uniformly as possible, and weighed on a beam balance accurate to 0.1 gm. An amount of pituitrin, pitressin, or of pitocin

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[1] Steggerda, F. R., *Am. J. Physiol.*, 1931, **98**, 255.

[2] Adolph, E. F., *Am. J. Physiol.*, 1931, **96**, 569.

equivalent to 0.1 cc. for each 10 gm. of body weight was then injected into the dorsal lymph sac of each frog and the frogs were again placed in the water. This same general procedure was followed for the frogs used as controls except that they did not receive the injections of the preparations of posterior pituitary. Weighings were made at intervals of approximately 30 or 60 minutes. Four sets of observations were made with each preparation; in each case 3 frogs received the injections and one was kept as a control. A total of 12 frogs therefore received each pituitary product. The values referred to in the following statements represent averages of all the observations with each preparation. The experiments were carried out during July and August.

Each of these posterior pituitary products caused a very definite increase in weight. The maximal increase following injections of pituitrin or pitocin was reached in from 3 to 4 hours, whereas pitressin produced its maximal effect in about 2 hours. Pitocin produced the most striking effect, since injections of this preparation caused a maximal increase in weight of about 19% in contrast to a maximal increase of about 16% for injections of pituitrin and of about 11% for pitressin. The weights of the control frogs did not vary more than 1.5% from the initial weights (Fig. 1).

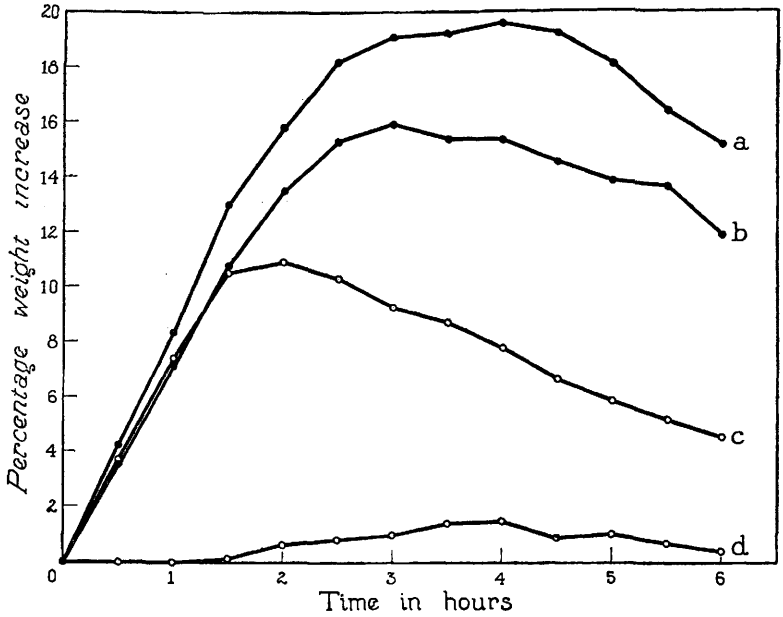

FIG. 1.

The influence of injections of 0.1 cc. per 10 gm. of body weight of preparations of the posterior lobe of the pituitary gland on the weights of frogs. *a*, pitocin, *b*, pituitrin, *c*, pitressin, and *d*, controls. Each line represents the average values for twelve different frogs.

The results of these experiments led us to inquire whether the absorbed water was lodged in the subcutaneous spaces or whether it was partially taken up by the body tissues. To investigate this problem, drainage of the subcutaneous spaces along the sides, back, and legs of 3 frogs was effected by opening the skin in those regions. These frogs then received intraperitoneal injections of pituitrin 0.1 cc. per 10 gm. of body weight; at the same time 3 intact frogs received similar injections, and the changes in weight were followed as in previous experiments. Both groups of frogs increased appreciably in weight, although in an equal period of time the average weight of frogs with intact skins exceeded that of frogs with opened skins by more than 5%. At the end of 3½ hours, when the increase in weight had not yet reached its maximal point, the skins of the intact frogs were opened in the same manner as had been done with those in the other group, and all the frogs were then reweighed. It is interesting to note that almost immediately following this procedure the weights of frogs of the 2 groups became almost identical. This sudden loss in weight following subcutaneous drainage indicates that a part of the water taken up is held in the subcutaneous spaces. Since there was a very decided increase in the weights of the frogs whose skins were opened at the beginning, and since the average weight of frogs in the second group after incision approximated that of frogs in the first group so closely, it is quite evident that a considerable amount of water is absorbed by the body tissues.

Since preparations of the posterior lobe of the pituitary gland were found to have so marked an influence on the water-absorption of frogs, we wondered what influence they might have on the rate of loss of water. To answer this question, 6 normal frogs were removed from the water and were placed in separate, large-meshed wire cages, to prevent huddling and to insure more uniform exposure of body surface. After control weights had been obtained, 3 of the frogs received injections of pitocin, 0.1 cc. per 10 gm. body weight, and the remaining 3 were kept as controls. All were then exposed to the breeze of an electric fan for about 2 hours and 30 minutes. All the frogs lost appreciably in weight, but those which had received injections of pitocin gave evidence of a greater loss of weight than those kept as controls. These observations would indicate that pitocin affects the frog in such a way that fluid is lost from the body at a more rapid rate than normally. Reddening of the ventral surface of the hind legs, which is seen in frogs after severe loss of water, occurred among those frogs that had been given in-

jections an appreciable time before it did among those which were not given the injections.

Summary and Conclusions. Preparations of the posterior lobe of the pituitary gland cause a marked increase in the weight of frogs which is found to be due to increased absorption of water. A comparison of the effects of pitocin, pituitrin, and of pitressin in producing an increased absorption of water indicates that pitocin is the most effective of the 3 in this regard. With the doses used, pitocin caused an average increase in weight of about 19%, whereas pitressin caused an increase of only 11%. The effects of pituitrin come practically midway between the other 2. About 5% of the excess water taken in through the skin may be held in the subcutaneous spaces along the sides, back, and legs. The rate of loss of water when frogs are removed from the water is definitely increased by injections of pitocin.

7710 P

Utilization of Calcium Salts by Children.

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Children 4-12 years of age have been given calcium salts in amounts such that the calcium content was equivalent to that in a pint or quart of milk. The retentions of calcium and phosphorus have been determined and compared with the retentions from the equivalent quantities of milk. The calcium and phosphorus retentions of children from 1 to 4 years of age have been determined when a quart of milk was given as the chief source of calcium, and when a calcium salt was substituted for one pint of the milk. A few studies were made wherein the salt was substituted for all of the milk. The protein intake of each diet was kept approximately constant during the salt and milk periods. The salts used were calcium lactate, carbonate, gluconate, and the di- and tri-phosphates. The latter was given either as the salt or in the form of a purified bone meal. No difference was observed in the relative retentions from the two sources. The results are summarized in Table I.

In general, the calcium and phosphorus retentions when the calcium phosphates were fed, were approximately equal to those from