Myriads of these bodies are sometimes visible on the flat corneal cells. They appear to be peculiar cell granules, and are present in normal animals.

22 (68). **"On the tetanic element in bile,"** with demonstrations: **S. J. MELTZER** and **WILLIAM SALANT.**

The toxic effects of bile are manifold, and have been the subject of numerous investigations. The authors referred only to the general effects: coma and convulsions. Of the early investigators of the effects of injection of bile into animals, some observed only coma, others convulsions, and still others stated that they observed both. The last work on this subject, the work which is now frequently quoted, was done by Rywosch about fourteen years ago. Rywosch claims that coma is the only effect of the two which the injection of bile or bile salts produces.

In their extensive series of experiments on frogs the authors established the fact that the injection of bile can produce coma as well as tetanus. Coma is the frequent and the more reliable result. By a certain device, however, they were able to demonstrate the presence of the tetanic element even in bile which infallibly produced coma; it was by the addition of a subminimum dose of strychnin. A frog of medium size will not respond, even with the slightest hyperesthesia, to an injection of a hundredth of a milligram of strychnin. When such a small dose, however, is injected into a frog which has received a certain quantity of bile, the animal reacts, sooner or later, with a distinct tetanus. The effective dose of bile varies with the animal from which it is obtained. For instance, of ox bile hardly more than 0.3 c.c. need be used, otherwise the coma will completely mask the tetanic element. Rabbit's bile, on the other hand, may be given sometimes even in doses of 2 c.c. or 3 c.c., without supressing any of the tetanic features. The setting in of complete coma usually masks the tetanic element, as already stated. A close observation, however, will reveal in many cases some distinct differences between the coma of animals which received a subminimum dose of strychnin and that of animals which had not received any strychnin.

The bile of rabbits, which thus far has been more extensively studied than that of other animals, produced in many instances

distinctly convulsive effects, even without the addition of strychnin. From an analysis of their observations to the present time, the authors feel justified in making the following statements: The toxic effect of bile from normal rabbits shows an individual variation; the effect of the bile from some animals is predominantly coma, and from others tetanus. Heating the bile seems to reduce the stupefying, paralyzing effect, and to favor the appearance of the tetanic element. In the bile of nephrectomized rabbits the tetanic element was distinctly more pronounced than in the bile of normal rabbits.

The bearing which these observations might have upon the understanding of the complex symptoms of cholemia and uremia was not discussed.

23 (69). **"A preliminary communication on the pharmacology of thorium": E. D. BROWN** and **TORALD SOLLMANN.** (Presented by **WILLIAM J. GIES.**)

Thorium nitrate precipitates proteins and is intensely astringent. Its intravenous injection is promptly fatal by embolism. Applied subcutaneously, it causes local necrosis. Administered by the stomach, even large doses have no appreciable effect.

Solutions in sodium citrate were found to be nonprecipitant and nonastringent. As much as 1 gm. of thorium nitrate, per kilogram of dog, injected subcutaneously and intravenously in citrate solution, had little acute action; however, the animals appeared depressed and became emaciated. The postmortem examination, made after several weeks, showed extensive and widespread calcification of tissues. Thorium could not be demonstrated in the calcified areas.

A method for the quantitative estimation of thorium was elaborated; this gave satisfactory results with urine, to which known quantities were added. But in actual experiments on animals it was found inaccurate, a large proportion of the injected thorium escaping detection. However, it was found that on intravenous or subcutaneous injection, the thorium appeared in the urine, and not in the feces. When administered by mouth, it appeared in the feces, but not in the urine. The conclusion appears justified that absorbed thorium is excreted by the kidneys, but that the metal is neither absorbed nor excreted through the intestine.