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PROCEEDINGS

OF THE

SOCIETY FOR

EXPERIMENTAL BIOLOGY AND MEDICINE

VOLUME I.

1903–1904

EDITED BY THE SECRETARY

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PREFACE.

Facts regarding the organization of the Society for Experimental Biology and Medicine are given on page 53.

The objects and general character of the society are indicated by the following summary of provisions in its constitution and by-laws:

The main object of the society is the cultivation of the *experimental* method of investigation in the sciences of animal biology and medicine.

No one can be elected to membership who has not completed a meritorious independent *experimental* research in animal biology or medicine.

Every member is required to conduct an *experimental* investigation, and give public notice of it, at least once every two years. Noncompliance with this requirement carries with it *automatic forfeiture of membership.* It is aimed to make the society an organization of *workers*, and to keep it such.

The program of each meeting consists of brief presentations of the essential points of *experimental* investigations in biology and medicine or allied natural sciences, usually of *demonstrations* of actual experiments.

The meetings are held in suitable laboratories.

Membership is not confined to residents of New York City.

Visitors are welcomed to the meetings.

The index at the end of this volume will show at a glance the nature of the scientific proceedings of the society.

June 1, 1904.

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CONSTITUTION AND BY-LAWS.

CONSTITUTION.

[As adopted February 25, 1903 and amended April 20, 1904.]

Article I. Name.

The name of this organization shall be The Society for Experimental Biology and Medicine.

Article II. Object.

The object of this Society shall be the cultivation of the experimental method of investigation in the sciences of animal biology and medicine.

Article III. Membership.

Section 1. *Eligibility.* — Any person who has accomplished a meritorious original investigation in biology or medicine by the experimental method shall be eligible to membership.

Section 2. *Classification.* — The term "resident members" shall refer, in this constitution, to those members whose experimental work shall be done within the limits of "Greater New York"; "non-resident members," to those whose scientific work shall be done outside of "Greater New York."

Section 3. *Obligations.* — A. Every member shall be expected to conduct an experimental investigation and give public notice of it, at least once in two years.

B. *Resident* members shall be required either to attend, every two years, at least three meetings of the Society, or to present in person, at least once every two years, a report of their experimental researches.

C. Each *non-resident* member shall be required to present in person, at least once every two years, a communication containing the results of an experimental investigation, or to send to the

President within that time, such a communication for presentation at a regular meeting of the Society.

D. It shall be the duty of the members to present to the Librarian two copies of all publications of their original work.

E. Non-compliance with any of these requirements carries with it forfeiture of membership, unless an acceptable explanation is offered to the Council.

SECTION 4. *Nomination and Election.* — A. Candidates for membership must be nominated by three members.

B. After their eligiblity has been determined by the Council, nominees may be voted for at any meeting succeeding that at which their names were presented.

C. A three-fourths vote of the ballots cast shall elect.

SECTION 5. *Expulsion.* — Any member may be expelled by a three-fourths vote of the total membership.

ARTICLE IV. MEETINGS.

SECTION 1. *Time.* — The Society shall hold regular meetings at least once every two months during the academic year.

SECTION 2. *Annual.* — The first meeting held in the calendar year shall be the annual business meeting.

SECTION 3. *Program.* — The program of the meetings shall consist of (A) brief presentations, in elementary form, of the essential points of an experimental investigation, preferably a demonstration of actual experiments; and (B) of brief reports of important facts recently discovered in the sciences of biology and medicine or allied natural sciences.

ARTICLE V. OFFICIALS.

SECTION 1. *Officers.*—The officers shall be a President, a Vice President, a Secretary, a Librarian and a Treasurer.

SECTION 2. *Council.*—The officers shall constitute the Council of the Society.

SECTION 3. *Nomination and Election.*—A. Nominations of officers shall be made by the members in the session immediately preceding the annual business meeting.

B. Election of officers shall be by ballot at the annual business meeting.

C. A plurality of the votes cast shall elect.

SECTION 4. *Term of Office.*—The term of office shall be one calendar year.

SECTION 5. *Duties.*—A. The duties of the officers shall be such as usually devolve on them individually, and also collectively as an executive committee.

B. The Council shall promptly investigate and report its findings on the eligibility of candidates for membership.

C. The Librarian shall receive and preserve copies of the publications of the experimental investigations of the members, and shall keep an official record of them. He shall call the roll of membership at the annual business meeting and, at that time, shall announce the publications of each member during the preceding year.

ARTICLE VI. DUES.

The annual dues shall be One Dollar ($1.00), unless otherwise determined by the Council.

Non-payment of dues for three consecutive years carries with it forfeiture of membership.

ARTICLE VII. QUORUM.

A majority of the members resident in "Greater New York" shall constitute a quorum for the transaction of business.

ARTICLE VIII. BY-LAWS.

By-laws may be adopted at any meeting by a majority vote.

ARTICLE IX. AMENDMENTS.

SECTION 1. Proposed amendments to the constitution must be endorsed by at least three members, at a regular meeting, and may be voted on at a succeeding meeting.

SECTION 2. It shall be the duty of the Secretary to give all members due notice of intended amendments.

SECTION 3. A two-thirds vote of the total membership shall be required for the adoption of an amendment.

BY-LAWS.

[Adopted February 25, 1903.]

1. *Meetings.*—A. The meetings shall be held on the third Wednesdays of October, December, February, April and May.

B. The meetings shall be opened at 8:15 p. m., and shall be closed at 10:30 p. m.

C. Whenever possible the meetings shall take place in suitable laboratories.

2. *Time Allowed for Reports and Discussions.*—A. The time allowed for making individual communications, except demonstrations of experiments, shall be restricted to ten minutes.

B. Not more than five minutes shall be allowed to a member for the discussion of any communication.

REGISTER OF NAMES AND ADDRESSES OF THE PRESENT MEMBERS.

ABEL, JOHN J. . . . . Johns Hopkins University.
ABBOTT, ALEXANDER C. . . . . University of Pennsylvania.
ADLER, ISAAC . . . . . 22 East 62d Street, New York.
ATKINSON, JAMES P. . . . . Department of Health, New York.
BURTON-OPITZ, RUSSELL . . . . . Columbia University.
BUXTON, B. H. . . . . Cornell Medical School.
CALKINS, GARY N. . . . . Columbia University.
CONKLIN, E. G. . . . . University of Pennsylvania.
CRAMPTON, HENRY E. . . . . Columbia University.
CUNNINGHAM, RICHARD H. . . . . Columbia University.
CUSHING, HARVEY W. . . . . Johns Hopkins Hospital.
CUSHNY, ARTHUR R. . . . . University of Michigan.
DAVENPORT, CHARLES B. . . . . University of Chicago.
DUNHAM, EDWARD K. . . . . N. Y. University and Bellevue Hospital Medical College.
EWING, JAMES . . . . . Cornell Medical School.
FLEXNER, SIMON . . . . . University of Pennsylvania.
GIES, WILLIAM J. . . . . Columbia University.
HAWK, PHILIP B. . . . . University of Pennsylvania.
HERTER, CHRISTIAN A. . . . . Columbia University.
HISS, PHILIP H. . . . . Columbia University.
HOWELL, WILLIAM H. . . . . Johns Hopkins University.
HUNT, REID . . Public Health and Marine-Hospital Service, Treasury Department, Washington, D. C.
JACKSON, HOLMES C. . . . N. Y. University and Bellevue Hospital Medical College.
LEE, FREDERIC S. . . . . Columbia University.
LEVENE, PHŒBUS A. . . State Pathological Institute, Ward's Island, N. Y.
LEVIN, ISAAC . . . . . 1883 Madison Ave., New York.
LUSK, GRAHAM . N. Y. University and Bellevue Hospital Medical College.
MACCALLUM, W. G. . . . . Johns Hopkins Hospital.
MANDEL, ARTHUR R. . . N. Y. University and Bellevue Hospital Medical College.
MELTZER, S. J. . . . . 107 W. 122d St., New York.
MENDEL, LAFAYETTE B. . . . . Yale University.
MORGAN, T. H. . . . . Bryn Mawr College.
MÜNSTERBERG, HUGO . . . . . Harvard University.
MURLIN, J. R. . . N. Y. University and Bellevue Hospital Medical College.

NORRIS, CHARLES . . . . . Columbia University.
NOVY, FREDERICK G. . . . . University of Michigan.
OERTEL, HORST . N. Y. University and Bellevue Hospital Medical College.
OPIE, EUGENE L. . . . . Johns Hopkins University.
PARK, WILLIAM H. . . N. Y. University and Bellevue Hospital Medical College.
PEARCE, RICHARD M. . . . . Bender Hygienic Laboratory, Albany, N. Y.
PFAFF, FRANZ . . . . . Harvard Medical School.
PORTER, W. T. . . . . Harvard Medical School.
RICHARDS, ALFRED N. . . . . Columbia University.
SALANT, WILLIAM . . . . . 36 W. 114th St., New York.
SMITH, THEOBALD . . . . . Harvard Medical School.
STILES, PERCY G. . . . . Massachusetts Institute of Technology.
STOOKEY, LYMAN B. . . State Pathological Institute, Ward's Island, N. Y.
WADSWORTH, AUGUSTUS B. . . . . Columbia University.
WALLACE, GEORGE B. . . N. Y. University and Bellevue Hospital Medical College.
WARTHIN, ALFRED S. . . . . University of Michigan.
WELCH, WILLIAM H. . . . . Johns Hopkins University.
WILLIAMS, HERBERT U. . . . . University of Buffalo.
WILSON, EDMUND B. . . . . Columbia University.
WOODWORTH, ROBERT S. . . . . Columbia University.
YATSU, NAOHIDÉ . . . . . 463 Manhattan Avenue, New York.

Total number of members (June 1, 1904), . . 55.

CLASSIFICATION OF MEMBERSHIP.

Charter members.*

Founder — S. J. Meltzer.

Burton-Opitz, R.,
Calkins, G. N.,
Crampton, H. E.,
Cunningham, R. H.,
Ewing, J.,
Gies, W. J.,
Herter, C. A.,
Hiss, P. H.,
Jackson, H. C.,
Lee, F. S.,
Levene, P. A.,
Lusk, G.,
Norris, C.,
Park, W. H.,
Richards, A. N.,
Stiles, P. G.,
Wallace, G. B.,
Wilson, E. B.,

Total, 19.

Elected members.

Resident.

Adler, I.,
Atkinson, J. P.,
Buxton, B. H.,
Cattell, J. McK., †
Dunham, E. K.,
Levin, I.,
Mandel, A. R.,
Murlin, J. R.,
Oertel, H.,
Salant, W.,
Stookey, L. B.,
Wadsworth, A. B.,
Woodworth, R. S.,
Yatsu, N.,

Total, 14.

Non-resident.

Abel, J. J.,
Abbott, A. C.,
Conklin, E. G.,
Cushing, H.,
Cushny, A. R.,
Davenport, C. B.,
Flexner, S.,
Hawk, P. B.,
Howell, W. H.,
Hunt, R.,
MacCallum, W. G.,
Mendel, L. B.,
Morgan, T. H.,
Münsterberg, H.,
Novy, F. G.,
Opie, E. L.,
Pearce, R. M.,
Pfaff, F.,
Porter, W. T.,
Smith, T.,
Warthin, A. S.,
Welch, W. H.,
Williams, H. U.,

Total, 23.

* All were originally resident members. Dr. Stiles is now non-resident.
† Resigned, April 20, 1904.

OFFICERS.

Temporary Organization.

January–February, 1903.

Chairman,	Frederic S. Lee.
Recording Secretary,	William J. Gies.

Permanent Organization.

First year: February, 1903–February, 1904.

President,	S. J. Meltzer.
Vice President,	William H. Park.
Librarian,	Graham Lusk.
Treasurer,	Gary N. Calkins.
Secretary,	William J. Gies.

Second year: February, 1904–February, 1905.

President,	S. J. Meltzer.
Vice President,	James Ewing.
Librarian,	Graham Lusk.
Treasurer,	Gary N. Calkins.
Secretary,	William J. Gies.

SCIENTIFIC PROCEEDINGS.

Abstracts of reports.[1]

First meeting.[2]

Laboratory of Physiological Chemistry of Columbia University, at the College of Physicians and Surgeons. February 25, 1903.

1. **"An experiment to show the difference in effect between the simple cutting of the cervical sympathetic and the removal of the superior ganglion,"** with demonstrations: **S. J. Meltzer.**

The author presented a rabbit in which the cervical sympathetic had been cut on one side, and the superior ganglion had been removed on the other side. Both pupils were of the same size. About two hours before the demonstration one hind leg was tightly constricted and 1 cc. of adrenalin solution injected into it (peripheral to the ligature). On removal of the ligature the pupil on the side from which the ganglion had been excised became greatly dilated, while the pupil on the other side remained unaffected.

2. **"Differentiation of monkey blood from human blood by the precipitin serum test,"** with demonstrations: **James Ewing.**

It has been known for some time that the serum of an animal immunized against a particular alien blood will precipitate proteids, not only in the particular blood used in the immunization, but also, to a lesser degree, in the blood serum of closely related animals. Thus the serum of a rabbit immunized against ox blood will precipitate proteids not only in ox blood but also in sheep and goat blood, etc. It is only when the anti-serum is diluted to a considerable degree that the precipitate forms only in the particular blood used in the immunization. This dilution, as a rule, must be as high as 1–50. In a series of tests with various human-

[1] The authors of the reports have furnished the abstracts. The secretary has made only a few abbreviations and minor alterations in them.

[2] Reprinted from *Science*, 1903, xvii, p. 468 and *American Medicine*, 1903, v, p. 707.

ized rabbit sera, it was found that monkey blood, which is very closely related to human blood, can be distinguished from human blood if the humanized rabbit serum is diluted in the proportion of 1–100 before it is added to the blood to be tested. In this dilution very active humanized rabbit sera fail to cause precipitates in the blood of lower monkeys (baboon, rhesus, and Java), while still causing flocculent precipitates within one to two hours in human blood.

The serum used by the author in this demonstration was obtained from a chicken which had received five injections each of 10 c.c. of human placenta blood. This serum proved to be much more selective than the ordinary humanized rabbit serum. The chicken serum in various dilutions up to 1–100 was added to specimens of human and monkey serum in dilutions also of 1–100. It produced turbidities in all the specimens of human blood, but failed entirely to affect the monkey blood. Finally, the chicken serum was added in a dilution 1–5 to specimens of both human and monkey blood. In the human blood a milky ring formed instantly at the line of junction of the test serum with the human serum, and a flocculent precipitate formed in fifteen minutes, while in the monkey serum no change whatever could be observed.

3. **"An improved cage for metabolism experiments,"** with demonstration: **William J. Gies.**

A cage specially designed for experiments on dogs was shown. The parts are so adjusted as to favor the collection and separation of feces, urine and hair. The improvements consist mainly of mechanical devices suggested by experimental experiences of the past few years in metabolism work, all of which are designed to ensure quantitative accuracy as well as comparative convenience in the collection of excreta.

4. **"Properties of 'Bence-Jones' body,'"** with demonstrations: **William J. Gies.**

Through the kindness of Dr. Meltzer a patient's urine containing this substance had been placed at the author's disposal for chemical study. Some of the results of this examination were presented and various properties of the body demonstrated. Special attention was drawn to a test of Boston's new method of detecting "Bence-Jones' body" in the urine.

Second meeting.[1]

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-

[1] 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: **PHŒBUS 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), thymin, cytosin, 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.

10. **"Respiration experiments in phlorhizin diabetes,"** with demonstration of apparatus: **GRAHAM LUSK** (with **A. R. MANDEL.**)

An experiment on a diabetic dog showed that whether fasting or fed on meat alone, or on meat and fat, no more fat was burned than in the same dog when he was normal and fasting.

11. **"A demonstration of a modified Eck fistula, with a note on adrenalin glycemia": ALFRED N. RICHARDS.**

A method devised by Vosburgh and Richards for establishing communication between the portal vein and the inferior vena cava of the dog was described and demonstrated. In this method two cannulas were employed. They were constructed on the same principle as the one used by Vosburgh and Richards in collecting blood from the hepatic and portal veins without interfering with the normal circulation in those vessels. After suitable incision through the abdominal wall a cannula of that type, 1 cm. long, was inserted into the portal vein about 2 cm. below the entrance of the pancreatico-duodenalis. A second cannula of similar design was introduced into the vena cava at a corresponding point. By connecting the cannulas with a rubber tube, communication was established between the two vessels. On ligating the hepatic arteries and the portal vein at the hilum of the liver, circulation through the liver ceased and the gland was extirpated.

By the successful use of this method Vosburgh and Richards have found that the application of adrenalin to the surface of the pancreas brings about a slight rise in the sugar content of the blood even after extirpation of the liver. Their experiments thus far have covered periods of from two to three hours, no systematic attempts having yet been made to get the animals to survive the operation.

12. **"Aims and achievements in recent experimental cytology"** (review): **GARY N. CALKINS.**

A review of Loeb's, Wilson's and Boveri's experimental researches.

Third meeting.[1]

Zoölogical Laboratory of Columbia University. October 21, 1903.

13. **"An experimental study of cell-specification in embryonic development,"** with demonstrations: **EDMUND B. WILSON.**

The author presented the results of a study of the development of isolated embryonic cells, in the mollusks *Patella* and *Dentalium*, which demonstrates that from the first cleavage onward, an isolated blastomere undergoes essentially the same differentiation as if it had remained in connection with its fellows. These eggs accordingly show a true mosaic development and differ widely in this respect from those of echinoderms. It was also shown that the specific character of the cleavage cells is predetermined, at least in part, by specification of the regions of the unsegmented egg from which the blastomeres arise, as is proved by the development of fragments obtained by cutting the egg in two before development has begun.

14. **"The occasional presence in the blood of untreated adult animals of large amounts of substances agglutinating many bacteria,"** with demonstrations: **WILLIAM H. PARK.**

The affinities of bacteria for specific agglutinins have been made use of, since the researches of Gruber, to establish relationships between different cultures. The test properly performed is delicate and reliable, but when carried out with insufficient precautions is often misleading. It has been known for some time that the blood of animals before immunization possessed, in moderate amount, substances which agglutinated many bacteria. An agglutination of bacteria must, therefore, take place in a high dilution of serum before it can be considered a specific reaction.

From results obtained in his own researches, the author considers that even this requirement is insufficient. He found that, before any inoculations had been made, the blood serum of certain horses agglutinated, even in such great dilutions as 1 in 1,000, both the bacilli having the characteristics of the true dysentery bacilli of Shiga, and those having the characteristics of the mannit-fermenting class of Kruse, Flexner and Duval. This was true to a somewhat less extent of the serum of full-grown goats. It has

[1] Reprinted from *American Medicine*, 1903, vi, p. 733.

happened in some instances that, after repeated injections with cultures of one of the varieties of the dysentery bacilli, the animal's blood agglutinated the variety of bacilli not used for immunization in as great or even greater dilutions than it did the variety injected.

It was found that a serum drawn from a horse which had been immunized by repeated injections of the dysentery bacillus received from Shiga, agglutinated this bacillus in dilutions of 1 in 500. The same serum, however, agglutinated the mannit-fermenting bacillus in dilutions of 1 in 1,000. The serum from another horse which had received injections of the mannit-fermenting bacillus, agglutinated this bacillus in dilutions of 1 in 1,000, but also agglutinated the Shiga bacillus in dilutions of 1 in 500. Judged by these reactions, these two varieties of bacilli would appear to be much alike in their affinities. Indeed, Shiga and Flexner seem to have come to this mistaken conclusion. Duval and Bassett certainly fell into this error when they announced, in the fall of 1902, that the mannit-fermenting type from the Baltimore diarrhea cases and the Shiga type had identical agglutination characteristics.

The blood of young animals was found by the author to be comparatively free from bacterial agglutinins. A goat 6 weeks old was found to possess no appreciable bacteria-agglutinating substance in its blood. After four injections of a culture of Shiga dysentery bacilli, its blood in dilutions of 1 in 500 agglutinated Shiga bacilli, but only in dilutions of 1 in 10 the mannit-fermenting variety. A rabbit whose blood was negative before immunization, after six injections of this bacillus agglutinated the mannit-fermenting bacillus in dilutions down to 1 in 5,000. The Shiga bacillus was agglutinated only in dilutions of 1 in 20. The slight development of substances which agglutinated the mannit-fermenting type during the process of immunizing to the Shiga bacillus, cannot be considered as showing any affinity between the Shiga type and the fermenting type, since about the same increase was found in animals injected with nutrient bouillon and other substances.

15. "Gastric secretion induced by a reflex from the intestine": HOLMES C. JACKSON.

The main points in his results were summarized by the author as follows :

1. The introduction of alcohol into the intestine sets up a reflex which causes a secretion of gastric juice.

2. Section of the nerves which supply the stomach (vagi and sympathetic), or the administration of atropin, prevents this reflex, whereas nicotin has no such effect.

3. Of the substances other than alcohol examined in this connection, it was found that oil of peppermint also induces a reflex secretion, but that other irritants, such as mustard and ether, do not show this action.

4. Section of the nerves, or the administration of atropin or nicotin, followed by the introduction of alcohol directly into the stomach, gave results similar to those obtained when the alcohol was injected into the intestine.

16. **"The organism of smallpox,"** with demonstrations: **GARY N. CALKINS.**

The author, after briefly describing some of the phases in the complicated life history of the smallpox organism — *Cytoryctes variolæ Guarnieri* — demonstrated twelve stages of the organism stained by an adaptation of the Borrel method, whereby the organism stains red upon the green background of cell body and nucleus. A similar parasite, as yet undescribed, in the macronucleus of *Paramœcium caudatum*, was also shown.

17. **"On respiratory stimulants,"** with demonstration: **GEORGE B. WALLACE.**

A demonstration was made of a method for estimating the volume of expired air. A rabbit was used and the volume of air expired under normal conditions, and after the animal had been given a respiratory stimulant, was measured. The apparatus used was a modification of the one devised by Dreser. In the experiments reported by the author, the greatest increase in respiration occurred after administration of atropin, the amount of expired air being increased 75 %. Strychnin produced an increase of 35 %, caffein 9 %, cocain 7 %, aspidospermin and quebrachin (two alkaloids obtained from *Quebracho blanco*) 9 % and 17 %, respectively.

18. **"The intracellular reduction of gold chlorid,"** with demonstration: **ALFRED N. RICHARDS.**

The author studied the effects of intravascular injections of the double chlorid of gold and sodium. His experiments were

carried out under the direction of Professor Schmiedeberg. Microscopic examination of the tissues of rabbits killed by lethal doses of this salt shows the deposition of metallic gold in and immediately about the nuclei of the cells of the kidney, liver, spleen, mucosa of the gastrointestinal tract, and cardiac muscle. By chemical analysis it was found that the greatest amounts of gold were deposited in the kidney and liver, only traces having been recovered from the other organs.

On account of the ease of reduction of this salt, and the possibility of accurately estimating the metallic gold, it was recommended as an indicator of the *quantitative* relationships of the reducing processes in the various organs.

19. **"Effect of ligation upon the vital staining of nerves,"** with demonstration: **S. J. MELTZER.**

The author demonstrated pieces of dried sciatic nerves of rabbits which, *intra vitam*, received intravenous infusions of methylene-blue. Single ligatures of the nerve, no matter where applied, are without any influence upon the color of the nerve on either side of the ligature. When the nerve is ligated at two places the section between the two ligatures remains free of color, while the central and peripheral ends of the nerve turn $\frac{3}{5}$blue in the usual manner. The effect is the same even if the ligatures are applied near either end of the nerve. This fact shows that, in the vital staining, the methylene-blue reaches the nerve only from its central and peripheral ends.

20. **"Effects of bloodletting on metabolism": PHILIP B. HAWK** and **WILLIAM J. GIES.**

The author reported the results of some experiments recently conducted by him in collaboration with Dr. Hawk. The experiments were carried out on dogs in a state of nitrogenous equilibrium. The withdrawals of blood were made while the animals were under the influence of ether-chloroform. The metabolic effects of anæsthesia and of operation were carefully controlled.

It was found that hemorrhages of about 3 % of body weight caused, among other effects, (1) diminished secretion and decreased specific gravity, of the urine at first, the reverse in

twenty-four to forty-eight hours afterward; (2) increased elimination of nitrogen and sulfur, and decreased excretion of phosphorus, in the urine. The amount and consistency of the feces were unaffected.

Repeated hemorrhages from the same animal resulted in (*a*) cumulative quantitative metabolic effects in harmony with those indicated above, and were followed by (*b*) steady decline in body weight, and (*c*) gradual increase in average daily volume of urine, even when the animal ate the same amount and kind of food as at the beginning.

After successive hemorrhages at intervals of a few days the content of nitrogen, sulfur, and phosphorus in the blood, as well as specific gravity and number of red corpuscles, gradually diminished, whereas the leukocytes steadily increased in number.

These data confirm the general metabolic results obtained in the earlier experiments by Bauer and others, and disagree with the opposite conclusions, as to effects on proteid catabolism, announced two years ago by Ascoli and Draghi.

Fourth meeting.[1]

Physiological Laboratory of Columbia University, at the College of Physicians and Surgeons. December 16, 1903.

21. Changes in the viscosity of the blood produced by various experimental procedures," with demonstrations: **RUSSELL BURTON-OPITZ.**

The author described and demonstrated the apparatus used in determining the viscosity of the blood. This demonstration was followed by a discussion of the changes in the molecular friction of the blood after intravenous injections of distilled water, and of saline, dextrose, and alcoholic solutions. The effect of alcohol, when introduced into the stomach and small intestine, was also noted. Next were considered the changes following subcutaneous administration of curare and the differences in the viscosity of arterial and venous blood. K, the coefficient expressing the viscosity, was determined before and after each experimental procedure, two or three determinations being made in each case.

[1] Reprinted from *Science*, 1904, xix, p. 104; *American Medicine*, 1904, vii, p. 111; *Medical News*, 1904, lxxxiv, p. 238.

It was found that, if distilled water, in quantities of from 5 c.c. to 50 c.c., is slowly allowed to flow into the facial vein, the viscosity of the blood is increased, but the increase is not considerable. The following experiment may serve as a sample: The normal coefficient K, in a dog weighing 19.2 kilos, was 802.6 or 5.8 times greater than K for distilled water at 37° C. After the injection of 10 c.c. of distilled water, the coefficient showed the value 786.0 or 6.0 times greater than distilled water at 37° C. Normal saline solutions produce the reverse effect, *i. e.*, the blood becomes less viscous. In one case after injecting 10 c.c. of 0.7 per cent. NaCl solution, the viscosity of the blood fell from 5.9 to 5.6 times that of distilled water at 37° C. Concentrated solutions of dextrose (5 c.c.) injected into the facial vein bring about an increase in the viscosity of the blood, which is more pronounced than that produced by distilled water. About a half-hour after the injection the coefficient K shows again its normal value.

If from 3 c.c. to 5 c.c. of 10 or 25 % solutions of alcohol in water are allowed to flow into the facial vein, the molecular friction of the blood becomes greater. The same result can be obtained by introducing the alcohol directly into the stomach or duodenum. After an injection of 30 c.c. of a 25 % solution into the stomach, the viscosity, determined 20 minutes later, showed the value 608.09, as against 664.17, the normal coefficient. Thus, instead of being only 7.0 times greater than that of distilled water at 37° C., it changed after the injection to 7.7 times greater. An equally decisive change occurred after injecting 40 c.c. of a 25 % solution into the duodenum. A marked increase in viscosity also follows subcutaneous administration of curare; however, this result is not evident until the respiratory muscles become paralyzed.

Venous blood is slightly more viscous than arterial, but the difference is often very insignificant.

In all these determinations a direct parallelism exists between the viscosity values and the specific gravity. When the viscosity increases, the specific gravity increases also, and *vice versa*. Not a single exception to this rule was observed.

The viscosity was also determined in a dog having very large thyroid bodies. The right gland weighed 57 gm., the left 52 gm.

The viscosity-coefficient, obtained in eight determinations, showed the value 1233.17 (specific gravity, 1.05028), which means that the blood of this animal was only 3.8 times more viscous than distilled water at 37° C. The lowest previous value obtained by the author occurred in a dog after three days of hunger. K equalled in this case 1110.3 (4.2 times more viscous).

In general, it may be said that the less the viscosity the longer the period required for extravascular coagulation. This was especially well shown in the case just mentioned. Clotting set in after about 15 minutes.

22. **"Survival of an animal after removal of both suprarenal capsules, due to a previous grafting of the organ into the kidney,"** with demonstrations of sections: **FREDERIC C. BUSCH** and **CHARLES VAN BERGEN.** (Presented by **S. J. MELTZER.**)

Dr. Meltzer stated that in several instances survival of a part of suprarenal grafts was obtained after transplantation into the kidney of the same animal.

In one experiment the animal (a rabbit) survived, after apparently all other suprarenal tissue, aside from that which was grafted into the kidney, had been removed. In this case, after total removal of the left suprarenal, a part of the gland, including medulla and cortex, was introduced through an incision into the cortex of the left kidney. Eighty-six days later the remaining right suprarenal was removed *in toto*. The animal survived the operation and was apparently normal for 21 days, at the end of which time it was killed in order to examine the graft. This was found, upon histological examination, to have been replaced in part by connective tissue. The surviving cells apparently belonged to the medullary portion of the suprarenal. The cortex had been replaced by connective tissue. Blood supply was good.

Microscopic sections showing the successful grafts were exhibited. In this connection, also, Dr. Meltzer showed, under the microscope, a section of Zuckerkandel's organ, the chromophilic bodies of which are similar in nature to the chromophilic granules of the medullary portion of the suprarenal capsule.

23. "On the absence of a cane sugar inverting enzyme in the stomach": GRAHAM LUSK.

It was shown by Professor Lusk that free hydrochloric acid and not an enzyme caused the inversion of cane sugar in the stomach.

24. "A new head holder for rabbits," with demonstration: **FREDERIC S. LEE.**

Professor Lee described and demonstrated the use of a head holder, devised by Mr. John T. Hoyt, showing a new universal clamping device.

25. "The action of potassium cyanid upon the unfertilized egg" (review): **HOLMES C. JACKSON.**

Loeb and Lewis were the first to note the fact that unfertilized eggs (of the sea-urchin), when placed in n/1000 KCN solution, retain their capability of fertilization much longer than when suspended in normal sea water. This was ascribed to the action of the KCN in inhibiting intracellular autolytic processes which lead normally to maturation and finally death. The bactericidal action of KCN was excluded, as the result of experiments in which eggs apparently died as rapidly in sterile as in putrid sea water.

Gorham and Tower's experiments in the same connection indicated, on the other hand, that the effect of KCN was entirely bactericidal. The sterile eggs retained their capacity for fertilization longer under absolutely sterile conditions than when placed in n/1000 KCN.

As the matter now stands there are two almost identical series of sterilization experiments by two pairs of investigators, with results diametrically opposed to each other. Critically considered, the more carefully conducted experiments seem to be those by Gorham and Tower; and in the lack of further evidence in favor of an intracellular action of KCN in this connection, we must conclude that the destruction of the bacteria by the KCN removes the condition which causes the death of the cell, and in the absence of which the eggs retain their potential power for growth after fertilization.

26. Results of recent investigations in proteid chemistry (review): **PHŒBUS A. LEVENE.**

Recent work on the chemistry of the proteid molecule has furnished explanation of many biological phenomena. Thus in

certain pathological conditions there appears in the urine a sulfur and nitrogen containing substance, cystin. The source of this substance in the organism had been unknown until, through the efforts of Mörner and Embden, and others, its radical was demonstrated to be a normal constituent of the proteid molecule.

The chromatin of a developed cell differs from that of an unfertilized egg by the presence in it of radicals of purin bases. It is probable that these bases are derived from the histidin radical, which is also a normal constituent of proteids.

Hemoglobin is known to be absent from the unfertilized egg, and it appears only in the course of development of the embryo. It was shown recently that the non-proteid part of hemoglobin is a pyrrol derivative, and it is probable that a pyrrol radical is present in the proteid molecule. Chlorophyl is also a pyrrol derivative, a fact further establishing its close relationship to hemoglobin.

The work of Emil Fischer points to the way in which the various component radicals may combine in order to form the proteid molecule, and makes probable the eventual synthesis of true proteid material.

Fifth meeting.[1]

Pathological Laboratory of the Cornell Medical College. February 17, 1904.

27. "The nature and basis of sexual selection in moths": HENRY E. CRAMPTON.

The object of the investigation described was to obtain a quantitative expression for the strength of the mating instinct in certain species of large saturnid moths (*Philosamia cynthia* and *Samia cecropia*), and to determine the correlation between the mating instinct and structural characters. The results of earlier statistical studies upon the pupæ of these species were reviewed, dealing with the nature and basis of the process of natural selection during the period before emergence and at emergence. It was shown that:

1. Those pupæ which die after pupation and prior to metamorphosis are structurally different from and more variable than those individuals which successfully survive the pupal period.

[1] Reprinted from *Science*, 1904, xix, p. 459; *American Medicine*, 1904, vii, p. 480; *Medical News*, 1904, lxxxiv, p. 571.

2. Those pupæ which become perfect moths are likewise different from those which cannot emerge as perfect moths.

3. The basis for selective elimination is to be sought in correlation between the various structures.

The mating period follows immediately after metamorphosis, when certain individuals with weak mating instinct fail to take part in the production of the next generation, and are thus "sexually eliminated." In order to determine the points mentioned above, pupæ of the two species named were isolated as the time for metamorphosis approached, and upon emergence were given one opportunity to mate. It was therefore possible to compare the pupæ of the two classes of mating and non-mating individuals. The results, briefly stated, are:

1. That even slightly imperfect moths possess very little mating instinct, or in other words, that, with the structural conditions associated with an imperfect power of emergence, is correlated a low grade of mating ability.

2. That the mating individuals of the perfect class differ structurally to a certain extent from the non-mating ones, but they are very much less variable than the latter class.

The importance of these results from the standpoint of inheritance and evolution is sufficiently clear to render extended discussion unnecessary.

28. "Observations on a serous fluid of unusually high molecular concentration:" EDWARD K. DUNHAM.

The fluid was removed from the pleural cavity of a man suffering from lobar pneumonia. The patient was a scene-shifter in a theater, and had suffered considerable pain in the chest for four months before his admission to the hospital. His occupation required severe labor for brief periods, during which he became much heated, with intervals of leisure and exposure to cold drafts of air. The immediate reasons for his admission were a chill and inability to continue work. There was nothing unusual in the clinical course of the pneumonia or peculiar in his treatment. A few days after he entered the hospital 400 c.c. of a clear serous fluid were aspirated from the affected side of the chest. This fluid was examined on the same day, with the following results:

Distinctly alkaline; specific gravity, 1.021; depression of the freezing point, 1.383° C. (mean of three examinations with different portions of the fluid, 1.395° C., 1.385° C., and 1.370° C., respectively); electrical conductivity, 0.009119; chlorin calculated as NaCl, 0.58%; total nitrogen, 0.84%; nitrogen from washed tannic acid precipitate, expressed in percentage of the fluid, 0.83%; proteid (N × 6.25), 5.21% of the fluid; traces of reducing substance (sugar?) after removing proteids with ferric acetate; traces of nitrogen liberated by hypobromite of soda; no extractives of appreciable amount upon shaking with ether, acetic ether, or chloroform.

The matter of chief interest in the results was the considerable depression of the freezing point — 0.81° C. greater than that by the blood, which was found to be 0.57° C. This 0.81° C. represents nearly 0.438 gram-molecule in solution in excess of the molecular concentration of the blood, and appears to be a clear indication that osmotic interchanges between this fluid and the blood did not freely take place, possibly because of a thick layer of fibrin upon the pleural surfaces. Such a deposit would not, however, explain the high molecular concentration of the fluid. It appears most probable that this was produced subsequent to the formation of the fluid, by cleavages in the larger molecules originally present in solution, or by the solution of substances not at first dissolved. These substances could not be dissociable, because the electrical conductivity was rather lower than is usual in such fluids. If the substances causing the high molecular concentration were organic compounds, they were not extractives soluble in ether, acetic ether or chloroform.

On the assumption that cleavage products of proteid substances, precipitable with tannic acid, might be present and cause the unusual depression of the freezing-point, the following experiments were made: Sterile horse serum, which had not been subjected to heat, was divided into portions. Of these some were kept for controls and others were inoculated with pure cultures of *Staphylococcus pyogenes aureus* or Fraenkel's pneumococcus. Freezing-point determinations were made on certain of these portions and the rest were sealed up in pipettes holding 100 c.c. each. These were incubated at 37° C. for a week, when freezing-point determin-

ations were made on one of the controls and on one of the tubes inoculated with each kind of bacteria mentioned. Cultures at this time showed the presence of great numbers of the species used, with no admixture of other species. The remaining tubes were left in the incubator for several months, when cultures proved to be sterile. The results of physico-chemical examination of these sera are tabulated below:

HORSE SERUM A.

	Sterile Controls.	*Inoculated with Staphylococcus.*
1903	°C	°C
May 19	$\Delta = 0.580$; $K = 0.009394$	$\Delta = 0.585$; $K = 0.009370$
May 26	$\Delta = 0.580$; $K = 0.009491$	$\Delta = 0.585$; $K = 0.009674$
1904		
Jan. 16	$\Delta = 0.590$; $K = 0.009684$	$\Delta = 0.640$; $K = 0.010128$

HORSE SERUM B.

	Sterile Controls.	*Inoculated with Staphylococcus*	
1903	°C	°C	
May 21	$\Delta = 0.560$; $K = 0.009516$	———	———
May 28	$\Delta = 0.560$; $K = 0.009516$	$\Delta = 0.580$	———
1904			
Jan. 15	$\Delta = 0.600$; $K = 0.009897$	$\Delta = 0.640$; $K = 0.010372$	

These data show but slight changes in the molecular concentration of the sera, and such changes as had occurred occasioned an increase in the electrical conductivity as well as in the depression of the freezing-point, showing that dissociable bodies had been produced. The experiments, therefore, failed to explain the high molecular concentration of the serous fluid from the chest, but it is possible that further investigation in this direction will be more successful.

29. **"An experimental study of the eosinophile cells during infection with an animal parasite — Trichina spiralis": EUGENE L. OPIE.** [Presented by **JAMES EWING.**]

The administration of *Trichina spiralis* to the guineapig causes an increase of the eosinophile leukocytes in the blood, comparable to that which accompanies human infection. There is no constant alteration of the number of these cells until the end of the second week after infection, when the relative and absolute number rapidly increases and reaches a maximum at the end of the

third week. At this time embryonic trichinæ are in process of transmission from the intestinal mucosa, by way of the lymphatic vessels and the blood through the lungs, to the vascular system.

Eosinophile cells accumulate in the mesenteric lymph glands and in the lungs, and form foci resembling small abscesses, in which polynuclear leukocytes are replaced by eosinophile cells. These cells are provided with polymorphous nuclei and do not differ from the eosinophile leukocytes of the circulating blood. Accumulation of the eosinophile cells in the mesenteric lymph glands and in the lungs is explained by the transmission of the embryonic parasites through these organs.

Increase of eosinophile cells in the blood and in other organs is accompanied by characteristic changes in the bone marrow. The fat is diminished in amount and cellular elements replace it. Cells with eosinophile granulation are present in immense number and particularly numerous are the eosinophile myelocytes, cells peculiar to the bone marrow. Eosinophile cells undergoing mitotic division are more numerous than usual.

The number of eosinophile leukocytes in the blood always diminishes before death, so that the proportion is usually less than 1 per cent. Infection with a very large number of trichinæ causes a rapid diminution of the number of eosinophile leukocytes, and is quickly fatal. The eosinophile cells of the bone marrow exhibit degenerative changes, of which nuclear fragmentation is most characteristic. Similar changes may affect the eosinophile cells of the intestinal mucosa and of the mesenteric lymph glands. Mild infection stimulates the eosinophile cells to multiplication, but severe infection causes their destruction.

30. "Subcortical expressive reflexes and their spinal pathways": ROBERT S. WOODWORTH.

The author reported on some experiments done in collaboration with Professor Sherrington in the latter's laboratory. It was shown that in a recently decerebrated cat, powerful sensory stimuli evoked reactions such as in a normal animal would be expressive of pain, anger, and other similar emotions. Such reactions are therefore primarily subcortical reflexes and not dependent on the organ of consciousness. The "ether cry" also appeared in decerebrate animals. The sensory spinal pathway, by which

these signs of pain were aroused, was found by experiments in which partial cross-sections of the cord were made, to run not in the posterior, but in the lateral columns. The pain pathway from either side of the body runs up both halves of the cord, but more largely up the opposite half.

31. "An experimental study of the cause of shock": WILLIAM H. HOWELL. [Presented by **S. J. MELTZER.**]

Professor Howell's experiments were made upon dogs anæsthetized with morphin and ether, and brought into a condition of shock by operations of various kinds. Blood-pressure records were obtained in the usual way during the experiment. The following general conclusions were reached:

1. The most important and dangerous feature of severe shock is a long continued, practically permanent fall in blood-pressure to about 20 mm. to 40 mm. of Hg. This condition is designated as vascular shock and is due to a long lasting loss of activity of the vasoconstrictor center.

2. A second important result of shock is a very rapid and feeble heart-beat. This condition is designated as cardiac shock; since, although it may result secondarily from the permanent fall in blood-pressure, it may also occur quite independently of the vascular shock as a primary result of the operations. Cardiac shock, so far at least as the rate of beat is concerned, is due to a more or less permanent loss of activity of the cardioinhibitory center.

3. Intravenous infusions of alkaline salt solutions (NaCl, 0.6% — Na_2CO_3, 0.5%) cause a rise of pressure by increasing the force of the heat-beat. The effect is more durable than with salt solution alone and may be renewed by repeating the injection.

4. The fundamental cause of vascular and cardiac shock is not exhaustion of the vasomotor and cardioinhibitory centers from over activity, but a more or less permanent inhibition of these centers from excessive stimulation of the inhibitory paths.

Sixth meeting.[1]

Bacteriological Laboratory of the Department of Pathology of Columbia University, at the College of Physicians and Surgeons. April 20, 1904.

[1] Reprinted from *Science*, 1904, xix, p. 828; *American Medicine*, 1904, vii, p. 789; *Medical News*, 1904, lxxxiv, p. 1101.

32. "On the secretion of human bile": PHŒBUS A. LEVENE, W. G. MELVIN, and B. MICHAILOWSKI.

The bile was obtained from a patient with a biliary fistula. The patient had been operated upon for gallstones, and was in comparatively good health at the time of the experiment.

Attention was directed to (1) the influence of diet on the quantity of bile secreted in 24 hours, (2) the permeability of the biliary ducts for certain substances like methylene-blue and sodium salicylate, (3) the influence of these substances and of some salts and acids on the secretion, and (4) on the nature of so-called "bile mucin."

The quantities of bile secreted under different conditions, together with other data, are briefly summarized below:

Diet and Dosage.	Volume—24 Hours. c.c.	Total Solids. Percent.	Organic Matter. Percent.	Ash. Percent.
Mixed diet	780	1.57	0.76	0.82
Animal diet	785	1.68	0.60	1.08
Milk diet	845	1.61	0.56	1.05
Vegetable diet	835	1.64	0.80	0.84
Sodium carbonate	461	1.62	0.71	0.92
Hydrochloric acid	461	1.53	1.08	0.45
Calcium chlorid	687	1.63	0.56	1.08
Sodium salicylate	642	1.40	0.42	0.98
Methylene-blue	864	1.58	0.54	1.04

For methylene-blue and sodium salicylate the bile ducts proved less permeable than the kidneys. There was observed a marked increase in secretion after subcutaneous injections of methylene-blue. The "mucin" was found to be a phosphorized proteid, but no purin bases could be detected in its molecule.

33. "Experiments with certain nitriles and their antidotes": REID HUNT.

Experiments (carried out in the laboratory of Professor Ehrlich) on the toxicity of a number of nitriles, and the antidotal action of certain sulfur compounds toward them, were described. Most of the nitriles studied are poisonous in virtue of the HCN which is split off in the body; in the case of some of the nitriles of the aromatic series and of certain amino nitriles, the molecules themselves seem to be poisonous. Although each of nearly all of the compounds studied is capable of splitting off one molecule of

HCN, it was found that the toxicity of the various compounds differed greatly. The toxicity depends in general upon the ease with which the HCN is split off; in some cases this seems to bear a relation to the ease with which the residue that is united to the CN group is oxidized in the body. Benzonitrile, containing the group C_6H_5, which is oxidized with difficulty in the body, is scarcely more poisonous than phenol. Acetonitrile, also containing a group, CH_3, which is oxidized with difficulty, is also but slightly toxic. Propionitrile and formaldehydcyanhydrin, which contain easily oxidizable groups, C_2H_5 and CH_2OH, are very poisonous.

The toxicity of the molecules of a few nitriles is greater than that of HCN itself, although the latter was the only toxic agent involved. Thus the molecule of chloralcyanhydrin, CCl_3 CH (OH) CN, is nearly twice as toxic as that of HCN. The probable explanation of this is that the chloral residue with which the CN is in combination causes the compound to be distributed especially to the central nervous system; the HCN is thus split off in greater concentration in these important organs than is the case after the administration of a compound which is distributed more uniformly to important and unimportant organs. Through the application of this principle it may be possible to modify the distribution in the body of a remedial agent, so that the active principle may be present in especially great concentration in the organs which it is desired to affect. It was suggested that the powerful action of nitroglycerin upon the bloodvessels may be explained on a similar hypothesis. The view of Hay, that the dilation of the bloodvessels caused by nitroglycerin is due to the formation in the body of nitrites from this substance, has been generally accepted, although the objection has been made that the production of a given effect requires two hundred times as much sodium nitrite as nitroglycerin. This criticism may be met by the hypothesis that the glycerin residue of the nitroglycerin causes this compound to be distributed especially to the arterial walls, and that the nitrite will be formed in greatest concentration at the point where it exerts its action.

The work of Heymans and Masoin on the antagonistic action of sodium thiosulfate toward certain nitriles was extended to many new cyanogen compounds. In addition to the thiosulfate, several

other compounds, containing a sulfur atom which is easily split off, were tested (the sulfur unites in the body to form a little poisonous sulfocyanate). The most efficient of these new sulfur compounds were thialdin, carbothialdin, and potassium xanthogenate. Great differences in the extent of the antidotal action of these bodies toward the various nitriles were noted. Thus thialdin protected against nitriles toward which potassium xanthogenate was without action ; toward other nitriles potassium xanthogenate was the more efficacious. Many of these differences can be easily explained on the hypothesis that the various nitriles and sulfur compounds are differently distributed in the body. Unless both the sulfur compound and the nitrile reach the same cells, and unless the conditions in these cells are favorable for the formation of the sulfocyanate, no neutralization will take place.

Especially interesting are the experiments on the antidotal action of alcohol toward certain nitriles. It was found that small doses of alcohol protected an animal against three to five times the fatal dose of acetonitrile and formaldehydcyanhydrin, and that after otherwise fatal doses of these substances, the animal recovered if small doses of alcohol were given. It was suggested that the explanation for this action may be that, because it is easily oxidized, alcohol consumed the oxygen usually available for the oxidation of the CH_3 and CH_2OH groups of these compounds, and for the consequent liberation of the HCN. Support for this hypothesis was found in the fact that dextrose (another easily oxidizable substance) also protects against acetonitrile.

This seems to be the first case in which alcohol has been clearly shown to have an antidotal action toward a poison. It was suggested that alcohol may have an analogous action in certain pathological conditions, in which physicians have long claimed a beneficial result from its use. Toward HCN itself, and several other nitriles, alcohol has no antidotal action ; in fact, in some cases the toxicity of the nitrile was increased by it.

34. "Toxicity of certain quinin derivatives": REID HUNT.

In one of the side chains of the quinin molecule there is, according to the commonly accepted view, a vinyl group : $— CH = CH_2$. As the toxicity of many compounds (*e. g.*, neurin

and allyl alcohol), is chiefly due to the presence of such a group, experiments were made (in Professor Ehrlich's laboratory) to determine whether this is the case with quinin. A number of derivatives in which the vinyl union was broken by the addition of H (hydroquinin), or of O and OH (oxyhydroquinin), or of H and Cl (hydrochlorquinin), were tested as to their toxicity upon various mammals and certain infusoria. The experiments showed that the presence of the vinyl group in quinin is without special significance as far as toxicity is concerned, the first two of the new compounds being about as poisonous as quinin itself. The results of the experiments with hydrochlorquinin are of special interest; these showed that the addition of H and Cl decreases the toxicity for mammals, while increasing it for infusoria. Thus the amount of hydrochlorquinin required to kill mice was two and a half times as much as that of quinin, while the former substance is distinctly more poisonous to certain infusoria than the latter. It is possible that hydrochlorquinin (or similar compounds) will be found to be more effective in the treatment of malaria than is quinin, and further work along these lines may result in the discovery of quinin derivatives which will be of use in certain diseases, caused by protozoa, in which quinin is of little value. Further experiments are in progress.

35. "Report on the metabolism of a case of diabetes mellitus": ARTHUR R. MANDEL and GRAHAM LUSK.

The case was in a young man, whose urine contained no albumin, little ammonia, only a small amount of aceton, and no β-oxybutyric acid. All these symptoms are said to justify a favorable prognosis. The patient was put on three different diets for three successive periods: Diet I. — Rich cream, oatmeal, meat, eggs, butter. Diet II. — Same as I, with 100 grams of levulose. Diet III. — Rich cream, meat, and eggs. The oatmeal was used on account of the favorable results obtained by von Noorden.

Diet III was practically a meat-fat diet. Upon this diet the polyuria decreased and the sugar fell from 8% to 4%, both of which phenomena would be favorably interpreted by the clinician. But on calculating the ratio between sugar and nitrogen

in the urine (after deducting the sugar fed in the cream), the relation between the two was found to be 3.65 gm. of dextrose to 1 gm. of nitrogen, as follows:

1904.	Dextrose. Grams.	Nitrogen. Grams.	D : N.
March 2	82.7	23.0	3.60 : 1
March 3	87.1	23.8	3.65 : 1
March 4	100.7	27.5	3.66 : 1

It will be noticed that the sugar and nitrogen rise and fall together. The amount of fat that was fed varied, but did not affect the ratio. The sugar production is therefore parallel to the proteid metabolism. Since 1 gm. of urinary nitrogen represents the destruction of 6.25 gm. of proteid we can calculate the sugar production from proteid. This D : N ratio is the same as that obtained in our laboratory in phlorhizinized dogs. It has also been obtained by others in the human subject, but has been falsely interpreted as indicating the production of sugar from fat. It represents the maximum output of sugar from proteid and a complete intolerance for carbohydrates. It is probably the most grievous prognostic sign in diabetes.

A calculation shows that the carbohydrates in the oatmeal and levulose were nearly quantitatively eliminated in the urine when the patient was under the influence of Diets I and II.

The patient rapidly lost in weight and died in coma five weeks after the completion of the above investigation.

36. "Antihemolytic properties of the serum of nephrectomized rabbits," with demonstration: **S. J. MELTZER** and **WILLIAM SALANT.**

In studying the properties of the blood of nephrectomized rabbits it was found that bullock's serum, which is distinctly hemolytic for normal rabbit's blood, was less so for the red cells of nephrectomized rabbits. It was found, further, that the serum of nephrectomized rabbits contains a distinct antihemolytic element which is destroyed by heating for an hour at 58° C. On the other hand the "washed" red cells of nephrectomized rabbit's blood are at least no more resistant to the hemolytic influence of bullock's serum than are the red cells of normal rabbit's blood.

37. "**On the influence of suprarenal extract upon absorption and elimination,**" with demonstration: **S. J. Meltzer** and **John Auer.**

In a series of experiments it was found that a previous intravenous injection of adrenalin will make a rabbit resistant to a surely fatal dose of strychnin. (Such an experiment was demonstrated to the society.) In experiments with subcutaneous injections of fluorescin it was also found that in the animal which had previously received injections of adrenalin, the greenish-yellow color of the conjunctiva, mucous membranes, and skin appeared much later than in the control animal. Both results might be due to delayed absorption or delayed transudation, or to both. In further studies with subcutaneous injections of fluorescin it was found that the color entered the blood later and in less quantity in the adrenalin animal than in the control. Among other observations, it was noted that the kidneys of the control animal were more intensely colored than those of the adrenalin animal. The same difference was found when equal quantities of the stain were injected directly into the blood stream. The lesser coloration of the kidney is therefore due to the diminished elimination by the kidneys in the adrenalin animal. Other related problems are still under consideration. But the reported series of experiments already justify the conclusion that suprarenal extract delays absorption as well as elimination.

The starting point for the investigation was the hypothesis, stated by Dr. Meltzer in a previous publication, that since capillary endothelia possess irritability and contractility, their pores are surrounded by rings of contractile protoplasm which act like sphincters upon them, thus increasing and decreasing the permeability of the endothelia. The explanation for the observed facts is now offered that suprarenal extract, which causes contraction of the smooth muscle fibers of the arterioles, causes also an increase of the contractility of the endothelia, diminishing thereby their permeability, and thus reducing their powers of absorption and elimination.

38. "**Mendel's law**" (review): **Edmund B. Wilson.**

A review of the more important facts in Mendel's observations, together with a statement of some of the deductions to be drawn from them.

Seventh meeting.[1]

Physiological Laboratory of the New York University and Bellevue Hospital Medical College. May 18, 1904.

39. "The lecithin content of fatty extracts from the kidney" (preliminary communication): **EDWARD K. DUNHAM.**

Rosenfeld has shown that the percentage of the alcohol-chloroform extracts from the dried kidneys of dogs, both normal and "fatty," fluctuates within very narrow limits. He calls these extracts "fat," and regards the microscopic examination as entirely untrustworthy for gauging the amount of fat in the kidney. His work on other organs has led him to the conclusion that, when the fat content is increased in the cells, it has been transported from the fat depots of the body. It appeared to the author of interest to compare the extracts obtained from the kidney by Rosenfeld's method with similar extracts from the depot fats. It was at once evident that they differed markedly in the percentage of phosphorus they contained, as is shown by the following analytic results:

Alcohol-chloroform extracts.	Percentage of Phosphorus.
Human kidney (mean of 28 analyses)	1.3849
Panniculus adiposus (4.2288 gms.)	0.0026
Perinephritic fat (5.6750 gms.)	0.0069

The extract from the kidney contains from 200 to 500 times as much phosphorus as the extract from depot fat. These facts suffice to show that the two extracts are not directly comparable, and to throw doubt upon the idea advanced by Rosenfeld that the fat in "fatty" organs is a simple infiltration from the depots of the body.

The phosphorus in these extracts was found to be wholly organic in character. Protagon could not be detected even in 400 gms. of the tissue. The quantity of jecorin that may have been present was too small to influence materially the analytic results. The most probable compounds containing the phosphorus are forms of lecithin. The barium hydroxid — platinic chlorid method for the separation of cholin was employed, with the following results:

[1] Reprinted from *Science*, 1904, xx, p. 79; *American Medicine*, 1904, vii, p. 950; *Medical News*, 1904, lxxxv, p. 230.

	Extract. Grams.	Phosphorus. %.	Platinum. Grams.	Lecithin in the extract (calculated as distearyllecithin), %.
I	0.4600	1.43	———	37.23
	0.4600	1.47	———	37.45
	1.5859	——	0.0650	34.50
II	0.6032	1.12	———	29.11
	0.6032	1.11	———	28.99
	2.1556	——	0.0711	27.40

Before incineration, in the first case, the platinum salt in the crucible weighed 0.2009 gm. The platinum, therefore, constituted 32.7 % of the salt. Cholin platinic chlorid contains 31.6 % of platinum. It appears highly probable, however, that some of the platinum salt was decomposed during the concentration of its solution with heat. It is also possible that some of the cholin suffered decomposition, or was lost, in the manipulations preceding its precipitation with platinic chlorid. With these considerations in mind, the foregoing results render it highly probable that the phosphorus is present in some form of lecithin, but, although these calculations are based on distearyllecithin, it is certain that this is not the only lecithin present. The fact that lecithin obtained in moderate purity (about 99 %) from the kidney extract promptly blackens with osmic acid, indicates that the oleic acid radical is present. The recogniton of this fact would make but trifling changes in the calculations in this report.

The foregoing analyses appear to justify the conclusion that one may, at least tentatively, assume the phosphorus content of the extracts obtained to be dependent upon the presence of some form of lecithin.

Upon this assumption are based the calculations given in the summary at the top of the next page.

These analytic results demonstrate that even in the kidney, which cannot be regarded as one of the fat depots of the body, and which probably plays little, if any, part in the general fat metabolism, the lecithin content must be taken into consideration in any study of the fatty extract. The limited number of the observations here referred to, do not justify conclusions bearing upon the question of the nature of the fatty changes met with in the kidney, but it is the author's intention to continue the study of this subject.

	Extract.[1]	*Phosphorus.*	*Lecithin.*	*Lecithin.*	*Autopsy Report.*	
	% of dry organ.	% of the extract.	% of the extract.	% of dry organ.	Cause of death.	Weight of kidney. Grams.
			Human Kidneys.			
I	11.42	2.11	55.07	6.29	Pneumonia and hepatic abscess.	200
	12.48	2.00	52.03	6.49		
II	11.44	1.35	35.14	4.02	Tuberculosis.	200
XI	15.40	1.18	30.84	4.76	Moderately fatty kidneys.	—
	15.51	1.19	31.09	4.80		
			Beef Kidneys.			
II	15.02	2.10	54.64	8.21	—	—
			Dog Kidneys.			
I	14.93	2.04	53.29	7.95	—	—
			Rabbit Kidneys.			
I	16.59	2.53	66.06	10.96[2]	—	—

40. "On the phloridzin test in Bright's disease": PHŒBUS A. LEVENE and LYMAN B. STOOKEY.

Investigation of the action of phloridzin in Bright's disease has a theoretical as well as a practical interest. The mechanism of kidney diabetes is as yet imperfectly understood. The original idea that it was due to a change in the permeability of the kidney epithelium has gradually lost support, and instead there is a growing belief in the hypothesis that, in kidney diabetes, the sugar owes its origin to an exaggerated katabolic condition of the kidney. This view was first expressed by Dr. Levene in 1894. In support of this theory, evidence was brought forward to show that in animals with injured kidneys, phloridzin fails to bring about glycosuria, or causes it in less degree than in normal animals. However, it is impossible to injure, by means of drugs or by mechanical interference, only one special part of the kidney. In the course of Bright's disease there are known conditions under which the involvement of either the epithelium or of the glomeruli predominates to a very great extent, and this, of course, enables one to study the seat of the sugar formation within the kidney. The observations of most authors tend to show that when the epithelium of the kidney is injured, administration of phloridzin fails to cause glycosuria or does so in very slight degree.

The authors injected simultaneously phloridzin and methylene-blue, and compared the course of the elimination of the dye with

[1] The author presented a large number of data. The table here given shows only a few examples of the many results obtained.

[2] 2.24% of the fresh kidney.

that of the sugar. The results of their observations in a general way corroborate the statements made by other writers. In acute parenchymatous Bright's disease, sugar fails to appear in the urine after the administration of phloridzin. In chronic forms of the disease, when only a trace of albumin can be detected in the urine, and when the permeability of the kidney for methylene-blue is normal, there is frequently a diminished sugar elimination — diminished as compared with that in health under the influence of phloridzin. In no case was there observed an impaired permeability for methylene-blue with a normal sugar elimination, but the contrary was often the case.

Levene's modification of Allihn's method was used for the sugar determinations. Further work in this direction is in progress.

41. "**Effect of blood serum in pneumonia upon the heart**," with demonstration of tracings (preliminary report): **ISAAC ADLER** and **RICHARD WEIL.**

The object of these experiments was to determine whether blood serum in pneumonia has a specific effect upon the heart, and also, whether there is any difference in action between the serum taken *before* crisis and the serum obtained *after* it. The experiments were made upon the heart of the turtle, use of the mammalian heart being impracticable, in this connection, for many reasons. The fluids to be tested entered the heart through a glass cannula introduced through the right aorta into the corresponding ventricle, passed through the septum into the left ventricle and flowed out through a cannula in the left aorta. Care was taken to keep the temperature, concentration and hydrostatic pressure uniformly constant. The veins were all carefully ligated. The small diaphragmatic vein at the apex was tied and cut, the ligature connected with a writing lever and the contractions of the heart thus recorded upon a drum.

Normal human serum acts upon the heart of the turtle as a violent inhibitor, but it was found that in a dilution of 1 to 20, or, better still, 1 to 15, it does not differ greatly in effect from "normal saline." All sera were thereupon tested in dilution of 1 to 20 or 1 to 15, and the routine of each experiment as ultimately adopted was as follows: Infusion into the heart: (*a*) "normal sa-

line," (*b*) normal blood serum, (*c*) "normal saline," (*d*) serum *before* crisis, (*e*) "normal saline," (*f*) serum *after* crisis. In this manner, after considerable preliminary experimentation, very characteristic tracings were obtained.

Two cases of lobar pneumonia and one case of bronchopneumonia have thus far been studied. The tracings obtained were demonstrated, and it appeared from them that the serum in pneumonia *before* the crisis, at least in the cases tested, acted upon the heart of the turtle as a most violent poison. The contractions at once became extremely weak and slow, and the pauses very long. The serum taken *after* the crisis gave tracings not very materially different from those obtained with *normal* serum.

42. "The influence of alcohol on biliary secretion": WILLIAM SALANT.

In the author's experiments, fasting or well-fed dogs were the subjects. Operation and collection were conducted in the usual manner. Ether narcosis was employed in every instance without previous injection of morphin. The rate of secretion was studied by comparing the amounts collected during periods of 15 minutes. The rate of secretion during the first four or five periods was used as a control, at the end of which time alcohol was injected by means of a burette into the femoral vein. Varying strengths of alcohol were used — 4½%, 30%, and 60%. The quantities administered were usually about 4 c.c. per kilo of body-weight.

After the injection of alcohol, it was found in all cases that the secretion of bile continued to diminish, the diminution in the rate of secretion being, however, somewhat greater than in the two or three control periods immediately preceding the administration of alcohol. Since the much larger quantity of bile of the first and second periods probably represents bile that has been held back during the operation, it could not be considered as a control. The author, therefore, regarded as a control the rate of secretion during the following two or three periods. Whether this slightly diminished secretion is to be ascribed to the influence of alcohol can only be decided by further comparisons of the rate of secretion in alcoholized and normal animals. Thus, in three dogs without alcohol the rate of secretion corresponding to the alcohol periods was as follows: In the first, a decline during the fourth, fifth, and

sixth periods, succeeded by a rise in the next period. In the second experiment the rate of secretion remained practically steady during the fifth, sixth, seventh, and eighth periods. In the third experiment there was a variation, but the average rate of secretion was about the same in the fifth, sixth, and seventh periods as in the preceding experiments. It would seem, therefore, that the diminished secretion of bile following the intravenous injection of alcohol may be due to the influence of that substance.

A study of the effect of alcohol on biliary secretion after injection into the stomach was also begun. It would seem *a priori*, in the light of recent investigations by Bayliss and Starling, Fleig, and Henriot, on the relation of secretin to the secretion of bile, that the author's method of administering alcohol ought to provoke secretion of bile. In the few experiments the author has made thus far, he has observed that when 60 % alcohol was introduced into the stomach, there was a slight, transitory increase of biliary secretion. With 30 % alcohol there was in some cases an increase, in some a decrease of the secretion of bile as compared with pre-alcoholic periods. At this stage of the work it would be premature to form any conclusion regarding this point. Whether this slight increase is due to increased gastric secretion and consequent formation of secretin, or is reflex in nature, will next be investigated.

43. **"The influence of repeated external hemorrhages on the general composition of the blood": GUSTAVE M. MEYER** and **WILLIAM J. GIES.**

Various observers have noted the fact that the composition of the blood changes after hemorrhage, but no systematic study has been made of these modifications. The authors have begun such an investigation for the purpose of establishing a more definite basis for comparative blood analysis. They reported the results of their observations on posthemorrhagic changes in the percentage content of water, total solids, organic solids, and ash. Further study is in progress.

Healthy, well-nourished or fasting dogs in light morphin-atropin narcosis were used, and quantities of blood ranging from 0.2 % to 1.0 % of body-weight were taken. These amounts were drawn from the femoral artery, and approximately the same

quantity was taken in each experiment at regular intervals, varying from fifteen minutes to two hours until death ensued. In one experiment a continuous fatal hemorrhage was effected and the blood analyzed in portions. Thus far twenty experiments have been carried out. In some of them the serum was also analyzed.

The following conclusions were reported: Hemorrhage causes increase of water and decrease of solids in the remaining blood. *Hemorrhages of about 0.6 % of body-weight*, cause little or no change in general composition of the blood until after 2.5 % has been taken. Under the conditions of these experiments it was generally found that the longer the intervals between withdrawals the less the maximal differences between composition of the first and last fractions. Short intervals between bleedings, all other conditions being equal, favored the largest total withdrawals before death ensued.

The differences in the serum ran parallel with those in the blood, but were less marked. The ash did not vary materially in either the blood or serum, no matter how much blood was taken. The blood ash and that from the serum were practically the same in relative amount, though different in composition.

When *small* quantities of blood, *equal to about 0.2 % of body-weight*, were removed at intervals of about a half-hour, little change was noted in either blood or serum until after 3 % had been taken. After this quantity had been lost the changes following further hemorrhage were such as usually occur.

The maximum differences between the percentage composition of the first and last fractions varied somewhat. The differences in the amounts of solids, for example, ranged from 1.5 % to 3.5 %. In *fasting animals* the influence of hemorrhage on chemical change in the remaining blood was somewhat more marked than in well nourished ones. The effect on the serum was about the same.

Other influences in the experiments were carefully controlled. The observed effects were due only in *slight* degree to the narcotics and the conditions attending the operations.

44. "Demonstration of a new portable sphygmomanometer": THEODORE C. JANEWAY.

The author's instrument was designed with the object of securing a thoroughly portable clinical sphygmomanometer, in which nothing essential to accuracy should be sacrificed. It em-

ploys the method of circular compression of Riva-Rocci, and Hill, with the 12 cm. width of armlet proved necessary by von Recklinghausen. The special construction of the cuff allows of adaptation to arms from 15 cm. to 34 cm. in circumference. The original feature of the instrument is the folding U tube manometer. This is a jointed U tube manometer (copied from Cook), fastened to the under surface of the box-lid, so arranged that, when closed for carrying, it measures $10\frac{1}{4} \times 4\frac{5}{8} \times 1\frac{7}{8}$ ins., and, with armlet and inflator, weighs $2\frac{1}{2}$ lbs. The manometer is perfectly secure when closed and stands firmly when open. The tube caliber is 3 mm. The sliding scale is empirically graduated for each instrument, to compensate for variations in the glass tubing, and is accurate. All connections are of heavy pressure tubing. For inflation a Politzer bag is used, as by Erlanger, except that one with valve is necessary to fill the large armlet. The gradual release of pressure is provided for by a stopcock, with needle-valve of special construction, the work of Mr. Charles E. Dressler, who is making the sphygmomanometer for sale.

The method of use, as of the other modern sphygmomanometers, is based on the criterion of the return of the pulse after obliteration (Vierordt), for systolic pressure, and is similar to the Riva-Rocci and its modifications. A fair approximation of diastolic pressure may also be obtained in most cases, using the criterion of maximum pulsation (Marey, Mosso). This is especially useful in cases of aortic insufficiency, or marked hypertension. For experimental work upon the systolic and diastolic pressures, it cannot compare with Erlanger's more elaborate and costly instrument, but aims to serve the clinician by providing him with an accurate, yet not bulky or costly instrument, for general use. Stanton's sphygmomanometer, which appeared after this one had been begun, answers the same purposes. The only criticism to be made of it is, that 8 cm. width of armpiece does not afford a guarantee of complete accuracy on large arms.

45. "Demonstration of cytological preparations": NAOHIDÉ YATSU.

The author exhibited seven preparations demonstrating important cytological structures found both in eggs normally fertilized, and in some treated chemically. He spoke on the achro-

matic figure in mitosis, with special reference to the morphology and cycle of the centrosome.

Preparation I. — Metaphase of the first polar mitosis with two centrioles at each pole (egg of *Cerebratulus*).

Preparation II. — Sperm nucleus with sperm aster, in which each daughter centriole has acquired a new system of rays (egg of *Cerebratulus*).

Preparation III. — Anaphase of the first cleavage mitosis, showing two centrioles in each centrosome (egg of *Cerebratulus*).

Preparation IV. — Telophase of the first cleavage mitosis, showing typical centrosomes (egg of *Ascaris*, Professor Wilson's preparation).

Preparation V. — Mitosis without chromosomes in a late blastula (egg of *Asterias*, unfertilized and etherized). In one of the blastomeres the aster is dividing, forming a typical central spindle, but devoid of chromosomes.

Preparation VI. — Cytasters (egg of *Asterias*, unfertilized and etherized). Many cytasters are found in the cytoplasm, some dividing, some forming synthetic triasters.

Preparation VII. — Cytasters (egg of *Cerebratulus*, unfertilized and treated with a solution of calcium chlorid). Many cytasters have appeared, the first polar mitosis being disturbed.

46. "The influence of subcutaneous injections and of instillations of adrenalin upon the pupils of frogs," with demonstrations: **S. J. MELTZER** and **CLARA MELTZER AUER.**

Many observers have established the fact that subcutaneous injections as well as instillations of adrenalin exert no influence upon the width of the pupil in normal mammals. In a series of experiments published recently by the authors of this report it was shown that from 24 hours to 48 hours after the removal of the superior cervical ganglion, a subcutaneous injection or an instillation of adrenalin caused considerable dilation of the pupil, which lasted an hour or longer.

In the present communication the authors report that in frogs a subcutaneous injection or an instillation of adrenalin into the conjunctival sac causes an unmistakable dilation of the pupils of a normal animal. The dilation lasts a good deal longer than was ever observed in mammals even after removal of the ganglion;

after instillation some dilation may be perceptible as long as 36 hours. The maximum dilation may even continue as long as 12 hours.

When the cord is severed just below the medulla oblongata, the pupils usually become small and ellipsoid in shape. A subcutaneous injection causes them to become wide and round. Instillation has the same effect. Finally, the effect of instillation can be well shown also on the excised eyes, even when the adrenalin is applied some hours after excision, provided the eyes are kept moist. The experiments were demonstrated.

RECAPITULATION OF THE NAMES OF THE AUTHORS AND OF THE TITLES OF THE REPORTS.

Adler, Isaac [with **Richard Weil.**]

41. Effect of blood serum in pneumonia upon the heart.

Auer, Clara Meltzer [with **S. J. Meltzer.**]

46. The influence of subcutaneous injections and of instillations of adrenalin upon the pupils of frogs.

Auer, John [with **S. J. Meltzer.**]

37. On the influence of suprarenal extract upon absorption and elimination.

Burton-Opitz, Russell

5. Changes in the blood-volume of the vein of the submaxillary gland on stimulation of the chorda tympani and sympathetic nerves.

6. Does a backward flow ever occur in the veins?

21. Changes in the viscosity of the blood produced by various experimental procedures.

Busch, F. C. [with **Charles van Bergen.**]

22. Survival of an animal after removal of both suprarenal capsules, due to a previous grafting of the organ into the kidney. [Presented by **S. J. Meltzer.**]

Calkins, G. N.

7. A new method of studying metabolism.

12. Aims and achievements in recent experimental cytology (review).

16. The organism of smallpox.

Crampton, H. E.

27. The nature and basis of sexual selection in moths.

Dunham, E. K.

28. Observations on a serous fluid of unusually high molecular concentration.

39. The lecithin content of fatty extracts from the kidney.

Ewing, James

2. Differentiation of monkey blood from human blood by the precipitin serum test.

29. [For **E. L. Opie.**] An experimental study of the eosinophile cells during infection with an animal parasite — *Trichina spiralis.*

Gies, W. J.

3. An improved cage for metabolism experiments.

4. Properties of "Bence Jones' body."

20. [With **P. B. Hawk.**] Effects of bloodletting on metabolism.

43. [With **G. M. Meyer.**] The influence of repeated external hemorrhages on the general composition of the blood.

Hawk, P. B. [with **W. J. Gies.**]

20. Effects of bloodletting on metabolism.

Herter, C. A.

8. On the origin of cholesterin in gallstones.

Howell, W. H.

31. An experimental study of the cause of shock. [Presented by **S. J. Meltzer.**]

Hunt, Reid

33. Experiments with certain nitriles and their antidotes.

34. Toxicity of certain quinin derivatives.

Jackson, H. C.

15. Gastric secretion induced by a reflex from the intestine.

25. The action of potassium cyanid upon the unfertilized egg (review).

Janeway, T. C.

44. Demonstration of a new portable sphygmomanometer.

Lee, F. S.

24. A new head holder for rabbits.

Levene, P. A.

9. On nucleic acid.

26. Results of recent investigations in proteid chemistry (review).

32. [With **W. G. Melvin** and **B. Michailowski.**] On the secretion of human bile.

40. [With **L. B. Stookey.**] On the phloridzin test in Bright's disease.

Lusk, Graham

10. [With **A. R. Mandel.**] Respiration experiments in phlorhizin diabetes.

23. On the absence of a cane sugar inverting enzyme in the stomach.

35. [With **A. R. Mandel.**] Report on the metabolism of a case of diabetes mellitus.

Mandel, A. R. [with **Graham Lusk.**]

10. Respiration experiments in phlorhizin diabetes.

35. Report on the metabolism of a case of diabetes mellitus.

Meltzer, S. J.

1. An experiment to show the difference in effect between the simple cutting of the cervical sympathetic and the removal of the superior ganglion.

19. Effect of ligation upon the vital staining of nerves.

22. [For **F. C. Busch and Charles van Bergen.**] Survival of an animal after removal of both suprarenal capsules, due to a previous grafting of the organ into the kidney.

31. [For **W. H. Howell.**] An experimental study of the cause of shock.

36. [With **William Salant.**] Antihemolytic properties of the serum of nephrectomized rabbits.

37. [With **John Auer.**] On the influence of suprarenal extract upon absorption and elimination.

46. [With **Clara Meltzer Auer.**] The influence of subcutaneous injections and of instillations of adrenalin upon the pupils of frogs.

Melvin, W. G. [with **P. A. Levene** and **B. Michailowski.**]

32. On the secretion of human bile.

Meyer, G. M. [with **W. J. Gies.**]

43. The influence of repeated external hemorrhages on the general composition of the blood.

Michailowski, B. [with **P. A. Levene** and **W. G. Melvin.**]

32. On the secretion of human bile.

Opie, E. L.

29. An experimental study of the eosinophile cells during infection with an animal parasite — *Trichina spiralis.* [Presented by **James Ewing.**]

Park, W. H.

14. The occasional presence in the blood of untreated adult animals of large amounts of substances agglutinating many bacteria.

Richards, A. N.

11. A demonstration of a modified Eck fistula, with a note on adrenalin glycemia.

18. The intracellular reduction of gold chlorid.

Salant, William

36. [With **S. J. Meltzer.**] Antihemolytic properties of the serum of nephrectomized rabbits.

42. The influence of alcohol on biliary secretion.

Stookey, L. B. [with **P. A. Levene.**]

40. On the phloridzin test in Bright's disease.

Van Bergen, Charles [with **F. C. Busch.**]

22. Survival of an animal after removal of both suprarenal capsules, due to a previous grafting of the organ into the kidney. [Presented by **S. J. Meltzer.**]

Wallace, G. B.

17. On respiratory stimulants.

Weil, Richard [with **Isaac Adler.**]

41. Effect of blood serum in pneumonia upon the heart.

Wilson, E. B.

13. An experimental study of cell-specification in embryonic development.

38. Mendel's law (review.)

Woodworth, R. S.

30. Subcortical expressive reflexes and their spinal pathways.

Yatsu, Naohidé

45. Demonstration of cytological preparations.

EXECUTIVE PROCEEDINGS.

Quotations from the minutes.

Preliminary conference.

Residence of Professor Graham Lusk. January 19, 1903.

On January 17, 1903, copies of the following letter were sent to a number of New York investigators in biology and medicine:

"You are requested to attend a meeting to be held at the residence of Graham Lusk, 11 East 74th St., on Monday evening, January 19, at half-past eight o'clock, for the purpose of establishing a Society for Experimental Biology and Medicine, to be composed of active workers in those branches."

(Signed) Graham Lusk,
S. J. Meltzer.

The following gentlemen were present at the meeting referred to: James Ewing, Holmes C. Jackson, Frederic S. Lee, Graham Lusk, S. J. Meltzer, George B. Wallace and William J. Gies. F. S. Lee was elected chairman; W. J. Gies, recording secretary.

S. J. Meltzer stated the object of the meeting to be the organization of active workers in experimental biology and medicine. Dr. Meltzer's views were unanimously endorsed and the following committee on permanent organization was appointed: S. J. Meltzer, Graham Lusk and W. J. Gies.

The Secretary was instructed to invite the following gentlemen to participate in the organization of the Society: Russell Burton-Opitz, Gary N. Calkins, Henry E. Crampton, Richard H. Cunningham, Christian A. Herter, Philip H. Hiss, Phœbus A. Levene, Charles Norris, William H. Park, Alfred N. Richards, Percy G. Stiles, Edmund B. Wilson.

All of these gentlemen became charter members.

First meeting.

(Permanent organization.)

Laboratory of Physiological Chemistry of Columbia University, at the College of Physicians and Surgeons. February 25, 1903.

Members present: Burton-Opitz, Calkins, Cunningham, Ewing, Gies, Hiss, Jackson, Lusk, Meltzer, Park, Richards, Wallace.

Members absent: Crampton, Herter, Lee, Levene, Norris, Stiles, Wilson.

The constitution and by-laws prepared by the committee on permanent organization were unanimously adopted. [The only amendments proposed to the constitution were adopted at the sixth meeting, on April 20, 1904.]

The following officers were elected: *President*, Meltzer; *Vice President*, Park; *Librarian*, Lusk; *Treasurer*, Calkins; *Secretary*, Gies.

Second meeting.

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

Members present: Burton-Opitz, Calkins, Ewing, Gies, Herter, Hiss, Jackson, Levene, Lusk, Meltzer, Norris, Richards, Stiles, Wallace.

Meetings open to the public. — By unanimous vote it was decided to open the scientific part of each meeting to all who may be interested.

Third meeting.

Zoölogical Laboratory of Columbia University. October 21, 1903.

Members present: Burton-Opitz, Calkins, Crampton, Ewing, Gies, Hiss, Jackson, Lee, Levene, Lusk, Meltzer, Norris, Park, Richards, Wallace, Wilson.

Fourth meeting.

Physiological Laboratory of Columbia Universiy, at the College of Physicians and Surgeons. December 16, 1903.

Members present: Burton-Opitz, Ewing, Gies, Hiss, Jackson, Lee, Levene, Lusk, Meltzer, Norris, Oertel, Park, Richards, Wadsworth, Wallace.

Members elected: A. C. Abbott, Isaac Adler, B. H. Buxton, J. McK. Cattell,* H. W. Cushing, E. K. Dunham, Simon Flexner,

* Resigned April 20, 1904.

Reid Hunt, Hugo Münsterberg, J. R. Murlin, Horst Oertel, E. L. Opie, Theobald Smith, A. B. Wadsworth, R. S. Woodworth, Naohidé Yatsu.

Fifth meeting.

[First annual business meeting.]

Pathological Laboratory of the Cornell Medical College. February 17, 1904.

Members present: Adler, Calkins, Crampton, Dunham, Ewing, Gies, Jackson, Levene, Lusk, Meltzer, Murlin, Norris, Richards, Wadsworth, Wallace, Wilson, Woodworth, Yatsu.

Members elected: J. P. Atkinson and Isaac Levin.

Treasurer's first annual report.

Dues received	$16.00
Miscellaneous expenditures	11.23
Balance in the treasury, Feb. 17, 1904	$ 4.77

Officers elected: President, Meltzer; vice-president, Ewing; librarian, Lusk; treasurer, Calkins; secretary, Gies.

Sixth meeting.

Bacteriological Laboratory of the Department of Pathology of Columbia University, at the College of Physicians and Surgeons. April 20, 1904.

Members present: Burton-Opitz, Calkins, Gies, Hiss, Hunt,* Jackson, Lee, Levene, Lusk, Meltzer, Murlin, Norris, Park, Richards, Wadsworth, Wallace, Wilson, Yatsu.

Members elected: J. J. Abel, E. G. Conklin, A. R. Cushny, C. B. Davenport, W. H. Howell, L. B. Mendel, T. H. Morgan, F. G. Novy, W. T. Porter, L. B. Stookey, W. H. Welch.

Amendments to the Constitution. — The following constitutional amendments, which had been proposed at the fifth regular meeting by W. H. Park, R. Burton-Opitz and W. J. Gies, were adopted:

I. ARTICLE 3, *Section 2.* The term "resident members" shall refer, in this constitution, to those members whose experimental work shall be done within the limits of "Greater New York"; "non-resident members," to those whose scientific work shall be done outside of "Greater New York."

* Non-resident.

II. ARTICLE 3. Former *Section 2* to be termed *Section 3;* subsections B and C to be designated D and E respectively. In subsection E the words "this requirement" shall be changed to "any of these requirements."

III. ARTICLE 3, *Section 3. B. Resident* members shall be required either to attend, every two years, at least three meetings of the Society, or to present in person, at least once every two years, a report of their experimental researches.

IV. ARTICLE 3, *Section 3. C.* Each *non-resident* member shall be required to present in person, at least once every two years, a communication containing the results of an experimental investigation, or to send to the President within that time, such a communication for presentation at a regular meeting of the Society.

Proceedings to be printed. — The Secretary was instructed to have the constitution, list of members and abstracts of the proceedings printed in pamphlet form, and to issue copies to the members.

Seventh meeting.

Physiological laboratory of the New York University and Bellevue Hospital Medical College. May 18, 1904.

Members present: Adler, Burton-Opitz, Dunham, Ewing, Gies, Jackson, Levene, Lusk, Meltzer, Murlin, Richards, Salant, Wadsworth, Wallace, Yatsu.

Members elected: P. B. Hawk, W. G. MacCallum, A. R. Mandel, R. M. Pearce, Franz Pfaff, William Salant, H. U. Williams, A. S. Warthin.

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