atoms, and that the orbital radius of the electron whose vibration frequency would give the convergence number is the true radius of the central positive atom.

Heydweiller has computed the atomic diameter of a large number of elements from the volume occupied by their dissociated ions in a very dilute water solution. Heydweiller's atomic radii are accordingly here taken as the orbital radii of the electrons whose vibration frequencies would give the convergence numbers of Kayser's "Principal Series" in the alkali metals, and the centripetal forces required to hold these convergence electrons in their orbits are calculated. Then, assuming the inverse square law for the attraction between an electron and its central positive charge, the force of attraction upon an electron at unit distance from the center of its orbit is calculated for each element.

If the central positive charges of the atoms were the same for different elements, then these central forces should be the same. They are found not to be the same.

The positive charges of these atoms have previously been computed by the writer from electrolytic data. The charges here computed are not proportional to those formerly computed, hence the assumption that the atoms of the different elements have different specific inductive capacities seems to be justified. These specific inductive capacities may be computed by dividing the charges of the atoms by the respective forces which they exert upon an electron at unit distance.

The specific inductive capacities are calculated in this way for the thirteen elements for which convergence numbers, atomic radii and atomic charges have been computed. Since it is only for the alkali metals that the convergence numbers used are known to belong to the principal, or inner, spectral series, it is only to these elements that we can be sure that the above arguments apply. However, the computed specific inductive capacities are proportional to the serial numbers of Rydberg for ten of the thirteen elements, and for the other three, viz.; zinc, cadmium and thallium, they increase with the serial numbers just half as fast as they do in the case of the other elements.

The specific inductive capacities here computed are also shown to vary with the same atomic properties which vary with the measured specific inductive capacities of non-metallic elements.

It is also shown that the specific inductive capacities of these elements are proportional to their respective atomic radii. This would make the centripetal force upon electrons revolving about and very near to these different atoms proportional to the inverse third power of their orbital radii. This is shown to be the relation that must hold in order that the kinetic energy of different electrons shall vary as their frequency, as is assumed in Planck's Law and is apparently shown in the case of electrons expelled by the action of ultra-violet light upon metals.

The *relative* specific inductive capacities which have been calculated as above are given in the following table:

Element	k	Element	k	Element	k
Li	35.9	Mg	134	Zn	190
Na	127	Ca	196	Cd	255
K	238	Sr	412	Tl	350
Rb	437	Ag	466		
Cs	567	Cu	346		

Attention is called to the fact that if the orbital radius of the outermost electron of a series be taken as the atomic radius instead of the orbital radius of the innermost electron, it will not change the order of values of the specific inductive capacities calculated as above.

Following the discussion of this paper, the question of a Pacific coast organization was taken up. The chairman of the meeting reported that favorable replies had been received from the science instructors at the universities in Washington, Oregon and Utah. It was decided to form an informal organization to be known as the Pacific Physical Society, looking toward the formation of a section or branch of the American Physical Society in the near future.

Ralph S. Minor,
Permanent Secretary

SOCIETIES AND ACADEMIES

THE AMERICAN MATHEMATICAL SOCIETY

The one hundred and eighty-fourth regular meeting of the society was held at Columbia University on Saturday, April 29, 1916. The attendance at the two sessions included fifty-one members. President Brown occupied the chair, being relieved by Vice-president E. R. Hedrick. The council announced the election of the following persons to membership in the society: Dr. E. T. Bell, University of Washington; Professor T. R. Eagles, Howard College; Mr. Glenn James, Purdue University; Dr. J. O. Hassler, Chicago, Ill.; Professor G. N. Watson, University College, London; Mr. J. H. Weaver, West Chester, Pa. Six

applications for membership in the society were received. Professor D. R. Curtiss, of Northwestern University, was reelected a member of the editorial committee of the *Transactions*, to serve for three years, and Professor L. P. Eisenhart, of Princeton University, to serve on the same committee in place of Professor Dickson for one year.

The twenty-first summer meeting and eighth colloquium of the society will be held at Harvard University, September 4–9, 1916. Two courses of colloquium lectures, each five in number, will be given by Professor G. C. Evans, of Rice Institute, on "Topics from the theory and applications of functionals, including integral equations," and Professor Oswald Veblen, of Princeton University, on "Analysis situs." The year 1916 marks the twenty-fifth anniversary of the broadening out of the society into a national organization and of the founding of the *Bulletin*. It is proposed to arrange an appropriate celebration of this event at the summer meeting. Some seventy-five of those who were members of the society in the year 1891 have retained their membership through these twenty-five years. It is hoped that the celebration may itself become a notable milestone in the society's history.

Committees were appointed to consider the question of the publication of the Harvard Colloquium Lectures, and to consider in cooperation with committees of other scientific bodies the matter of the classification of technical literature. A committee was also appointed to draw up a list of nominations of officers and other members of the council to be elected at the annual meeting next December.

The following papers were read at this meeting:

Samuel Beatty: "Derivation of the complementary theorem from the Riemann-Roch theorem."

J. F. Ritt: "The resolution into partial fractions of the reciprocal of an entire function of genus zero."

J. F. Ritt: "Linear differential equations of infinite order with constant coefficients."

C. J. Keyser: "Concerning autonomous doctrines and doctrinal functions."

Edward Kasner: "Element transformations of space for which normal congruences of curves are invariant."

J. H. Weaver: "Some extensions of the work of Pappus and Steiner on tangent circles."

J. L. Coolidge: "New definitions for Plücker's numbers."

G. C. Evans: "Integral equations whose kernels satisfy a certain difference equation in variable differences."

Dunham Jackson: "An elementary boundary value problem."

L. P. Eisenhart: "Transformations of conjugate systems."

A. A. Bennett: "An existence theorem for the solution of a type of real mixed difference equation."

A. A. Bennett: "A case of iteration in several variables."

R. W. Brink: "Some integral tests for the convergence and divergence of infinite series."

Glenn James: "A theorem on the non-summability of a certain class of series."

F. J. McMackin: "Some theorems in the theory of summable divergent series."

J. R. Kline: "A definition of sense on plane curves in non-metrical analysis situs."

H. B. Fine: "On approximations to a solution of a system of numerical equations."

B. H. Camp: "Fourier multiple integrals."

G. A. Pfeiffer: "On the conformal mapping of curvilinear angles."

G. C. Evans: "Proof of Green's theorem by approximating polynomials."

A. R. Schweitzer: "On a type of quasi-transitive functional equations."

J. W. Alexander: "Some generalizations of the Jordan theorem."

C. E. Wilder: "Expansion problems of ordinary linear differential equations with auxiliary conditions at several points."

E. V. Huntington: "A simple example of the failure of Duhamel's theorem."

W. F. Osgood: "Note on functions of several complex variables."

F. N. COLE,
Secretary

THE BIOLOGICAL SOCIETY OF WASHINGTON

THE 553d regular meeting of the society was held in the Assembly Hall of the Cosmos Club, Saturday, March 25, 1916, called to order by President W. P. Hay at 8 P.M., with 40 persons present.

The president called attention to the recent death of Henry Talbott, a member of the society.

Under the heading Brief Notes and Exhibition of Specimens, General Wilcox exhibited lantern slide views of the country along the Mexican border of the United States.

Under the same heading Mr. A. A. Doolittle exhibited a specimen of *Amblystoma punctatum* from the District of Columbia.

Dr. O. P. Hay exhibited a mutilated braincase of an elk which had caused certain persons much difficulty to identify; he also showed a remarkably well preserved skull of an extinct horse.

President Hay exhibited a number of lantern slides of biological interest, chiefly of aquatic animals in the vicinity of Beaufort, North Carolina.

Medical Inspector Ames asked if any member present had positive knowledge as to the ability of camels to swim, or otherwise? This question was discussed by several members, but no positive knowledge was forthcoming. He also inquired as to the possible existence of a South American animal with dorsally placed mammæ.

Following the adjournment of the society several members examined a microscopic preparation of a living embryo of *Filaria bancrofti* obtained by Dr. Lyon from a former inhabitant of British Guiana but for several years resident in the District of Columbia.

The regular program was as follows:

W. P. Hay: "Notes on the Growth of the Loggerhead Turtle," illustrated by lantern slides and chart. Mr. Hay gave an account of two young loggerhead turtles now under observation at the U. S. Fisheries Biological Station at Beaufort, N. C. They are the survivors of a lot of 77 hatched September 9–11, 1912, from eggs obtained from a nest on Bogue Bank about six weeks earlier. When first hatched the average size of the young was: total length 77.3 mm.; length of carapace, 46.2 mm.; weight, 20.1 grams.

At the age of three years the survivors measure 493 and 515 mm., in total length; 343.75 and 365 mm., in length of carapace; and weigh 6,690 and 7,967 grams, respectively. The increase in size and weight has been steady and the measurements, which have been taken twice a year, can be plotted as points on a curve. This curve continued indicates that the maximum size of this species, about 1,000 mm. length of carapace, may possibly be obtained in the tenth or eleventh year, and that sexual maturity is probably reached in the sixth or seventh year. This is considerably more rapid growth than has usually been attributed to animals of this kind.

The paper was discussed by Dr. Shufeldt, Dr. O. P. Hay, Medical Inspector Ames, and Mr. Doolittle.

R. W. Shufeldt: "The Restoration of the Dinosaur, *Podokesaurus holyokensis*." Dr. Shufeldt gave an historical account of a discussion upon the restoration of the dinosaur *Podokesaurus holyokensis* of Talbot, which took place in the autumn of 1915. This discussion was carried on in correspondence and participated in by Drs. Richard S. Lull and Mignon Talbot, Hr. Gerhard Heilmann, and the speaker. Lantern slide illustration and blackboard demonstration were employed to point out what was held to be inconsistencies in the restoration of this animal, as figured in Dr. Lull's "Triassic Life of the Connecticut Valley" (Fig. 31). Drs. Lull and Talbot contend that the pubic element in the matrix of *Podokesaurus holyokensis* occupies the position in relation to the other bones of the skeleton that obtained in life. Dr. Shufeldt and Hr. Heilmann controvert this decision by pointing out that all the bones in the slab containing the remains of this dinosaur are far removed from their normal articulations; and that, if the pubic element were articulated as Dr. Lull has figured it, it would have come, in life, forcibly in contact, anteriorly, with the sternal ribs and been a constant menace to the abdominal viscera in various movements of the animal.

R. E. Coker: "A Biological and Fish Cultural Experiment Station," illustrated by lantern slides. Mr. Coker said that since biologists, at least, are generally familiar with the functions of the Fairport Biological Station in the propagation and study of the fresh-water mussels, particular attention was given to the purposes of that station in experiment work relating to the rearing of fishes.

As in horticulture the problems of the nurseryman and those of the fruit grower are distinct, so in fish-culture, and in fish-cultural experiment work there is the phase of the hatchery with its product of fry and fingerling, and that of the fish farm where it is intended to rear fish to adult size in commercial quantities. The Fairport station is concerned with problems of rearing rather than of hatching. The grower of fish has problems similar to those of the stock farmer or the poultry raiser, while in addition he must take thought for conditions affecting the respiration of fish. He can not always regulate the numbers of fishes in his ponds by direct means, but may have to accomplish this end by proper association of species. It may even be necessary to group together species which are to an extent "incompatible."

The problem of the fish pond has its mechanical, physical, chemical and zoological aspects; more especially, however, it is a problem of appropriate vegetation, promotion of food supply, and proper association of species of fish.

M. W. Lyon, Jr.,
Recording Secretary