

**Second meeting.<sup>1</sup>**

*Physiological Laboratory of New York University and Bellevue Hospital Medical College. April 15, 1903.*

5. "**Changes in the blood-volume of the vein of the submaxillary gland on stimulation of the chorda tympani and sympathetic nerves,**" with demonstrations of curves: **RUSSELL BURTON-OPITZ.**

The author explained the mechanism of a recording stromuhr by means of which he made quantitative determinations of the blood-flow in the vein conveying the blood from the submaxillary gland. The blood-volume was measured previous to, as well as during, the stimulation of the secretory nerves. The curves which were exhibited showed very striking changes in the blood-flow, namely, an increase on stimulation of the chorda and a decrease when the current was applied to the sympathetic fibers. In the former case the volume of the blood-flow (c.c. per second) was from about two to nearly six times as great as normal, and in the latter case it was from about one-half to one-fifth the normal volume. By using a strong stimulus a complete cessation of flow can be produced.

6. "**Does a backward flow ever occur in the veins?**": **RUSSELL BURTON-OPITZ.**

The results of this investigation may be summarized as follows: A backward swaying of the column of blood in the central veins is a constant normal phenomenon. It is produced by two factors: first, by the contraction of the right side of the heart; and second, by high intrathoracic pressure (forced expiration). If the distal conditions in the venous system are favorable, this backward movement can also be obtained in the peripheral veins (femoral veins). The same instrument was used in this investigation as in the former.

7. "**A new method of studying metabolism**": **GARY N. CALKINS.**

The author described experiments then in progress upon metabolism in unicellular animal organisms. These forms, reproduc-

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<sup>1</sup> Reprinted from *Science*, 1903, xvii, p. 741 and *American Medicine*, 1903, v, p. 708.

ing by simple division, offer the same protoplasm for study generation after generation, and with each division the daughter organisms, by reason of the functions of regulation and regeneration, perfect themselves in the race-type, while digestion, assimilation, waste, repair and growth are handed down unchanged from cell to cell. The problem is to ascertain whether these various functions will continue their activities indefinitely or whether protoplasmic old age will supervene to put an end to the race. In nature such an end is prevented by sexual union, whereby the conjugating organisms are rejuvenated.

In the experiments by the author this function was prevented by isolation. The general metabolic functions *wore out* four consecutive times at intervals of six months, and each time, except the last, the race was saved only by a change in diet or by chemical stimuli. The phenomena were analogous to those in the artificial fertilization experiments of Loeb and others, with this difference, that if comparable with artificial parthenogenesis, the process was repeated with the same protoplasm three consecutive times. In the fourth period of degeneration the stimuli previously tried were no longer effective and the race died out, seven hundred and forty-two generations old. Structural changes were different in the different periods of depression. The degenerate animals, in the periods which were successfully overcome, had curiously altered nuclei and endoplasm. In the last period of depression which was not overcome, the nucleus and endoplasm were normal, while abnormal parts were found in the micronucleus and the cortical plasm.

The conclusions which this part of the work seems to justify are:

1. That "old age," so-called, of the cell may be due either to the wearing out of functions, or to the degeneration of structural parts. The former is capable of artificial rejuvenescence, the latter apparently not.
2. The ordinary functions of metabolism, such as digestion, assimilation, excretion, growth, etc., are dependent upon certain definite portions of the cell (macronucleus and endoplasm), while the dividing energy is a function of the micronucleus and of the cortical plasm.

3. After conjugation the organisms start with high potentials of metabolic energy which gradually wear out, but which can be restored artificially. So, too, the dividing energy starts with a high initial potential energy, which cannot be restored after exhaustion.

In the light of these experiments it would be pertinent and instructive to ascertain whether artificial parthenogenesis, in sea-urchins for example, could be repeated more than once on the same continuous protoplasm. On *a priori* grounds a successful result would be extremely doubtful.

**8. "On the origin of cholesterin in gallstones": CHRISTIAN A. HERTER.**

The author said that experiments made in his laboratory by Dr. Wakeman give strong support to the view that inflammatory conditions of the walls of the gallbladder may lead to an increase in the cholesterin of the bile. Dr. Wakeman injected strong solutions of bichlorid of mercury into the gallbladders of dogs which had previously fasted for three days. After periods of from two to five days the animals were killed. As a rule the gallbladder walls were much thickened and the epithelium was proliferated and desquamated. The solids of the bile were diminished in percentage. The cholesterin content was much increased. The contents of the gallbladder in these experiments were sterile. These facts are of great interest in relation to the etiology of gallstones.

**9. "On nucleic acid," with a demonstration of preparations: PHOEBUS A. LEVENE.**

According to Osborne, nucleic acid derived from the plant cell differs from that of the animal cell because of variations in the characters of the contained pyrimidin radicals. The author has devised a new method of separating the pyrimidin bases, in which he avoids precipitation with silver. With this method he has obtained from animal nucleic acid (derived from the spleen and pancreas), thymine, cytosine, and uracil. The radical of the latter substance had been supposed to occur only in plant nucleic acid. Kossel and Steudel have made this same observation in regard to the nucleic acids derived from the thymus gland and from fish sperm.