THE BACONIAN CLUB OF IOWA CITY

HISTORICAL INTRODUCTION

At seven-thirty on the evening of November 20, 1885, a small group of men who were interested in Science met in the Chemical Laboratory of the State University of Iowa. They had assembled at the call of Dr. L. W. Andrews, at that time and for many years afterward Professor of Chemistry in the University. Dr. Andrews stated that the object which he had in mind in calling the meeting was the formation of a "Science Circle"; and with this announcement "the meeting proceeded to temporary organization by the election of Prof. Leonard as Chairman and E. L. Boerner as Sec'y."[1] Then a committee was appointed to draft a constitution and by-laws for a permanent organization. "After listening to an interesting informal lecture by Prof. Leonard on the probable course of the meteor, the meeting adjourned to 7 o'clock Saturday evening, Nov. 28th."[2]

The report by the committee on constitution and by-laws, which was made at the meeting on November 28th was referred back to the committee with instructions to make certain changes. At a meeting on the evening of December 11th, however, the constitution was unanimously adopted.[3]

Such, in brief, is the story of the organization of the Baconian Club of Iowa City. Professor N. R. Leonard was the first President of the Club, and Professor L. W. Andrews, to whom is due the credit for inaugurating the Club,

[1] *Baconian Club Record-Book*, Vol. I, p. 3.

[2] *Baconian Club Record-Book*, Vol. I, pp. 3, 4.

[3] *Baconian Club Record-Book*, Vol. I, p. 7.

was the first Secretary. The charter members were: N. R. Leonard, P. H. Philbrick, Samuel Calvin, T. H. Macbride, J. G. Gilchrist, L. W. Andrews, and Andrew A. Veblen[4]—all of whom were at the time professors in the State University of Iowa. Two of these charter members, Professor Macbride and Professor Calvin, have remained in the service of the University; and all but two, Professor Philbrick and Professor Gilchrist, are living at the present time. The Club thus organized has had a continuous and prosperous existence.

The passage of the years, however, has witnessed many changes in the character and membership of the Club. The largely attended meetings which are now held in an electric-lighted, steam-heated room, are in striking contrast to the meetings held twenty-five years ago, when the Club was in its infancy. Then a few men, seldom more than twenty and often less than half that number, gathered in the Chemical Laboratory in old North Hall and sat in a circle around the stove, the members taking turn in replenishing the fire. The reader of the evening sat in the circle with the other members, and there was an almost total lack of formality, the meeting assuming the nature of a friendly conference rather than having a set form of procedure. Indeed the meeting was often without a formal paper.

At each meeting a subject for discussion the following week was chosen by mutual consent and assigned to some member by the President. Frequently no paper was prepared, the member to whom the subject was assigned simply opening the discussion by speaking in an informal manner with or without notes. The discussion of topics was free and often animated, since the object of the Club was to give the members the benefit of each other's ideas. The

[4] *Constitution of the Baconian Club* (Edition of 1891), p. 8.

meetings were in no sense open to the public, and no record of the discussions was kept. Consequently the members were under no restraint in the expression of their views, but stated their beliefs freely and fully whether they met with the approval of other members or not. Besides the discussion of regularly assigned subjects, the policy was early established of permitting voluntary reports on any topic of interest to the Club — a custom which has been adhered to down to the present time.

The Constitution provides for three classes of members: ex officio members; full members, or "those engaged in active scientific work"; and associate members, or "those interested in scientific work". The President of the University is a member ex officio.[5] The actual working of this provision has had these results: full members have been persons on the faculty of the State University of Iowa; while the associates have been instructors in the University, fellows, scholars, or graduate students pursuing researches in scientific subjects.

In the beginning, as has been suggested, no publicity was given to the meetings of the Club. Occasionally a few guests were invited to be present, and later guests were permitted to participate in the discussions, but the tendency was to restrict the attendance to members and those vitally interested. In February, 1889, a standing resolution was adopted providing that "only full and associate members and those personally invited by members" should be admitted to the meetings of the Club, and that invitations might be issued "for any specified evening or for the whole or any portion of the club year".[6] This resolution, how-

[5] *Constitution of the Baconian Club* (Edition of 1900), p. 3. In the Constitution as originally adopted there was no provision for ex officio members.

[6] *Baconian Club Record-Book*, Vol. I, p. 199.

ever, has not always been followed, and in fact at present a general invitation is given to the public to attend the meetings of the Club, and accounts of the papers and discussions often appear in the University publications or in the city newspapers.

The papers read before the Club have covered a broad range of subjects, as will be revealed by a reading of the list which is published herewith. The papers as a rule have been prepared with care and with only a few exceptions have been presented by the members themselves, little effort having been made to secure addresses by scientists of reputation from outside the University. Thus individual effort on the part of members of the Club has been encouraged and a spirit of mutual helpfulness has prevailed.

From the time the Constitution of the Club was adopted and signed in 1885 the number of members has increased until at present there are nearly fifty full members. In the meantime many have come and gone, and hence the membership has varied from year to year both in numbers and in personnel. Besides those already mentioned as charter members the following professors, still serving on the faculty of the State University of Iowa, were elected to full membership in the Club during the first five years of its existence: Laenas G. Weld, Charles C. Nutting, Elbert W. Rockwood, George T. W. Patrick, and Bohumil Shimek.

The records of the Baconian Club are unusually complete. The Secretary's *Record-Books* from the very beginning are still in existence, and in these books may be found the minutes of all the meetings, together with lists of officers and members. The purpose of the founders, the character of the meetings, the persons in attendance, and the topics which from year to year were of interest in the world of science are revealed in the pages of these *Record-Books,*

and hence in them may be found the best history of the Baconian Club.

The Baconian Club was the first organization of its kind in the University. During the early years, although the chief object of the Club was to discuss subjects in the natural and physical sciences, the membership included men from the faculties of all the colleges and departments in the University. But as the University grew the need of similar clubs in the various departments began to be felt. And so, as time went on members of the Baconian Club who were not primarily interested in the natural and physical sciences withdrew and formed the Political Science Club, the Philosophical Club, the Humanist Society, and other similar organizations, modelled after the Baconian Club which was the parent society. The result is that at the present time the membership of the Baconian Club is confined almost entirely to persons actively engaged in teaching or research work in the natural and physical sciences.

CONSTITUTION

Article I—Name and Object

Section 1. This organization shall be known as the Baconian Club of Iowa City.

Section 2. Its object shall be, the mutual interchange of thought, and the discussion of such scientific topics as possess a general interest.

Article II—Membership

Section 1. Membership shall be of three classes, viz., ex-officio, full, and associate. The President of the University shall be a member, ex-officio.

[Revised April 15, 1898.]

Section 2. Members shall be those engaged in active scientific work.

SECTION 3. Associates shall be those interested in scientific work.

SECTION 4. Members and associates shall be elected by ballot of the members of the club, the names having been proposed at least one week previously. Three black balls shall cause the rejection of the candidate. In case of rejection a second ballot may be had, at a subsequent stated meeting. A second rejection shall render the candidate ineligible for the remainder of the club year.

[Amended October 25, 1889, by adding:]

SECTION 5. No person not a resident of Iowa City shall be a member of the club. Members who remove their residence permanently, or members who though residents of the city have not been in attendance on the meetings of the club for one year, shall thereby cease to be members, but may, by vote of the club, be carried on the rolls as associate members.

SECTION 6. A member who refuses to give a paper during any one year, or who fails to read a paper during any two consecutive years, unless such failure is due to illness or unavoidable absence from the city, shall have his name dropped from the roll of the club. In case the membership is too large to allow an assignment of topic during the year, one or more voluntary reports may be accepted as a substitute.

[Adopted April 15, 1898.]

SECTION 7. An associate who removes his residence permanently from the city shall thereby cease his membership in the club, provided, always, that any associate may continue his relations with the club by presenting, either personally or by written communication, at least one voluntary report each year. By a two-thirds vote of the club, any name may be retained permanently on the roll of associates.

[Adopted April 15, 1898.]

Article III—Officers

Section 1. The officers of the club shall be a President and a Secretary.

Section 2. The President shall be elected at the first meeting in September, of each year, from among the members, by a majority vote of all members present. He shall hold office until the next annual meeting, or until his successor is elected. He shall perform the duties usually appertaining to the office of President. In his absence his place shall be taken by a Chairman elected by the members present.

Section 3. The Secretary shall be elected at the same time, and in the same manner as is prescribed for the election of the President, and his term of office shall be the same. He shall perform the duties usually devolving upon a Secretary. Should he be absent from any meeting, a Secretary *pro tem.* shall be elected.

Article IV—Dues and Fees

There shall be no dues nor fees. Any expenses incurred by vote of the club, shall be met by a pro rata assessment, previously made, on all the members.

Article V—Meetings

Section 1. The meetings shall be Annual, Regular, and Special.

Section 2. The Annual Meeting shall be in the last week in September. At this meeting the Order of Business shall be:

1. Report of President.
2. Report of Secretary.
3. Report of Committees.
4. Election of Officers.

Section 3. The Regular Meetings shall be held once a

week, from the last week in September to the last week in April, on such day, at such hour, and in such place as the club may from time to time direct. The Order of Business at these meetings shall be as hereinafter provided.

SECTION 4. Special Meetings may be held at any time, by vote of the club, on call of the President, or at the request of three members. At such meetings no other business than that for which the meeting has been called shall be transacted.

ARTICLE VI—ORDER OF BUSINESS

The Order of Business at all regular meetings shall be as follows:

1. Reading of Minutes.
2. Reading of Essay.
3. Colloquium.
4. Discussion.
5. Voluntary Reports.
6. Assignment of Topic.
7. Miscellaneous Business.
8. Adjournment.

ARTICLE VII—ESSAYS AND ESSAYISTS

SECTION 1. The appointed essayist, at each regular meeting, shall furnish the Secretary with an abstract of the paper, to be entered in the minutes.

SECTION 2. The essay shall remain the property of the writer, unless it shall be published in full by the club, with the consent of the author, in which case the copyright shall remain with the club.

ARTICLE VIII—BY-LAWS

The club may adopt Standing Resolutions, at any meeting, as circumstances may require, by a majority vote of all the members present. Such Standing Resolutions shall be re-

corded, and have all the authority of By-Laws until repealed.

Article IX—Amendments

The Constitution may be altered or amended at any regular meeting, by a two-thirds vote of all the members, written notice of the proposed amendment having been given at least one week previously. Absent members may vote by proxy on questions of amendment.

OFFICERS OF THE CLUB 1885-1910

For the Year 1885-1886—President, N. R. Leonard; Secretary, L. W. Andrews and A. A. Veblen.

For the Year 1886-1887—President, Samuel Calvin; Secretary, A. A. Veblen.

For the Year 1887-1888—President, Samuel Calvin; Secretary, A. A. Veblen.

For the Year 1888-1889—President, L. W. Andrews; Secretary, A. A. Veblen.

For the Year 1889-1890—President, A. A. Veblen; Secretary, C. C. Nutting.

For the Year 1890-1891—President, T. H. Macbride; Secretary, C. C. Nutting.

For the Year 1891-1892—President, J. G. Gilchrist; Secretary, L. G. Weld.

For the Year 1892-1893—President, C. C. Nutting; Secretary, A. L. Arner.

For the Year 1893-1894—President, L. G. Weld; Secretary, W. E. Barlow.

For the Year 1894-1895—President, G. T. W. Patrick; Secretary, A. G. Smith and Frank Russell.

For the Year 1895-1896—President, A. L. Arner; Secretary, A. G. Smith.

For the Year 1896-1897—President, E. W. Rockwood; Secretary, A. G. Smith.

For the Year 1897-1898—President, A. G. Smith; Secretary, G. L. Houser.

For the Year 1898-1899—President, W. L. Bierring; Secretary, G. L. Houser.

For the Year 1899-1900—President, B. Shimek; Secretary, W. E. Barlow.

For the Year 1900-1901—President, Samuel Calvin; Secretary, C. E. Seashore.

For the Year 1901-1902—President, A. V. Sims; Secretary, C. E. Seashore.

For the Year 1902-1903—President, C. E. Seashore; Secretary, C. L. Von Ende.

For the Year 1903-1904—President, W. J. Teeters; Secretary, C. L. Von Ende.

For the Year 1904-1905—President, A. A. Veblen; Secretary, J. J. Lambert.

For the Year 1905-1906—President, G. L. Houser; Secretary, C. L. Bryden.

For the Year 1906-1907—President, Karl E. Guthe; Secretary, F. A. Stromsten.

For the Year 1907-1908—President, W. G. Raymond; Secretary, A. G. Worthing.

For the Year 1908-1909—President, R. B. Wylie; Secretary, P. S. Biegler.

For the Year 1909-1910—President, G. F. Kay; Secretary, S. M. Woodward.

PAPERS AND REPORTS 1885-1910

Frank Stanton Aby, 1888.—*Papers*: The Development of the Cerebro-Spinal Axis, 1889; Trichinae, 1891; The

Ultimate Distribution of the Blood, 1892; Recent Researches on the Physical Basis of Life and Heredity, 1893. *Reports*: Cultivation of Mushrooms, 1889; The Sweat Ducts and Blood Supply of the Skin, Discovery of the Hog-Cholera Microbe, 1891; Coloring Matter in Human Epidermis, 1892; The Estimation of the Weight of Haemoglobin in a Dried Human Blood Cell, A New Science "Cystology", Demonstration of Giant Cell of Sarconea, A Theory of Heat-producing Centers in the Brain, Partheno-genesis as Shown by the Worker Bee, 1893; Review of Article by W. D. Howells on "Nerve Degeneration and Regeneration" (given by Gilchrist and Aby), 1894.

Henry Albert, 1904.— *Papers*: Insects, the Role They Play in the Transmission of Diseases, 1905; Bacteria and the Public Health, 1906; Animal Diseases Transmissible to the Human Being, 1907; Arterio-sclerosis — its Relation to the Pathology of Senility, 1908; The Pasteur Treatment of Rabies and Other Forms of Vaccine Therapy, 1909. *Reports*: The Preparation of Permanent Museum Specimens, 1903; Construction and Working of the Epidiascope, 1905; Filaria, Sulphur and Formaldehyde Fumigation, Light Producing Bacteria, 1906; Inhalation of Coal Dust, Appendicitis, 1907; Spirochaete Bacteria, Method of Isolating the Typhoid Bacillus from Others Found in Water, 1908; Making of Colored Slides by a New Process of Color Photography, Hook-worm and the Hook-worm Diseases, 1909; The Work of Cultivating Tissues and Organs of the Body outside of the Body, 1910.

Edward X. Anderson, 1909.— *Report*: The Nucleation of Pure and Mixed Vapors in Dust Free Air, 1910.

Launcelot Winchester Andrews, Charter.— *Papers*: Dead Matter, 1886; Historical Review of the Methods Em-

ployed for the Production of Extreme Cold and the Liquefaction of the Permanent Gases, 1886; Evolution of the State, 1886; The Flowing Wells at Belle Plaine (with Calvin), 1886; The Asymmetric Carbon Atom in Organic Compounds, 1886; The Evolution of the Telephone, 1887; Atomic Theories in the Light of Atomic Facts, 1887; What We Know about the Weight of Atoms, 1888; Electrical Storage Batteries, 1888; A Chapter from the History of Science, 1889; What Have the Material Sciences to Do with Education, 1889; The Absolute Size of Molecules, 1889; Osmosis and Allied Manifestations of Molecular Motion in Solutions, 1890; Aluminum — its Manufacture and Possible Industrial Value, 1890; A Symposium on the Nature of the Centre of the Earth (with Weld and Calvin), 1891; The Spectrum, 1891; Progress toward Aerodynamical Navigation, 1891; Modern Explosives, 1892; Paracelsus Bombastus and the Science of his Day, 1892; Some Principles of Evolution Illustrated in Chemical Processes, 1892; The Development of Chemistry from Alchemy, 1893; Recent Useful Applications of Electricity Other than Mechanical, 1893; Some Applications of Science to the Detection of Crime, 1894; Porcelain, 1896; Next to Nothing, 1896; An X Ray Soiree, 1896; Discovery Scientific and Otherwise, 1898; The Non-Chemical Elements, 1898; The Air We Breathe, 1899; Concerning the Scope of University Training, 1900; How the Weight of an Atom is Ascertained, 1901; The Water Supply and Purification System of Budapest, 1902; Some Relations of Mass to Chemical Action, 1903. *Reports*: Silicon in Iron and Steel, Fallacies Concerning Freezing of Water, Poison in Wall Paper, Determination of the Velocity of Meteors, The Linking Carbon Atom in Organic Compounds, Intelligence Displayed by Mice, Some Phenomena in Connection with Fracture of Glass, Edelmann's Calorimeter and von Beetz's

Lecture Galvanometer, Another Series of Experiments on Nitrification, A New Astatic Galvanometer with Spiral Needle, Survival of the Fittest in the Conflict of Molecules, 1886; Antisepsis and Sterilization by Electricity, The Function of Rain in Supplying Substances Important to Plant Life, Methods of Photometry, A Hydrostatic Balance and Testing Machine, Secretions of Insectivorous Plants, Free Fluorine, Comparison of the Sense of Smell with the Other Senses as Regards Delicacy, Electrification of Air, Viscosity of Liquids and a New Form of Viscosimeter, The Prediction and Discovery of the Element Germanium, The Symptoms of Hemlock Poisoning, 1887; Aluminum in Plants, Molecular Geometry, Influence of Light on Electric Leakage and Disruptive Discharge, Microscopic Perspective, The Kruess Vierordt Spectroscope, Singing Flames, The Formation of Waterspouts, The Cimento Academy of Florence, 1889; Recent Researches Concerning Solutions, The Element "X", The Action of Light in Producing Electrical Disturbances, A Pipette for Volumetric Work, Modifications in the Theory of Electrolysis, The Manufacture of Photographic Dry Plates and the Theory of Developing the Image, Discovery of Criteria for the Actuality of Truth, 1889; Photography of the Electric Spark, Herbert Spencer's Principles of Psychology, Vol. I, Ch. V, Last Line, The Sandwich Islands, Plasmodium Malariae (for Hagebeck), Christening of the "Myopyknometer", The Pasteur Filter, Hydrazic Acid, 1890; The Application of Electrolysis to Toxicology, The Electric Coal Cutter, A Bronze Microbe, Individuality of the Chemical Unit, Siemens's Regenerative Evaporator, 1891; Stas and his Work on the Determination of Atomic Weights, The Nature of the Interatomic Force Acting within the Molecule, Recent Experiments in the Sub-Divisions of Matter, The Asymmetric

Arrangement of Atoms, An Analysis of the Illuminating Gas of the Iowa City Gas Company, Prof. H. A. Rowland's New Map of the Solar Spectrum, A Chemical Paradox, Non-Existence of Chemical Action at Low Temperatures, 1892; A Supposed Meteorite by Analysis Shown to be only Hematite; Results of a Chemical Examination Bearing on the Oxygenation of the Water, An Experiment in Capillarity Showing Relative Rate of Movement of Water and the Substance Dissolved in it, The Longitudinal Conductivity of Quartz Crystals, The Use of Tools by Animals, Illustrations of the Structure of Molecules by Means of Models, Wolf's Electrolytic Apparatus for the Detection and Estimation of Small Quantities of Arsenic, 1893; The Optics of Photography, Photographic Inaccuracies, Use of Electricity in Bleaching Operations, Use of Electricity for the Disinfection of Sewage, Perception of Time, Viscocity and Diffusion, Lack of a Rythmic Sense, Dangers from Kerosene Stoves, 1894; The Effect of Ammonia upon India Rubber, The Survival of the Fittest as Shown in the Overthrow of Past Civilizations, Myrotype, a New Photographic Printing Paper, Argon, Some Physiological Effects of Extreme Cold, The Phenomena of Electro-Thermometry, A Hot Air Motor, The Incombustibility of Sulphur in Dry Oxygen, Cycles of Lengthening and Shortening of the Swiss Glaciers (with Littig), Aluminum Bronze, Translation of a Paper by Ostwald on the Overthrow of Scientific Materialism, The Absence of Hydrogen from the Atmosphere, 1895; Calculating Machines, Experiments in Cathode Ray Photography, The Apparatus Used in the Discovery and Study of the Lenard Rays, Attempts to Obtain the X Ray without a Vacuum, Negatives Illustrating the Location of a Foreign Body by Means of the X Rays, 1896; Sciograph of a Femur Showing a Rifle Bullet Lodged in the Flesh, Curious Mark-

ings in the Interior of a Compound Lens Due to the Slow Contraction of the Canada Balsam Used as a Cement, The Sea Mills in Cephalonia, The Energy of Chemical Change, The Wetherell Electromagnetic Method of Ore Concentrating, Recent Revivals of Alchemistic Notions, The Melting of Impure Ice, 1897; The Selective Radiation of Light by Certain Substances, Modern Methods of Liquefying Air, 1898; The Keeley Motor Fraud, The Degree of Accuracy Attained in Atomic Weight Determination, Comparison in Size of the Smallest Bacteria and the Molecules of Starch (with Bierring), 1899; The Transmission of Coloring Matter to the Plumage of Birds through Food, 1900; The Death Rate Greater in the Cities than in the Country, A Model to Illustrate the Process of Electrolysis, A Phase of Vital Statistics, The Acoustics of an Auditorium, Investigation Made by Piquard on the Self Healing Power of Glass, 1901; Poisoning of Chemical Reactions, Mercerized Wool, 1902; Radium, Small Amount of Catalyzers Required to Cause a Marked Hastening of Action, 1903; Discovery of Radium, 1904.

Oscar William Anthony, 1889.—*Papers*: Thermo-Electricity, 1890; Vortex Rings with Special Reference to their Properties in a Non-viscous Medium, 1891; Some Achievements and Possibilities of Mathematics, 1892.

Albert Levi Arner, 1890.— *Papers*: Electro-Magnetism and the Methods of its Measurements, 1891; The Tendency of Modern Electrical Theory, 1891; Temperature and Precipitation, 1892; The Removal of Faults in Submarine Cables, 1894; Cloud Formation, 1894; The Principle of Interference and its Application to the Refraction of Light, 1896; Some Characteristics of Modern Physics, 1897. *Reports*: A Recent Electrical Installation in London, A Thompson Houston Watt-metre, Nature of the Charge and Discharge

of the Leyden Jar, 1891; Electrolytic Method of Refining Copper, High Electrical Resistance, Continuity of the Spectrum, Magnetic Hysteresis and its Manifestation in the Armature of the Dynamo, Certain Analogies between the Electric Current (so-called) and Flowing Water, A Contribution to the Theory of the Electrophorous, Experiment Confirming the "Kinetic Theory of Gases", 1892; The Theory of Induction, Comparative Economy of Heating by Coal and Electricity, 1893; A Frauenhofer Micrometer, Queen and Company's New Pyrometer, Meteoric Dust Shower of March 17, Isothermal Lines of Iowa, 1894; The Cold Pole in Northeast Siberia, Municipal Control of Electric Lighting Plants, 1895; Cathode Ray Photography, The Measurement of Magnetic Fields, The Distribution of Temperature in Iowa on April 16th, 1896, 1896.

Fred George Baender, 1906.— *Papers*: The Relation of the Mechanical Trades to Each Other, 1906; The Development of a Phonographic Record, 1908. *Reports*: Application of the Gyroscope in Automobile Practice, 1908; Installation of the White Steam Car, 1909.

Richard Philip Baker, 1906.— *Papers*: Mathematical Concepts, 1907; Printer's Ink, 1908.

William Edward Barlow, 1892.— *Papers*: The Phosphatic Nodules of the Mesozoic Deposits of Cambridgeshire, England, 1893; Impure Air, 1894; Coffee and its Adulterants, 1897; The Reducing Properties of Aluminum, 1899; Corundum, Especially Rubies and Sapphires, 1900. *Report*: Recent Improved Methods of Gold Extraction, 1895.

Edward Newton Barrett, 1888.— *Reports*: Some Psychological Phenomena, Cosmogony of the Pre-historic Race of Central America, 1891; Recent Archaeological Discoveries in the Orient, 1893; The Last of the Samaritans, 1894;

A Table Giving a Babylonian Account of the Deluge, The Principles of the Polychrome Bible, 1898; The Recent Discovery of a Royal Mummy Supposed to be that of the Pharaoh of Exodus, 1900.

George Neander Bauer, 1895.— *Papers*: The Nine-point Circle, 1897; The Principle of Duality, 1897.

H. Heath Bawden, 1900.— *Papers*: The Psychological Theory of Organic Evolution, 1901. *Report*: A Review of Loeb's Physiology of the Brain, 1901.

Arthur Beavis, 1887.— *Papers*: The Passion Play and Some Deductions Therefrom, 1887; The Evolution of the Bicycle, 1888.

William Edmund Beck, 1902.— *Paper*: The Northern Constellations, 1904.

Frederick Jacob Becker, 1902.— *Paper*: The Infusion of a Salt Solution, 1903.

Russell Burns Haldane Begg, 1899.— *Paper*: The Fatigue of Metals, 1900.

William Bonar Bell, 1902.— *Report*: Results of Experiments at Woods Holl, 1903.

Philip Sheridan Biegler, 1906.—*Paper*: Electrification of Steam Railways, 1907.

Walter Lawrence Bierring, 1893.— *Papers*: Modern Methods of Bacteriological Research, 1894; The Sewers of Paris, 1895; Louis Pasteur the Scientist and the Fruits of his Labors, 1895; Animal Parasites in Disease, 1896; Formaldehyde the New Disinfectant, 1897; Some of the Benefits of Bacteria, 1899; Recent Developments in the Study of Pathological Processes, 1899; The Role of Insects in the Spreading of Disease, 1900; The Relation of Tuberculosis in Man to that in the Lower Animals, 1890; Smallpox Vac-

cine, its Preparation and Use, 1903; Why are We Becoming a Race of Dyspeptics, 1905. *Reports*: Bacilli of Tuberculosis of Leprosy and of Actinomycosis or Ray Fungus, 1893; Diphtheria, 1895; Loeffler's Blood Serum in Diphtheria Diagnosis, The Cause of Cancer, Odontoma, 1896; The Plague in India, A New Method of Cultivating Anaerobic Bacteria, The Discovery of Bacillus Icteroidis, the Microbe of Yellow Fever, 1897; A Method of Preparing the Eye for Demonstration, Leprosy, Demonstration of the Microbe of Yellow Fever, A Hair Ball from a Human Stomach, A Culture Medium of Human Blood Serum, 1898; Phototherapy, Comparison in Size of the Smallest Bacteria and the Molecules of Starch, 1899; A Case of Agoraphobia, Mosquito Inoculation for the Spreading of Malaria, 1901; Tetanus Resulting from the Use of Antitoxin, 1902.

Walter Martinus Boehm, 1903.—*Paper*: The Musical Scale, 1904. *Reports*: Making Zone Plates, 1901; Ether of Space, 1904; Electrical Conductivity of Various Liquids, 1906; Advance in Science in the Year 1907, 1907.

Charles Henry Bowman, 1894.—*Papers*: Alternating Currents, 1896; The Wave Theory of Light, 1897; Thermodynamics, 1898; The Electromagnetic Theory, 1900. *Reports*: Modulus of Elasticity of Steel, 1894; A Demonstration of the Vibration of a Soap Film Due to Sound Waves, Experiments on the Interference of Light, 1897; The Phenomena of Interference in Light Waves, 1898; The Wehnelt Interrupter, Interference Phenomena in Circular Shadows, Some Experiments in Hydrodynamics, 1899; Surface Tension of Liquids, 1900.

William J. Brady, 1902.—*Papers*: Are the Teeth of Man Degenerating?, 1902; The Influence of Civilization on the Teeth, 1902; Why Teeth Decay, 1905.

Fay Cluff Brown, 1909.— *Paper*: Light Electric Properties of Light-Positive and Light-Negative Selenium, 1910. *Reports*: A New Form of Selenium Cell, 1909; Some Recent Facts Concerning Radio-Activity, 1910.

Maud Brown, 1903.— *Report*: Technique of Experiments in Psychological Laboratory, 1904.

Charles Lazarus Bryden, 1904.— *Papers*: The History of a Piece of Coal, 1906; Extinguishing an Anthracite Mine Fire, 1906. *Reports*: Mineral Carborundum, Method of Eliminating Moisture from Air Used in Blast Furnaces, 1905; Mining of Anthracite and Bituminous Coal, 1906.

Motier A. Bullock, 1889, Associate.— *Reports*: Ancient Bread Found in Cliff Dwelling, 1890; The Utilization of Electricity in Horticulture and Floriculture, Employment of Monkeys in Siam for Detection of Spurious Coin, Bodily Levitation, 1891; Waterworks System of South Haven, Michigan, Use of Electric Light in Forcing Certain Plants, Hay Fever and Asthma, 1893; The Discovery of an Extinct Race in Egypt, 1895; A Case of Double Consciousness, 1897; The George Junior Republic, 1898; The Scientific View of the Doctrine of Immortality, 1899.

Albertus Joseph Burge, 1901.— *Papers*: Blood in Health and in Disease, 1902; Physics Applied in Medicine, 1904; Facts and Fancies about Appendicitis, 1907; The Doctor as an Economic Factor, 1908. *Report*: Foreign Substances Taken from the Body, 1907.

Joseph M. Califf, 1886.—*Papers*: The Contest between Heavy Guns and Heavy Armor Plating, 1886; The Dynamite Gun, 1887; Submarine Mines, 1888; The Development of the Modern Rifle, 1888; The Development of the Modern High Power Rifle, 1889. *Reports*: The Latest Results in Experiments on Slow Burning Powder, The New

Explosive Melanite and Other High Explosives, Experiments in the Use of Torpedo Netting in the Defense of Vessels, 1887; The Accuracy of Modern Rifled Cannon, 1888; Results of the Tests of the New Steel Guns, 1889; The Composition of Nickel-Steel Armor Plate, 1892.

Samuel Calvin, Charter.— *Papers*: Living Matter, 1885; The Sources of Vital Energy (with Macbride), 1886; Geology in Iowa, 1886; Formation of Strata, 1886; The Flowing Wells at Belle Plaine, (with Andrews), 1886; Croll's Theory of Secular Changes in Climate, 1886; Spontaneous Generation, 1887; The Vorticellidae, 1887; The Deep Well at Washington, Iowa, 1887; Some Special Geological Problems in the Sierras, 1888; Some Points in the Physiology of the Nervous System, 1889; The Duration of Geological Time, 1889; Mountain Making, 1890; The Eccentricities of Rivers, 1890; A Symposium on the Nature of the Center of the Earth (with Weld and Andrews), 1891; The Elephant in Iowa and Elephant Dentition in General, 1891; The Niagara Limestone of Iowa, 1892; Some Mesozoic Reptiles and Birds, 1893; The Driftless Area in Northeastern Iowa, 1893; Conditions Attending the Deposition of the Cambrian and Silurian Strata of Iowa, 1894; The History and Genesis of the Soils of Northeastern Iowa, 1896; Pre-Paleozoic and Paleozoic Faunas, 1896; Pleistocene Iowa, 1897; The Mesozoic Faunas, 1897; Geological Walks about Iowa City, 1899; Land Forms in Iowa, 1899; The Geology and Scenery of the Pipestone Region, 1900; A Geological Trip through Colorado, 1901; A Trip to British Columbia, 1902; The Interglacial Deposits of Iowa, 1904; Vulcanism and Associated Phenomena, 1905; Some Points in the Geological History of the Mississippi River, 1907; Some Mammals now Extinct, that once Inhabited Iowa, 1907; Large Animals now Extinct which Lived in Iowa during the First

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William B. Cochrane, 1892.—*Papers*: Mineral and Thermal Springs, 1894; Modern Surgery of the Digestive Tract, 1895; Some Defects in Eye Refraction, 1895.

Samuel W. Collett, 1905.—*Paper*: Plant Breeding, 1906.

Jacob Elon Conner, 1901.—*Report*: Some Features of the Tariff Schedule, 1903.

Amos Noyes Currier, 1889. Associate.—*Reports*: Decline of Rural New England, 1890; Lately Found Constitution of Athens by Aristotle, What Should Precede the American University, 1891; The Cleanliness of the Ancient Romans, 1895.

Robert Burdette Dale, 1909.—*Report*: The Teredo Navalis, 1910.

Lee Wallace Dean, 1894.—*Papers*: The Plastic Compounds of Cellulose, 1895; Some Practical Points in Dietetics, 1898; The Hygiene of the Eye in the Public Schools, 1899; The Anomalies of Refraction, 1900; The Causes of Blindness in Children in Iowa, 1901; The Beating of the Heart, 1902; Taking Cold, 1903.

Mrs. J. J. Dietz, 1889. Associate.—*Report*: Some Thoughts from Emerson, 1904.

Edward Lewis Dodd, 1904.—*Paper*: The Interest on One Cent and Some Mathematical Curiosities, 1905.

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Gilman Arthur Drew, 1888. Associate.—*Report*: The Sting of the Honey Bee, 1890.

Frank Moses Dryzer, 1908. Associate.— *Report*: Principle of Least Work, 1909.

Clarence Willis Eastman, 1898.— *Report*: Defects of the Verb "Must", 1901.

Burton Scott Easton, 1898.—*Paper*: Star Color under the Meteoric Hypothesis, 1899. *Reports*: The Discovery of the Ninth Satellite of Saturn, Dr. Morrison's Paper on Hebrew Sundials, 1899.

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Hanson Edward Ely, 1897.— *Report*: The Defense of Sea Coasts and Harbors, 1898.

Clarence Estes, 1909.— *Report*: Radium Content of Hot Springs in the Yellowstone National Park, 1910.

J. M. Faucett, 1886.— *Report*: Relative Durability of Limestone and Sandstone in Engineering Structures, 1886.

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Arthur Hillyer Ford, 1905.— *Papers*: Electric Power Transmission, 1905; Illumination, 1906; Design of an Electric Power Station, 1907; Street Lighting, 1908; Recent Advances in Electric Lamps, 1909.

J. Allen Gilbert, 1895.— *Papers*: Some Effects of the Loss of Sleep, 1896; Researches upon the School Children of Iowa City, 1897. *Reports*: A Measurement of an Error of Judgment, 1895; An Instrument for Testing Hearing, The Spark Method of Measuring Time, 1897.

James Grant Gilchrist, Charter.—*Papers*: Migration of Leucocytes, 1885; Abnormal Changes in Cell Structure

and Development, 1886; Light Houses and Buoys, 1886; Cognition Physiologically Considered, 1886; Mechanism and the Effects of Snake-Bite, 1887; The Anatomical and Physiological Reasons for Right-Handedness and Left-Handedness, 1887; Difference in Cellular Structure in Original and Reparative Organizations, 1887; Auxiliary Motive Power in Ships of War, 1888; The Genesis of Morbid Action, 1888; Development of the Pipe Organ, 1888; The Origin of the Blood, its Functions and the Mechanism of its Circulation, 1889; The Military Lessons of the Civil War, 1889; Modern Surgery, 1889; A National Reserve, 1890; Fractures and Methods of Repair, 1890; The Natural History of Disease, 1891; Surgical Anaesthesia, 1891; The Anatomy and Physiology of a Man of War, 1892; The Phenomena of Inflammation, 1892; Medical Education as a Function of the State, 1892; Vascular Traumatism, 1893; Reminiscences of Travel in Venezuela, 1893; Inflammation, 1894; Dislocations With Particular Reference to their Reduction, 1895; Gunshot Wounds, 1895; The Genesis and Classification of Tumors, 1896; Vis Medicatrix Naturae, 1896; Medical Jurisprudence, 1897; Physiological Compensations, 1898; Our Naval Successes and the Reasons for Them, 1898; Some Recent Considerations of the Surgery of the Great Cavities of the Body, 1899; Westminster Abbey, 1900; Gun Shot Wounds in the Great Cavities, 1901; How to Meet Modern Requirements for a Medical Education, 1902; College Amateur Athletics, 1903; The Problem in Medical Art, 1903; Aneurisms, 1904; The Evolution of the Gothic in English Architecture, 1905; The Genesis of Malignant Tumors and Factors Favoring their Recurrence, 1905. *Reports*: On the Migratory Cell, A Method of Emptying Bilge-water from Vessels, Visceral Evolution, Symptoms of Poisoning as Regards Judicial Toxicology,

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Russell D. George, 1900.—*Papers*: A Sketch of the Geology of Canada, 1900; A Sketch of Gold Mining and Milling in the United States, 1902; The Development of the Iron Industry in the United States, 1902. *Reports*: Recent Criticism of the Nebular Hypothesis, 1900; Marble Flows, 1901; Report of Mineral Output for 1901, The Possibility of Aluminum Replacing Copper, Solubility of Glass in Water at a High Pressure, 1902; Growing of Crystals, 1903.

Henry Max Goettsch, 1899.—*Papers*: Drinking Water and Typhoid Fever, 1900; The Pecuniary Economy of Food, 1901.

Ethel Golden, 1897.—*Report*: The Education of Linnie Haguewood, a Blind and Deaf Girl, 1898.

Charles Edward Gordon, 1907. Associate.—*Papers*: Underground Waters, 1908; Railroad Construction, 1909. *Report*: Work of the Reclamation Service, 1909.

Selskar Michael Gunn, 1906.—*Report*: The Problem of Clean Milk, 1907.

Karl Eugen Guthe, 1905.—*Papers*: The Whistling and the Speaking Arc Light, 1906; What is Matter, 1906; Electrical Units, 1907. *Reports*: A New Tantalum Electric Incandescent Lamp, 1905; Two Kinds of Burners in Iowa City, Magnetic Properties of Different Materials Especially Manganese, Theory of Isostasy, 1906; Average Temperatures of the Winter Months during the Past Few Years, 1907; Application of the Gyroscope to the Steamship, 1908; Difference in Pressure in the Atmosphere by Small Changes in Height, Vibrations of Spring and Wires, Weather Conditions of the Past Fifty Years, 1909.

Frederick Goodson Higbee, 1905.— *Papers*: Mechanical Drawing, 1906; Lumber Industry in the Pacific Northwest, 1909; Our Inland Seas, 1910.

Jack Brunt Hill, 1909.— *Report*: The Heating Element of an Electric Flat Iron, 1909.

Albert S. Hitchcock, 1886.— *Papers*: Chlorophyl, 1886; The Future of Chemical Science Economically Considered, 1887; The Metallurgy of Silver, 1887; The Chemistry of the Plant Cell, 1888. *Reports*: Variations of Sucrose in Sorghum, On Manufacture of Gun-Cotton, Changes in the Spectrum of Chlorophyl on Standing in the Dark, Heating of Platinum by Condensation of Gases on its Surface, 1887; The Delicacy of Chemical Reactions, Certain Cases of Abnormal Flowers, On Two Species of Peronospora, Lines of Magnetic Force, Remarks on the Iowa Flora, Absorption Bands of the Chlorophyl Spectrum, 1888; Chlorophyl in Alcoholic Specimens of Silk-Worm, Two Specimens of Silicified Wood, 1889.

Arthur Warren Hixon, 1908.— *Paper*: Iron Mining in the Lake Superior Region, 1909.

F. A. Holton, 1887.— *Paper*: Methods of Distinguishing between Butter and Butter Substitutes, 1887.

Gilbert Logan Houser, 1892.— *Papers*: Some Features of Paleozoic Corals, 1893; The Structural Elements of Connective Tissue, 1894; The Cleavage of the Egg, 1895; Segmentation of the Vertebrate Head, 1895; The Ear, 1896; The Degeneration of the Tunicate, 1898; The Data of Modern Neurology, 1899; The Physical Basis of Heredity, 1900; Recent Progress in Cellular Biology, 1901; The Results of Experimental Embryology, 1902; Vitalism and Mechanism as Explanations of Life, 1903; Phosphorescence, 1905;

Primary Causes of Animal Behavior, 1903; The Brain of the Vertebrate, 1906; Recent Progress in the Study of the Living Substance, 1908; Present Status of Darwinism in the Field of Zoology, 1909; Some Modern Viewpoints of Animal Life, 1909; Form Changes in the Animal Cell, 1910. *Reports*: The Nematocysts of the Fresh Water Hydra, 1893; Formaline, 1893; The Formation, Growth and Disappearance of a Water Spout, 1896; The Origin and Purpose of the Thyroid Gland, 1897; The Relation between the Auditory Nerve and the Hair Cells of the Ear, Changes in Nerve Cells due to Activity, 1898; Effect of Radiation of Radium on Animal Life, Achievements of Carl Gegenhaur, Experiments of the Japanese Hatai with Lecithin, 1903; Phosphorescence in Animals, The Stimulation of Protoplasm and the Deferring of Somatic Death, 1905; Cilia, The Distribution of the Physiological Metals in the Animal Cell, Oxidation in the Living Cell, 1906; Changes in Cellular Structure of Animals with Age, 1908.

Minnie Howe, 1888. Associate.— *Report*: The Flora of a Metamorphic Ledge in Luverne County, Minn., 1891.

Alfred Onias Hunt, 1888.— *Papers*: Toothache, 1888; Methods of Tooth-Saving, 1889.

James Elder Hutchinson, 1909.—*Report*: Liquid Illuminating Gas in Switzerland, 1910.

Woods Hutchinson, 1895.— *Paper*: Uses of Pain, 1895.

Z. H. Hutchinson, 1894.—*Reports*: An Apparent Immunity from Rattlesnake Poison Acquired by Dogs, Two Present Day Instances of Old Sick-Room Superstitions, 1894.

W. T. Jackson, 1891.— *Report*: The Writings of Commenius, 1892.

Charles Davis Jameson, 1887.—*Papers*: The Panama Canal, 1887; Photography Applied to Surveying, 1888; Engineering Features of the Proposed Nicaragua Canal, 1888; Evolution of the Bridge Truss, 1889; Sewerage and Sewers, 1889; Railroad Signals and Safety Appliances, 1890; The Virtual Length of Railways, 1890; Field Methods of Railroad Location, 1891; The Evolution of the Modern House, 1892; A Comparison of English and American Railways, 1892; The Evolution of Rapid Transit in Cities, 1893; The Indicator and its Use, 1894; An Engineering Education, 1894. *Reports*: An Astonishing History Showing the Great Justice in the Working of the Railroad Law in Iowa, The Relative Efficiency of Electric and Steam Locomotives, Color Photography, 1890; The Fall of Two Spans of the Louisville and Jeffersonville Bridge, Glaciers of Alaska, 1894.

Leora Johnson, 1890. Associate.—*Report*: The Prevention of Diphtheria by Inoculation, 1894.

Charles Kahlke, 1890. Associate.—*Report*: Inoculation of a Rabbit with Anthrax Bacillus, 1891.

William Jay Karslake, 1909.—*Paper*: The Doctrine of Valence, 1909.

George Frederick Kay, 1907.—*Papers*: Theories of the Earth's Origin, 1908; The Coal Supply of the United States, 1910. *Reports*: Discovery of Diamonds in Arkansas, 1906; Nickel Ore Deposits in Northern California, 1908; Supply and Conservation of Coal, 1909; Evidences of Glaciation, 1909.

Harry Eugene Kelly, 1897.—*Report*: The Harvard English Reports, 1898.

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GRACE KENT, 1893. Associate.—*Report*: Effects of Fatigue upon the Senses, 1904.

EDWARD C. KNOWER, 1885.—*Paper*: Changes in Tactics since Waterloo and the Breech-Loader, 1886.

ALBERT KUNTZ, 1908.—*Report*: Development of the Sympathetic Nervous System, 1910.

BYRON JAMES LAMBERT, 1903.—*Papers*: The Automobile, 1904; The Tunnels and Subways of New York City, 1907; Illustrated Description of the Big Bridges of New York City, 1909; Aeronautics, 1910. *Reports*: Telegraphone, 1905; Transportation Facilities of the Brooklyn Bridge, 1905; Report on Bridge near Quebec which Collapsed, 1907; Michigan Central Tunnel under the Detroit River, 1908.

JOHN JOSEPH LAMBERT, 1900.—*Papers*: Regeneration in Animals, 1902; Animal Grafting, 1903; The Physiology of Sleep, 1904; The Marine Biological Laboratory at Woods Holl, 1905. *Reports*: Dr. Kim's Phototherapeutics by Injection into the Spinal Cord, 1901; Beating of a Cat's Heart, Cause of Muscle Contraction, 1902; Distribution of Animals, 1904.

JAMES HENRY LEES, 1902.—*Reports*: The Study of the Drift in Madison County, Continued Motion of Occluded Bubbles, 1903.

NATHAN R. LEONARD, Charter.—*Papers*: Meteorites, 1886; Physical Cause of Earthquake, 1886; Color Envelopes, 1886; Croll's Theory of Glacial Climate, 1887; Methods of Measuring the Velocity of Light, 1887. *Reports*: Recent Meteoric Showers, On Meteorites, Method of Distinguishing between Atmospheric and Solar Lines of the Spectrum, Displacement of the First Band of the Spectrum

of Encke's Comet, Temperature of Different Parts of Sun Spots, 1886; Velocities Observed in Solar Prominences, Progress in Celestial Photography, 1887.

Lawrence William Littig, 1890.—*Papers*: Cleanliness in Surgery — What it Implies To-day, 1891; Cause and Prevention of Typhoid Fever, 1893; Brief References to Pasteur and Some of his Works, 1893; The Spinal Cord and its Functions, 1894; The Athletic and the Senile Heart, 1895; La Grippe, 1897. *Reports*: Some Remarkable Cases of Hysteria, Two Cases of Hysteria Cured by Suggestion, 1893; A Copy of Father Kneippe's Book on Water Cure and Some of his Methods, 1894; Cycles of Lengthening and Shortening of the Swiss Glaciers, 1895; A Hair Tumor in a Human Stomach, 1896; A Case of Cure by Suggestion, 1897.

Fred James Longworth, 1907.—*Paper*: Mining and Smelting Conditions in British Columbia, 1908. *Report*: Effect of Recent Financial Flurry on Mining, 1907.

Isaac Althaus Loos, 1890. Associate.—*Paper*: Logical Methods in Political Economy, 1895. *Report*: Professor Nutting's Theory of the Coloration of Deep Sea Animals, 1900.

Charles F. Lorenz, 1900.—*Papers*: Measurement by Light Waves, 1901; A Few Electrodynamic Experiments, 1903; Stereoscopic Projection, 1904. *Reports*: The Phenomena of a Rotary Magnetic Field, 1898; Principle of Orthochromatic Photography, A New Nernst Lamp, 1903; Cooper Hewitt Mercury Vapor Lamp, 1906.

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PERCY C. MYERS, 1896.—*Reports*: A Mega-microscope, The Diatomaceous Deposit of Clear Lake, The Diatomaceous Deposits of Lake Okoboji, 1898.

FRANK JOHN NEWBERRY, 1895.—*Papers*: The Relation of Electricity to Medicine, 1896; The Ophthalmoscope and What it Reveals, 1897; The Human Ear, 1897; Color Blindness, 1898; Some Observations Concerning the Upper Respiratory Tracts, 1900; The Sympathetic Relations Between the Two Eyes, 1901.

ERNEST R. NICHOLS, 1886.—*Papers*: Series, 1888; Trochoids, 1889; The Growth of Mathematics, 1890.

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Finder, Latest Discovery at Lick Observatory, 1904; Description of a Piece of Photometric Apparatus Seen in Standard Bureau at Washington, Astronomical Instrument for Eliminating the Personal Equation in Obtaining the Transit of a Star, 1905; Some Factors to be Considered in the Determination of Loss of Matter, 1906; Certain Methods of Sinking Wells Through Sandy Soils, 1907.

Roy Titus Wells, 1903.— *Papers*: Some Developments in Electric Railroading, 1904; The Reaction of a Conducting Core on a Solenoid, 1904. *Reports*: An Electrically Driven Pendulum, 1903; Regulating the Strength of a Field, 1904; Electric Traction, A New Electric Light Bulb, Methods of Measuring very Minute Alternating Currents, 1905.

John Van Etten Westfal, 1899.— *Papers*: A Famous Old Problem in Geometry, 1900; The Game of Minor Fan Tan, 1902; The Fundamental Principles of Life Insurance and Annuities, 1902; A Proof of the Transcendency of e and π, 1903; Transcendental Numbers, 1904.

William Robert Whiteis, 1893.— *Papers*: Immunity, 1895; The Histology of the Tooth, 1897. *Reports*: A Solution for Staining Nerve Centers, A Large Microtome for Sectioning the Entire Brain, 1897.

Henry Frederick Wickham, 1903.— *Papers*: Ants, 1903; Some Remarkable Habits of Spiders, 1904; Insect Life in the Great Basin, 1905; Arctic Colonies in the Rocky Mountains, 1905; Notes on a Trip to Mexico, 1908; Notes on the Mexican Trip of 1908, 1909; Variation of Color Pattern in the Genus Cecindela, 1910. *Reports*: The Simplest Form of Insects — Compodes Staphylinus, 1907; A Peculiar Bug Emesa Longipes, 1910.

William Craig Wilcox, 1894.— *Report*: Trend of Modern Historic Research in this Country, 1904.

FRANK ALONZO WILDER, 1903.— *Papers*: Yellowstone National Park, 1904; The Geological History of the Rhine Valley and its Relations to History and Science, 1905; The Geology of the Appalachian Mountains and its Bearings on American History, 1906. *Reports*: Recent Criticism of the Nebular Hypothesis, Coal-Testing Plant at St. Louis, 1904; Gas and Oil Fields of Kansas, 1904; Government Coal Testing at St. Louis Fair, Mining and Shipping of Iron Ore, Producer Gas, 1905.

MABEL CLARE WILLIAMS, 1903.—*Papers*: The Subconscious, 1903; How Many Senses Has Man, 1903; Memory in Animals, 1903; Rhythm, 1910. *Reports*: Result of Experiments in Area-Volume Illusion, 1901; Investigation by Motora, 1904.

HENRY SMITH WILLIAMS, 1886.—*Paper*: Brains, 1886.

EDWARD WOLESENSKY, 1909.— *Report*: A New Method of Preparing Diamonds, 1910.

SHERMAN MELVILLE WOODWARD, 1904.— *Papers*: A Mathematical Attempt to Mitigate the Severity of a Torrid Climate, 1905; The Principle of Least Work as Applied to Beams, 1909; English Gothic Cathedral Construction, 1909. *Reports*: A Freak Standpipe, 1905; Conditions Causing the Explosion of an Evaporator in a Factory, 1908; A Problem in Hydraulics, The Humphrey Gas Pump, 1909.

ARCHIE GARFIELD WORTHING, 1906.— *Papers*: The Application of the Electron Theory to Certain Physical Phenomena, 1908; Water Splashes, 1909. *Reports*: Atomic Weight of Nickel, Some Experiments of Sir Wm. Ramsey, 1907.

ROBERT BRADFORD WYLIE, 1906.—*Papers*: A Primary Factor in the Evolution of Plants, 1908; The Okoboji Lakeside Laboratory, 1909. *Reports*: Peculiar Characteristics

of the Red Algae, 1907; Method of Isolating Some Forms of Fungi, 1908.

The following papers were read by invitation of the members of the Club:

Capt. Bennett — Some Peculiarities of Whales, 1889.

Prof. W J McGee — A Visit to a Savage Tribe, 1899.

Prof. W. H. Norton — Shore Forms, 1901; Artesian Wells in this Locality, 1908; Illustrated Account of the San Francisco Earthquake Disaster, 1908.

Regent Albert W. Swalm — The Growth and Prosperity of the University, 1894.

Dr. E. S. Talbot — Degeneracy, its Causes, Signs and Results, 1904.

Prof. S. N. Williams — The Obligation of Science to Suffering Humanity, 1910.

Mr. White — The Great Storm at Samoa, 1890.

Malcolm Glenn Wyer — Book Binding, 1909.

Mr. George P. Dieckmann — The Modern Manufacture of Portland Cement from the Mechanical and Chemical Standpoints, 1910.