that the theory of muscle being the only seat of so-called motor fatigue is yet without proof. The early experiments of Mosso and of other investigators do not clearly establish a nervous fatigue, but results in these, and certain later experiments may be explained in either way, namely, that there is nervous fatigue or that there is only muscular fatigue. There is, indeed, as much reason to say that there is a widening of the synapses in fatigue as in sleep (see above).

Such a book has long been needed both by psychologists and by physiologists. Material has been carefully chosen from psychological, physiological and clinical literature, and theory has been properly subordinated to fact.

SHEPHERD IVORY FRANZ.

McLEAN HOSPITAL,
WAVERLEY, MASS.

SOCIETIES AND ACADEMIES.

SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE.

THE seventh regular meeting of the society was held on Wednesday, May 18, at 8:30 P.M., in the physiological laboratory of the New York University and Bellevue Hospital Medical College at 338 East 26th Street. Dr. S. J. Meltzer presided.

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.

ABSTRACT OF REPORTS ON ORIGINAL INVESTIGATIONS.*

The Lecithin Content of Fatty Extracts from the Kidney (Preliminary Report): E. 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 microscopical 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 grams)	**0.0026**
Perinephritic fat (5.6750 grams)	**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 grams of the tissue. The quantity of jecorin that may have been present was too small to influence materially the analytical results. The most probable compounds containing the phosphorus are forms of lecithin. The barium hydroxide-platinic chloride method for the separation of cholin was employed with the following results:

	Extract, Grams.	Phosphorus, per cent.	Platinum, Gram.	Licithin in the Extract (Calculated as Di-stearyl-lecithin), per cent.
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

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

gram. The platinum, therefore, constituted 32.7 per cent. of the salt. Cholin platinic chloride contains 31.6 per cent. 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 chloride. With these considerations in mind, the foregoing results render it highly probable that the phosphorus is present in some form of licithin, but although these calculations are based on di-stearyl-lecithin, it is certain that this is not the only lecithin present. The fact that lecithin obtained in moderate purity (about 99 per cent.) from the kidney extract promptly blackens with osmic acid, indicates that the oleic acid radicle is present. The recognition 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 the calculations given in the following table* are based:

	Extract, % of Dry Organ.	Phosphorus, % of the Extract.	Lecithin, % of the Extract.	Lecithin, % of Dry Organ.	Autopsy Report. Cause of Death.	Weight of Kidney.
			Human Kidneys.			Grams.
I.	11.42	2.11	55.07	6.29	Pneumonia and	
	12.48	2.00	52.03	6.49	hepatic abscesses.	200
II.	11.44	1.35	35.14	4.02	Tuberculosis.	200
XI.	15.40	1.18	30.84	4.76	Moderately fatty	——
	15.51	1.19	31.09	4.80	kidneys.	
			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 †	——	——

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

† 2.24 per cent. of the fresh kidney.

These analyses demonstrate that even in the kidney, which can not 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.

On the Phloridzin Test in Bright's Disease: P. A. Levene and L. 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 catabolic condition of the kidney. This view was first expressed by one of the authors 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 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 albumen 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 Allihus's method was used for the sugar determinations. Further work in this direction is in progress.

Effect of Blood Serum in Pneumonia upon the Heart (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* and the serum obtained *after* the crisis. 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 1–20, or better still, 1–15, it does not differ greatly in effect from 'normal saline.' All sera were thereupon tested in dilution of 1–20 or 1–15, and the routine of each experiment as ultimately adopted was as follows: Infusion into the heart, (*a*) 'normal saline,' (*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 broncho pneumonia 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.

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 morphine. The rate of secretion was studied by comparing the amounts collected during periods of fifteen 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, four and one half per cent., thirty per cent. and sixty per cent. 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: 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 two experiments. It would seem, therefore, that the diminished secretion following intravenous injection of alcohol might be due to the effect of alcohol.

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 sixty per cent. alcohol was introduced into the stomach there was a slight, transitory increase of biliary secretion. With thirty per cent. alcohol there was in some cases an increase, in some a decrease, of the secretion of bile as compared with prealcoholic 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.

The Influence of Repeated External Hemorrhages on the General Composition of the Blood. G. M. Meyer and W. 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 morphia-atropin narcosis were used and quantities of blood ranging from 0.2 to 1.0 per cent. 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 per cent. of body weight* cause little or no change in general composition of the blood until after 2.5 per cent. 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 very much in either the blood or the 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 per cent. of body weight* were removed at intervals of about a half-hour, little change was noted in either blood or serum until after 3 per cent. had been taken. After this quantity had been lost the changes following further hemorrhage were such as usually occur. The maximum differences in 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 per cent.

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.

Demonstration of a New Portable Sphygmomanometer: T. C. JANEWAY.

Dr. Janeway's instrument was designed with the object of securing a thoroughly portable clinical sphygmomanometer, in which nothing essential to accuracy should be sacrificed. It employs the method of circular compression of Riva-Rocci, and Hill, with the 12cm. width of armlet proved necessary by Von Recklinghausen. The special construction of the cuff allows of adaptation to arms from 15 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 $10\frac{1}{4} \times 4\frac{5}{8} \times 1\frac{7}{8}$ inches, and with armlet and inflator weighs $2\frac{1}{2}$ pounds. 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 variation 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 stop-cock, 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 can not 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.

Demonstration of Cytological Preparations: NAOHIDÉ YATSU.

Mr. Yatsu exhibited seven preparations demonstrating important cytological structures found both in eggs normally fertilized and in some treated chemically. He spoke on the achromatic 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 chloride). Many cytasters have appeared, the first polar mitosis being disturbed.

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 to 48 hours after the removal of the superior cervical ganglion a subcutaneous injection or an instillation of adrenalin caused a 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 observed 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.

William J. Gies,
Secretary.

THE TORREY BOTANICAL CLUB.

The meeting of April 12, 1904, was held at the New York College of Pharmacy, with Dr. MacDougal in the chair.

The first paper of the evening was by Professor L. M. Underwood on '*Cyathea* and its Allies in Jamaica.' One of the objects of Professor Underwood's trip to Jamaica last year was to study the tree ferns in the field. Specimens usually show a single pinna without its connections or any part of the caudex. Such material has been used for types and one species has been described from a single pinnule. Although a species which is well known can often be recognized by a fragment of a good specimen, it should show as much as possible of a pinna, its connection with the main rachis, and part of the caudex.

The Cyatheaceæ or tree ferns mostly have an elongated caudex or trunk, but a few are herbaceous. The more distinctive family characters are furnished by the sporangia, which are rounded-triangular with complete ring and are sessile or very shortly stalked. There are six genera in the West Indies distinguished by the character of the indusium, habit and cutting of the leaves.

Cyathea arborea is the oldest and best known of the West Indian tree ferns and the only one common to most of the islands, many of the species being found only on the islands on which they were originally described. It occurs at an elevation of 1,000 to 2,000 feet and forms a handsome tree with a spread of 14 to 18 feet. Above this it is replaced by a similar but larger species of *Alsophila*. *Cyathea arborea* and *C. elegans* are noticeably distinguishable by the caudex, that of the former being smooth, while that of the latter is very rough and shaggy. *C. nigrescens* is common to Jamaica and Cuba. *C. insignis* is a handsome plant, but as only two were seen, and these represented perhaps 200 years' growth, they were not taken for specimens, but notes were made on the trunk characters. A fine specimen is in cultivation at the conservatory of the Botanical Garden brought up by Professor Earle. Of the sixteen species of *Cyathea* which are not doubtful, thirteen are endemic in Jamaica and three are known only from type specimens. The sharp prickles of these and other species secrete a poison and wounds from them are very painful, so that collecting on the steep hillsides is likely to be attended with considerable discomfort. The genus *Alsophila* has three species which are well known. *A. armata,* occurring at 4,000 to 5,000 feet elevation, has a usual height of 40 to 45 feet and is the most graceful plant of the island. It is armed only with weak bristles. *Alsophila aspera,* which is a lower

tree, has smooth leaves but prickly petioles. It occurs at about 1,500 feet elevation. Two of the species are endemic. *Hemitelia* has one species, described early in the last century, which is probably extinct, and two others very little known. A species of *Lophosoria* has a dense bloom on the under side of the leaves and is somewhat xerophytic in habit. It has merely a woody base.

Cnemidaria is distinguished by its habit and the cutting of its leaves. It has veins uniting near the midrib to form meshes.

Amphidesmium, from Trinidad and South America, differs from all other ferns in that the veins bear a second or even third sorus.

Most of the species discussed were illustrated by herbarium specimens and by portions of their trunks.

The second paper was by Dr. P. A. Rydberg, on 'The Flora of Northwest America.' A general discussion of the manuals available for the identification of the plants of different parts of the United States was given and a review of Mr. Howell's flora of the Columbia River region.

WILLIAM T. HORNE,
Secretary pro tem.

THE PSYCHOLOGICAL CLUB OF CORNELL UNIVERSITY.

THE session of 1904 has been devoted to the consideration of current theories of auditory sensation. The following papers have been read:

MR. H. C. STEVENS: 'The Helmholtz Theory.'

DR. J. W. BAIRD: 'The Facts of Auditory Sensation.'

MR. C. E. FERREE: 'The Physics of the Ear.'

MR. C. E. GALLOWAY: 'The Histology of the Ear.'

MR. C. E. GALLOWAY: 'The Physiology of the Ear.'

PROFESSOR E. B. TITCHENER: 'Rutherford's Theory and its Relation to the Helmholtz Theory.'

PROFESSOR I. M. BENTLEY: 'Ebbinghaus and Stumpf.'

MR. G. H. SABINE: 'Max Meyer.'

DR. T. DE LAGUNA: 'Ter Kuile's Theory.'

MISS A. JENKINS: 'Ayers's Theory.'

PROFESSOR TITCHENER: 'The Theories of Gray and Wundt.'

MISS E. MURRAY: 'Hermann and Ewald.'

MR. STEVENS: 'Objections to the Helmholtz Theory.'

PROFESSOR BENTLEY: 'Is Analysis Possible without Resonators?'

DISCUSSION AND CORRESPONDENCE.

KINDERGARTEN SCIENCE.

DR. THEODORE GILL'S arraignment in SCIENCE (No. 488) of popular writers on natural history who indulge in 'baby talk,' by which is meant the practise of 'talking down' to an assumed inferior level of understanding, is a point exceedingly well taken. The use of a 'trot' to enable the young idea to canter smoothly along the road to learning, and thus avoid the toilsome march, is as much to be deprecated in natural science as in classics or other studies.

Dr. Gill's censure happens in this instance to be directed against over-popularizers of paleontology, whose administration of sugar-coated tabloids to juvenile readers is objected to on the ground, as he puts it, that 'science is scarcely food for babies.' But paleontological writers are not the only offenders in this direction. For the employment of kindergarten methods of illustration, even in serious articles, no science can compare with physiography. The recent literature of this subject has been suffering from a mania for interpreting topographic features in terms of vital phenomena, and for correlating, or attempting to correlate, physical changes (*cycle* is a misnomer) with stages of organic development. *Youth, maturity* and *old age* are terms constantly employed for indicating the successive expressions of unchanging forces in nature, for things as essentially different from life as the growth of the crystal is different from the growth of the individual.

It may be answered that an analogy is not implied by the use of these terms in a figurative sense, or if one is suggested, it is not harmful. Harmful it does become, however, when a false analogy is strained so far as to produce senseless or even ludicrous incongruities. Without exaggerating the prevailing style of metaphor, it may be said that a coordinate value is placed by physiographers upon the ridges and valleys of landscapes, and