which he draws attention to the ethics in the case of the cope of Nicholas IV., which was abstracted from the cathedral at Ascoli and has been purchased by J. Pierpont Morgan.

## SOCIETIES AND ACADEMIES.

### AMERICAN MATHEMATICAL SOCIETY.

DURING September and October the American Mathematical Society held three several meetings. Of these the first in interest and importance was the eleventh summer meeting, held at St. Louis on September 16–17, thus immediately preceding the congress of arts and science of the Louisiana Purchase Exposition. Nearly forty members of the society attended this meeting, and there were present also by invitation Professors Gino Fano, of Turin, who brought greetings from Italian colleagues, and Henri Poincaré, of Paris, who read a paper on 'Closed geodesics on a closed convex surface,' a subject which had attracted his attention on account of its importance in connection with the discussion of trajectories in celestial mechanics. A detailed account of the meeting will be found in the November number of the *Bulletin* of the society, which also contains a report of the meeting of the San Francisco section at the University of California, October 1. At the latter meeting the program included a conference on recent investigations on the teaching of elementary geometry.

The one hundred and twentieth regular meeting of the society was held at Columbia University on Saturday, October 29, with an attendance of twenty-four members. President Thomas S. Fiske occupied the chair. Nominations of officers and members of the council to be elected at the annual meeting in December were adopted and ordered placed on the official ballot. The committee on the financial support of the *Transactions* reported a favorable outlook, several universities already having promised assistance in the form of a subvention. The expense of publishing the *Transactions* has been $2,000 per annum, of which amount ten universities have thus far contributed one half, the balance being met by the society and by returns from subscriptions and sales. Committees were appointed to consider measures for providing for the increasing burden of administration and to audit the treasurer's accounts.

The following papers were read at the October meeting:

DR. EDWARD KASNER: 'Contact transformations and related systems of curves.'

DR. MAX MASON: 'The doubly periodic solutions of $\Delta u + \lambda A(x, y)u = f(x, y)$.'

PROFESSOR E. B. VAN VLECK: 'A proof of some theorems on pointwise discontinuous functions.'

PROFESSOR HENRY TABER: 'Hypercomplex number systems.'

MR. J. C. MOREHEAD: 'Note on a theorem of Lucas on Fermat's numbers.'

PROFESSOR E. W. BROWN: 'On the completion of the new lunar theory.'

PROFESSOR VIRGIL SNYDER: 'Quintic scrolls having a tacnodal or an osculating conic.'

PROFESSOR G. A. MILLER: 'Groups of subtraction and division.'

The following new members have recently been admitted to the society: Mr. R. P. Baker, Union Academy, Anna, Ill.; Dr. W. H. Bussey, Evanston, Ill.; Dr. H. A. Converse, Baltimore Polytechnic Institute; Mr. A. M. Curtiss, State Normal School, Oneonta, N. Y.; Professor G. R. Dean, University of Missouri; Dr. E. L. Dodd, University of Iowa; Dr. Saul Epsteen, University of Chicago; Professor R. R. Fleet, William Jewell College, Mo.; Professor E. D. Grant, Michigan College of Mines; Mr. J. E. Higden, Shortridge High School, Indianapolis, Ind.; Dr. L. E. Karpinski, University of Michigan; Dr. O. C. Lester, Yale University; Professor Tullio Levi-Civita, University of Padua; Professor J. C. Lymer, Lawrence University, Appleton, Wis.; Professor W. F. Moncreiff, Winthrop College, S. C.; Mr. Arthur Ranum, University of Wisconsin; Mr. C. S. Sisam, U. S. Naval Academy; Miss Adelaide Smith, Huguenot College, Wellington, S. A.; Dr. Clara E. Smith, Yale University; Professor C. M. Snelling, University of Georgia; Professor Eduard Study, University of Bonn; Professor D. T. Wilson, Case School of Applied Sciences. The total membership of the society is now 480.

F. N. COLE,
*Secretary.*

AMERICAN CHEMICAL SOCIETY. NORTHEASTERN SECTION.

THE fifty-fourth regular meeting of the section was held Thursday evening, October 27, in the Lowell Building, Massachusetts Institute of Technology, with President W. H. Walker in the chair. About 135 members and guests were present. Dr. Harvey W. Wiley, chief of the bureau of chemistry, U. S. Department of Agriculture, gave an address on the 'Effects of Preservatives on Health,' in which he described the experiments made in Washington under his charge to determine the effect of boric acid and borax, when taken into the system daily with the food for a long period of time. The conclusion drawn by the lecturer was that the effect of the constant use of these preservatives was on the whole somewhat injurious, causing, in many cases, loss of appetite, headache, and resulting in a diminution of weight, and slight changes in the metabolism of phosphoric acid, nitrogen, fat, etc.

ARTHUR H. COMEY,
*Secretary.*

PHILOSOPHICAL SOCIETY OF WASHINGTON.

THE 588th regular meeting was held October 15, 1904, Past-president Dall in the chair.

The death since the last meeting of Messrs. A. Lindenkohl and F. G. Radelfinger was announced.

Mr. F. W. Clarke spoke on 'Chemistry at the International Congress of Arts and Science.' The papers read were of high character and on the chemical sides the congress was a decided success.

Mr. O. H. Tittmann gave a brief account of his work the past summer as one of the commissioners for 'The Demarkation of the Alaskan Boundary.' A strip of this line some 500 miles long by 20 to 30 miles wide had been surveyed by the phototopographic method in previous years, and the results had been mapped for the High Joint Commission in London; the findings of the commission had defined the boundary line, and the five field parties this summer were engaged in erecting monuments over a portion of it.

Mr. L. A. Bauer then described 'A Method of Disclosing System of Magnetic Forces Causing the Secular Variation of the Earth's Magnetism.' It was pointed out that until an analysis of the secular variation forces has been made in a similar manner to that employed by Gauss for the permanent magnetic field, it is useless to theorize as to the cause of the secular variation. Such an analysis has been undertaken by the Department of Terrestrial Magnetism of the Carnegie Institution, an exhaustive compilation and discussion of the available data being made for the entire earth. Some preliminary results of the analysis as applied to certain well-surveyed areas, as, for example, the United States, were given in order to show the fruitfulness of the methods employed. The system of magnetic forces causing the secular variation in the United States during the period 1885–95 operated in opposition to that of the permanent field, *i. e.*, it acted as a *demagnetizing* system of magnetic forces directed opposite to those of the earth's permanent magnetization.

CHARLES K. WEAD,
*Secretary.*

THE ANTHROPOLOGICAL SOCIETY OF WASHINGTON.

DR. ALES HRDLICKA presented a photograph of a recent Crow burial in Montana, showing a well-covered body lying on a platform elevated on four-forked poles.

Dr. Hrdlicka also showed two crania with the same variety of intentional deformation, one from Peru and the other from Vancouver Island. The Peruvian skull presents an extreme degree of deformation, which was produced by surrounding the infant's head with tightly drawn bandages. Strangely enough, Peru and a portion of the northwest coast of North America, including Vancouver Island, are the only localities where this rather complicated form of mutilation is found on the American continent.

Dr. Swanton gave a short account of the Tlingit Indians of Alaska whom he has recently studied. There were formerly about fourteen local groups of these people, divided into numerous families and, socially, into two exogamous clans, or sides. A small division

was found which belongs to neither of these latter. Anciently each group had at least one winter town, but scattered among many camps in spring and summer. All law was based on the principle of 'retaliation,' and they believed in a multiplicity of spirits who communicated with men through numerous shamans. The Tlingit and Haida languages are similar in form and are probably genetically related.

Hon. Ainsworth R. Spofford, of the Library of Congress, who has recently paid a visit to Spain, read a paper entitled 'The Spanish Race of To-day.' It was replete with historic data, and references to scenery, language and manners and habits of the natives. The characteristics of the people were shown to be politeness, observance of etiquette, and sobriety. The climate varies from cold in the north to heat in the south. This has marked influence upon the people, those of the north being austere, while those from the south are lively and pleasure-loving. Though illiteracy is common, the natives are shrewd; agriculture is neglected, lotteries are fostered by the state, and begging is a national trait. The mule is the beast of burden, there being 1,500,000 of them to 400,000 horses.

J. D. McGuire,
*Acting Secretary.*

THE TORREY BOTANICAL CLUB.

The club met at the New York Botanical Garden, October 26, 1904. The meeting was called to order at the usual hour, Dr. D. T. MacDougal occupying the chair.

The first paper on the scientific program was by Dr. N. L. Britton on 'Notes on the Flora of the Bahamas.' The speaker, in continuation of previous explorations, which were reported in *Torreya* for July, recently spent five weeks in the Bahamas, principally on the Island of New Providence.

About 950 native and naturalized species have been reported from the Bahama Islands, an unexpectedly small number, in part accounted for by the fact that most of the land does not reach an elevation of more than 25 feet, although on one of the outer islands a height of 400 feet is recorded.

The flora is remarkable in the very unequal distribution of species, some being recorded from only one key. It is related to that of northern Cuba, extreme southern Florida, and in a lesser degree to that of Haiti. While the collections have as yet received only preliminary study, it is probable that ten or twelve new species will be founded on forms formerly thought to be identical with Cuban or other West Indian species.

The speaker gave a brief review of the flora, noting among other facts the presence of but five Gymnosperms—a *Pinus,* three *Zamias* and a *Juniperus.* The lower Monocotyledones are but poorly represented.

Of the grasses about fifty species were collected; these have not been studied, but it was noted that they show characteristic forms in each of the plant associations of the island. One of the most interesting is the climbing bamboo, *Arthrostylidium capillifolium* Griseb., whose light green color gives a characteristic tinge to the coppices. Seventeen species of sedges, none new, are to be added to the published flora of the islands. The palms are abundant and interesting, five species being reported. There were eight or ten species of bromeliads, about twenty-five orchids, and four or five figs reported. Among the Nyctaginaceæ there are two trees heretofore referred to *Pisonia* but evidently not properly referable to that genus.

It was noted that most of the trees of the islands do not reach as great a height as they do in the Florida 'hammocks.' A water-lily, in habit resembling a small *Nelumbo,* and heretofore referred to *Castalia ampla* is of special interest. The coastal thickets furnished a beautiful species of *Parthenocissus* with scarlet pedicels. Among the abundant types were many Malvaceæ, Celastraceæ, Euphorbiaceæ, herbaceous Papilionaceæ and shrubby and arborescent Mimosaceæ. Numerous photographs and specimens were exhibited.

The second paper was by Dr. Marshall A. Howe, who spoke on 'The Algæ of some European Herbaria.' This was a general account of a trip undertaken during the past summer for the purpose of seeing and studying the historical types of American marine algæ pre-

served in certain foreign herbaria. The first stop was at Trinity College, Dublin, where are found the collections of W. H. Harvey, author of the 'Nereis Boreali-Americana,' and of several shorter papers on American seaweeds.

In England, the three principal herbaria visited were those of the British Museum, the Linnæan herbarium and that of the Royal Botanical Gardens at Kew.

In France, a few days were spent at Caen, in the department of Calvados, where are preserved the collections of several students of seaweeds, such as Roussel, Lamouroux, Chauvin and Lenormand. Of these, the herbarium of Lamouroux is of chief interest, containing the materials from which thirty or more American species were first described.

At Paris the collections of Montagne, of De la Pylaie, and of Decaisne, which are in possession of the Muséum d'Histoire Naturelle, were those chiefly studied, though a collection of Guadeloupe algæ issued by Mazé and Schramm was also examined. The next stop was Eerbeek, Holland, for the purpose of seeing certain originals of Kützing, now owned by Madam Weber-van Bosse.

In Oldenburg, Germany, a few types of Roth, and in Copenhagen a few of Lyngbye and of Vahl were seen. The longest stay of the trip was made at Lund in southern Sweden, where a month was spent in studying the numerous American originals of the two Agardhs, father and son, who were actively engaged in describing marine algæ for a period of ninety years. Specimens were taken to Europe by Dr. Howe for comparisons with the types.

Photographs were obtained of about three hundred of the types examined and these are expected to prove particularly useful, especially as many of the species have never been figured.

The next regular meeting falling on the evening of election day, on motion the club adjourned to the last Wednesday in November.

EDWARD W. BERRY,
*Secretary.*

## THE SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE.

THE eighth regular meeting of the Society for Experimental Biology and Medicine was held on Wednesday evening, October 19, in the demonstration room of the Department of Physiology of Columbia University at the College of Physicians and Surgeons. Dr. S. J. Meltzer presided.

*Members present.*—Burton-Opitz, Calkins, Davenport,* Ewing, Flexner, Gies, Hiss, Lee, Levene, Levin, Lusk, Mandel, Meltzer, Park, Richards, Salant, Wadsworth, Wallace, Yatsu.

*Members elected.*—J. G. Adami, R. A. Hatcher, Yandell Henderson, G. N. Stewart, C. G. L. Wolf.

### *Scientific Program.*†

1. *The accommodation of the eye,* with demonstrations. Professor THEODOR BEER, of the University of Vienna.

Professor Beer called attention to the facts that, in an eye constructed as a 'camera obscura,' accommodation is effected by (1) change of curvature of refracting surfaces, principally the lens, and by (2) change of distance between refracting mediums and image screen, principally distance between lens and retina. Change of curvature of refracting surfaces is always in the direction of *increase* of curvature. It may be observed in mammals, birds and reptiles (very few snakes). Experiments were carried out before the society to show the increase of curvature of the lens in the eye of the water turtle. Accommodation by change of distance between lens and retina is effected, for objects at a distance, by (*a*) a movement of the lens toward the retina or by (*b*) a movement of the lens toward the cornea. The former is shown in cephalopods and fishes, the latter in amphibia and most snakes. In the eye of the fish there is a muscle, *Musculus retractor len-*

* Non-resident.

† The abstracts given in this account of the proceedings have been greatly condensed from abstracts given to the secretary by the authors themselves. The latter abstracts of the reports may be found in current issues of *American Medicine* and *Medical News.*

*tis Beer,* which draws the lens toward the retina. In amphibia and most snakes, the lens is moved toward the cornea away from the retina by changes of the intra-ocular pressure.

2. *Preliminary communication on the composition of the liver after subcutaneous injections of liver extracts.* P. A. Levene and L. B. Stookey.

Rabbits were treated with saline liver extracts. The autolytic powers of the livers of such animals were compared with the autolytic powers of livers from normal animals, and were found to be undiminished. The livers of the treated animals contained smaller proportions of nitrogen, but larger proportions of non-coagulable proteids, of non-basic nitrogen and of ethereal extract, than the livers of the control rabbits. Water and carbohydrate contents were unaffected by the treatment.

3. *Retransformation of negatively heliotropic animals (Gammarus pulex) into positively heliotropic animals by chemical means.* Jacques Loeb. (Presented by Simon Flexner.)

Professor Loeb recently succeeded in finding an instance of the transformation, by chemical means, of the sense of heliotropism in animals. He has observed that if one puts suddenly a large number of *Gammarus pulex* into distilled water or into common tap water, they all become at first very negatively heliotropic. These negatively heliotropic animals can be transformed instantly into positively heliotropic animals by the following substances: (1) many of the anesthetics of the fatty series; (2) many acids, except very weak ones like boric acid; (3) certain salts, like ammonium salts. The strengths of solution which effect this change instantly are, for example, ethyl acetate, $m/50$; ether, $m/6$; ethyl alcohol, $5/2m$; paraldehyd, $m/10$; hydrochloric, oxalic and acetic acids, $m/500$; boric acid, $m/10$; ammonium chlorid and ammonium hydroxid, $m/125$. Professor Loeb ascribes his results to chemical actions rather than to osmotic influences.

4. *Trypanosomes and bird malaria.* F. G. Novy and W. J. MacNeal. (Presented by Gary N. Calkins.)

Two genera of malarial parasites were studied—*Plasmodium* and *Hæmoproteus*—and four new species were distinguished, viz., *Plasmodium Vaughani, Hæmoproteus MacCallumi, H. Sacharovi* and *H. Rouxii.* The first is found in robins, the second and third in mourning doves, the fourth in sparrows.

The culture method is the best means of differentiating Trypanosomes as well as for detecting them in the blood.

Schaudinn's contention that *Halteridium* forms are but sexual phases of *Trypanosoma* is not confirmed, but, on the contrary, evidence is accumulated against it. For example, the culture method shows the existence at one time and in one culture of forms which Schaudinn described as *Halteridium* and as *Spirochæta* or Danilewsky's 'leucocytozoon.' One possibility of error in Schaudinn's results is that he worked with 'mixed cultures' in the mosquito.

5. *The gradual decrease in bacteria of the production of agglutinable substance.* William H. Park.

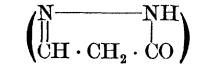
Dr. Park observed a diminution and finally almost a complete lack of development of agglutinable substance in bacteria grown in a serum rich in agglutinins and immune bodies. This observation is interesting both as showing a rapid variation in bacteria of essential characteristics and as possibly indicating one means of adapting themselves to resist destruction in the living body, since the bacteria which cease to produce agglutinable substance and probably, also, less substance with affinity for other anti-bodies, might be considered less vulnerable to these substances. Dr. Park's explanation of the process is that there are substances in the serum which attack certain parts of the bacteria, such as the agglutinable substance. With the increase of bacteria in the serum, those which produce the least of these substances are least inhibited and therefore develop most rapidly. When cultures are made from serum solution to serum solution daily, a gradual differentiation takes place until finally bacilli producing almost no agglutinable substance develop.

6. *Some Mendelian results in animal breeding.* C. B. Davenport.

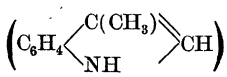
The essence of Mendelism in inheritance is its alternative character. In this it is opposed to blending inheritance (as in human skin color), which has been regarded as the typical sort of inheritance. At the Station for Experimental Evolution of the Carnegie Institution certain new cases of non-blending inheritance have already been found. Among sheep it appears from Dr. Alexander Graham Bell's records that the offspring of two black sheep are (probably always) black, although one or more of the grandparents were white. It looks as if black color (like albinism) might be recessive. Among canary birds it is found that, of the offspring of crested and of plain headed birds, some are crested and some are not. Poultry have been studied because of the numerous characters they exhibit. When a Japanese long tailed, clean legged cock was crossed on a white bantam hen, the two surviving offspring were highly colored like the father and had abundant feathers on the legs like the mother. The crested characteristic of poultry is peculiar, being sometimes dominant, and sometimes (apparently) blending with the crested condition when the cross is made.

7. *On the decomposition products of epinephrin.* JOHN J. ABEL and R. DE M. TAVEAN. (Presented by WILLIAM J. GIES.)

The empirical formula, $C_{10}H_{13}NO_3 \cdot \frac{1}{2}H_2O$, adopted by Professor Abel for that member of the epinephrin series which he has called epinephrin hydrate (the adrenalin of Takamine) is, at present, the subject of an acute controversy. In this report special attention was drawn to the fact that the $\frac{1}{2}$ $H_2O$ of the above formula has always been regarded by Abel as *water of constitution* and *not* water of crystallization, as his opponents have apparently taken for granted. The basic substance, $C_3H_4N_2O$, which is obtainable equally from both forms of epinephrin, has been decomposed, by treatment with caustic potash, into ammonia ($NH_3$), methylamin ($CH_3 \cdot NH_2$), and methylhydrazin ($CH_3 \cdot NH : NH_2$). The last degradation product is of great importance in throwing light on the chemical constitution of the new base, $C_3H_4N_2O$. Its appearance, under the circumstances referred to, proves that the two nitrogen atoms of this base are directly combined one with the other, and suggests, among other things, for this base a ring structure such as is found in bodies of the pyrazolon



series. Small quantities of skatol



have been obtained on fusing epinephrin hydrate with caustic alkalies. Further investigation, particularly an analytic study of epinephrin hydrate prepared in an atmosphere of hydrogen, is in progress.

WILLIAM J. GIES,
*Secretary.*

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## *DISCUSSION AND CORRESPONDENCE.*

### THE MEMBERSHIP OF THE AMERICAN ASSOCIATION.

THE writer was recently dining with friends, none of whom is engaged in scientific work in the narrower sense of the term. The American Association came up for discussion, and one of them said that he would like to become a member, but did not know how to arrange it. I said that I should be glad to nominate him for membership, and then asked the others if they would consent to be proposed for membership. There were in all seven; four consented to join the association, one was already a member, one took the matter under consideration and one declined. They were all surprised, so far as I remember, to learn that the dues were only three dollars and that SCIENCE is sent without charge to members. I venture to communicate this experience to SCIENCE because it seems to me that the conditions would be similar in any group of intelligent people. If each member of the association would ask two of his friends to join the association, at least one of them would be likely to accept, and the membership of the association would be doubled, much to the advantage of the association and the progress of science in America.

X.