"key" for the vibrating tongues or bars of this instrument will be changed.) Flutes and similar wind instruments do not appear to be numerous or highly developed, but many horns, especially of ivory, are figured. The drum and the xylophone or *Marimba* require many pages.

The introductions and indexes are similar to those in former volumes and are good; the ethnographical notes are fuller than ever and add many interesting details.

CHARLES K. WEAD

WASHINGTON, D. C.,
June, 1907

SOCIETIES AND ACADEMIES

THE AMERICAN MATHEMATICAL SOCIETY

SIX years ago the summer meeting and colloquium of the society was held at Cornell University. In the intervening years the Society has met successively at Evanston, Boston, St. Louis, Williamstown and New Haven. This year the summer meeting was again convened at Cornell University, on Thursday and Friday, September 5–6. Forty-seven members were in attendance. By close economy of time the scientific proceedings were condensed into two sessions on Thursday and a morning session on Friday. Friday afternoon was devoted to an excursion on Lake Cayuga, Mr. H. H. Westinghouse, of the university, having kindly placed his steam yacht at the members' disposal. The evening gatherings at the Town and Gown Club also furnished pleasant opportunities for social intercourse.

The first session opened with an address of welcome by Professor Wait, head of the university department of mathematics. At the close of the meeting resolutions were adopted expressing the society's appreciation of the generous hospitality of the university and its officers.

The president of the society, Professor H. S. White, occupied the chair, being relieved by Professors Fine and E. B. Van Vleck. The council announced the election of the following persons to membership in the society: Thomas Buck, University of Chicago; Arnold Dresden, University of Chicago; T. H. Hildebrandt, University of Chicago; W. J. King, Harvard University; J. O. Mahoney, High School, Dallas, Texas; J. F. Messick, Randolph-Macon College; H. W. Powell, College of the City of New York. Six applications for membership in the society were received. The total membership is now 569.

The following papers were read at the meeting:

L. E. DICKSON: "Modular theory of group matrices."

W. B. FORD: "Sur les équations linéaires aux différences finies."

R. D. CARMICHAEL: "On the classification of plane algebraic curves possessing fourfold symmetry with respect to a point."

R. D. CARMICHAEL: "Note on certain inverse problems in the simplex theory of numbers."

W. B. CARVER: "The ten special Γ^4_6, configuration in the Pascal hexagram."

E. O. LOVETT: "Generalization of a problem of Bertrand in mechanics."

E. O. LOVETT: "The invariants of a group which occurs in the problem of n bodies."

E. R. HEDRICK: "A peculiar example in the theory of surfaces."

E. R. HEDRICK: "A smooth closed curve composed of rectilinear segments."

R. D. CARMICHAEL: "On certain transcendental functions defined by a symbolic equation."

D. C. GILLESPIE: "On the canonical substitution in the Hamilton-Jacobi canonical system of differential equations."

G. A. MILLER: "The invariant substitutions under a substitution group."

G. A. MILLER: "Methods of determining the primitive roots of a number."

VIRGIL SNYDER: "On a special algebraic curve having a net of minimum adjoint curves."

JAMES MCMAHON: "The differential geometry of the vector field. Second paper: lamellar field."

L. E. DICKSON: "Commutative linear groups."

L. E. DICKSON: "A simple derivation of the canonical forms of linear transformation."

EDWARD KASNER: "Geometric interpretation of integrating factors."

EDWARD KASNER: "The conformal representation of geodesic circles."

A. R. SCHWEITZER: "On the relation of right-handedness in geometry."

F. L. GRIFFIN: "On the law of gravitation in the binary systems, II."

F. L. Griffin: "Certain trajectories common to different laws of central force."

E. W. Davis: "Colored imaginaries. I, Imaginaries in the plane."

E. W. Davis: "Colored imaginaries. II, Imaginaries in space."

C. H. Sisam: "On the equations of quartic surfaces in terms of quadratic forms."

Virgil Snyder: "On the range of birational transformation of curves having genus greater than the canonical form."

G. A. Miller: "Third report on recent progress in the theory of groups of finite order."

Oswald Veblen: "Continuous increasing functions of ordinal numbers."

H. S. White and Miss K. G. Miller: "Note on Lüroth's type of plane quartic curve."

W. B. Fite: "Concerning the degree of an irreducible linear homogenous group."

Arthur Ranum: "Concerning linear substitutions of finite period with rational coefficients."

R. P. Stephens: "Certain curves of class n having $n-2$ tangents in any given direction."

A. L. Van Benschoten: "Curves of genus 4 which remain invariant under birational transformation."

M. E. Sinclair: "On a discontinuous solution in the problem of the surface of revolution of minimum area."

Maurice Fréchet: "Sur les opérations linéaires (troisième note)."

A. G. Greenhill: "The elliptic integral in electromagnetic theory."

The next meeting of the society will be held at Columbia University on October 26. The San Francisco section met at the University of California on September 30; the Southwestern Section will meet at Washington University on November 30, and the Chicago section at the University of Chicago on December 30–31. The annual meeting of the society will be held at Columbia University on December 27–28.

F. N. Cole,
Secretary

Society for Experimental Biology and Medicine

Twenty-fourth meeting.—Carnegie Institution's Station for Experimental Evolution, Cold Spring Harbor, Long Island, New York. June 22, 1907. President Flexner in the chair.

Members present: Atkinson, Beebe, Carrel, Davenport, Donaldson, Ewing, Field, Flexner, Gibson, Gies, Hatcher, Lusk, Meltzer, Meyer, Shaffer, Wallace, Wadsworth.

Members elected: C. H. Bunting, Rufus I. Cole, Charles W. Duval, William W. Ford, Frederick P. Gay, Isaac F. Harris, James W. Jobling, Oskar Klotz, Paul A. Lewis, Thomas B. Osborne, H. T. Ricketts.

Abstracts of the Communications[1]

Demonstrations of Methods and Results of Pedigree-breeding of Plants and Animals: Charles B. Davenport.

Four series of pedigreed poultry were shown to illustrate certain laws of inheritance, as follows: (1) Darwin's case of "reversion," (2) The production of a frizzle-silky race, (3) Particulate inheritance of plumage color, (4) Independence in inheritance of the different characters.

There were also demonstrations of inheritance of characters in canaries, of Œnothera (evening primrose) and its mutants, of branching and branchless sunflowers, of variability of chromosomes in Œnothera and its mutants, and of inheritance of abnormal wing venation in the vinegar fly, Drosophila.

Further Studies of the Effects of the Exposure of Sperm to X-rays: Charles R. Bardeen.

Eggs of *Rana pipiens* fertilized by sperm exposed to Roentgen rays for one hour all develop abnormally. The abnormalities begin to appear during the gastrulation period. Cases of spina bifida are not uncommon. In a lot of several hundred eggs, nearly all of which were fertilized, only one specimen survived two weeks. This was much stunted in growth and very abnormal in shape. Of 80 eggs of the common toad exposed only 15 minutes to Roentgen rays only 4 larvas survived one month. Most of the larvas were markedly abnormal in shape. Of the sur-

[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 appear in Number 7 of Volume IV. of the society's proceedings, which may be obtained from the Secretary.

vivors, two are large and apparently normal and two are undersized. Only one individual out of 150 eggs, fertilized by sperm exposed 37 minutes to the rays, has survived one month and this individual is only half the normal length and breadth. In a group of 250 eggs, fertilized by sperm exposed to Roentgen rays for an hour and ten minutes, all exhibited marked abnormalities of development and the least abnormal larva and longest survivor died a week after the eggs were fertilized.

The susceptibility of sperm of anura to X-rays is in marked contrast to that of paramecia. Exposure of paramecia for 12 hours to rays of the same intensity caused no visible effects on form, rate of division or process of conjugation.

The author exposed the sperm of the toad to heat at 50° and 65° C. for from 15 to 20 minutes. This exposure destroyed the fertilizing power of most of the spermatozoa, but the few eggs fertilized by such sperm developed normally. Sperm exposed for from 15 to 20 minutes to the following solutions: 1/40 per cent. formol, 12.5 per cent. ethyl alcohol, 1 per cent. NaCl, 1/32 per cent. HCl and 1/32 per cent. KOH, had the power of fertilizing toad eggs. Practically all of the resulting larvas that have been preserved appear normal at the end of one month after fertilization of the eggs. Sperm exposed to stronger solutions of the same substance for 15 to 20 minutes seems to lose power of fertilizing. No abnormal larvas have developed from the few eggs thus fertilized.

On the Absorption of Toxins by the Nerves: CYRUS W. FIELD.

In a large number of animals into which both tetanus and diphtheria toxin had been injected, Field found that the toxin was present in the peripheral nerves leading from the inoculated area; and by the use of the right dose, and at a certain time, free toxin could be demonstrated in the cord, although the other tissues of the body, including the blood, liver, spleen and kidneys, contained no free toxin.

Not on'y is this true for diphtheria and tetanus, but it is likewise true for the toxin produced from *B. botulinus* and also for colloidal ferric hydrate. In the case of colloidal ferric hydrate, by removing the nerves and cord, and subjecting them to treatment with a solution of hydrogen sulphide, Field was able to detect the presence of iron. By using small doses he was able to show the presence of these colloids in the nerves near the points of injection and in the spinal cord, but of none whatever in the other tissues, except at the points of inoculation.

The author concluded that tetanus toxin does not travel by way of the axis cylinder because of any specific attraction of the nerve tissue for this toxin, but it passes up because the lymphatic flow of the nerve is progressing constantly from the periphery to the center. For this reason the toxin, when injected subcutaneously or intramuscularly, is taken up by the nerves and passes to the cord; and the first symptom to develop is the local tetanus because the local cells are the first that come in contact with the toxin.

It is a well-known fact that in giving diphtheria or tetanus toxin intravenously a much greater dose is required to cause death than when either is injected subcutaneously or intramuscularly. The reasons for this are first, that the toxin injected into the blood may be combined with some of the constituents of the blood and therefore rendered inactive; second, that by injection into the blood the toxin is diluted to a very great extent, whereas when injected subcutaneously, a portion passes into the lymphatics of the nerves and is not mixed with the general body fluids, before it reaches the central nervous system.

The author's general conclusion was that tetanus does not travel up a nerve by reason of any specific attraction of nervous tissue, but because the lymphatic flow in a nerve is from the periphery toward the center.

On the Formation of a Specific Precipitin in Rabbits after Inoculation with Colloidal Platinum and Colloidal Silver: CYRUS W. FIELD.

Some time ago in testing the precipitating

effect of rabbit serum on various positive and negative colloids, Field found that such serum precipitated colloidal platinum and colloidal silver to a fair degree. Serum from one rabbit precipitated colloidal platinum completely at 1–100, slightly at 1–200 and not at all at 1–500. This serum precipitated colloidal silver completely at 1–10, partially at 1–100 and not at all at 1–250. After receiving three injections of colloidal platinum in three weeks this rabbit's serum then precipitated colloidal platinum completely at 1–1,000, slightly at 1–1,250 and not at all at 1–1,500, whereas it precipitated colloidal silver completely at 1–100, slightly at 1–250 and not at all at 1–500.

Serum from another rabbit originally precipitated colloidal platinum completely at 1–50, partially at 1–100 and not at all at 1–250. The same figures held good for colloidal silver. After three injections of colloidal silver during three weeks, this rabbit's serum precipitated the colloidal silver completely at 1–500, partially at 1–1,000, and not at all at 1–1,250, whereas colloidal platinum was completely precipitated at 1–200, partially at 1–500 and not at all at 1–1,000.

In other words the precipitating power of the serum of the first rabbit, after it received three injections of the colloidal platinum, had increased from 1–100 to 1–1,000 (= *ten times*), whereas for the colloidal silver there was only a very slight increase. Serum from the second rabbit, which received colloidal silver, increased its precipitating power from 1–100 to 1–500, whereas for the colloidal platinum, from 1–100 to 1–250. In both these rabbits there was then an increase in the precipitating power of the serum after injection of these colloidal metals, and it would seem that they increased more for the metal injected than for the other.

Remote Results of Transplantations of Blood Vessels: Alexis Carrel.

The results of arterio-arterial, veno-venous and arterio-venous anastomoses have remained excellent for many months. No stenoses or aneurisms have been observed on the arterial anastomoses even six to seven months after operation. No stenosis occurred after venous anastomosis: a cat, in which an Eck fistula was made eighteen months ago by Carrel and Guthrie, is still in good health. The same is true of an arterio-venous anastomosis: the jugular vein and the carotid artery of a dog were anastomosed by Carrel and Guthrie twenty-two months ago, and now strong thrills and pulsations can easily be detected by palpation of the jugular vein. The modifications of the vascular walls are produced mainly by the changes of blood pressure. No great change occurs if the blood pressure of the transplanted vessel be not modified. Segments of carotid, aorta or vena cava of one animal, transplanted in the carotid, aorta or vena cava of another animal of the same size and species, do not undergo any important anatomical modification. If blood pressure is diminished, the wall of the transplanted vessel becomes thinner. Six months after the operation, it was found that the wall of the carotid transplanted in the external jugular vein was thinner than the normal one. If blood pressure is increased, hypertrophy of the wall ensues. A segment of external jugular vein interposed between the cut ends of the carotid artery was a little dilated and its wall was as thick as the arterial wall, eight months after the operation. In other cases, there was no dilation of the lumen of the vessels. As a rule when a vein is anastomosed uniterminally to an artery, its lumen is found to be dilated, six or seven months after the operation. Nevertheless, after one year the lumen may progressively diminish in size, as was seen in a dog operated upon twenty-two months ago.

It may be concluded that transplanted blood vessels adapt themselves to the pressure by thinning or thickening their walls.

The Dependence of Gastric Secretion upon the Internal Secretion of the Salivary Glands: John C. Hemmeter. (Communicated by S. J. Meltzer.)

The relations of the gastric secretion to the salivary glands are illustrated by the following clinical and experimental observations:

1. In four cases of Mikulicz's disease, with

normal conditions of the blood, the stomach was found to secrete no gastric juice during the course of the disease. Mikulicz's disease consists of a benign chronic swelling of all the salivary and lacrimal glands.

2. In dogs with accessory stomachs (Pawlow) the removal of all the salivary glands abolishes permanently all gastric secretion.

3. The gastric secretion is not started in such dogs by feeding them with food masticated and well insalivated by other normal dogs.

4. The abolished gastric secretion is temporarily resumed by peritoneal or intravenous injections of extracts made of salivary glands of normal dogs.

5. This temporary resumption takes place even if the stomach be completely isolated from the central nervous system.

These observations justify the conclusion that normal gastric secretion depends upon the internal secretion of the salivary glands.

The Influence of Diuresis upon the Toxic Dose of Magnesium Salts: S. J. MELTZER.

A dose of 2 grams of magnesium sulphate per kilo is absolutely fatal for the rabbit; the animal dies of respiratory paralysis in less than an hour. All the animals recovered from the effects of such a dose, however, if an intramuscular injection of diuretin was given soon after the subcutaneous injection of the magnesium salt. Diuretin is theobromin and acts as a diuretic. The deeply narcotized animals usually urinate about fifteen or twenty minutes after its injection; by that time, at least, the bladder can be felt to be full. The largest dose that should be given is about 0.1 gram. In larger doses diuretin itself is liable to become toxic.

When the dose of the magnesium sulphate exceeded 2 grams per kilo, the injection of diuretin alone could not save the animals. But if, in addition to the diuretin, an intravenous infusion of 0.9 per cent. solution of sodium chloride was instituted, animals recovered from doses of magnesium sulphate amounting to as much as 2.25 grams per kilo. When still larger doses of the magnesium salt were given, the animals usually died of respiratory paralysis in less than fifteen minutes and before any diuresis could have been effected. Animals recovered from doses as large as 2.5 grams per kilo, if, in addition to the diuretin injection and the venous transfusion, artificial respiration was early resorted to. For doses larger than 2.5 grams per kilo all three measures together usually proved of no avail; with this dose the early death of the animal is usually due greatly to paralysis of the heart.

The Toxicity of Magnesium Nitrate when given by Mouth: S. J. MELTZER.

It is a daily experience that large doses of magnesium sulphate can be taken by mouth without any other than a purgative effect. Meltzer has given to rabbits, by mouth, 7 grams or more of magnesium sulphate (in molecular solution) per kilo, without any unfavorable effects. The same applies also to magnesium chloride and various other magnesium salts. Meltzer has, however, discovered that magnesium *nitrate,* when given *by mouth,* is capable of producing a toxic effect like that of magnesium sulphate when introduced subcutaneously.

When a dose of 6 grams of magnesium *nitrate* per kilo (in molecular solution) is given by mouth to a rabbit, the animal soon becomes paralyzed and narcotized, and dies in from thirty to forty minutes of respiratory paralysis. Fifteen or twenty minutes after the administration, the appearance as well as behavior of the animal is exactly like that of one which received magnesium sulphate subcutaneously (2 grams per kilo). A dose betweeen 4 and 5 grams per kilo causes in general the same symptoms, but in a gradual way; the animal dies after five or six hours. A dose of between 3 and 4 grams causes no serious effects, but for six or eight hours after its administration the animal remains in a soporous state; it sits in one place with eyes closed and head drooping; a loud noise wakes it up and it attempts to move about or to eat, but in a few minutes it falls asleep again.

This toxicity of the magnesium nitrate is apparently due to its greater absorption from

the gastro-intestinal canal. It is certainly not due to diminished elimination through the kidneys; on the contrary, it acts in some degree as a diuretic, and, when given by subcutaneous injection, the animal withstands a somewhat greater proportionate dose of the nitrate than of the sulphate or chloride, probably because the nitrate increases somewhat the diuresis.

Meltzer believes that the effects observed can not be attributed to the nitrate radical (NO_3). He studied the toxic effects of sodium nitrate after administration by mouth and compared the resultant symptoms with those seen after administration of magnesium nitrate; the contrast was sharp. Even with a dose of 12 grams of the sodium nitrate per kilo there is never such anesthesia or paralysis as that caused by the magnesium salts; on the contrary, the animal is all excitement and restlessness. Besides, the late death of the animal after administration of sodium nitrate is due to circulatory disturbances, whereas after poisoning with magnesium salts the animal dies of respiratory paralysis.

On the Promoting Influence of Heated Tumor Emulsions on Tumor Growth: Simon Flexner and J. W. Jobling.

The authors gave the results of a study of an effect on the growth of a transplantable sarcoma of the rat which is produced by inoculation of rats with an emulsion of the tumor cells, previously heated for half an hour to 56° C. This emulsion was injected into the peritoneal cavity and the fragments of living tumor were introduced beneath the skin. The promoting effect on the growth of the tumor fragments to be described became evident in several sets of experiments in which the tumor emulsion (*unheated*), blood serum, bouillon, salt and Ringer solutions were injected in the same manner, with which substances this promoting effect was not obtained. When the inoculation of the fragment of the tumor was made twenty-four hours after the injection of the unheated emulsion, no difference was noted between the control rats and the rats injected with the enumerated materials, including the *heated* emulsion. But when the fragments were inoculated ten or more days (up to thirty days) later, then the number of tumors which developed in the rats receiving the *heated* emulsion tended to exceed the controls and the other series mentioned; they grew with greater rapidity so as to reach double the size of the controls or even a still greater size, and showed a far smaller percentage of recoveries (retrogressions). This promoting influence was exerted on the tenth day after inoculation, and various indications suggested that it was less effective at the expiration of thirty days. On the other hand, it appeared that when the injections of heated emulsion were repeated once or twice at ten-day intervals, the conditions of the animal favoring the growth and persistence of the tumors were maintained and possibly were even still further increased.

On the Chemical Inactivation and Regeneration of Complement: Hideyo Noguchi.

It was found that all acids and alkalies are able to inactivate complements when used in sufficient concentrations. With monobasic acids it takes about 1 c.c. of $n/40$ solution to inactivate 1 c.c. of active serum. About 1 c.c. of $n/50$ solution of the acid is, as a rule, neutralized by the inherent alkalinity of the serum.

With alkalies 0.3 c.c. (ammonium hydrate 0.8 c.c.) is sufficient for inactivation. The acids and alkalies are, when used without serum, hemolytic in the quantities stated. But when mixed with the serum they—serum and chemicals—lose their activity mutually.

Alkaline salts of strong acids are not anti-complementary unless a certain limit of concentration is exceeded. Sodium carbonate is anti-complementary in a relative, but not in an absolute sense. All other salts employed are strongly anti-complementary, the magnesium salts being the least inhibiting. Calcium and barium salts of strong acids are absolute anti-complements, while the carbonates of these elements may or may not be active upon complements.

Complements which are inactivated by acids can be reactivated by neutralizing the acids with alkalies, and *vice versa*. The action of

various acids, alkalies and salts upon complements renders the complement-deviation phenomenon for forensic purposes less safe, because the materials are often impure in practical cases.

Various soluble salts of oleic acid are accelerators of the complementary action of serum.

A Study of the Influence of Lecithin on Growth: A. J. GOLDFARB.

The author's experiments included three series of over 1,200 tadpoles. In each series the lecithin varied in strength from 1/150 per cent. to 2 per cent. (the toxic concentration). In one series (1) the tadpoles were not fed, in another (2) they were given minced worm, in the third (3) they were given a liberal supply of plant débris.

The tadpoles that were kept in lecithin solutions did not show any greater increment in weight or size than the controls of the same series. There was a marked difference, however, in both the size and weight of tadpoles of one series compared with the tadpoles in the corresponding solution of another series, due to the kind (and presumably the amount) of food given. Individuals of series 1 were smallest and weighed least; those of series 3 weighed from 3 to 6 times as much and were twice as broad as the tadpoles in the same strength of solution in series 2.

Young kittens (over 50 in number) were treated as follows:

Series 1. Lecithin was injected subcutaneously daily in doses of from 0.0006 to 0.004 gram. Control animals received subcutaneously equal volumes of physiological salt solution. The increase in weight was somewhat greater in the kittens that received the lecithin.

Series 2. Lecithin was injected subcutaneously in doses of from 0.01 to 0.32 gram daily. The kittens that received the lecithin gained, in some cases, as much as 7 per cent. over the control animals.

Series 3. Lecithin was fed daily in amounts of from 0.01 to 0.32 gram. With very few exceptions, these kittens weighed from 2 per cent. to 12 per cent. more than the controls.

The best results were obtained in the feeding experiments, with doses of from 0.04 to 0.16 gram daily; yet under these conditions, the actual difference in weight between the kittens fed with lecithin and those not so fed was small, amounting on an average to about 7 per cent. Whether the same quantity of any other fatty or simple nutrient compound would result in an equal increment has not yet been determined, but will be investigated with other matters bearing upon the interpretation of the results recorded above.

Comparative Data for the Elementary Composition and the Heat of Combustion of Collagen and Gelatin: CHARLOTTE R. MANNING and WILLIAM J. GIES.

Comparative elementary analyses, as well as determinations of the heat of combustion, of many samples of connective tissue collagen and gelatin, have indicated that there is a closer agreement between the mother substance and its derivative, on these two planes of comparison, than the prevalent idea of their chemical relationship would indicate. The following sample data show this quite clearly:

	C Per Cent.	H Per Cent.	N Per Cent.	Heat of combustion. Cal.
Tendocollagen[2] ..	48.85	8.01	18.02	5,387
Tendogelatin ...	48.28	7.84	17.56	5,350

The differences between the above figures for nitrogen and hydrogen contents harmonize with the observation by Emmett and Gies that nitrogen is eliminated as ammonia when collagen is converted into gelatin by treatment with hot water, and also strengthen their conclusion that gelatin is not a simple hydrate of collagen.

On the Fate of Elastose after its Subcutaneous or Intraperitoneal Injection: a Preliminary Inquiry into the Origin and

[2] Each of these products was desiccated (before analysis) to constant weight by the Benedict-Manning process *in vacuo*. See the *American Journal of Physiology*, 1905, XIII., p. 309.

Nature of Bence Jones's Protein: Reuben Ottenberg and William J. Gies.

Bence Jones's protein and crude elastose not only have several proteose properties in common, but unlike the ordinary proteoses, each is precipitated from its aqueous solution when the latter is gently warmed. Bence Jones's protein occurs in the urine of patients suffering from sarcoma of bone marrow or from osteomalacia. Bone contains considerable elastin-like material (osseoalbumoid). The possibility that Bence Jones's protein may be a derivative of osseoalbumoid, and the great desirability of making our knowledge of this elusive protein more definite, led the authors to undertake a study of a preliminary phase of the work that will be necessary to determine the points at issue.

They sought first to ascertain whether crude elastose, when injected subcutaneously or intraperitoneally, is eliminated in the urine and whether it can be detected there by the heat-precipitation test. When thus introduced in dogs, crude elastose, obtained by peptolysis of ligament elastin prepared by Richards and Gies's method, not only promptly appears in the urine, but may be identified in it by the heat-precipitation test. This observation makes it clear that if elastose is formed in bone or in any other tissue by any pathological process, the elastose thus produced may pass into the urine without material alteration of the characteristic property referred to.

Before proceeding further in this connection, the authors intend to prepare osseoalbumoid (bone elastin?) in sufficient quantity to permit of a determination of the nature of its proteoses and their fate when injected into animals.

William J. Gies,
Secretary

THE AMERICAN PHILOSOPHICAL SOCIETY

A stated meeting of the society was held on Friday, October 4. The following papers were read:

Dr. Edgar F. Smith: "New Results in Electrolysis."

Professor Simon Newcomb: "A Study of Correlations among Terrestrial Temperatures, as indicating Fluctuations in the Sun's Thermal Radiation."

R. H. Mathews, L.S.: "Language of the Burdhawal Tribe in Gippsland, Victoria."

DISCUSSION AND CORRESPONDENCE

SMELTER SMOKE

In an article recently published in the *Journal of the American Chemical Society* (July, 1907) on gases *vs.* solids, an investigation of the injurious ingredients of smelter smoke, by Professor W. Clarence Ebaugh, the results of the investigation are contrary to previous experiments along this line as well as to the experience of the writer, and it appears to him that the conclusions are based on misleading and inadequate data.

The writer is very much averse to criticizing the work of a brother scientist, but since the results of this work, if uncontradicted, will undoubtedly be used in many cases between smelters and injured parties, it would only seem proper to point out the fallacy of the arguments. Not to be misunderstood in the beginning, the writer wishes to explain that he is firmly of the opinion that the solid emanations which arise from a smelter (including perhaps, soluble copper, arsenic and lead compounds) are injurious to vegetation in so far as they reach it, but that such emanations reach as far as sulphur dioxide or have so injurious an action appears to be decidedly doubtful and has certainly not been proven in the paper published by Professor Ebaugh.

On page 953, of his article, Professor Ebaugh says:

> In the first place, the injury (in the Salt Lake Valley) does not occur simultaneously over a large area; on the contrary, it seems to be restricted in its range. Secondly, it is rarely found that a number of crops grown successively in a given locality show the effect of smelter smoke, etc.

The above assertions are, of course, only the personal opinion of Professor Ebaugh but in the main they are diametrically opposed to the experience of the writer who has examined smelter injury at Redding, Cal., Ducktown, Tenn., and at Anaconda, Mont. In every case examined by the writer the injury *did* occur