benzoic acid given to rabbits is greater on the first day of the administration during a fasting period than on subsequent days. Whether the glycocoll is combined with carbohydrate as an amino-sugar, as Lüthje imagines, or not, it is evident from the several experiments that no permanent synthesis takes place. Glycocoll, therefore, behaves in much the same way in metabolism as does gelatin.

82 (225)

An hydrodynamic explanation of mitotic figures.

By **ARTHUR B. LAMB** (by invitation).

[*From the Havemeyer Chemical Laboratory, New York University.*]

The distinctly polar arrangement of the chromatin substance about the astral centers in dividing cells, combined with the pronounced curvature of the astral rays and of the spindle fibers, have demanded the assumption of some polar force as universally operative. On such an assumption it is of course necessary to assume further that astral centers represent either opposite or like poles. On the alternative of opposite poles, we should expect, with any force so far proposed, a configuration of astral rays simulating that of iron filings between *opposite* magnetic poles, coupled with a mutual *attraction* of the astral centers. On the other alternative, we should similarly expect a configuration of astral rays and spindle fibers simulating that of iron filings between *like* magnetic poles, coupled with a mutual *repulsion* of the astral centers. Actually, we have neither of these conditions, but instead, a configuratian like that of iron filings between *opposite* magnetic poles *and at the same time an apparent repulsion between the astral centers or the centrosomes.*

This is not the case with the forces of attraction or repulsion existing between bodies oscillating or pulsating in a fluid medium. More specifically, if two spheres are pulsating synchronously and in opposite phase, or oscillating synchronously and in the same phase, they will repel one another, *but at the same time the field between them will simulate the configuration of iron filings between opposite magnetic poles.*[1]

[1] See Bjerknes' text-book, "Hydrodynamische Fernkräfte," J. A. Barth, Leipzig, 1902.

If then we assume that the centrosomes are pulsating in opposite phase, or better, oscillating in the same phase, we will obtain the desired repulsion and at the same time have a configuration like that actually observed.

The configuration taken by the chromosomes is explicable on the same grounds. Indeed, it is not necessary to assume any independent motion on their part, but simply to consider it an induction phenomenon. The tri- and multi-polar spindles are also better explained on these hydrodynamic grounds than on previous assumptions.

The foregoing explanation is, of course, pure hypothesis, with no support other than the facts it seeks to explain. There is, however, nothing inherently impossible in it, and it may provoke fresh observation and new ideas.

83 (226)

Transfusion experiments in dogs showing artificially implanted tumors.

By **GEORGE W. CRILE** and **S. P. BEEBE.**

[*From the Department of Experimental Pathology, Cornell University Medical College, New York City.*]

Direct transfusion of the whole blood from immune dogs to dogs with actively growing, artificially implanted tumors has been carried out upon a series of six animals. The operative method of this transfusion is the same as has been used by one of us in a large series of experiments previously reported in the proceedings of this society.[1] In the first set of three, sufficient time has elapsed to determine the outcome, and we give below brief data of each experiment in this series.

I. Dog 116. Planted Jan. 7, 1907. Tumors were first seen on Feb. 20; continued to grow slowly. March 20, transfusion experiment — dog was bled 400 c.c. and immediately transfused with 550 c.c. of blood from dog 244, in which implantation had occurred on Jan. 18th; tumors were first noticed on Feb. 6th, and had continued to grow until Feb. 20th, when they began to regress. Regression complete March 7th. Three days after transfusion,

[1] Crile and collaborators: This volume, pp. 6, 64, 65 and 67.