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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

SECTION B, PHYSICS.

THE annual meeting of Section B, Physics, of the American Association for the Advancement of Science, in affiliation with the American Physical Society, was held in St. Louis, from December 28 to 31. The sessions were universally pronounced successful and enjoyable. The attendance varied from forty to seventy-five, and was representative of the middle west, while there was also present a number of the prominent members from the east, and a few from the Pacific coast.

The retiring vice-president, Professor E. F. Nichols, of Columbia University, was unable to be present. The section passed a resolution expressing its disappointment in not having the opportunity of listening to the expected vice-presidential address.

The presiding officers were Professor E. H. Hall, of Harvard University, vice-president of Section B, and Professor A. G. Webster, of Clark University, president of the American Physical Society. The other officers of the section who were in attendance were Dayton C. Miller, secretary; D. B. Brace, councilor, and the following members of the sectional committee—E. H. Hall, D. C. Miller, Ernest Merritt, D. B. Brace, A. G. Webster and F. E. Nipher.

For the next meeting to be held in Philadelphia, from December 28 to 31, 1904, the vice-president is Professor W. F. Magie, of Princeton University. The other officers for the Philadelphia meeting, so far as now determined, are: retiring vice-presi-

dent, E. H. Hall; secretary, Dayton C. Miller, Case School of Applied Science, Cleveland, Ohio; members of the sectional committee, E. H. Hall, W. F. Magie, D. C. Miller, D. B. Brace, A. G. Webster, G. F. Hull and F. E. Nipher.

Professor E. Rutherford, of McGill University, gave a popular scientific lecture on 'Radium and Radio-activity.' The lecture was illustrated with many experiments and demonstrations, some exhibiting Professor Rutherford's recent researches. The lecture was greatly appreciated by the large audience in attendance.

The number of papers read at St. Louis was thirty-six, twenty-four before Section B, and twelve before the Physical Society. Of these papers thirteen were upon electrical subjects, eleven were optical, four were upon heat, three upon radio-activity and five were upon miscellaneous subjects. The abstracts of the papers read before Section B are given below; the papers given before the Physical Society are described in the report of that society.

Report of the Committee on the Velocity of Light: D. B. Brace, University of Nebraska.

A Half-Shade Elliptical Polarizer and Compensator: D. B. Brace, University of Nebraska.

To be published in full in the *Physical Review*.

On the Effect of a Magnetic Field on the Interference of Natural Light: John Mills, University of Nebraska.

The conception of natural light as an elliptical vibration and our knowledge of the Faraday 'effect' would give as a criterion for an analogous rotation of natural light, the disappearance of interference fringes, previously observable, upon the formation of a magnetic field capable of rotating plane polarized light through an angle of an odd multiple of 90°. The apparatus consisted of a Michelson interferometer. In the path of each beam was placed a tube of carbon disulphide surrounded by a solenoid. Natural monochromatic light was used and the current varied. Observations were taken at the points of disappearance and reappearance of the fringes. The mean of these current readings was taken as that for which interference was impossible. These values of the current would have produced in plane polarized light a rotation of 95.8°, 256.8°, 447.5°, 613.6°.

The apparent invalidation of the results obtained because of a partial polarization of the entering light by the reflecting surfaces is also discussed.

On the Velocity of Light in a Magnetic Field: John Mills.

The experimenter undertook to measure the acceleration or the retardation experienced by a circular component traversing a magnetic field. The apparatus consisted of a Michelson interferometer. In the path of each beam was placed a tube of carbon disulphide surrounded by a solenoid. The light passed through a Nicol prism and a Bravais double plate. Half of the fringes were thus composed of light circularly polarized in a direction opposite to those of the other half. The formation of a magnetic field produced a shifting of the two sets in opposite directions. The current causing a shifting of one full band (corresponding to a difference in phase of 360°) was observed. On the assumption that the rotation of plane polarized light is the result of a difference of phase between its circular components, produced by an acceleration of one component and a corresponding retardation of the other, the difference of phase corresponding to this value of the current was calculated. It was 368°. The readings for the current

giving a displacement of three bands (that is, a difference in phase of 1080°) corresponded to a difference of 1101° calculated.

Hertzian Waves since Hertz: A. D. COLE, Ohio State University.

Hertz's experimental proof of the existence of electromagnetic radiation in 1888 was the culmination of Maxwell's work and led to a large output of new research. In this Germany took the lead. Arons, Lecher, Boltzmann and Zehnder introduced better methods of showing the electrical waves. The coherer came in 1895, although its principle was discovered by Branly in 1891. Three of the new receivers were strictly quantitative; the electrometer of Bjerknes, the oscillation-bolometer of Paalzow and Rubens and the thermo-receiver of Klemenčič. Important improvements in the exciter were made by Righi in 1893 and by Blondlot. J. J. Thomson and Lecher used the Hertzian oscillations to measure dielectric constants. Rubens and Arons showed that the Maxwellian relation between these and the refractive index held better with Hertzian than with light waves. Cohn extended this to the case of water. This was shown to be rigidly true by Drude, by Cole and by Cohn and Zeeman. Cole showed that alcohol possesses anomalous dispersion for electrical waves. Drude and Lampa proved this true of many substances. Drude perfected apparatus for determining refractive indices. Lecher and also Larasin and de la Rive showed that the velocity along wires is the same as in air. Blondlot, Trowbridge and Duane, and Saunders gave more exact proofs that this velocity was that of light. The gap between the wave-lengths of electrical and light waves has been narrowed from each side. Lebedew reduced the former to 1 mm., Dubois and Rubens produced longer infra-red waves.

The essentials of the electromagnetic theory have been established. It remains to correlate with it our views of corpuscles and the Becquerel rays.

A Simple Alternate Current Frequency Recorder: E. S. JOHONNOTT, Rose Polytechnic Institute.

The instrument may be attached directly to alternating current mains and a record of the frequency obtained. To one pole of the electromagnet of an ordinary electric bell is attached a light armature which is held at some little distance from the other pole by a stiff flat spring. If now an alternating current is sent through the coils the armature vibrates, ordinarily, with a frequency equal to twice that of the current. If a stylus be arranged on the outer end of the armature to leave a trace on a smoked drum alongside that of a seconds pendulum or an electromagnetic tuning fork the frequency may be counted off at once. The current through two incandescent lamps in parallel in 100 volts is sufficient to give ample motion.

Iron Losses in Loaded Transformers: E. S. JOHONNOTT, Rose Polytechnic Institute.

With the addition of a differential coil to the Rayleigh phasemeter it was adapted to measure directly the loss of energy in the iron of a loaded transformer. The readings give at once also the magnitude of the exciting current and its phase with respect to the induction. A transformer of special design to test the effect of magnetic leakage was used in the experiments. The conclusions drawn from the work were as follows: (1) In a transformer having great magnetic leakage between the primary and secondary, and in which a constant induced E.M.F. is maintained and measured. (*a*) In the secondary. There is an apparent increase in values of the loss of energy in the iron, the magnitude of the exciting current and the cosine of the angle

of lag between this current and the induced E.M.F. as the load in the secondary is increased. (*b*) In the primary. There is an apparent decrease in the loss of energy in the iron, the magnitude of the exciting current and the cosine of the angle between, as the load increases. (2) If the load is increased in the secondary of a transformer in which there is little magnetic leakage, not only the loss of energy in the iron, but the exciting current and its phase with respect to the induction remain constant.

A Method for the Determination of Mutual Induction Coefficients: Augustus Trowbridge, University of Wisconsin.

The method is based on the fact that when a pair of coils are joined in series so that the magnetic tubes of force form one thread through the other in the same direction as those due to it the self-inductance of the pair is $L_1 + 2M + L_2$. When the current is reversed through the one coil but not through the other the coefficient of self induction of the pair is $L_1 - 2M + L_2$.

By a bridge method each of these quantities may be determined in terms of a standard self inductance and thus M (the coefficient of mutual induction) is obtained. A careful comparison of the results obtainable with this method with those by other known methods seems to be considerably in favor of this method, the probable error being about 1 part in 800.

The Influence of Occluded Hydrogen on the Electrical Resistance of Palladium: W. E. McElfresh, Williams College.

To be published in full in the *Transactions of the American Academy of Arts and Sciences.*

On Hydrogen-charged Palladium: E. H. Hall, Harvard University.

This paper is a review of the main facts known in regard to the properties of hydrogen-charged palladium and an examination of the various suggestions which have been made as to the nature of the union between the two elements concerned. The point is made that previous estimates, by Graham and by Troost and Hautefeuille, of the density of the hydrogen in the combination gave values very much greater than the observed value of liquified hydrogen. These estimates practically neglected the possibility of spaces between molecules of palladium sufficiently large to admit molecules of hydrogen with little expansion of the solid. The evidence in favor of a definite chemical combination between the palladium and the absorbed hydrogen is, on the whole, inadequate.

A New Form of Frequency Meter, Preliminary Note: A. S. Langsdorf, Washington University.

The paper described a type of instrument to indicate frequency on alternating-current circuits, the readings to be independent of fluctuations of voltage on the line, the connections similar to those of an indicating wattmeter.

A Remarkable Distribution of Carbon on the Bulb of a 'Hylo' Incandescent Lamp: Arthur L. Foley, University of Indiana.

In the 'Hylo' turn-down incandescent lamp there are two filaments, one of 16 c. p. (F) and one of 1 c. p. (f), the former consisting of two and the latter of three turns. Whatever be the direction of the current, the filament coils are of opposite polarity.

When f is burning F is in series with it, but the current is insufficient to render the latter luminous. When F is burning f is short-circuited. Let P and P' be points on the globe at the ends of a diameter through the plane of the filaments, and NS and sn be points on the globe where

the axes of the filaments F and f meet it. At P there is a deposit from one to two centimeters wide, while the globe is perfectly clear on either side. At P' the conditions are exactly reversed, the central region being dark with clear glass on each side. At n, also at s, there is a small circular deposit about half the area of a turn of f. This deposit is surrounded by another in the form of a ring about one centimeter wide and two centimeters in diameter, the ring being open next to the base of the lamp. Between the central deposit and the ring the glass is clear. There is no deposit within two centimeters of the base of the lamp, and very little on the crown. The theory of molecular shadows and the Edison effect, so thoroughly worked out by Fleming* and others, explains the general character of the deposit, but seems to fail to explain the definiteness of it. In general the deposit is of uniform density and quite dark, while the clear places are perfectly clear, the line of separation being as definite as if the deposit had been laid on with a brush. The weak magnetic field of the small filament was sufficient to concentrate the deposit at the ends of its axes, leaving certain regions perfectly clear. It seems that it should be possible to keep clear any desired part of the wall of a vacuum table. The peculiarity of the deposit above described was noticed but a few weeks since, hence the incompleteness of this investigation. An attempt to age a number of similar lamps by running at an excessive voltage resulted in a practically uniform deposit.

On the Charges given to Surfaces by the Diffusion of Ions, and the Earth's Negative Potential: JOHN ZELENY, University of Minnesota.

Experiments are described showing that neutral ionized air in passing through a long tube at first gives a negative charge to the walls, but as it passes along it eventually gives them a positive charge. In passing through a short tube the ionized air acquires a positive charge, while the tube itself becomes charged negatively. Similar effects were obtained with dry carbonic acid, but when the gas was saturated with water vapor the effects were all reversed in sign. The experiments are all explained by supposing the charges to arise from the unequal rates of diffusion of the two ions. It is shown that Villari's hypothesis that charges are given to metals by the friction of the ionized gas against the metal does not suffice to explain all of the facts. Simpson's objection to Geitel's explanation of the earth's negative potential is next taken up and the results of the above experiments are used in refutation of the objection. Other theories of the cause of the earth's negative potential are briefly considered.

The Rate of Propagation of Smell: JOHN ZELENY, University of Minnesota.

The propagation of smell through tubes where the air is free from convection currents was found to be very slow, as has already been noted by Ayrton; showing that the fast propagation ordinarily observed in free space is due almost entirely to convection currents. For example, with ammonia diffusing through a tube a meter and a half long, over two hours elapsed before the smell could be detected at the other end of the tube. Using different lengths of tubing, it was found that the time required for the diffusion of the smell was roughly proportioned to the square of the length. Ammonia and hydrogen sulphide were used for the above experiments. The presence of ammonia could be detected chemically at a point in a tube after about

* 'Molecular Shadows in Incandescent Lamps,' *Philosophical Magazine*, Vol. 20, 1885. 'A Further Examination of the Edison Effect in Glow Lamps,' *Philosophical Magazine*, Vol. 42, 1896.

the same time as when the sense of smell was used for a detector. The rate of propagation of the smell of ammonia was not markedly different when this had to pass along the same tube either horizontally or vertically upward or vertically downward. With camphor, however, while the rates horizontally and downward were about the same, the speed upward was about twice as great. The smell given to iron and brass by rubbing these with the fingers was also tried, but gave no definite results.

On the Theory of the Electrolytic Rectifier: S. R. Cook, Case School of Applied Science.

When aluminum is the anode in an electrolytic cell in which oxygen is set free there is very quickly introduced into the cell an exceedingly high apparent resistance. If aluminum is made the kathode and carbon or platinum the anode, the resistance is normal and very low. The anomalous action of this cell was noted by Professor Tait in 1869, but the cell did not attract attention until 1897, when Pollok and Grätz showed that the cell could be used to rectify an alternating current. Since 1897 investigations on the electrolytic rectifier have been published by Wilson and Norden, Burgess and Hambuecher, Taylor and Ingals, and Dr. Guthe. Each investigator set forth an independent theory for the high resistance of the aluminum anode. The object of this investigation was to determine the cause of this anomalous action of the aluminum anode, and it was found by a series of measurements of the applied electromotive force and the current, and also of the counter electromotive force with the same current; that the very high apparent resistance could be accounted for on the theory that it was due to the counter electromotive force. The potentials were measured by methods that were independent of the resistance, and curves were plotted showing the direct and counter electromotive force with current. When the electromotive force is greater than a certain critical value depending on the temperature the high resistance breaks down. This was shown to be due to the crystallization of the film around the aluminum anode, which exposed free metallic surfaces to the ions. It was also shown by direct determinations that free metallic aluminum conducted as readily when anode as when kathode, and the counter electromotive force was due to charged ions that could not penetrate the film formed on the aluminum.

On the Position of Aluminum in the Voltaic Series and the Use of Aluminum as a Positive Element in a Primary Cell: S. R. Cook, Case School of Applied Science.

Wheatstone in 1855, while determining the position of aluminum in the voltaic series, found that when immersed in a dilute solution of potassium hydroxide aluminum was negative to zinc and positive to cadmium, tin, lead, copper, iron and platinum; and in a solution of dilute hydrochloric acid aluminum was negative to zinc and positive to other elements. The object of the research was to make quantitative measurements on the difference of potential between aluminum and the other elements in different solutions. Measurements were made in several alkaline solutions, three acids and several salts. It was found that the difference of potential did not remain constant, but, in general, any solution the negative ions of which would attack the aluminum producing a soluble compound, the potential was more constant than in those solutions in which oxygen was the negative ion forming with the aluminum an insoluble compound. Measurements were taken with zinc, cadmium, tin, lead, copper, iron and platinum in solu-

tions of potassium hydroxide, hydrochloric, nitric and sulphuric acid, and ammonium chloride, potassium chloride, aluminum and potassium sulphate. A primary cell composed of aluminum, potassium sulphate, aluminum and carbon, was also investigated. The peculiarity of this cell was that it gradually increased to a maximum and again fell to its normal value when disturbed. It was also shown that the amount of current that could be taken from the cell was very small, and that the temperature coefficient was positive.

On the Differential Telephone: WILLIAM DUANE, University of Colorado.

Two separate coils are wound on the bobbin of a telephone receiver, and by suitable means are adjusted so as to have equal resistance, and equal self-inductances, and so that the magnetizing effect of a current flowing through one coil would be annulled by that of an equal current flowing in the proper direction through the other coil. To measure a self-inductance the unknown coil X and a variable self-inductance standard S are placed in series with the two receiver coils respectively, and a non-inductive resistance box R is inserted in series with S or X, according as the resistance of X is greater or less than that of S. The two entire circuits are joined in parallel, and an alternating E.M.F. is applied to the branch points. Values for R and S can be found easily, such that no sound is heard in the receiver, and, when this is the case, the self-inductance of S equals that of the unknown coil X. The magnetizing effects of the two receiver coils can be equalized by placing a small auxiliary coil in series with one of the receiver coils and with its plane parallel to the axis of the receiver. Joining the two receiver coils in series and sending an alternating current through them, a position for the auxiliary coil can be found that completely extinguishes the sound. With a receiver that will detect 10^{-6} amperes, the theoretical accuracy is about one one-hundredth per cent. Practically an accuracy of one part in five thousand is not difficult, as absolute silence can be obtained, if there is no iron in coil X. The advantages of this method of measuring self-inductance are: (a) That the apparatus is portable and does not get out of order easily; (b) that great accuracy can be obtained and the manipulation is not difficult; (c) that only one standard is required, and it is not necessary to know the value of any resistance or bridge-wire lengths. The disadvantage is that the self-inductance of the standard must *equal* that of the unknown coil. A range from zero to 150 milli-henrys can be obtained, however, with ordinary laboratory apparatus.

The Selective Reflection of Fuchsin: W. B. CARTMEL, University of Cincinnati. Presented by D. B. Brace.

This investigation was undertaken in order to ascertain whether the reflection from substances showing metallic reflection agreed with the values computed from reflection formulas. The reflection from a film of fuchsin was determined for various wave-lengths. The films of fuchsin were deposited upon a glass plate, and the reflection was measured not only from the upper surface of the fuchsin, but also from the interface between the fuchsin and the glass. The measurements were made by means of a Brace spectro-photometer. Instead of using the usual method of comparing the light reflected from the fuchsin with the light reflected from some other substance, whose coefficient of reflection was assumed to be known, the reflected light was compared with the direct light from the same source which supplied the reflected light. The work was begun last summer at the University of Nebraska and is now being continued at the University of Cincinnati.

Primitive Conditions in the Solar Nebula: Francis E. Nipher, Washington University.

The writer has used the equations developed in his paper forming No. 5, Vol. XIII., of the *Transactions of the Academy of Science of St. Louis,* for computing the numerical values throughout the primitive solar nebula. He finds that the resulting density and pressure, if the nebula be assumed a gas, filling the volume internal to Neptune's orbit, is incompatible with known physical conditions. The author concludes that the solar nebula was composed of discontinuous masses of solid matter during most of its early life. It was only in its later stages that gravitating compression caused the central mass now called the sun to fuse and vaporize.

On the Investigation of the Kinetic Theory of Gases by Elementary Methods: Henry T. Eddy, University of Minnesota.

This paper establishes some of the principal results of the kinetic theory of gases, such as the mean frequency of collision, the mean free path, the number of molecules striking a given area per second, the ratio of the specific heats, etc., on the assumption of a given constant velocity for all molecules, by simple semi-geometrical methods.

A Demonstration to disprove the Second Law of Thermodynamics: Jacob Wainwright, Chicago.

Paper published in full by the author.

At the 1902 meeting, at Pittsburg, the author presented to the members of the section a demonstration having substantially this same title. That particular demonstration was based upon a phenomenon disclosed by the published research work of Emile Hillaire Amagat, of Paris, viz., 'At or about an absolute temperature of 274°, and at pressures above the critical pressure, carbon dioxide becomes practically or absolutely incompressible or inert, as regards the influence of pressure alone.' The demonstration was confronted by the suggestion that Amagat's work should be thoroughly verified before it could be accepted as evidence to effect a so important revolution in physical and chemical science. In order to overcome such difficulty, the subject was presented in a simple manner free from all questions of quantitative analysis and unverified matter. The pressure condition of a practically perfect gas is manipulated and transformed, and all postulations, except the 'first law' of conservation of energy, which is properly a postulation in a strict sense, but has been thoroughly verified as it relates to the various phenomena which contribute to this demonstration, are dispensed with. Maxwell questioned the validity of the 'second law,' but failed in his attempts to devise a material or real cycle to effect a refutation; and as a last resource, invoked his demon and kinetic theory combination. This particular problem was solved by devising a working medium consisting of a combination of a gas and solid matter; the solid matter being arranged so as to constitute a complete heat engine in itself and having the *peculiar* property of transmuting heat into work by reason of *either* a rise or a fall in temperature. In this manner is produced a working medium which, taken as a whole, is not amenable to the 'second law.'

The Continuous Method of Steam Calorimetry: Joseph H. Hart, University of Pennsylvania.

The continuous method of steam calorimetry here outlined is capable of measuring readily latent and specific heats of fluids with a degree of accuracy seldom attained by other methods, even though they be made with the greatest refinement in the method and observations. If a stream

of water at a temperature of T_1 be passed through a worm immersed in a steam bath and energies at a temperature T_2, the quantity of heat absorbed is $mS(T_2 - T_1)$ where m is the mass of water passed through and S the mean specific heat of water between T_2 and T_1. If the heat absorbed by the water is obtained by direct condensation of steam alone we have the equation

$$ML = mS(T_2 - T_1)$$

when M is the mass of the condensed water and L the latent heat of condensation of steam. If either L or S is taken as known the other may be readily obtained. Barnes's values of S were taken and a number of determinations of L made to test the efficiency of the method. In the practical development of the method, the process was made continuous. The water in the worm and the condensed water were drawn off constantly and measured. Radiation and conduction entered as important factors in the construction of the calorimeter, but were eliminated or a least satisfactorily accounted for in the amount of condensed water by both theory and practice. Results were obtained in consecutive experiments which were concordant to the fifth significant figure. The value of L which was obtained was slightly lower than Callendar's value of 540.2 calories at 20° C. and points to the existence of a slight constant error.

On the Thickness of Adsorbed Aqueous Films: L. J. BRIGGS AND A. W. MCCALL, United States Department of Agriculture.

Parks (*Phil. Mag.*, May, 1903) found the thickness of the aqueous film adsorbed on the surface of glass wool to be 13.6×10^{-6} cm. He also calculated the thickness of the film on silica by an indirect method based upon Martini's calorimetric measurements, and obtained the value 44×10^{-6} cm.

The authors have measured the thickness of the aqueous film on glass wool, silica and quartz when exposed at 30° C. to an atmosphere five sixths saturated. The substances were kept at constant temperature in a thermostat, and were continually stirred so as to bring the material into thorough contact with the water vapor. The amount of water taken up was determined by drying at 110° C. The surface area was calculated from microscopic measurements. The following values for the thickness of the film were obtained, based upon the assumption that the density of the adsorbed layer is the same as that of the liquid in mass.

Silica	167	$\times 10^{-6}$ cm.
Glass	18	$\times 10^{-6}$ cm.
Quartz	0.45	$\times 10^{-6}$ cm.

The great discrepancy in the results obtained for silica and quartz indicates that in the case of silica we have something analogous to a solid solution—a conclusion supported by the results of Bellati and Finazzi. It is not improbable that in the case of glass also there is something more than simple adsorption, and that the measurements with quartz give more nearly the true value of the thickness of the adsorption film.

The Circulation of the Atmosphere, as indicated by the Recent Abnormal Sky Colors: A. LAWRENCE ROTCH, Blue Hill Meteorological Observatory.

The author urges upon physicists and others in various parts of the world the importance of recording the dates when unusually brilliant sunset glows and the reddish corona around the sun, known as Bishop's rings, are visible, as has been the case intermittently during the past year. These phenomena are probably caused by discontinuous clouds of volcanic dust in

the upper atmosphere, and the author has ascertained that the analogous optical effects were observed in the eastern United States about twenty days later than in central Europe, which, assuming a movement from the west of the dust-bearing currents, indicates an approximate velocity of thirty miles an hour, or considerably less than that of the highest ice-clouds. After the Krakatoa eruption in 1883 the rate of propagation of the volcanic dust from east to west, at a height above the equator calculated from the duration of the sunset colors, was determined with considerable accuracy by a committee appointed by the Royal Society, and it is hoped that sufficient observations will now be collected to enable the velocity of the highest currents above the temperate regions to be deduced equally well.

DAYTON C. MILLER,
Secretary.

ZOOLOGY AT THE ST. LOUIS MEETING.

SECTION F of the American Association for the Advancement of Science and the Central Branch of the American Society of Zoologists met in joint sessions at the St. Louis Meeting for the reading of papers, but held separate business meetings. On Monday afternoon, December 28, the address of Vice-President Hargitt before Section F was read by Professor C. C. Nutting, in the absence of the author, the subject being 'Some Unsolved Problems of Organic Adaptation.' Section F was organized with the following officers:

Vice-President—E. L. Mark, Harvard University.

Secretary—C. Judson Herrick, Denison University.

Councilor—A. M. Bleile.

Sectional Committee—E. L. Mark, Vice-President 1904; C. W. Hargitt, Vice-President, 1903; C. Judson Herrick, Secretary, 1904–1908. For one year, H. F. Osborn; for two years, S. H. Gage; for three years, C. H. Eigenmann; for four years, H. B. Ward; for five years, Frank Smith.

Member of General Committee—Jacob Reighard.

Press Secretary—C. Judson Herrick.

Joint sessions for the reading of papers were held on Tuesday and Wednesday, at which the following communications were presented. Titles preceded by an asterisk were presented by Section F; others by the Society of Zoologists.

**The Albatross Rookeries on Laysan:* C. C. NUTTING, University of Iowa.

An exhibit of lantern slides after original photographs taken by the author during the Hawaiian cruise of the *Albatross* in May, 1902.

A Restricted Habitat of Scutigerella immaculata (Newport), together with some remarks on the Animal and its Habits: STEPHEN R. WILLIAMS, Oxford, O.

In the bed of a small branch of Four Mile Creek, a tributary of the Great Miami River, a comparatively large number of specimens of this little centipede have been found. As far as ascertained the range of this particular group of this species is limited to a part of the bed of this small branch perhaps 600 feet in length. A discussion of the surroundings in general, the precise habitat which the animals seek, some of their observed habits in captivity, and one instance of breeding in confinement, were included. Larvæ have been kept through one molt and certain bodies which may possibly be eggs have been seen.

On the Analogy between the Departure from Optimum Vital Conditions and Departure from Geographic Life Centers: CHARLES C. ADAMS, University of Michigan.

In a previous paper (*Biological Bulletin*, III., 115–131) the writer briefly discussed some of the criteria which may be used to determine geographic life centers, and certain functional and structural changes resulting from departure from such centers. At the present time attention is called to