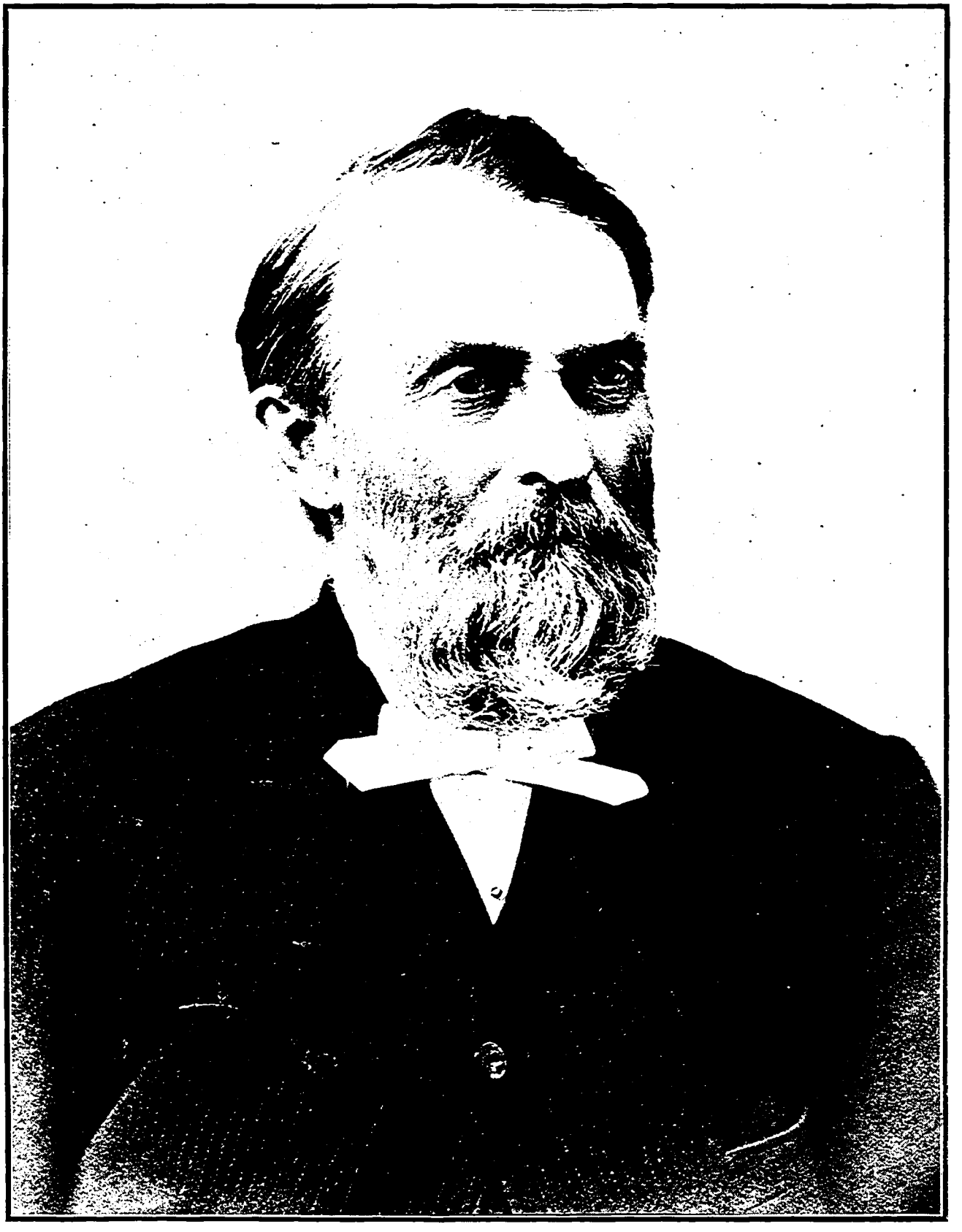
Chautauqua Society History and Natural Science

1883-1908



PROF. SAMUEL G. LOVE

PROCEEDINGS OF THE

Chautauqua Society of History and Natural Science

FROM JULY 19, 1883, TO JULY 19, 1908, WITH

CONSTITUTION AND BY-LAWS
LIST OF MEMBERS, OFFICERS
PAPERS AND ADDRESSES, ETC.

Organized July 19, 1883

Published by the
CHAUTAUQUA SOCIETY OF HISTORY AND NATURAL SCIENCE
JAMESTOWN, NEW YORK

CHAUTAUQUA SOCIETY OF HISTORY AND NATURAL SCIENCE

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Jamestown, N. Y.

OFFICERS 1908

President

HON. OBED EDSON

First Vice President

WM. W. HENDERSON

Second Vice President

MRS. DANIEL GRISWOLD

Secretary

HON. ABNER HAZELTINE

Treasurer

LEVANT L. MASON

Executive Committee

L. L. MASON

MRS. NEWEL CHENEY
MRS. GEO. W. STRONG
MRS. GEO. S. TUCKERMAN
HON. A. B. OTTAWAY

Necrologist

MRS. R. C. SEAVER

Organization of the Chautauqua Society of History and Natural Science.

BARNES' PAVILION,
MAPLE SPRINGS, July 19, 1883.

The following named gentlemen, to wit: Samuel G. Love, Wm. W. Henderson, Obed Edson, Dr. A. Waterhouse, Judge L. Bugbee, Wm. C. J. Hall, John A. Hall, A. Brooks Fletcher, Daniel Sherman, Dr. H. C. Taylor, and Dr. Chas. Parker, having previously considered the utility and necessity of a permanent organization for the collection and preservation of valuable historic facts, and the exploration and development of local fields and subjects of scientific research, united in calling a meeting for that purpose, to assemble at Maple Springs, on Chautauqua Lake, Thursday, July 19, 1883.

On that date, the first six gentlemen named being in attendance, the meeting was called to order at 11 a. m., by Wm. W. Henderson, and on motion of Obed Edson, Esq., of Sinclairville, Prof. S. G. Love, of Jamestown, was nominated for temporary Chairman, and Wm. W. Henderson, of the same place, for temporary Secretary. Both gentlemen were duly elected.

Prof. Love, on taking the chair, returned thanks for the compliment and briefly stated the purpose of the meeting.

The draft of a Constitution and By-Laws had been prepared and was presented by Mr. Henderson. These were read and discussed in detail by the assembly, and as finally amended, were, on motion, unanimously adopted. (The Constitution and By-Laws will be found complete on the concluding pages of the report.)

On motion of Dr. Waterhouse, the Society, under the Constitution, proceeded to the election of officers for the ensuing year, with the following result:

President—SAMUEL G. LOVE.
1st Vice President—WM. C. J. HALL.
2d Vice President—H. C. TAYLOR, M. D.
Secretary—WM. W. HENDERSON.
Treasurer—JUDGE L. BUGBEE.

Ex. Committee: OBED EDSON, Chairman.
A. WATERHOUSE, M. D.
DANIEL SHERMAN,
JOHN A. HALL,
CHARLES PARKER, M. D.

By vote of the Society, on motion of Mr. Wm. C. J. Hall, the question of charter members was referred to the Executive Committee, with power to add to the list within sixty days, the names of such persons desiring to become charter members, as may be deemed eligible.

On motion of Dr. Waterhouse, it was decided to hold the next annual meeting at Maple Springs.

On motion, a committee consisting of W. C. J. Hall, W. W. Henderson and J. L. Bugbee was appointed to explore the mounds and earthworks located in the vicinity of Jamestown, and report upon the same at the next regular meeting.

Papers and addresses to be prepared and read at the next regular meeting were, by personal consent, assigned as follows:

History of Educational Progress—Prof. Love.

Geology of Chautauqua Lake Region—O. Edson.

The Flora of Chautauqua—A. Waterhouse, M. D.

Pioneer Homes and Characteristics—J. L. Bugbee.

On motion of O. Edson, Esq., the Society voted to adjourn to meet at Jamestown, Thursday, January 17th, 1884, at such place and hour as the Executive Committee shall designate, of which the members shall each be duly notified.

WM. W. HENDERSON,
Secretary.

OFFICERS AND COMMITTEES
1883-4

President

PROF. SAMUEL G. LOVE - - - Jamestown

Vice Presidents

WILLIAM C. J. HALL - - - Jamestown
HORACE C. TAYLOR, M. D. - - Brocton

Secretary

WM. W. HENDERSON - - - Jamestown

Treasurer

JUDGE L. BUGBEE - - - South Stockton

Executive Committee

HON. OBED EDSON, Chairman - - Sinclairville
A. WATERHOUSE, M. D. - - - Jamestown
DANIEL SHERMAN - - - Forestville
JOHN A. HALL - - - - Jamestown
CHAS. PARKER, M. D. - - - Panama

CONSTITUTION AND BY-LAWS

PREAMBLE.

WHEREAS, Experience has established the value of association and organized effort in promoting special departments of knowledge; and,

WHEREAS, There exist important facts relating to the original physical characteristics and resources of this region—many evidences and traces of pre-historic and primitive occupation, fast being obliterated, as well as facts relating to the first settlement, and the progressive history of this county which need to be recorded and preserved for the benefit of succeeding generations. Therefore, be it

Resolved, That we whose names are hereto attached, citizens of Chautauqua County, N. Y., do hereby organize ourselves into a permanent society for that purpose, and that we adopt the following Constitution and By-Laws.

CONSTITUTION

ARTICLE I.

NAME.

This Society shall be called the Chautauqua Society of History and Natural Science.

ARTICLE II.

PURPOSE.

The aims of this Society shall be to unite persons of kindred tastes for mutual aid in the development and preservation of valuable local history, and the exploration of local fields and subjects of scientific research, and in the form of published papers, addresses, etc., to transmit the same for public use and benefit.

ARTICLE III.

MEMBERSHIP.

*SECTION 1. This Society shall consist of Active and Honorary members. All Active members must be residents of Chautauqua County.

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*Amended to read as follows at annual meeting, 1908:

SECTION 1. This Society shall consist of Active and Honorary members. Active members must be resident or native of Chautauqua County.

SEC. 2. Any adult person of good moral standing whose taste and culture tend to affiliation with the Society is eligible for membership.

SEC. 3. Historians, Scientists and former residents living elsewhere, who shall be thought worthy, may be elected honorary members. Such shall not, however, be required to contribute to the funds, nor shall they be eligible to office, or vote at the meetings of the Society.

ARTICLE IV.

OFFICERS.

The officers of this Society shall be a President, two Vice Presidents, a Secretary, a Treasurer, and an Executive Committee consisting of five members, (and of which Committee the Secretary shall be, ex-officio, a member), all of whom shall be elected annually, by ballot, and shall hold office until the election of their successors.

ARTICLE V.

DUTIES OF OFFICERS.

SECTION 1. The President, or in his absence or inability to serve, the Vice Presidents, in their order, shall preside at all meetings of the Society; call special meetings at the written request of three active members; shall present or cause to be presented at each annual meeting an address, or report of the Society; suggest such subjects as he may deem worthy of notice, and perform such other duties as pertain to the office.

SEC. 2. The Secretary shall keep a record of all the proceedings of the Society, and a roll of the names of the members, their residence, date of admission, and any subsequent changes. He shall read all communications, conduct all correspondence, notify all members four weeks in advance, of each regular meeting, and at each annual meeting render a report of the duties performed by him since the last annual meeting, and, in conjunction with the Executive Committee, superintend such publications as the Society shall direct. He shall notify all members of their election, and also furnish each member of a committee with the names of his associates on such committee. He shall have charge of the archives of the Society and the custody of papers, documents, specimens, etc., until otherwise provided for.

SEC. 3. The Treasurer shall have charge of all the funds of the Society, for which he shall be personally responsible; shall collect all moneys due the Society; pay all bills when countersigned by the

Executive Committee; render a full report of his transactions at each annual meeting, and report the state of the treasury when requested by the Executive Committee.

SEC. 4. It shall be the duty of the Secretary and Treasurer to turn over to their successors all papers and property of the Society committed to their care.

ARTICLE VI.

EXECUTIVE COMMITTEE.

The Executive Committee, of which the Secretary shall be, ex-officio, a member, shall have charge of the revision of the roll; the investigation of applicants for membership, and the publication of the proceedings. It shall audit all bills against the Society, and have charge of all business not otherwise assigned.

ARTICLE VII.

MEETINGS.

SECTION 1. There shall be held regularly an annual meeting of the Society on the third Thursday in July of each year, and a semi-annual meeting on the third Thursday of January in each year at such place and hour as the Society shall previously select.

SEC. 2. Special meetings shall be called by the President upon the written request of three active members. The notice shall state the object of the meeting, and no other business shall be transacted at that meeting. The Secretary shall give due notice of all special meetings.

ARTICLE VIII.

BY-LAWS.

This Society may establish for its future government and regulation such By-Laws as do not conflict with this Constitution as may be deemed proper and desirable.

ARTICLE IX.

AMENDMENTS.

Every proposition to alter or amend this Constitution shall be submitted in writing and read at a regular meeting, and may be voted for at the next regular meeting, when, upon receiving the vote of three-fourths of the members present, it shall become a part of this Constitution.

BY-LAWS

ARTICLE I.

QUORUM.

The President—either Vice President—the Secretary, and any three members of the Executive Committee, shall constitute a quorum for the transaction of business.

ARTICLE II.

MEMBERSHIP.

The names of persons applying for membership, with their place of residence and present occupation, shall be presented to the Society in writing, signed by two of its members in good standing, and shall be referred to the Executive Committee, and if its report be favorable the candidates may be balloted for. Three negative votes shall defeat an election.

ARTICLE III.

INITIATION FEE.

The initiation fee of the Society shall be one dollar, which shall be paid into the treasury, and the member elect shall sign the Constitution and By-Laws before the close of the next regular meeting. A failure to conform to this requirement will render his election null and void.

ARTICLE IV.

COMMITTEES.

Special committees may be appointed as occasion requires, but such committees shall be limited to the scope of the resolution under which empowered to act.

ARTICLE V.

DELEGATES.

The Society may elect annually one or more delegates to represent it at the meetings of kindred Societies when invited.

ARTICLE VI.

VOTING.

It shall be the duty of every member present at a meeting to vote upon all motions which have been duly put, unless excused therefrom by the presiding officer.

ARTICLE VII.

RULES.

The ordinary rules of parliamentary bodies shall be observed.

ARTICLE VIII.

SUSPENSION AND AMENDMENT.

SECTION 1. These By-Laws shall not be suspended without the unanimous consent of the members present.

SEC. 2. Any amendment to the By-Laws must be presented in writing and be read by the Secretary, when, upon receiving the vote of two-thirds of the members present, it shall become a part of these By-Laws.

ARTICLE IX.

READING OF PAPERS.

All special papers to be read before the Society or filed in its archives shall be deposited with the Secretary, for the examination of the Executive Committee, at least five days previous to the meeting following, and shall, by their consent, be presented to the Society, and read and published, or may be published in the proceedings without reading.

ARTICLE X.

PUBLICATION OF PROCEEDINGS.

The proceedings of the Society, the roll of the officers, committees and members shall be published annually, under the supervision of the Secretary and Executive Committee, and a copy of the proceedings sent to each member of the Society.

ARTICLE XI.

EXPULSION AND REMOVAL.

The expulsion and removal of members or officers for improper conduct or for violation of the Constitution and By-Laws, may be effected by a two-third vote of all the members present at a regular meeting.

ARTICLE XII.

EXHIBITS.

The Society invites all members having specimens or objects of historic or scientific interest to exhibit the same at the regular meetings.

ARTICLE XIII.

ORDER OF BUSINESS.

1. Reading of the minutes of last session.
2. Applications for membership.
3. Address of the President, (annual).
4. Reports of the officers and committees.
5. Election of members.
6. Election of officers, (annual).
7. Reading of communications.
8. Reading of papers, addresses, etc.
9. Miscellaneous business.

OFFICERS OF THE SOCIETY SINCE ITS FOUNDATION

PRESIDENTS.

1883-1893. Prof. Samuel G. Love, Jamestown, N. Y.
1894-1903. Horace C. Taylor, Brocton, N. Y.
1904-1906. Flint, Blanchard, Jamestown, N. Y.
1907. Hon. O. Edson, Sinclairville, N. Y.

FIRST VICE PRESIDENTS.

1883-1888. Wm. C. J. Hall, Jamestown, N. Y.
1888-1894. Horace C. Taylor, M. D., Brocton, N. Y.
1894-1906. Marcus Sackett, Silver Creek, N. Y.
1897-1904. Flint Blanchard, Jamestown, N. Y.

SECOND VICE PRESIDENTS.

1883-1904. Marcus Sackett, Silver Creek, N. Y.
1904. Newel J. Cheney, Poland Center, N. Y.

SECRETARIES.

1883-1908. Wm. W. Henderson, Jamestown, N. Y.

TREASURERS.

1883. Judge L. Bugbee, Stockton, N. Y.
1886. Wm. W. Henderson, Jamestown, N. Y.

NECROLOGISTS.

1895-1900. Mrs. Jane E. Clark, Jamestown, N. Y.
1900-1902. Mrs. N. J. Cheney, Poland Center, N. Y.
1902. Mrs. Ruth C. Seaver, Sinclairville, N. Y.

PAPERS AND ADDRESSES

1. 1884, Jan. 17.—Local Mounds and Earthworks. Wm. W. Henderson, Chairman Committee.
2. 1884, Jan. 27.—Geology of the Chautauqua Lake Region. Hon. Obed Edson.
3. 1884, Jan. 27.—Pioneer Homes and Characteristics. J. L. Bugbee.
4. 1884, Jan. 27.—The Pioneer Press. W. McKinstry.
5. 1884, July 27.—Methods by which the Progress of Civilization is Maintained. Prof. S. G. Love.
6. 1884, July 27.—Classified List of the Flowering Plants of Chautauqua. Ai Waterhouse, M. D.
7. 1884, July 27.—Eloquent Eulogy upon Life and Services of Orsamus H. Marshall. Hon. Richard P. Marvin and Hon. O. Edson.
8. 1885, July 16.—Mastodon Americanus. Prof. Samuel G. Love.
9. 1885, July 16.—The King's Eighth Regiment. Hon. O. Edson.
10. 1885, Jan. 29.—Birds of Chautauqua County. John M. Edson, Jr.
11. 1885, Jan. 29.—The Six Nations. Hon. Daniel Sherman.
12. 1885, Jan. 29.—The Beaver. W. W. Henderson.
13. 1885, Jan. 29.—Microscopic Illustrations of Masticated Twigs found with remains of Mastodon (Hoyt farm). Ai Waterhouse, M. D.
14. 1885, Jan. 29.—Romance of Amos Sottle. H. C. Taylor, M.D.
15. 1886, Jan. 27.—Address upon the Work and progress of the Society. Prof. Samuel G. Love.
16. 1885, Jan. 27.—Reports of Mound Exploration; Important Revelations. Ai Waterhouse, M. D., Prof. Love and Wm. W. Henderson.
17. 1886, Jan. 27.—Recollections of Early Jamestown. J. Warren Fletcher.
18. 1886, Jan. 27.—Pioneer Mill Owners of the Cassadaga and its Tributaries. E. A. Ross.
19. 1886, Jan. 27.—Biographical Sketch of Hon. Abner Hazeltine. Abner Hazeltine.
20. 1886, Jan. 27.—Biographical Sketch of Hon. Joel Burnell, of Charlotte. Rev. H. H. Moore.

21. 1886, Jan. 27.—Sketch of Nathan Fay, of Portland. Horace C. Taylor, M. D.
22. 1886, Jan. 27.—Paul Busti, of Milan, Italy, for 25 years Agent Holland Land Co. Hon. Loren Blodget.
23. 1886, Jan. 27, (Evening).—Origin of the Erie Railroad. Hon. R. P. Marvin.
24. 1886, July 23.—Evidences of Early French Occupation. Nathan Brown.
25. 1886, July 23.—New Philosophy of the Sun. Henry R. Rogers, M. D.
26. 1887, Jan. 28.—Nebular Hypothesis. Henry R. Rogers, M. D.
27. 1887, July 28.—Fishing Excursion in Wilds of Pennsylvania. J. Warren Fletcher.
28. 1887, Jan. 28.—Personal Reminiscences of Pioneer Days. Nathan Brown.
29. 1887, Jan. 28.—Explorations with H. R. Reynolds of the Smithsonian Institute. Prof. Love and W. W. Henderson.
30. 1887, Aug. 4.—Experiences of the 154th Regiment en route and on Battle Field. Maj. W. S. Cameron.
31. 1887, Aug. 4.—Canals of New York. Henry Severence.
32. 1887, Aug. 4.—Memoir of Hon. Alvin Plumb. Mrs. Mary E. Bliss (daughter).
33. 1887, Aug. 4.—Pioneer Days. Nathan Brown.
34. 1887, Aug. 4.—Local Archaeology. Hon. O. Edson.
35. 1888, Aug. 30.—Memoir of Judge L. Bugbee. W. W. Henderson.
36. 1888, Aug. 30.—Memoir of Samuel B. Winsor. N. Brown
37. 1888, Aug. 30.—Chautauqua Regiments in War of 1812. G. W. Hazeltine, M. D.
38. 1888, Aug. 30.—Chautauqua Regiments in the Late War for the Union. Chaplain W. L. Hyde.
39. 1888, Aug. 30.—Ancient Mounds and Earthworks along Cattaraugus Creek. Marcus Sackett.
40. 1888, Aug. 30.—Early History of Town of Ellington, N. Y. Nathan Brown.
41. 1888, Aug. 30.—Indian Scare of 1838. Albro Brown.
42. 1889, Feb. 27.—Absolute Vacuum; Ice Lens of 1608. Henry R. Rogers, M. D.
43. 1889, Feb. 27.—Major Samuel Sinclair, founder of Sinclairville, N. Y. (a sketch). Hon. Obed Edson.
44. 1889, Feb. 27.—Anti-Slavery Times in Jamestown, J. W. Fletcher.

45. 1889, Feb. 27.—Labor Unions. Rev. W. L. Hyde.
46. 1889, Feb. 27.—Early Steamboat Navigation of Chautauqua Lake. Nathan Brown.
47. 1889, Sept. 6.—American Antiquities. Gen. G. P. Thruston, Nashville, Tenn. (Illustrated address.)
48. 1889, Sept. 6.—Monograph on Gravity. Henry R. Rogers, M. D.
49. 1889, March 25.—Sun Light and Sun Heat. H. R. Rogers, M. D.
50. 1890, Sept. 24.—Mistakes of Old Theories in Science. Henry R. Rogers, M. D.
51. 1890, Sept. 24.—Old French Portage Road. Horace C. Taylor, M. D.
52. 1891, March 20.—Methods to Enhance the Objects of the Society. Address by Prof. S. G. Love.
53. 1891, March 20.—Unitary Science—the Science of the Future. Henry R. Rogers, M. D.
54. 1891, March 20.—Recollections of the late Nelson E. Cheney, of Poland Center, relating to early settlement of Chautauqua County. Captain N. Cheney.
55. 1891, March 20.—Early Commerce by Store-Boats on the Chadakoin and Allegany Rivers. Nathan Brown.
56. 1891, Sept. 18.—The Moon's Place in Nature. Henry R. Rogers, M. D.
57. 1891, Sept. 18.—De Celoron's Expedition of 1749. Hon. Obed Edson.
58. 1892, Oct. 12.—Letter of Mrs. Elizabeth Berry Sage; Reminiscences of Fredonia Eighty Years Since. Mother of Hon. Geo. R. Sage, U. S. Court, Cincinnati, O.
59. 1892, Oct. 12.—Progress of Telescopic Knowledge. Rev. John Peate.
60. 1894, July 19.—An Emigrant's Tour from Massachusetts to Chautauqua County in the early years of the Century. Mrs. Jane E. Clark.
    Biographical sketch of Hon. N. Sackett. Marcus Sackett.
61. 1894, July 19.—Memoir of the late Prof. Samuel G. Love. Rev. W. L. Hyde.
62. 1894, July 19.—Memoir of the late Nathan Brown. Rev. W. L. Hyde.

63. 1895, July 18.—Evidences of Ancient Roadways in Town of Portland—Conjectural Character and Origin. H. C. Taylor, M. D.

64. 1895, July 18.—The Sun as a Dynamo, and the Sun's Dazzle. H. R. Rogers, M. D.

65. 1895, July 18.—The Big-Tree Council 1797 and Treaty of 1797. Mrs. Anna S. Jones.

66. 1895, July 18.—Early Memories of Chautauqua. Address of James A. Allen, Esq., Buffalo.

67. 1896, July 24.—Electrical Science as Related to the Solar System. H. R. Rogers, M. D.

68. 1896, July 24.—Ceremonial Scepter, Chipped Flint. Remarks upon by General G. P. Thruston.

69. 1897, Aug. 4.—Memorial sketch of Life and Character of the late Hon. Benj. H. Williams, of Buffalo, an honorary member of this Society. W. W. Henderson.

70. 1897, Aug. 4.—Memorial sketch of the Life and Character of the late James A. Allen, of Buffalo, an honorary member of this Society. Hon. Obed Edson.

71. 1897, Aug. 4.—A Chapter in the Geological History of the Chautauqua Lake Region. Prof. Herbert E. Bonsteel, of Cornell University.

72. 1897, Aug. 4.—Sketch of Amos Sottle as related to early settlement of County. Marcus Sackett.

73. 1897, Aug. 4.—The Universe (illustrated). Henry R. Rogers, M. D.

74. 1899, Sept. 29.—The Microscopic Germ. Henry R. Rogers, M. D.

75. 1899, Sept. 29.—Mastodon and Mammoth Fossil Remains in Chautauqua County (illustrated by specimens). W. W. Henderson.

76. 1900, July 19.—Phases of Early History of Chautauqua County. W. W. Henderson.

77. 1900, July 19.—Celebration of Opening of Erie Railroad at Dunkirk in 1851. Hon. Obed Edson.

78. 1901, Oct. 3.—Reference to Pan-American Exposition and Death of President McKinley. W. W. Henderson.

79. 1901, Oct. 3.—Soil Surveys and Their Value to Agriculture. Hon. Newel J. Cheney.

80. 1901, Oct. 3.—Food Fishes of Chautauqua Lake. Frank W. Cheney.

81. 1903, Oct. 1.—Eulogy upon Life and Services of Henry R. Rogers, M. D., as a Physician, and an able advocate of Progressive Science. W. W. Henderson.

82. 1903, Oct. 1.—Early Recollections of Ellicott. Hon. Flint Blanchard.

83. 1903, Oct. 1.—Causes of Migration to Chautauqua County. Hon. Newel Cheney.

84. 1904, July 19.—Eulogistic Remarks and Resolution on the Society's late President, Horace C. Taylor, M. D. Hon. Obed Edson and W. W. Henderson.

85. 1904, July 19.—Battle of Oriskany and Death of General Herkimer. G. W. Strong.

86. 1904, July 19.—Native Religious Sentiment and Forms. Moses Shongo.

87. 1905, July 19.—The Chautauqua Muscalonge. Hon. Obed Edson.

88. 1905, July 19.—Cell Growth. Chas. M. Reed.

89. 1905, July 19.—Word Picture of an Ancestral Home. Mrs. Lois N. Lott.

90. 1905, July 19.—History as Inspiration. Address by Prof. Thos. Bailey Lovell, Niagara Falls High School.

91. 1906.—Indian Remains in Western New York. D. M. Silver, Buffalo, N. Y.

92. 1906.—Glacial Epoch. Forrest Crissey.

93. 1907.—The Eries. Hon. Obed Edson.

94. 1907.—William Peacock. Hon. Abner Hazeltine.

95. 1907.—Pioneer Women of America. G. W. Strong.

96. 1907.—History of an Orchard. Mrs. N. J. Cheney.

97. 1907.—Archaeology. Arthur C. Parker, State Archaeologist.

98. 1908.—Chas. M. Dow. Paper written by the late Hon. A. G. Dow, aged 100 years—Aids to Longevity.

99. 1908.—Influence of Colonial and Revolutionary Times on the Literature of Today, by Prof. Thos. Bailey Lovell, Superintendent High School, Niagara Falls, N. Y.

100. 1908.—Chautauqua County: Past and Present. Mrs. S. W. Mason.

101. 1908.—Sketch of Captain Joseph Dix, a Soldier of the Revolutionary War. Hon. Abner Hazeltine.

102. 1908.—Chautauqua County: One Hundred Years. W. H. Tennant.

ACTIVE MEMBERS

Alverson, James
*Arnold, W. F.
*Blanchard, Flint
Blanchard, Mrs. Flint
Barrows, Ransom J.
Baker, Mrs. Richard
Baldiwn, Margaret Peacock
Bonsteel, Mr. and Mrs. H. E.
Bray, Frank C.
*Bugbee, George L.
Blood, Mr. and Mrs. Augustus
*Burtch, Mrs Sophia
Bentley, Gustavus A.
Broadhead, Miss Flora
Broadhead, Miss Myrtle
*Brown, Nathan
*Bishop, Elijah
*Bishop, Charles L.
*Barnes, Perry
*Brewer, Hon. F. B.
Belknap, M. C.
Cameron, Maj. and Mrs. W. S.
Crosby, Mr. and Mrs. H. N.
Cheney, Capt. and Mrs. Newell
Cheney, Mrs. Kate G.
*Crissey, E. B.
Crissey, Mr. and Mrs. Newton
Crissey, Shepard
Clark, Mr. and Mrs. Frank M.
Clark, Mr. and Mrs. Eugene C.
Clary, Mr. and Mrs. J. A.
Cawcroft, Ernest
*Clark, Mr. and Mrs. J. H.
*Cobb, John W.
Cadwell, Mrs. Jennie Wilson
Crandall, Mr. and Mrs. C. F.
Cipperly, Mr. and Mrs. C. P.
Coombs, Mrs. Delos
Dow, Mr. and Mrs. C. M.
Dickinson, Miss Sarah
Dawley, Mr. and Mrs. F. C.
Donehue, J.
Edson, Obed
Edson, Mrs. Emily Allen
Edson, John M.
Edson, Mr. and Mrs. Walter
Fletcher, A. Brooks
Fletcher, Miss Mary
Fuller, Fred A.
*Falconer, Mrs. Helen A.
*Farnham, John M.
Gifford, Mr. and Mrs. F. E.
Gifford, Mrs. A. B.
Griffith, Miss Ophelia
Griswold, Mr. and Mrs. Daniel
Green, Eleazer
Green, Mr. and Mrs. E. C.
Hall, Mr. and Mrs. Ralph A.
Hall, Mr. and Mrs. Edw. L.
Hall, Rev. and Mrs. Eliot C.
Hall, Miss Sarah
Hatch, Miss Saarh
*Hall, John A.
*Hall, Maj. W. C. J.
*Hall, Henry P., M. D.
Hall, Mr. and Mrs. Alfred E.
*Hall, Erie L.
Hall, Mr. and Mrs. Fred P.
Hallock, Rev. W. G.
*Hazeltine, Gilbert W., M. D.
*Hazeltine, Mrs. Susan
Hazeltine, Abner
Henderson, W. W.
*Henderson, Mrs. Martha T.
*Hyde, Rev. W. L.
Hyde, Fred W.
*Hedges, Mrs. Theda P.
Jenks, A. Frank
Ingraham, Mrs. Lucia T. S.
*Jones, Solomon
*Jones, Sidney
*Jones, Orsino E.

*Jones, Miss Calista
Jenks, Mr. and Mrs. A. F.
Keeler, Mrs. Z. G.
Larmonth, Mr. and Mrs. J. T.
Livingston, Dr. and Mrs. A. T.
*Lake, Hon. H. C.
Lannes, A. G.
LaDue, Jerome
*Love, Prof. S. G.
Mason, Levant L.
Mason, Mr. and Mrs. G. W.
Marvin, Mr. and Mrs. R. N.
Marshal, Mr. and Mrs. F. H.
Moore, Rev. H. H.
Merril, George D.
McGinness, J. S.
Miller, Phineas M.
Mott, Frank H.
*Marvin, Hon. Richard P.
*Moore, J. Robert
*Mason, Mrs. Eunice
*McKinstry, Willard
McLaury, Mr. and Mrs. G. E.
Nuttall, A. L.
Ottoway, J. E.
Ottoway, Hon. A. B.
Ottoway, Irving O.
Phelps, Mr. and Mrs. John F.
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*Post, Daniel H.
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Sheldon, Mr. and Mrs. Royal E.
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Tennant, Mrs. DeEmma
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*Winsor, Samuel B.
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*White, Hon. Orsamus A., Norwalk, O.

*Deceased.

TREASURER'S REPORT

J. L. BUGBEE, Treasurer

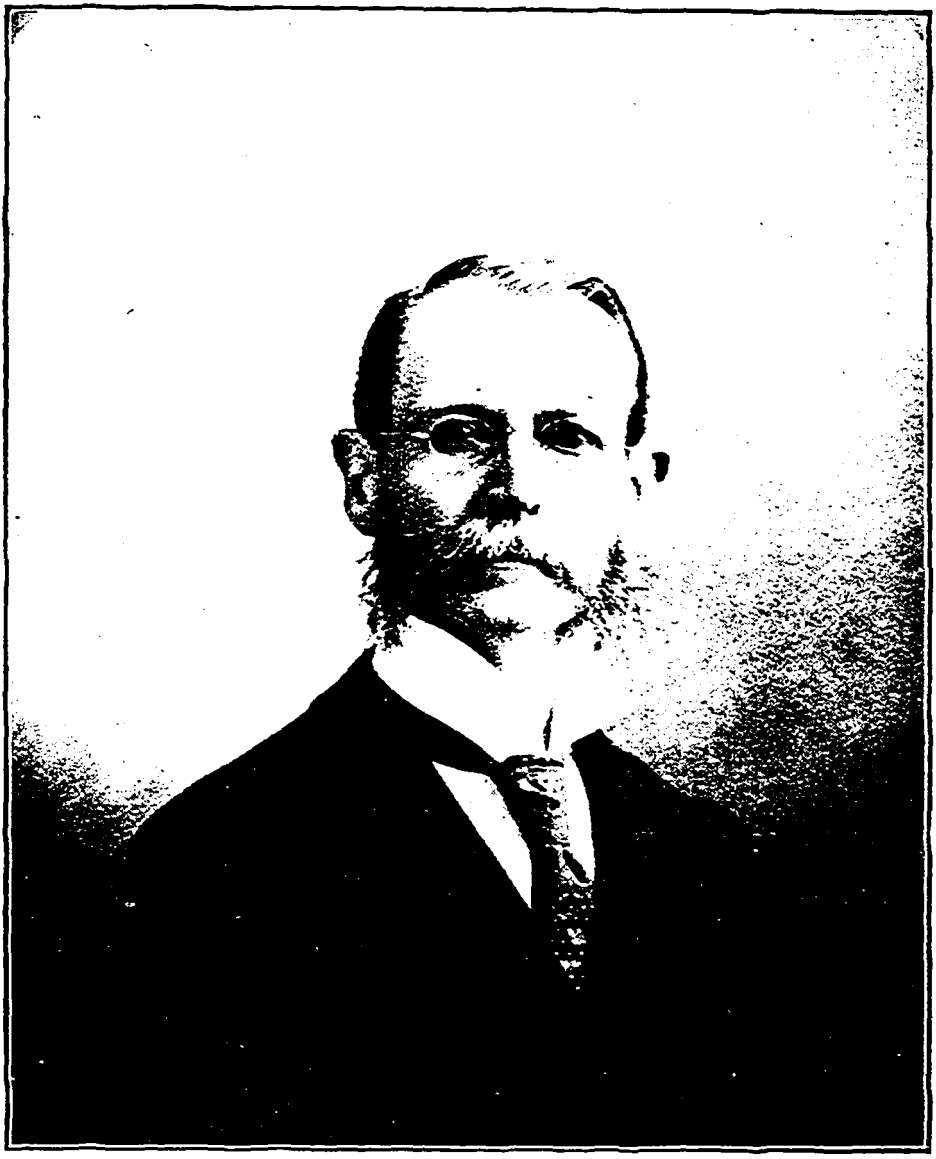
Receipts to July 17, 1884	$18.00
Disbursements	17.00
Balance	$ 1.00
Receipts During Year	35.00
Total July 16, 1885	$36.00
Disbursements	31.12
Balance	$ 4.88
Receipts July 23, 1886	16.00
Total	$20.88
Disbursements	11.95
Balance	$ 8.93
Receipts Aug. 4, 1887	22.00
Total	$30.93
Disbursements	10.40
Balance	$20.53
Receipts to Sept. 6, 1888	19.00
Total	$39.53
Disbursements	6.15
Balance	$33.68
Receipts March 20, 1889	12.00
Total	$45.38
Disbursements	3.10
Balance	42.28
Balance Sept. 24, 1890	$42.28
Receipts	10.00
Total	$52.28
Disbursements	2.10
Balance Sept. 18, 1891	$50.18
Receipts Oct. 12, 1892	9.00
Total	$59.18
Disbursements	1.50
Balance	$57.68
Receipts	9.00
Total	$66.68
Disbursements	1.00
Balance Jan. 19, 1894	$65.68

Balance Jan. 19, 1894	$65.68
Receipts	5.00
Total	$70.68
Disbursements	1.00
Balance July 25, 1896	$69.68
Receipts	7.00
Total	$76.68
Disbursements	1.00
Balance	$75.68
Receipts 1897	1.00
Total	$76.68
Disbursements	4.25
Balance	$72.43
Balance July 28, 1898	$72.43
Receipts	2.00
Total	$74.43
Disbursements	3.25
Balance	$71.18
Receipts	18.00
Total	$89.18
Disbursements	1.25
Balance July, 1901	$87.93
Disbursements	3.00
Total Oct. 3, 1903	$84.93
Disbursements July 19, 1904	9.25
Balance	$75.68
Receipts	9.00
Total	$84.68
Disbursements	7.55
Balance, 1905	$77.13
Receipts July 19, 1905	1.00
Total	$78.13
Disbursements	2.50
Balance July 19, 1906	$75.63

PROF. SAMUEL G. LOVE

Samuel G. Love was born at Barre, Orleans County, New York, May 30th, 1821. He died at Jamestown in his seventy-third year, November 12th, 1893. Gaining the education to be had in the common schools and academies of that period he, after fitting himself for Hamilton College, was graduated from that institution at about his majority. Subsequently he became a teacher in the public schools of Buffalo, had charge of the schools of Randolph, and next came to Jamestown on the consolidation of the schools into the Jamestown Union School and Collegiate Institute in 1865, and was the first superintendent. In this position he continued without intermission in that post of usefulness until he retired in 1890 to accept the less arduous yet congenial position of librarian of the James Prendergast Free Library. He was the first librarian of that library and devoted himself to cataloging the books in accordance with the most advanced systems. After the library was opened he applied himself unremittingly to make it what it was intended by its founder —an aid for the education of the people. Here the grim reaper found him with his work accomplished.

He was a student and gave his aid and encouragement to all matters that uplifted the people. He was one of the founders and the first President of the Chautauqua County Historical Society. To that society he contributed many valuable papers. He will be best remembered as an educator. He was a great school superintendent, fertile in ideas, courageous in execution, wise and firm in administration, stimulating both in precept and example to those of whom he was chief, and loyal always to the pupil, the teachers and the Board of Education. He was held in high esteem by the educators of the state and received from them frequent marks of distinguished honor.



W. W. HENDERSON

Founder and for 25 years Secretary and Treasurer of the Society

WILLIAM WALLACE HENDERSON

The subject of this sketch was born September 11th, 1828, at Sinclairville, of Scotch and English parentage, received such advantages as the common and high schools of that period afforded. With developing tastes and tendencies toward philosophical and scientific inquiry he early became a student of medicine under the tutelage of Henry B. Hedges, M. D. In 1847 and 1848 Mr. Henderson was a student in the Medical Department of the University of Buffalo. He adopted the profession of pharmacy in which he continued for nearly half a century, being the senior partner of the firm of Henderson & Putnam in the city of Jamestown. He has been President of the County Pharmaceutical Association, a member of the State Pharmaceutical Association and one of the Curators of the Department of Pharmacy of the University of Buffalo.

Politically he was affiliated with the anti-slavery element of the Whig party and was active in the local organization of the Republican party, with which he has continued. His services and counsel have been recognized, often serving as delegate to the State Convention and as member of the State Committee. He was appointed Postmaster at Sinclairville in 1861 under President Lincoln and held that office during four successive administrations. In 1871 President Grant appointed him Collector of Internal Revenue for the 31st District of New York, and after its consolidation with the 27th District, he was re-appointed its Collector with office at Elmira.

Mr. Henderson is known as an enthusiastic student in fields of philosophic and historic research. He was the founder of the Chautauqua Society of History and Natural Science and from its organization its Secretary and Treasurer. Many papers of interest and value have been contributed by him to its archives. He is a member of the Oneida Historical Society.

In all the varied relations of official, business and social life in which Mr. Henderson has been placed he has ever manifested kindliness of heart and the urbanity and courtesy of a gentleman.

CHAUTAUQUA PALEONTOLOGY

MASTODON AND MAMMOTH

By W. W. Henderson

At the threshold of local history, among the important and interesting facts relating to the natural history of Chautauqua County which have contributed to its fame, are those revealed in its archaeological remains. It is notable that within the last half century there have been exhumed from its soil four distinct specimens of the Mastodon (mastodon gigantus) and one specimen of the Mammoth (elephas Americanus), members of the order of Pachydermata (dense skinned animals), and of the family proboscidia (having probosis and tusks).

The initial discovery of the kind within the county was made August 25, 1871, on the farm of Joel I. Hoyt near the northern border of Jamestown, among a group of low hills—the terminal glacial moraines of the locality, which mark the southern extension of the ice sheet in this longitude, and here overlook the picturesque valley of the Chadakoin.

Regarding the event of discovery, we here introduce the descriptive portion of the excellent detailed report of the late Professor Samuel G. Love, of the Jamestown Collegiate Institute, published by the Jamestown Journal at the time, which forcibly illustrates the difficulties in the way of securing a perfect collection of such parts of a skeleton as might, with care and skill, be preserved, when the discovery is not accidental, and, as is usually the case, made by laborers wholly unacquainted with the importance and necessities of the occasion. These facts will inspire caution and care in unearthing and preserving future discoveries of the kind.

The Hoyt farm is on North Main street. The sink or peaty slough in which the remains were found is about five hundred feet from the east line of that street, covering an area of about an acre and varying from two to eight feet in depth—originally fed by several springs.

Mr. Hoyt caused the sink to be drained, leaving the muck to dry, but later began an excavation there for the double purpose of enriching his land with the muck and making a trout pond. The work of excavating had continued about a week when the workmen began to find, as they supposed, a peculiar kind of wood and roots imbeded some six feet beneath the surface. For several days they

continued to carry the smaller pieces into an adjoining field with the muck and to pile the larger ones with pine roots and stumps to be burned. But Mr. Hoyt being present on August 25, discovered unmistakable evidences of the remains of some huge animal which at some previous age of the world had been deposited there.

It was difficult to determine the precise position of the remains, as they were much disturbed, and some removed before any special notice was taken of them. From the best information obtainable, it was concluded that the body lay with its head to the east, from four to six feet below the surface. Many of the bones, however, were out of place. The lower jaw was about five feet from the head, and lay on the side, crushed together, so that the two rows of teeth were very near each other. The tusks extended eastwardly in nearly a natural position, and, judging from the statements of Mr. Hoyt and the workmen, they must have been ten or more feet in length.

After digging into the gravel and clay about ten inches, traces of a rib were found, decayed, but distinctly marked, over five feet in length. Where the body must have lain were found large quantities of vegetable matter, evidently the contents of the stomach, mostly decayed, in which were innumerable sections of small twigs from one-half inch to two inches in length, which, under the microscope, proved to have the cellular structure of the hemlock spruce. The remains were all in a forward state of decay, and it was found impossible to do but little more than had been done to preserve them. Many of them were picked up in the field whither they had been drawn with the muck, and from piles of roots and stumps. The parts of the skeleton secured are as follows:

Tip of one of the tusks; length, three feet, seven and one-half inches; diameter, six and one-half inches.

Middle section of the other tusk; length, two feet, five inches; diameter, seven and one-half inches.

Six teeth; length of the longer ones on the crown, seven and one-half inches; weight, five and one-half pounds; length of shorter ones, four and one-half inches; weight, two and one-half pounds.

Left side of under jaw, containing two teeth in situ; length preserved, two feet one inch; depth from the crown of the teeth, ten and one-half inches; thickness, six inches.

Pieces of scapula (shoulder blade) from ten to thirteen inches long, and four to seven inches wide.

Sections of ribs, twelve to eighteen inches long.

Head of the femur (thigh bone).

Portions of the vertebrae of the neck.

Fragments of the cranium (skull).

Various other pieces not identified.

This collection was presented by Mr. Hoyt to the Jamestown Collegiate Institute, and under the supervision of Professor Love, encased in glass was deposited in the museum of that institution, where it may now be inspected.

To facilitate a better understanding of the form and structure of the mastodon, we illustrate the subject by a reprint of the celebrated Cohoes specimen of the skeleton of the animal, as mounted in the New York State Museum of Natural History at Albany. The plate of the molar, as seen in this connection, is from a tooth of the Hoyt farm collection and exhibits the conical or mastoid tuberosities forming the grinding surface of the molar of the Mastodon as distinguished from the molar of the Mammoth, and giving name to the former as applied by Cuvier.

Several years later, (in July, 1888) at Bemus Point, on Chautauqua Lake, Frank Arnold, who resided near its shore, and habitually, in his boat, fished from its waters, had frequently observed, a rod or two from shore, at a depth of two or three feet, an object on the bottom which appeared to be a curiously shaped log or section of the knotty limb of a tree; on removing it for examination he found it to be a massive bone, which, on reference to accepted authority, was decided to be the tibia (or shin-bone) of the mastodon, and is probably part of the skeleton of that animal of large dimensions still remaining imbedded in the soil at the bottom of the lake near the place of this discovery. It doubtless became detached, was thrown up, and slowly washed in shore by the agitation of the waters of the lake during violent storms and by the landing of steamers many times daily at this place. Other portions of the same skeleton are likely to be thus recovered in the future. The tibia here illustrated is described as follows:

Length, twenty-eight inches; diameter at knee joint, ten and one-half inches; diameter at ankle joint, eight inches; weight, twenty-one and one-half pounds.

A comparison of the dimensions of this specimen with reported measurements of the tibia in the Cohoes skeleton exhumed in September 1866, (twenty-six inches in length) and of the Warren mastodon skeleton of Warren Museum in Boston, exhumed at Newbury, 1845, (twenty-eight inches in length), establishes its size to be uniform with that of the latter. When clothed in flesh, they were therefore respectively about nine and a half and ten and a half feet in height at the shoulders, the Chautauqua Lake specimen belonging to an animal of the latter dimensions.

Next in order of discovery is the Sheridan skeleton. We are indebted to George E. McLaury, Esq., of that town, for the following brief particulars kindly furnished by him:

"The skeleton referred to was found on the farm of George Dahlman, a few rods south of Main or Erie Road, on lot seven, midway between Silver Creek and Sheridan Center. It was discovered about 1895 while digging or deepening a ditch through a springy place about two rods wide. It was not more than two feet below the surface. The portions of the skeleton found were the skull, portion of tusk about twenty inches long and from three to five inches in diameter; four or five teeth about five by six inches and six inches long; shoulder blade and several pieces of ribs. The bones were inclosed in a sort of paste when found, and began to crumble on exposure to the air. This specimen was sold to the principal of the Dunkirk schools and is supposed to be at the present time in Rochester."

On June 16th, 1902, just previous to the Centennial of County Settlement, workmen employed in excavating the muck and peaty soil from a slough on the premises of Mrs. Alice M. Peacock in Westfield, for the purpose of forming an artificial pond, came upon the ribs and other bones of a large animal which, on the finding of a tusk, were pronounced those of a Mastodon. The tusk was much decayed and broken into sections and these, when placed in union as nearly as possible, measured seven feet six inches in length and sixteen inches in largest circumference. The first rib measured twenty-five inches, and the longest (probably the ninth) measured nearly six feet, and was three inches in thickness.

Several vertebrae, the largest dorsal, including body and spinous process, twelve inches. Two scapule (shoulder blade), two petallae (knee pan) globular in form, three and a half inches in diameter; several pieces of ribs and other bones. These were much separated, some found quite remote from the others. The bottom of the slough, which was from six to eight feet in depth, was quite thickly covered with small granite boulders mingled with blue clay. In the absence of molars, the distinguishing test of the species is wanting. All parts of the skeleton were deeply stained by the black muck of the sink and gave evidence of long exposure to decay.

Some time in June, 1900, William Myers, whose farm lies along the Conewango, near its junction with the Chadakoin, between the City of Jamestown and Frewsburg, was digging a ditch near his residence to drain a small tract of land previously more or less flooded by the stream, and at a depth of two and a half feet came upon a huge fossil tooth which, on exhibition, awakened much interest and curiosity. It was brought to Jamestown and shown to several gentlemen for the purpose of ascertaining its true character and importance. The writer having been referred to, with request to examine the specimen with this object in view, pronounced it the molar or grinding tooth of the Elephas Americanus. The American

elephant, like its Siberian congener, the Elephas Primigenius or Mammoth, is distinguished from the Mastodon by its peculiar dental structure and clothing of hair and wooly fur evidenced by specimens found intact in the Arctic ice fields of both continents. The molar herewith illustrated weighs four and three-fourths pounds, is eight inches in length at its crown, three and a half inches in width, and five and a half inches from crown to point of fracture in the root; a small portion of the crown and base is absent, also the extremity of the root.

The Mastodon has eight tuberculated or mastoid molars, and two upper and two lower incisors or tusks, though the latter are usually absent in the mature animal. The molar of the Mammoth, of which there are six on each side above and below, presents a flattened or corrugated grinding surface in transverse ridges of cementine and dentine, the number and arrangement of which in classification determines the species.

The Mammoth has no inferior incisors. In the adult males the upper incisors or tusks often attain a length of nine or ten feet, with tendency to spiral form. Different specimens, however, present great variations in curve from nearly straight to almost complete circle. The external characteristics for which the Mammoth was distinguished was its dense clothing, not only of long, coarse outer hair, but also a close under wooly hair of a reddish brown color, adapting the life of the animal to a colder climate. Its average size was about that of the largest existing elephants. The Mammoth belongs to the post tertiary or phistocine epoch, and it was undoubtedly contemporaneous with primeval man.

The space here alloted our subject permits only of a cursory local treatment, the bearings of which on the general theme are most interesting and important. Its relations to the Glacial period have received the able exposition of distinguished scientists on both continents, whose learned conclusions are accessible to every student of paleology.

The subject is actively engaging the attention of the great schools, and resulting in many startling discoveries affecting the progress of life on the globe.

Dr. Warren, in his work on the Mastodon gigantius of North America, describes about thirty species. The evidence is conclusive that long ago these huge animals and their congener, the elephant, pervaded this continent in great numbers.

The Western continent has come to be regarded by historians and archaeologists as a fertile field for research and study of prehistoric man and his environments in the distant past. In later years the progressive exploration and settlement of the country has brought to light a vast region in the west which abounds in well

preserved remains of various extinct animals—some of prodigious size and proportions, representing the animal life of remote ages. Many of these have been exhumed and placed in form with scientific skill and now enrich the collections of our principal museums. These discoveries reveal facts, and suggest truths which have greatly advanced the scientific wisdom of the age. Their frequent occurrence throughout the land has led to the adoption of more critical methods in dealing with the evidences adduced, and aside from dim tradition, it is now asserted, from the remains of Mastodons unquestionably more recent, that primitive man and these huge proboscidians were contemporary. This is one of the problems of the human race which has found its solution here. The contemplation of this fact awakens the most sublime reflections, and we close this brief sketch by quoting the eloquent thoughts of John D. Godman, of Philadelphia, a celebrated physician and naturalist of the last century:

"The emotions experienced when, for the first time, we behold the giant remains of this great animal, are those of unmingled awe. We cannot avoid reflecting on the time when this huge frame was clothed with its peculiar integuments and moved by appropriate muscles—when the mighty heart dashed forth its torrents of blood through vessels of enormous caliber, and the Mastodon strode along in supreme dominion over every other tenant of the wilderness. However we examine what is left to us, we cannot help feeling that this animal must have been endowed with a strength exceeding that of other quadrupeds as much as it exceeded them in size, and looking at its ponderous jaws, armed with teeth peculiarly formed for most effectually crushing the firmest substances, we are assured that its life could only be supported by the destructon of vast quantities of food.

"Enormous as were these creatures during life, and endowed with faculties proportioned to the bulk of their frames, the whole race has been extinct for ages. No human record of their existence has been saved, and but for the accidental preservation of its bones, we never should have dreamed that a creature of such vast size and strength once existed, nor could we have believed that such a race had been extinguished forever. Such, however, is the fact—ages after ages have rolled away, empires and nations have arisen, flourished and sunk into oblivion while the bones of the Mastodon, which perished long before the period of their origin, have been discovered scarcely changed in color and exhibiting all the marks of durability.

"That a race of animals so large, and consisting of so many species, should become entirely, and so universally extinct, is a circumstance of high interest, for it is not with the Mastodon as with

the elephant, which still continues to be a living genus although many of its species have become extinct. The entire race of the Mastodon has been utterly destroyed, leaving nothing but the 'mighty wreck' of their skeletons to testify that they were once living occupants of the land."

(First printed in the Centennial History of Chautauqua Co., with illustrations, Vol. 1, Page 588.)

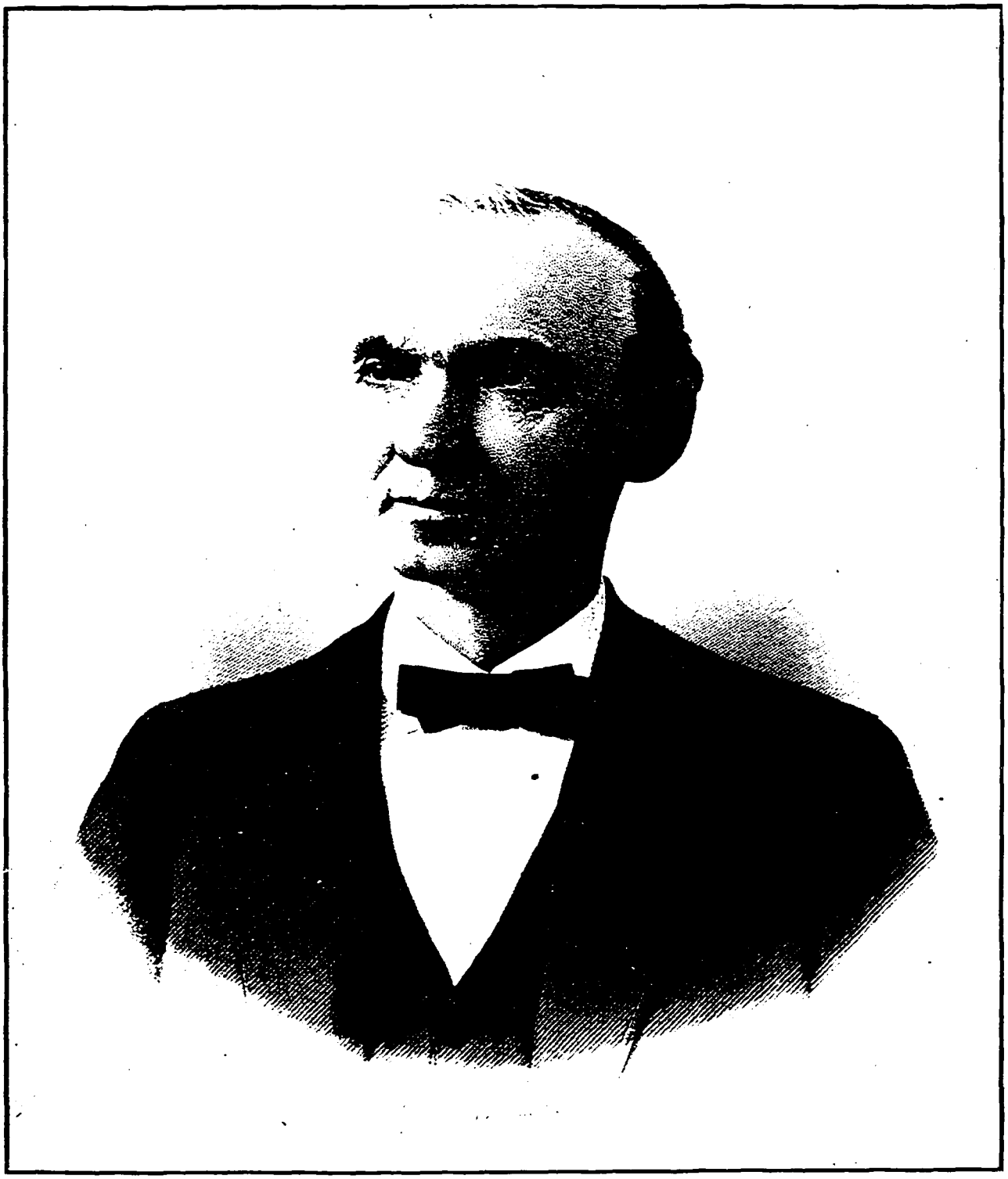
HON. OBED EDSON

Mr. Edson is descended from Samuel Edson, who emigrated from England to the Massachusetts Bay Colony and landed at Salem in 1638. His ancestors were prominent in the Council of the Colony, and served in the Colonial and Indian wars before the Revolution which gained the independence of the Colonies, and were conspicuous participants in the War of the American Revolution. He has a distinguished ancestry. He was born at Sinclairville, Chautauqua County, February 18th, 1832. His education was obtained in the common schools and the Fredonia Academy. He is a lawyer and obtained his professional education, as was the custom in his youth, in the office of a practicing attorney and the Albany Law School. On being admitted to the bar in 1853 he commenced to practice in his native village where he has been the trusted and faithful counsellor of his neighbors for more than half a century.

In the early part of his life work he was employed in civil engineering and assisted in the work of locating the original line of the Erie Railroad to Dunkirk and afterwards of what has since become the Dunkirk, Allegany Valley and Pittsburgh Railroad, so far as it lies in this state. He has been several terms a member of the Board of Supervisors from his native town, where he was an effective leader. In 1874 he was elected to the Legislature, where he drew and procured the passage of the first law making circulating libraries practicable outside of the cities.

He was one of the organizers of the Chautauqua Society of History and Natural Science, and for its success his labors have been abundant. He is a member of the State Bar Association, of the Buffalo Historical Society, and of the National Geographic Society. His tastes have been scholarly and his researches into the history of this region from the period when successive nations or tribes of the aborigines occupied it to the present time have been long continued and are valuable as settling many interesting problems of Indian customs and occupancy. His articles upon these subjects have appear in the magazine of American History. He also has written articles on the glacial period, on the terminal moraine which ends within the limits of our county that have attracted the attention of students because they have settled some points that were in doubt.

His greatest labors and those best appreciated by his associates and neighbors are those by which he has collected with painstaking perseverance the account of the struggles, hardships and success of the pioneers of his own county and eloquently told in the history of the county from its settlement more than a century since. The toil and privations endured and suffered by our fathers, but for him and his patient services, would not have been known to the present and future generations. The story that he has graphically but truthfully written will remain to interest and delight the descendants and successors of the brave pioneers who subdued the wilderness of Western New York.



HON. OBED EDSON

GEOLOGICAL STRUCTURE OF THE CHAUTAUQUA LAKE REGION

By Hon. Obed Edson of Sinclairville, N. Y.

(This address was originally delivered before the Chautauqua Society of History and Natural Science at Jamestown, Jan. 17, 1884. Aug. 7, 1884, it was delivered in the Hall of Philosophy at Chautauqua, N. Y., and March 14, 1884, at the annual meeting of the Agricultural Association of Western New York in Randolph, Cattaraugus County, N. Y.)

The beautiful lake of Chautauqua that sparkles near us lies in a notch that is cut deeply across a range of grass-covered hills which for many miles divide the basin of the Great Lakes from the Valley of the Mississippi. To mingle with the waves of the Gulf of Mexico, its waters have to flow southward successively through six water courses; the Chautauqua outlet, the Cassadaga, the Conewango, the Allegheny, the Ohio and Mississippi, performing a long and sinuous journey of two thousand five hundred miles. Yet Chautauqua Lake is almost within eyesight of Lake Erie, and is seven hundred and thirty feet above it. Scarce a barrier prevents its waters, in a short and rapid dash of some half dozen miles, from mingling with the waves of Lake Erie, and with them to meet the sea upon the ice-bound coast of Labrador, nearly four thousand miles northward from the mouth of the Mississippi. This paradox of lakes, like a thousand others that brightly glisten upon the plains or darkly gleam among the mountains of America, is the product of a glacier. The rounded hills and sloping valleys that border it, and all the graceful forms that are moulded upon the landscape around it, are the sculpturings of ice. The extensive area in which it lies, comprising four thousand square miles, including the principal part of the counties of Chautauqua, Cattaraugus, and a part of Allegany, in New York, and also the greater portions of Warren and McKean, and a part of Potter, in Pennsylvania, is called by Prof. Carll and other geologists, the Chautauqua basin. It consists of long, irregular valleys, having crooked and often ragged branches, separated from each other by irregular ranges of hills. This basin lies south of the summit of the ridge that divides the waters that flow into Lake Erie from those that flow into the Mississippi, at an average altitude above that lake of seven or eight hundred feet; the hills that bound it often rising five hundred and even a thousand feet higher.

The Chautauqua basin, since the era of ice, has been covered with great beds of northern drift which are deep, even upon the hills, but lie deepest in the valleys. Before the glaciers came to widen and partially fill the valleys, to carve the hills into their present graceful forms, the landscape had bolder outlines, the hills were higher and more rugged, the valleys were deep chasms walled by steep and rocky sides. The region is now drained by the upper Allegheny, the Conewango, and their tributaries. The outer edge of the Chautauqua basin is identical with the highest line of the highlands where these streams and their branches have their sources. The waters as they flow southward converge into one outlet—the Allegheny. That river, six miles below Irvington, at Thompson's gap, passes through a narrow chasm, or notch cut deeply through the southwestern rim of the basin. According to Prof. Carll, if a dam two hundred feet in height should be built across the Allegheny river at this narrow defile, it would cause the waters of these streams to flow back towards their sources, flooding all this valley region. The waters would rise thirty-one feet above the surface of Chautauqua, and twenty-five feet higher than the Cassadaga lake, and would be forced to flow through a notch sunk in the northern rim of the Chautauqua basin, at Cassadaga lake, into the channel in which now flows the Canadaway, to be discharged northward into Lake Erie. Measurements made in the course of railroad surveys, borings for oil, careful comparison of the altitude of the hills, and depth of the northern drift, afford very satisfactory evidence that before the glaciers invaded this basin, its waters were thus for ages discharged northward. As we follow up the Conewango from Warren, Pennsylvania, to the head of Cassadaga Lake, the rocky floor beneath the drift and alluvium of the valley will be found to lie deeper and deeper as we proceed northward. At Warren this ancient river bed is eleven hundred feet above the level of the sea, and is covered by one hundred feet of this drift. At Fentonville, thirteen miles north of Warren, it is diminished to nine hundred and sixty-four feet and is covered with twenty-seven feet of drift. At Falconer, near Jamestown, it is believed to be but nine hundred and nineteen feet above the sea, and is covered by fifty feet of drift. At Laona, in the valley of the Canadaway, still further north, it is only eight hundred feet above the tide, and at Dunkirk, on Lake Erie, still less. The coast survey of Lake Erie reveals the fact that, northward in a line with the channel of the Canadaway, soundings extending across the lake in a direction corresponding with the course of that stream are deeper than other adjacent parts of the lake, indicating that the Canadaway formerly continued its course northward to the ancient river bed that, it is believed, once traversed Lake Erie not far from the Canadian shore.

These facts seem to indicate that if the debris of this valley should be removed from its sides and bottom, and the hard rock that forms its floor should be exposed we would discover a deep canon, extending from Warren northward, in almost a direct line to Lake Erie at Dunkirk; thence northerly to the buried channel of the ancient river of Lake Erie. Its rocky bottom would be seen to have a very regular slope or descent to the north, as if it were once worn by water running in that direction into Lake Erie; walled by precipitous rocky sides, forming a chasm in some places nearly one thousand feet deep. The deep gorge of the Canadaway, which seems now to have its upper or south termination at the villages of Laona and Shumla, actually extends far beneath and south of the waters of Cassadaga lake. The lake itself lies in a little cavity sunk in the surface of an immense deposit of northern drift which now fills this ancient gorge. It further appears, from like data, the depth of oil wells sunk along the Allegheny, in Cattaraugus and McKean counties, the form of hills and the direction of the valleys, that the waters of the upper Allegheny and its tributaries, instead of flowing by way of Kinzua and Warren, southward, as they do now, were formerly deflected westward at Steamburg, Cattaraugus County, and were finally discharged into this ancient river of the Cassadaga at or near Falconer, and thence into Lake Erie.

Like the other waters of the Chautauqua basin, there is also the strongest reason to believe that the waters of at least the lower segment of Lake Chautauqua were once discharged through a channel worn and polished by the operation of mighty forces in ages past, which extends underneath the drift from the foot of the lake north of the city of Jamestown to Falconer, where it discharged its waters into this northward flowing river, and thence into Lake Erie and the Gulf of St. Lawrence, instead of the Mississippi and Gulf of Mexico, as it now does, and that the waters of the northern section of the lake were discharged northward into Lake Erie near Barcelona.

These old channels are not the result of chance, but are the product of mighty dynamic forces operating continuously through long periods of time, in faithful obedience to the general but simple laws that govern the universe. Since their waters have ceased to flow, oceans have waxed and waned, mountains and islands have arisen from the sea, and continents have grown old. For a history of these channels we must turn to the faithful records that the rocks have kept. The story that man has preserved of his deeds and his race, is, at best, a collection of feeble tales, dim legends, the prejudiced or partial stories of imperfect historians, while the biography of the earth is carved in monuments of stone. The rocks and fossils are letters in which it is written. Indeed, the facts them-

selves are sealed, as it were, in the bosom of the earth. The story as it is written on the everlasting hills is more interesting than the annals of a people, more pleasing than the most wonderful creation of human fancy. The Rosetta stone gave Campollion no better key by which to decipher the history of the dynasties of Egypt than the shells afford for telling the stories of mountains and oceans. Indeed, why should we wish to read from crumbling monuments trivial stories of kings and nations, when we may, in these pleasant shades, read in the rocks and the hillsides the history of lakes and rivers, tales far older and more wonderful than those written in Karnac.

These channels, once conduits of ante-diluvian waters, we now find, like old abandoned canals, are choked throughout their entire length, and, in most places deeply buried beneath vast masses of gravel stones and sand. The waters, which once flowed through them into northern oceans, are now turned southward into the Mississippi. What brought this loose material here to fill the valleys, dam these ancient channels, turn their waters southward, and to spread it over the hills in such vast quantities, is a curious and interesting subject for speculation.

If we turn to a large map of North America, we will observe that it has remarkable features. Its shores north of the forty-second parallel of latitude, corresponding with the northern boundary of Pennsylvania, is indented by deep and narrow bays, or fiords, which often extend between bold and rocky shores, sometimes fifty miles inland. In the higher latitudes of the continent high and broken coasts and ragged peninsulas bound the adjacent seas, and numerous misshapen islands lie along the shores. North of this limit, over the vast region away to the Arctic Ocean, besides the largest lakes of the world, are also scattered a multitude of lesser ones, which are often distributed in chains and systems. New Brunswick, New York, the New England States, Michigan, Wisconsin and Minnesota, all of which lie north of the forty-second parallel of latitude, are gemmed with lakes. In the latter state alone there are estimated to be ten thousand. Like sparkling beads strung on silver threads, they are joined together by a common stream affording a curious means of communication between distant parts. In all the territory that lies south of this limit, there is a mery marked contrast. In Iowa, Illinois and Indiana and all the southern part of the United States, scarcely a lake exists. There the seacoast extends in wide and sweeping curves, the bays and inlets lie between low and sandy shores. No foreign masses of earth and boulders overlie the natural rocks. The soil is solely formed from the mouldering strata upon which it rests. This region often extends in wide and level plains, veined throughout its whole extent with innumerable water courses,

of which some are the most noble rivers of the earth. Yet in marked contrast with this northern land of drift, there is not within the borders of the greater number of states comprising this lakeless region a single lake, and within the remainder, with the exception of Florida and Louisiana, but few. The lakes, even of these latter states, are mere lagoons or estuaries of the sea where the tides ebb and flow, or they owe their existence to abandoned river beds. Unlike the clear, pebbly lakes of the north, they degenerate into dark and slimy morasses of shallow water and miry shores. The charms of our pleasant lake—its popularity with those who seek rest and pleasure here—are no doubt enhanced by the fact that it lies upon the southern borders of this northern land of lakes, so easily accessible from the great lakeless regions of the south.

What scooped out the basins for these northern lakes, chiseled the gorges and deep chasms for the fiords, and spread the drift over all, in such vast quantities, has long been one of the most interesting and perplexing problems. It has been explained by some upon the hypothesis that has been called the iceberg theory. We are told of a continent submerged beneath a great northern ocean, bearing upon its bosom armadas of glittering icebergs, each laden with a cargo of rocks and earth, and which, like phantom ships, for an epoch drifted southward in frozen splendor. Again, others tell us of a frost-bound continent, most elevated in the north, buried beneath glittering mountains of ice and broad fields of stainless snow, slowly, very slowly, moving southward along a gentle slope, but with immeasurable power, grooving channels for the rivers, scooping basins for the lakes, and spreading everywhere a traveled mass of gravel, sand and rounded stones. It seems that the true explanation of this phenomena is that it was the operation of glaciers through vast eras of time, aided by icebergs along the borders of the continent and across its widest waters.

The point of departure, from whence the great glacier that spread over the Chautauqua basin, and all of the eastern part of North America, started, is located in the highest point in the highlands that extend between the river St. Lawrence and Hudson Bay. Early in the cold period the snow and ice, which had accumulated in this elevated region, put forth immense tongues, which at first followed the courses of the valleys among the hills of Canada, filling them with ice, carving them wider and deeper, advancing southward during the cold of winter, and receding slightly before the heat of summer. As the cold of this period increased in intensity the glaciers increased in magnitude. Having filled the valleys, they ascended the lower hills, moving southward in the winter, and lingering longer there in the summer. At length a field of ice moved across the valley of the St. Lawrence into New York and

New England, and in a broad mass up the basin of Lake Ontario. The direction in which it advanced is marked by the scratches upon the rocks, the arrangement of boulders along its course, and its terminal moraines. During the lapse of long eras of time the cold grew more and more intense, until its maximum was finally reached. The glaciers invaded regions further and still further south. No longer confined to river channels or mountain gorges, it scaled hills and ridges. A grand *mer de glace* covered the valley of the Genesee. It filled Lake Erie, which is but eighty feet deep, to its bottom. It pushed against the base of the ridge that bounds the basin of Lake Erie on the south. It forced its way into the gorges at the mouths of the streams of western Pennsylvania and northern Ohio; which streams, we have seen, discharged their waters northward through the ridge into Lake Erie. As it ascended the chasm of the Cassadaga it carried away its rough sides, deeply filling them with an earthy mass. It scaled the sides of the dividing ridge, and climbed to the summits of the highest hills of Chautauqua County, spreading deeply over all, highland and lowland, an unbroken sheet of material called drift. As it forced its way up the channel of the Cassadaga and through the passes between the hills of Cattaraugus, it seems to have met a great glacier that had ascended the Genesee river and crossed into the chasm formed by the upper Allegheny. Here these streams of ice, controlled by the same laws that govern the action of running water, but moving with far less velocity, seemed to have formed a great eddy among the hills of Cattaraugus. There we may see to great advantage the effects of the enormous power of these mighty glaciers as they opposed each other like currents of water, in the wonderful sculpturing of the hills and in the carving of the valleys.

The physical features of Chautauqua County were greatly changed when the glaciers left them. The landscape was also quite different at the close of the ice period from what it is now. There were dumped everywhere confused and unfertile heaps of loose earth, gravel and stones. Huge boulders lay scattered at intervals entirely above the drift and over the whole surface. They lay thickest along the northern face of the ridge and near its brow in the town of Portland, and in the other ridge towns of the county. They some time seem to have been arranged in windrows, and often rest in such high relief above the drift, lying wholly upon its surface, as to lead to the conclusion that they were brought by icebergs. It is quite probable that they were transported by glaciers, but instead of being moved along beneath their under surface like common drift, they were borne upon the upper portions of the glaciers from the granite regions of Canada, and as the ice melted away they were left upon the surface as we find them now.

The portal of the chasm, through which the ancient river of the Cassadaga may have discharged its waters northward, where now rests the Cassadaga lake, and at the point where the highland range reaches its greatest altitude, was left choked with drift to the extraordinary depth of five hundred feet, extending southward along the channel of the stream, decreasing in depth and quantity until it reached the Allegheny river at Warren. The chasms of Bear Lake, of the Conewango and Cattaraugus, and the upper Allegheny, were also deeply buried beneath the debris.

The deposition of the heaviest masses of drift in the northern portion of these channels had the effect to raise their levels, so that the surfaces of the valleys was slightly tilted southward and their water currents reversed. The moraines left by the retiring glaciers had the effect to dam their waters, and to cause an extensive and irregular lake to extend like the fingers of a man's hand up the valleys of the Conewango, the Cassadaga and Bear Creeks, the evidence of which remains in the fine assorted material, peculiar fresh water deposits, stratified drift, and beds of marl—a product of fresh water life. The semi-tropical era that followed the glacial period, known as the Champlain, fitted this region for the existence of the mastodon and the North American elephant which frequented the marshes that bordered these waters. Their teeth and other bones have been found in the Cassadaga valley. The skeleton of a large mastodon, with tusks ten feet in length, the twigs of the ancient conifers upon which he fed, preserved with his remains, were found near Jamestown, and are now preserved in the museum of its city school. But this ancient lake sought an outlet southward to the Allegheny. The drift moraines that dammed its waters during the Champlain and recent periods, have been slowly wearing away. As the channel of its outlet has been cut deeper, its waters have lowered, and there now only remains clusters of little lakes in the upper parts of these valleys where the drift is piled the deepest. Yet the process of draining is still going on. The Cassadaga, Bear, and Mud Lakes of the Conewango and Cassadaga valleys, diminutive descendants of the great lake that once spread so widely over the Chautauqua basin, must yield with the lapse of time, drained through their slowly lowering outlets, and filled with silt from the neighboring hillsides. Yet the waters of these extensive valleys are even now detained from resuming their old channels and flowing northward into Lake Erie by the slightest of barriers. Many years ago a few strong men in a few hours cut a channel from the head of the Cassadaga Lake a few rods, but sufficient to permit the waters to flow into a tributary of the Canadaway,—a stream that discharges itself into Lake Erie. They were restrained by an injunction issued by Judge R. P. Marvin, of Jamestown. Had not this measure been promptly taken

the waters would have been turned through this channel— the sand and gravel and loose material that deeply underlies all the northern borders, and indeed the whole lake would have so quickly yielded to the rapid flow down its steep descent northerly as to excavate a deep channel which would have soon drained it. In time, the flow of the waters of the Cassadaga, and of the Outlet, and also of the Conewango, would have been eventually turned northward into this channel, and the floor bed of this ancient river laid bare, practically demonstrating the truth of the theory that such was the original direction of the waters.

The old gorge cut in the rocks underneath Chautauqua Lake, which may once have been the channel of an important tributary of this ancient river, was also, during the ice period, buried beneath immense masses of this drift. Along the shores of the lake we now see displayed to great advantage the work of the glaciers that closed its channel. Chautauqua, Long, and Bemus Points are all moraines left by the retiring glaciers. Extending from the foot of the lake as far as Falconer, are ranges of drift hills and immense isolated heaps of gravel and stones piled up by the glaciers, as at Tiffanyville. Seldom do we find such masses of drift as compose the hills upon which the City of Jamestown is built. The glacier moved southerly, probably obliquely along the eastern shore of the lake, shoving along beneath it masses of debris which it had loosened and detached from the firm, stratified rocks in regions northward, gathered mainly from the hills of Ellery. It first filled the old channel which extended easterly, north of the cemetery near Jamestown and nearly along the course of Moon's Brook towards Falconer. The glacier then moved slowly southward at right angles with the longest axis of the lake, bearing with it a huge mass of debris which composes the hills that form the site of Jamestown. It so dammed the waters of the channel as to form the lake. It gradually crowded the outlet southward until, at the close of the ice period, its course extended where we now find it, bending around the main part of the town. The duration of the ice period was so great, and the process so slow of accumulating these deposits of drift, that had man then existed the movement of the glacier would have been unobserved by him.

As it has been said, the same causes and the same movement of the glaciers that made the drift hills at Jamestown, produced Chautauqua, Bemus and Long Points. These capes extend across the old channel in the same direction, and now, when the waters of the lake are lowered, crowd its course southward in the same manner. They now tend to divide the lake in separate compartments, or smaller lakes connected by channels or straits. The deepest part of each lake is usually just above or just below these divisions. Above Chautauqua and Chautauqua Point, according to accurate soundings

From a photograph taken in 1907 by Arthur C. Parker, New York State Archæologist, of a channel cut from the head of Cassadaga Lake to a tributary of the Canadaway. The writer of this article appears in the picture as facing Cassadaga Lake.

taken through the ice, the lake is thirty-five feet deep and gradually decreases towards its head. A short distance below these points soundings show a depth of fifty, increasing to ninety feet above Long Point where are the deepest parts of the lake. Between Long and Bemus Points the depth is, in places, as great as sixty feet. Below Bemus Point the lake is twenty-five feet deep, decreasing the whole length of the lower lake to its outlet, where it is but six feet in depth. These imperfect moraines now divide Chautauqua into four imperfect lakes connected by straits or channels. A fifth lake existed during the ice period, filling the cavity between the drift hills now occupied by that part of Jamestown known as Brooklyn, and the easterly part of the main village. The waters of this lake were dammed, not only by drift and rock at Dexterville, one mile below Jamestown, but by ice also, and were connected with the other lakes by a narrow strait.

The topography of the surface at Dexterville, where the waters were dammed, affords matter for curious inquiry. Where the waters of the outlet have cut their way through the solid rock, just above the railroad bridge, the tops of the rocks, that wall either side of the stream, are many feet higher than the surface of the ground not many rods to the west. Indeed, a deep depression there connects this valley of Brooklyn with the wide valley below the Dexterville mills, which the railroad company has utilized by making cuttings there. No one can fail to remark the regular and even descent that the surface maintains from the highest point of the hill beyond and east of the gorge through which the outlet flows until it reaches the railroad cutting on the west side. Why should the waters of the outlet seek a passage at this elevated point through so difficult and rock-breasted a route, when to the west a few rods, a low depression invited an easy way for them, unobstructed except by loose earth and stones. The explanation of this phenomenon may be that the ice so filled the depression where the railroad cutting now is, as to compel the water to seek a passage at the higher point, now occupied by their present channel. Held there for ages by this dam of ice, by slow yet constant work, they may have lowered the channel to its present level. A study of the region of drift discloses many instances of the kind. Even now permanent lakes exist in the frozen regions of the north, that were made ages before the era of man, and have been held until the present time by shores exclusively formed of ice and snow precisely as they were formed at first.

How long before the era of ice the deep and wide gorges that extend from the northern face of the ridge southerly through Chautauqua County, now partially filled with drift, had been worn into the foundation rocks, we have no reliable data. Since the area occupied by Chautauqua County emerged from the paleozoic ocean, and

all through that almost immeasurable period known as the mesozoic and cenozoic time, until the age of ice, there is little doubt that its surface had been undergoing important and extensive changes. Owing to the constant oscillations of this continent, which is more restless and inconstant than the sea, the drainage of the basin of the Great Lakes (always an extensive region of waters) has been transferred in regular process from the west to the east. First from the Mississippi gradually to the Hudson, and then to the St. Lawrence. All the northern states, by this rising and sinking of the land, have been scored and furrowed with new and extensive lines of drainage. Facts, brought to light by the coast survey and the recent investigations of geologists, it is believed, prove that a pre-glacial river, before Lake Erie was formed, extended from the south end of Lake Huron, occupying a channel now buried, which extends through Upper Canada to Lake Erie, curving around Long Point and following the valley of Grand river in a buried channel northerly across the province of Upper Canada, to the west end of Lake Ontario. Among other tributaries from the south it received the waters of the ancient river of Cassadaga. The channel of this old river and its tributary, in their course through the lake is determined by the soundings made by the coast survey. During the lapse of vast eras of time, but before the ice epoch, this old river channel became closed by the action of glaciers, which also excavated the lake basin, and dammed its waters. While such great changes and events were occurring so near to the limits of Chautauqua Lake, it is impossible that the surrounding highlands must not have also experienced grand physical changes. In Chautauqua County, through the great furrows between the hills, which now form its principal valleys, extending southerly from the northern face of the ridge, may have been the outlet of the Great Lakes, or of some great inland sea, of which continental changes of level and other causes may have slowly lessened its southward flow and finally turned its current northward; or they may have been the channels of some mighty river that emptied its waters into the peleozoic ocean. The great depth and width of these valleys, the hardness of the rocks that lie on either side of them, in level lying strata, sundered where they border the valleys, shows that the intervening space was once filled with solid strata of rocks, forcing upon us the conviction that they could have only been carved out by the exercise of some mighty force, as of water and ice, roughly scoring in the rocky surface of the country the outlines of these great valleys, leaving them to be deepened and finished by the glaciers and later processes, these first forces graving upon the country only the general features of the landscape.

Imperfect as is the history of this region, after it emerged from the great paleozoic ocean that once covered it, until the glacial

period, the rocks that underlie it and rib its hills, give us more fully and perfectly its history before that period. The oldest formation of Chautauqua County is known as the Portage. It forms the surface in its northern portion, extending from the shore of Lake Erie high up along the remarkable ridge that extends easterly and westerly through the northern part of the county. Above the rocks of the Portage group lie the rocks known as Chemung. These rocks spread over the whole southern part of the county.

The Panama and Salamanca conglomerate compose the upper strata of the Chemung group, and are the last formed of the stratified rocks of Chautauqua County. Great fragments of it lie scattered at wide intervals over its southerly portion. In Harmony, at Panama, at the celebrated city of rocks, it exists in huge masses sixty or seventy feet thick, extending for more than one-half mile. The northerly line of this formation extends southwesterly from the hills of Arkwright across Chautauqua Lake near the narrows through the southwestern towns of the county into the State of Pennsylvania. To the southward east of this line, at various points upon the hills, are scattered blocks of Panama conglomerate and its underlying sandstones. Northwest of this line but little evidence remains of its former existence. Yet it is probable that it once extended as far to the northwest at least as the northern face of the ridge, and once covered the whole surface of the southern part of the county. By the action of the glaciers, through the ice period its thinnest edge has been worn away, or covered with drift and obliterated in nearly all the southern portion of the county, wiping out with it all traces of life in the carboniferous, mesozoic and tertiary ages—that vast period of time that has elapsed since the devonian. The marks of abrasion by the glaciers are often seen upon the upper surface of these rocks. The direction of the ice scratches in the conglomerate at Williams quarry, are nearly north and south. The dip of this rock and other circumstances have led many to suppose that the Panama conglomerate was the equivalent of the Venango oil sands, but close observations of geologists (particularly of Prof. Carll) have proven that it is neither the first, second nor third sands, but has an age older than either. If this rock could be traced to the oil country through the characteristic marks and fossils which it contains, it would be found to lie the lowest of them. This formation, however, is found, as it extends southerly, to quickly lose its identity and merge gradually away into sandy shales; consequently the oil wells that in this county, and at other points have been commenced in the Panama conglomerate, or rocks beneath them, have been sunk in rocks far below the oil bearing measures, with often a show, but never in any instance, paying in quantities.

The Panama conglomerate is probably a shore formation. Its peculiar constituents, the comparatively narrow belt occupied by its deposits, its lens-formed pebbles of quartz, indicate that they were smoothed and polished by sliding back and forth along the shallow waters of an ocean shore, rather than by rolling on its bottom. We may picture in our minds masses of pebbles, fine gravel and sand, accumulating in the devonian age in great beds and irregular heaps upon the northern shore of the vast paleozoic ocean, that for time inconceivable had heaved its billows here. The sand and pebbles washed shoreward by the surf and tide, to be borne back again by the out running streams and refluent waves, would produce just such a collection and arrangement of materials and distribution of masses as make up the Panama conglomerate. It here constituted, probably, the last contribution made by the sea to the growing continent of North America before it became dry land. The great openings that now appear in these rocks, dividing them into blocks, as at Panama and Rock City, are not the result of upheavals, but are solely the quiet work of frost and ice, aided by the weight of the rocks themselves. A silent process, which is still imperceptibly going on, and which was, during that almost immeasurable period that has elapsed since the devonian age, slowly opened and widened these fissures into passages that have at length come to resemble the streets and avenues of a city, illustrating in a most striking manner the results that time can bring about. Indeed, time is the most important factor in producing all geological changes. The laws that govern matter will not alone account for the phenomena that we find exhibited in the rocks. Pressure and heat would not alone, without time, give us coal. Minute particles of matter held in solution by the sea to be finally deposited at the bottom, could not, without the lapse of ages, be changed to rock hard as flint and become Parian marble bleached as white as the driven snow. Had man existed during all that vast era since the Alps arose from the sea, he would have lived unconscious of the movement that has made their peaks to pierce the clouds, so slow has been the process. The time covered by the ordinary history and traditions of his race has been insufficient to show a perceptible change. Even now the process of creation is going on. Sweden is rising from the sea. Amsterdam and New York are sinking beneath the waves, and man scarce observes it. Here, upon the shore of the lake, in this very grove, we may learn to what length the process of creation is drawn out. When first formed, the lake was more than fifty feet above its present level, evidenced by the peculiar materials that compose the plains and levels that border its shores. Old beaches extend around it high above its present waters. At first the lake was longer and wider than now. It extended far up the inlet and over the level plain at Hartfield.

The beautiful bay of Dewittville was deeper and wider than now. The lake spread much beyond its present limits below Chautauqua and in this grove its water extended high up the hillside. Bemus and Long Points were submerged; above and far below them the lake expanded wide over either shore and a spacious bay extended a long way up the valley of Goose Creek. The waters were broad and deep over the swampy ground that borders either side of the outlet. The lake's highest altitude is marked upon the hills of gravel and sand at Jamestown, through which the outlet has worn its way. Its former elevation is plainly measured where its waters have slowly, very slowly, cut a passage through the rocks at Dexterville. The process by which it has been drained is as slow as that by which it was formed. Indeed, its drainage is still going on, but so slowly that the change in its level that has occurred during the whole period of written human history, scarce deserves a record. We may trace along this hillside and among the winding avenues of this shady grove, as we would read in the slowly sinking sands of the hour-glass, the marks of its subsiding waters. Faint traces of the lake are marked upon the shelving banks nearly as high as the amphitheater. Later traces are more plainly visible in the regular and natural terraces that rise near the lake, and that now partially form the graded avenues that curve parallel to its shores. Unmistakable evidence of the action of water and their more recent presence exist in the character and arrangement of the material that forms the little cape called Chautauqua, that extends from the auditorium outward into the lake. It is now elevated scarce ten feet above it, yet when Caesar crossed the Rubicon this little point of land was above its waters and bore its maple shade as gracefully as now.

The earth is more than a million of times smaller than the sun. Yet the sun is an insignificant star among the myriad of stars that adorn the heavens. Light moves eleven millions of miles in one minute of time. Notwithstanding this prodigious velocity it would take three thousand years to reach us from some of the fixed stars, and it would never reach us from the extreme limits of the universe. Wonderful as are these disclosures of magnitudes and distances made by astronomy, full as amazing have been the revelations that geology has made of the passage of time. Twenty miles of stratified rocks envelop the earth. What an immense length of time this fact implies. Man is utterly powerless to grasp the prodigious circumstances. He can no more determine with his finite measure the illimitable past than he can fathom the immeasurable future.

Long as was the epoch of icebergs and glaciers, during which our lake was born, and long as was the period of time that fol-

lowed, during which our lake has been reduced to its present level, it is in the world's history but as a day. Compared with the millions of years that had elapsed previous thereto, and since the end of azoic time, when life on earth began, it is but as yesterday. The millions upon millions of years that passed before the dawn of life, and since the world began its course—that immeasurable period of time in which the world has circled around the sun, is but an hour compared with the time that the stars have existed. Who dare to estimate the ages upon ages of blazing splendor during which the sun and all the stars have shone. Yet all that infinite period of time is but a flash compared with the duration of the universe, and the universe itself and all its glittering belt of stars moving, as it seems to the limited comprehension of man, in regular orbits, under fixed laws, compared with eternity, is but as a cloud of dust, casually blown up from the wayside, to whirl and circle for a moment in seeming order before some passing gust.

Note—Many years prior to the delivery of this address, I was convinced that what is called the Chautauqua Lake Basin, anciently discharged its waters northward, and expressed that opinion in various lectures. I was later confirmed in that opinion by Prof. Carll. Still later examinations by Prof. Frank Leverett led him to believe that the waters of this north flowing river were discharged still northward through a channel now nearly represented by the Cattaraugus Creek.

The hills that compose the Great Terminal Moraine where it crossed the Conewango, near the state line between Pennsylvania and New York, indicate a greater original elevation than do the earthy barriers at the head of Chautauqua and Cassadaga Lakes, and which now prevent their waters from flowing northward into Lake Erie. The waters of the ancient lake that once spread so widely over the valleys of the Cassadaga and Conewango, were probably anciently held in place at the southward by this Great Continental Glacier, or dam of ice that for unnumbered centuries slowly retired northward before the mild breath of the south wind, and until the channel of the Conewango was worn lower than the level of these lakes. Lakes centuries old, held by shores of ice, were a common occurrence in the Ice Age, and are a phenomenon existing in the Polar Region even to this day. Obed Edson.