CONCLUSION.

In a previous publication we have called attention to the possibility that our completely parathyroidectomized animals may on occasion show convulsive seizures indistinguishable from grand mal attacks of idiopathic epilepsy seen in man. The same factors which predispose to such attacks in man favor the convulsive attacks in such dogs. Indiscretions of diet particularly in infants are likely to induce convulsive seizures with definite clinical indications of a gastritis and enteritis. Whereas it is desirable to prevent constipation in epileptics and promote intestinal evacuation following any dietary indiscretion, it is obvious, on the basis of the results just described, that too drastic catharsis may be more harmful than beneficial in that any violent cathartic may for reasons advanced rather induce convulsive seizures than prevent them.

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On the efficacy of various calcium salts in parathyroid tetany.

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Several satisfactory methods are now available to preserve the life of dogs following an otherwise rapidly fatal thyroparathyroidectomy. Forced diuresis by the intravenous injection of large quantities of Ringer's solution quite rapidly controls the symptoms of parathyroid tetany, or if maintained in the absence of any symptoms even prevents it appearance.[1] The oral administration of calcium lactate[2] is less laborious and even more effective. If, however, the animal at any time develops *severe* tetany in spite of treatment the intravenous injection of Ringer's solution is indicated as the first measure of choice to obviate the extreme tetany with exitus possibly attendant on the passage of

[1] Luckhardt and Rosenbloom, PROC. SOC. EXP. BIOL. AND MED., 1921, xix, 129; Luckhardt and Rosenbloom, *Science*, 1922, lvi, 48; Luckhardt and Blumenstock, *Science*, 1922, lvi, 257.

[2] Luckhardt and Goldberg, *J. Am. Med. Assn.*, 1923, lxxx, 79; Luckhardt and Blumenstock, *Am. J. Physiol.*, 1923, lxiii, Feb. (Proceedings).

the stomach tube. Under any condition the oral administration of calcium lactate is safer and more physiological than its intravenous injection[3] and the literature bears evidence of our contention that many dogs in tetany have probably died, not in spite of such intravenous injections, but probably because of them. The dietary method of conserving the life of parathyroidectomized dogs devised by Dragstedt[4] and used by him in a number of studies involves the use of milk (and bread) enriched with large quantities of lactose. Under this regime the intestinal flora was kept aciduric due partly to the high lactic acid content of the intestinal material as well as to the altered metabolism of the bacteria in the presence of an abundant source of available carbohydrate and absence of large amounts of animal protein (meat) from which under the usual conditions, the bacteria might and do form the toxic compounds responsible for the tetany.

In our own studies, meat was allowed plentifully, but when given with large amounts of calcium lactate (1.5 gm. per kg.) maintained the animal in an excellent state of health and nutrition. It seemed possible that the lactate ion, present in high concentration in the bowel, might be in a great measure responsible for the beneficial action of the calcium lactate fed; and that its presence (like the lactose or lactic acid) had so altered the metabolism of the intestinal flora that the toxic compounds responsible for the tetany would not be formed. In spite of the fact that under our regime of intensive calcium lactate feeding the intestinal flora on a high protein intake maintain their essentially gram negative character, we nevertheless tested out the efficacy of other calcium salts when fed in large quantities, using the same technique as described in a previous communication.[2] Finding the chloride unsatisfactory because too irritating, we restricted our studies up to the present to calcium nitrate, calcium acetate, calcium carbonate, and the soluble monobasic calcium phosphate.

RESULTS.

1. Calcium carbonate, calcium nitrate, and calcium acetate

[3] Blumenstock and Luckhardt, *Am. J. Physiol.*, 1924, lxviii, March (Proc.).

[4] Dragstedt, *J. Am. Med. Assn.*, 1922, lxxix, 1593; *Am. J. Physiol.*, 1923, lxiii, (Proc.); Peacock and Dragstedt, *Am. J. Physiol.*, 1923, lxiv, 499; Dragstedt, Phillips and Sudan, *Am. J. Physiol.*, 1923, lxv, 368; Dragstedt, Phillips and Sudan, *Am. J. Physiol.*, 1923, lxv, 503.

can be administered orally in large quantities (1.5 gm. per kg. daily) to completely parathyroidectomized dogs with no visible deleterious effect.

2. These forms of calcium are as effective as the lactate in preventing by their oral administration the development of tetany or rapidly restoring the animal to its normal condition (in 1½ hours) if tetany has developed spontaneously or has been induced intentionally.

3. Because of their irritating properties to the gastro-intestinal tract the acetate and nitrate are more likely to produce emesis than the lactate or the carbonate.

4. Calcium carbonate, though tasteless (unlike the bitter lactate), is physiologically as efficient but decidely more constipating than the lactate (acetate or nitrate).

5. The soluble calcium phosphate, on the other hand, is not only highly irritating but induces enophthalmos, vomiting, abdominal distress, great depression, hyperpnea, some spasticity, and pronounced salivation. It cannot be used, therefore, in place of the other salts of calcium and will receive further study. Calcium phosphate seems rather to favor the development of tetany than lead to its disappearance.

6. Calcium salts, with the exception just noted, will carry a recently parathyroidectomized but pregnant bitch through pregnancy, labor, and normal lactation although the pregnant and lactating animal is not as easily managed as a normal dog.

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Ketosis associated with conditions of alkalosis.

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Abnormally large amounts of acetone bodies have been observed in the blood associated with conditions of uncompensated alkalosis, due either to alkali therapy or to excessive loss of HCl through vomiting. The pH of the blood plasma was determined by the method of Myers, Schmitz and Booher and the acetone bodies by the method of Van Slyke and Fitz. For example, values