Arizona and New Mexico," H. H. Robinson; "Heat of Combustion of Silicon and Silicon Carbide," W. G. Mixter; "Vanadium Sulphide, Patronite, and its Mineral Associates from Minasragra, Peru," W. F. Hillebrand; "Mineralogical Notes," W. T. Schaller; "Thermoelectromotive Forces of Potassium and Sodium with Platinum and Mercury," H. C. Barker; "Reaction between Potassium Aluminium Sulphate and a Bromide-Bromate Mixture," F. A. Gooch and R. W. Osborne; "Preparation of Formamide from Ethyl-Formate and Ammonium Hydroxide," I. K. Phelps and C. D. Deming; "Lower Middle Cambrian Transition Fauna from Braintree, Mass.," H. W. Shimer.

We learn from *Nature* that after the current year the *Journal of Anatomy and Physiology* will be issued in two independent parts, one to be devoted to anatomical, histological, morphological, and embryological subjects, and the other to contain papers on subjects of physiological interest (including physiological histology and physiological chemistry). The acting editor of the anatomical part will be Professor D. J. Cunningham, with whom will be associated Sir William Turner, K.C.B., Professor A. Macalister, and Professor G. S. Huntington. The acting editor of the physiological part will be Professor E. A. Schäfer, with whom will be associated Professors F. Gotch, W. D. Halliburton, C. S. Sherrington and E. H. Starling.

SOCIETIES AND ACADEMIES

THE SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE

Twenty-first Meeting

The twenty-first meeting of the Society for Experimental Biology and Medicine was held at the College of Physicians and Surgeons, of Columbia University, on Wednesday evening, March 20. The president, Simon Flexner, was in the chair.

Members present—Adler, Beebe, Burton-Opitz, Carrel, Crampton, Crile, Emerson, Ewing, Field, Flexner, Gibson, Gies, Hatcher, Lee, Levene, Levin, Lusk, Mandel (J. A.), Meltzer, Murlin, Noguchi, Opie, Richards, Schwyzer, Shaffer, Torrey, Tyzzer, Wadsworth, Wallace, Wolf.

Abstracts of the Communications[1]

A Study of the Vital Conditions Determining the Distribution and Evolution of Snails in Tahiti, with Illustrations: H. E. Crampton.

It was shown that different valleys of Tahiti contain forms of the genus *Partula* that, on account of their more or less complete isolation, have come to differ in correlation with their geographical proximity or remoteness. Evidence was adduced showing that "mutations" have arisen at various recent times.

The Parathyroid Gland, with Demonstrations of the Effects of Hypodermic Injections of Parathyroid Nucleoproteid after Parathyroidectomy: S. P. Beebe.

It has been found that the symptoms of tetany following parathyroidectomy in dogs can be inhibited by the hypodermic injection of parathyroid nucleoproteid. The globulin from these glands has not been found effective. If the nucleoproteid is heated to boiling in an alkaline medium its inhibitive powers are destroyed.

Further Experimental and Clinical Observations on the Transfusion of Blood: George W. Crile.

Beneficial results were obtained after acute hemorrhage, after pathologic hemorrhage and in the treatment of shock and illuminating gas poisoning. Negative results were obtained in pernicious anemia, leukemia, carcinoma, strychnin poisoning and diphtheria toxemia.

A Preliminary Report on the Direct Transfusion of Blood in Animals given Excessive Doses of Diphtheria Toxins: George W. Crile and D. H. Dolley.

[1] The abstracts presented in this account of the proceedings have been greatly condensed from abstracts prepared by the authors themselves. The latter abstracts of the communications may be found in Number 4 of Volume IV of the society's proceedings, which may be obtained from the secretary.

Transfusion had no beneficial effects on dogs that received lethal doses of the toxin. Exsanguinated normal dogs, that received blood from dogs treated with excessive doses of toxin, were apparently unaffected. Blood letting, as well as blood letting followed by transfusion of physiological salt solution, had no effect upon the action of the toxin.

The Effect on the Normal Dog Heart of Expressed Tissue Juice from Hearts of Dogs Poisoned with Diphtheria Toxin: J. J. R. MACLEOD and GEORGE W. CRILE.

Expressed juice from hearts of dogs poisoned with diphtheria toxin, caused cardiac paralysis and fibrillation when perfused through hearts of normal dogs. The same result was obtained, however, with similar juice from normal hearts and with aqueous solutions of the ash obtained from such juice. The paralytic result was attributed to the influence of potassium, although the associated fibrillation requires a different explanation.

Experimental Liver Necrosis: 1. Hexon bases. HOLMES C. JACKSON and RICHARD M. PEARCE.

In the scattered focal necroses of the livers of dogs and horses the nitrogen precipitable by phosphotungstic acid, after acid hydrolysis, formed 11.3 per cent., and in the diffused necroses 30 per cent., of the total nitrogen, as against 15 per cent. for the normal. The necrotic livers that were allowed to undergo autolysis showed approximately the same percentage loss of phosphotungstic-precipitable nitrogen (hexon) as normal livers, despite the extent of the necrosis. In the focal necrosis the average was 28 per cent., in the diffuse necrosis, 21 per cent.

The Action of Nitric Acid on the Phosphorus of Nucleoproteids and Paranucleoproteids: A. B. MACALLUM.

Phosphorus is combined in caseinogen in a manner very different from that which obtains in true nucleoproteids. When treated with nitric acid (1.2 sp. gr.) at 35° C. for two weeks, no phosphate is produced. Nucleic acid and true nucleoproteins yield phosphate under such conditions. Nitric acid may therefore be employed to distinguish nucleic acids and the typical nucleoproteids from paranucleic compounds.

Does the Stomach of the Dog contain Free Hydrochloric Acid During Gastric Digestion? LAFAYETTE B. MENDEL.

Many positive results were obtained.

On the Nature of the Process of Fertilization: JACQUES LOEB.

The author's recent experiments have shown that in the purely osmotic method of producing artificial parthenogenesis, we are in reality dealing with a combination of two different agencies, one being the increase of the osmotic pressure at a comparatively low concentration of hydroxyl ions, and the other, the hydroxyl ions at a comparatively high concentration. The proof for this statement rests upon the following experimental facts.

(*a*) When the concentration of the OH is below a certain limit, namely, $10^{-6}n$, even the maximal increase of osmotic pressure fails to cause the formation of larvas from the unfertilized eggs.

(*b*) When the concentration of hydroxyl ions is high, *e. g.*, $10^{-3}n$, a very slight increase of the osmotic pressure is able to call forth the formation of larvas.

(*c*) The effects of the two agencies can be separated by first putting the eggs for from 1½ to 2 hours into a hypertonic solution with a concentration of hydroxyl ions between 10^{-7} and $10^{-6}n$, and afterwards transferring them for some time to an isotonic solution with a concentration of hydroxyl ions of about 2 or $4 \times 10^{-3}n$. While no egg that has been exposed to the hypertonic solution will develop, many or possibly the majority of the eggs that have in addition been exposed to the hyperalkaline solution will develop into larvas, many of which are perfectly normal and rise to the surface. Eggs which develop into larvas very often (possibly always) have a membrane which, however, differs from the fatty acid membrane or the fertilization membrane in this, that it is not separated by so wide a space from the protoplasm and therefore easily escapes detection.

Comparative Chemical Composition of the Hair of Different Races: Thomas A. Rutherford and Philip B. Hawk.

After subjecting hair obtained from Indian, Negro, Japanese and Caucasian subjects, to the action of digestive juices, and also alcohol and ether, the percentage content of sulphur, nitrogen, carbon and hydrogen in the remaining keratin was found to be nearly the same for each type. The S:N ratio was practically 1:3 in each case.

The Oxidation of Sugars by Cupric Acetate-Acetic Acid Mixtures: A. P. Mathews and Hugh McGuigan.

The addition of acetic acid to cupric acetate diminishes its speed of oxidation. The amount of acid that may be necessary to check the oxidation to any given rate depends on the concentration of the acetate; the more concentrated the acetate the more acid is required.

Solutions of different concentrations of acetate and acetic acid were prepared which would just fail to oxidize levulose to a visible production of cuprous oxide after a half-minute's boiling. Similar solutions were prepared for the different sugars. Each of these solutions for any given sugar of one per cent. concentration had the same speed of oxidation. In all the solutions oxidizing any one sugar with the same speed, the decomposition tension of the cupric oxide in the solutions was a constant. For the different sugars the following data for decomposition tension were obtained in those solutions that just failed to show oxidation to a visible extent after a half-minute's boiling: Levulose, 0.583 volt; galactose, 0.562 volt; glucose, 0.558 volt; maltose, 0.532 volt; lactose, 0.519 volt.

A cupric acetate-acetic acid mixture of proper concentration will show the same selective action toward levulose that many bacteria and other living organisms manifest and will oxidize the levulose almost completely before the glucose is attacked.

Observations on the Effects of Fasting upon the Opsonic Power of the Blood to Staphylococcus aureus: Allan C. Rankin and A. A. Martin (by invitation).

Fasting perceptibly diminished the particular opsonic power studied (from 0.98 to 0.7).

The Automatism of the Respiratory Center: G. N. Stewart and F. H. Pike.

The authors described a method which seems to afford a means of temporarily eliminating all the afferent paths connected with the respiratory center. Since under these conditions the center continues to discharge itself in such a way as to maintain a long and unbroken series of regular, efficient respiratory movements, its normal activity is to be considered an example of physiological automatism, not originated, although influenced, by afferent nervous impulses.

A Series of Spontaneous Tumors in Mice: E. E. Tyzzer.

In the investigation of tumors in mice, attention has been directed, for the most part, to those which develop in the subcutaneous tissue. It is possible that *internal* tumors often occur unnoticed.

The author described tumors of the lungs, kidneys, mammary glands and lymphatic glands, and stated the effects of their inoculation into mice. Silver preparations were made by the method of Levaditti and the results given of an extended examination for spirochetes.

Concerning the Neutrality of Protoplasm: Lawrence J. Henderson (by invitation).

It is desirable, both on account of the normal production of acid during metabolism, and because of the production of acid under pathological circumstances, to study the adjustment of equilibrium in protoplasm whereby neutrality is maintained.

As a result of this investigation it appears that in the presence of both free and combined carbonic acid in measurable amount, mixtures of sodium hydroxid, phosphoric acid and carbonic acid are precisely neutral to rosolic acid, and that the amount of sodium bicarbonate in such mixtures can vary considerably without great variation in the ratio between mono-sodium phosphate and di-sodium phosphate. These results are in accord with the

theory, based upon the ionization constant of carbonic acid (3×10^{-7}) and of the ion H_2PO_4 (2×10^{-7}). Although the equilibrium in such a system at 40° C. may be somewhat different, it is evident that this equilibrium will almost perfectly protect protoplasm from variation in neutrality. The variation in hydrogen and hydroxyl ionization can hardly be more than 5×10^{-7}.

The Influence of Adrenalin upon the Venous Blood Flow: RUSSELL BURTON-OPITZ.

The blood flow in the femoral, external jugular and azygos veins was measured by means of the stromuhr previously described by the author. During the experiment, solutions of adrenalin were injected centrally to the stromuhr. The effect of the adrenalin showed itself in a retardation of the venous inflow, which appeared in from fourteen to sixteen seconds after the injection. Considering the velocity of the venous blood stream, it must be assumed that the adrenalin did not produce its characteristic effect until it had reached the arterial side of the circulatory system. The experiments tend to disprove the existence of vaso-motor nerves in the central veins and the pulmonary circuit.

The Viscosity of Laked Blood: RUSSELL BURTON-OPITZ.

It was found that the viscosity of laked blood prepared by the process of freezing is very much less than the viscosity of defibrinated blood. The specific gravity was only slightly lessened. Examples of the experimental data are appended:

Defibrinated Blood		Laked Blood	
Spec. Grav.	Viscosity	Spec. Grav.	Viscosity
1.0566	665.74	1.0563	982.35

The Determination of Ammonia and Urea in Blood: W. MCKIM MARRIOTT and C. G. L. WOLF.

Ammonia is determined by distillation in vacuo. 100 c.c. of blood are treated with 50 c.c. of saturated sodium chlorid solution, and 250 c.c. of methyl alcohol are added to the mixture. The resultant precipitate is finely granular. The residue is filtered off in a filter press, and the filtrate distilled for forty minutes, with the temperature of the water bath at 40–50° C. The receivers are charged with $n/50$ sulphuric acid, and the acid titrated with $n/50$ sodium hydroxid free from carbonate. Sodium alizarin sulphonate is used as the indicator. The results are perfectly accurate.

The residue after distillation is made acid with hydrochloric acid, evaporated and hydrolyzed with 10 grams of glacial phosphoric acid at 150° C. The ammonia formed from the urea is then distilled into $n/50$ acid. The duplicates have shown very satisfactory agreement, but it is quite certain that not all the urea which is added to a sample of blood is recovered. It is probable that the carbohydrates in the residue combine with the urea at the temperature of hydrolysis and prevent the formation of ammonia.

The Resolution of Fibrinous Exudates, with Exhibition of Specimens: EUGENE L. OPIE.

During the early stage of inflammation, a fibrinous exudate, freed from the serum by washing in salt solution, undergoes digestion when suspended in an alkaline (0.2 per cent. sodium carbonate), or in an acid, medium (0.2 per cent. acetic acid). At the end of six days, when fluid has disappeared from the pleural cavity, digestion fails to occur in an alkaline medium, but occurs with great activity in the presence of acid.

During the first stage of the inflammatory reaction, when fluid is abundant and the fibrin which is present digests in the presence of alkali, polynuclear leucocytes are very numerous in the meshes of the fibrin. In the second stage, when fluid has in great part disappeared, and the fibrin contains only one enzyme active in the presence of acid, polynuclear leucocytes have disappeared and only mononuclear cells are embedded in the fibrin.

Since the acids, which, in vitro, favor the action of the enzyme present in the second stage of the process, do not occur in the body, the possibility has suggested itself that carbon dioxide brings this enzyme into action. When carbon dioxide is passed through normal salt solution in which strips of such fibrin are suspended, digestion is very greatly hastened. The normal inhibition exerted by blood serum upon the enzyme is overcome by carbon diox-

ide; in the presence of a small quantity of blood serum, carbon dioxide causes greater enzymotic activity than in the presence of salt solution alone.

Extirpation of both Kidneys from a Cat and Transplantation of both Kidneys from another Cat, with Exhibition of Specimens: Alexis Carrel.

Both kidneys from a cat were extirpated and immediately replaced by both kidneys from another cat. After this operation the animal urinated abundantly. Urine collected during the first few days contained albumin. On the fourteenth day the cat was operated on for hernia of the small intestine through the abdominal wound. The animal died from general peritonitis one day after this second operation.

The anatomical specimen shows that the kidneys are a little enlarged. There is a slight hydronephrosis on the left side. Nevertheless, both organs appear to be in good condition.

William J. Gies,
Secretary

THE TORREY BOTANICAL CLUB

The club met on May 29, 1907, at the museum building of the New York Botanical Garden at 3:30 o'clock, with an attendance of twenty.

Dr. John Hendley Barnhart was called to the chair.

After the reading and approval of the minutes of the meeting of May 14, the following scientific program was presented:

The Linnæan and Other Early Known Species of Cratægus: Mr. W. W. Eggleston.

The earliest record found of American *Cratægi* is from the Spanish by Caspar Bauhini, in 1623. It is as follows: "*Mespilus virginiana colore rutilo. Mespilus qui colore est rutilo ut cerasa & valde dulcis,* part. I., Ind. occid."

The latter part of this quotation probably refers to Historia Medicinal, by Monardes, in 1569.

Lists of plants raised in the botanical garden at Leiden published by Herman in 1687, by Boerhaave in 1720, and by Royen in 1740; and in the *Schola Botanica,* published at Paris, in 1687; as well as Linnæus's own lists (Hort. Cliffortianus and Hort. Upsaliensis), give short references to American Cratægi; but it is to the English botanist, Plukenet, that we owe our first real knowledge of American thorns. His plates and descriptions are referred to by Linnæus, and these, with his references, are invaluable to us.

Contemporary with Plukenet was Ray, who also added somewhat to our knowledge. John Banister, of Jamestown or Williamsburg, Va., must have contributed much to Plukenet's knowledge, as he was the first English botanist to live in Virginia, and sent many seeds and specimens to England.

This Chesapeake bay region produced all of the Linnæan species, except the one that has been referred to as *C. tomentosa.* This might have been brought from farther back in the country, perhaps by the Indians, as it was one of the earliest thorns raised in England, and is not found in the coastal plain.

In Plukenet's "Phytographia," published in 1691, are five figures of American Cratægi; Plukenet says that he saw the species illustrated in his plate 46, Fig. 1 in the garden of the Hon. Charles Howard, in Surrey. This specimen Linnæus refers to *Cratægus Crus-galli.* A colored plate of it is published in the "List of Plants raised for sale by the English Gardeners about London" (Hort. Brit.), published in 1730. This is the plant labeled in the Linnæus herbarium as *C. tomentosa.* About this Miller was undoubtedly right, for Plukenet's description will cover no other American thorn, certainly none other that was raised in England at that time.

Plukenet's plate 46, Fig. 2, undoubtedly refers to *C. Phœnopyrum* (Linn. f.). There is a good plate of this in Hort. Brit. Linnæus referred this plate to *Cratægus coccinea,* and it has long been incorrectly referred to as *C. cordata* (Miller).

Plukenet's plate 46, Fig. 4, is the first figure referred by Linnæus to *Cratægus coccinea.* This figure and description require a smooth thorn with broad, slightly-lobed leaves, and a

red, two-seeded fruit. The only known American thorn that fits this description is *C. Margaretta* Ashe (= *C. Brownii* Brit.). This was not known from the coastal plain region, but there is a specimen in the U. S. National Museum from Maryland. Fig. 5 of plate 99 is a young shoot of *Cratægus Crusgalli* L.

Plate 100, Fig. 1, was referred by Linnæus to *Cratægus tomentosa.* This is the same as *Cratægus uniflora* Muench. or *C. parvifolia* Aiton. It is a common coastal-plain species, which both Banister and Clayton must have collected in Virginia. Clayton mentions but one species with leaves hairy on the lower side, and the reference is doubtless to this species.

That Linnæus did not know well the thorns he was describing, is partially proved by his referring *C. Phœnopyrum,* a five-seeded species, to a two-seeded species. Miller's descriptions of the *Cratægi* raised in England is invaluable to us in tracing out these Linnæan species. As Miller says, Linnæus was doubtless misled by Kalm.

Cratægus viridis L. was collected and probably described by Clayton. About this species there can be no question, for there is a Clayton specimen of *C. viridis* in the British Museum.

A colored plate was made by Ehret for "Plantæ Selectæ" between 1750 and 1762. This may be the first illustration of *Cratægus flava* Aiton. It certainly belongs to the *flavæ,* and was raised from seed sent from Carolina by Catesby in 1724. Another American thorn, *C. punctata,* was illustrated by Jacquin in Hort. Vind., 1770.

Further Remarks on the Botanical Exploration of the Bahamas: Dr. N. L. BRITTON.

Referring to a previous communication made to the club and to others, printed in the *Journal of the New York Botanical Garden,* Dr. Britton gave an account of the recent expeditions of Mr. L. J. K. Brace to Crooked Island, Acklin's Island, Long Cay (Fortune Island), and Andros, and of his own trip in February and March, in company with Dr. C. F. Millspaugh, to Eleuthera, Little San Salvador, Cat Island, Conception Island, Watling's Island, and Long Island. During the progress of this trip Mrs. Britton explored the northern part of Eleuthera, and did some collecting on New Providence. The greater portion of the archipelago has now been visited through the cooperation of the Field Museum of Natural History with the New York Botanical Garden, but the extreme southeastern islands, including Atwood Cay (Samana), Mariguana, and the Caicos Islands are as yet botanically unknown, and the central portion of the large island of Andros is a *terra incognita.* The small islands on the Cay Sal bank also remain unvisited. Dr. Britton exhibited specimens of many of the characteristic species and remarked on their distribution.

The club adjourned at five o'clock until October 8, 1907. C. STUART GAGER,
Secretary

NEW YORK ACADEMY OF SCIENCES—SECTION OF GEOLOGY AND MINERALOGY

AT the regular monthly meeting, May 6, 1907, the following papers were presented:

Correlation of the Newark Trap Rocks of New Jersey: Professor J. VOLNEY LEWIS.

The disconnected extrusive traps west of the Watchung Mountains may be explained in several ways, but they are probably the results of scant eruptions, the New Vernon crescent being the upturned western edge of the Long Hill trap. The extrusives at Sand Brook and New Germantown are probably outlying remnants of, or at least contemporaneous with, the flows of First and Second mountains.

Darton's dike-and-sheet hypothesis of the Palisades sill is not supported by the facts, the trap being roughly conformable to the strata, so far as known, in all directions. The chance of the fissure of intrusion coinciding with the western flank of the Palisades from Weehawken to Haverstraw is exceedingly small. On the other hand, data now available quite satisfactorily establish the connection between the Palisades and the trap of Rocky Hill to the southwest, and a section along the Delaware River shows a threefold repetition of this by faulting. Thus there is but one intrusive sheet, which gives off numerous dikes

and apophyses, in contrast with four extrusives, Second Mountain being double.

The intrusive is considered of later age than the first extrusive, and may be contemporaneous with one of the later extrusives or subsequent to all of them. This conclusion is in harmony with the results of recent studies of the copper deposits, which are intimately connected with the intrusion of the great Palisades sill.

There are many points of resemblance to the Connecticut Valley traps: the same number of extrusives appear in both, grouped in the uppermost strata; in both the second is a double flow; an intrusive sill lies near the base, and dikes cut the intervening strata.

This paper was illustrated with maps and lantern slides.

Recent Investigations of the Potable Water Supplies of New Jersey: Dr. Henry B. Kümmel, State Geologist of New Jersey. The paper was illustrated with maps.

Some Volcanoes of the Western Mediterranean: Dr. Henry S. Washington.

The speaker described briefly the volcanoes of Catalonia, Sardinia, Pantelleria and Linosa, which he visited for the Carnegie Institution in the summer of 1905. The Catalonian eruptions are referred to two phases, a first of extensive lava flows, followed by the formation of numerous small cinder cones, the material being basaltic in every case, nephelite appearing in some types. The Sardinian occurrences consist of extensive sheets of basalt and trachyte of Tertiary age, with the two later large volcanoes of Monte Ferru and Monte Arci, both of which show an interior core of salic rocks (trachytes and phonolites at the former and rhyolite at the latter), covered by extensive mantles of basalt. The last phase of vulcanicity in Sardinia is seen in a long line of small cinder cones of recent date, much resembling those of Catalonia, in both form and material. The island of Pantelleria is quite complex, but here also the earlier eruptions were of trachytes and phonolites, the activity closing with the formation of small, basaltic, cinder cones. The small islet of Linosa, which is almost unknown, shows nine volcanic cones, two phases of eruption being evident: the first producing basalt tuff cones, and the second basaltic cinder cones, similar to those from the other localities. The paper was illustrated by numerous photographs taken by the speaker.

A Contribution to the Geology of Maine: Dr. Ida H. Ogilvie. The paper was read by title.

A Peridotite Dike in Coal-measures of Southwestern Pennsylvania: Professor J. F. Kemp and Mr. J. G. Ross. This paper will be published in the *Annals* of the Academy.

Alexis A. Julien,
Secretary of Section

Discussion and Correspondence

The Administration of the Ohio University

To the Editor of Science: A remarkable and, it is to be hoped, unique condition of affairs exists at present in the Ohio University. There is at least one spot in this "land of the free and home of the brave" where Russian administrative methods are in vogue. At a recent meeting of the board of trustees a member of the faculty was summarily dismissed. The president seems even to have willfully misled the man, for he discussed with him his work for next year only a few days before commencement. His dismissal was certainly not for incompetence. The charge against him was that he had unfavorably criticized the administration to one of his colleagues. Evidently the delator, who is the natural product of similar conditions everywhere, got in his nefarious work. One member of the board was guilty of the same conduct toward another member of the faculty, although he had always professed to be his special friend. Whether the discharged professor spoke the truth was not considered; he was condemned on ex parte evidence without being given a chance to be heard. Six years ago Alston Ellis, who had formerly been at the head of the Colorado Agricultural College, was chosen president. His career in that state was comparatively brief and would have