# PROCEEDINGS

OF THE

# MANCHESTER · INSTITUTE

OF

# ARTS AND SCIENCES.

VOL. I, 1899.

MANCHESTER, N. H.

PUBLISHED BY THE INSTITUTE.

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PRINTED BY W. E. MOORE, NUTFIELD LANE.
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PUBLICATION COMMITTEE.

FREDERICK W. BATCHELDER, ALBERT L. CLOUGH,
WILLIAM H. HUSE.

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# MANCHESTER INSTITUTE

OF

# ARTS AND SCIENCES.

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ORGANIZATION AND INCORPORATION.

During the autumn of 1898 the suggestion that there might be a great gain in usefulness and economy of administration, through a combination of organizations having somewhat similar purposes and interests, met with the cordial endorsement of many public-minded citizens, chiefly members of the Manchester Electric Club and the Manchester Art Association. Accordingly a joint committee from those organizations held meetings at various times during the months of November and December, at the residence of Hon. Joseph W. Fellows, at which meetings a plan of organization was formulated.

In the meantime articles of incorporation were drawn up, setting forth the purpose of the signers to form a corporation to be known as the Manchester Institute of Arts and Sciences and defining the objects of the corporation to be, "to promote the cultivation of the arts and sciences, to give a more general impulse and systematic direction to scientific research and encourage and stimulate the study of history, literature and industrial institutions." The articles of association, with a list of the signatures thereto, will be found appended.

The first meeting of the incorporators was held at the rooms of the Manchester Art Association, December 31st, 1898, at 7.30 P. M., the following gentlemen being present: Edward J. Burnham, Joseph W. Fellows, William H. Huse, Luther C. Baldwin, Henri Schaeffer, Norwin S. Bean, Albert L. Clough, Dr. Ezra B.

Aldrich, Arthur J. Smith, Charles J. Abbott, George I. Hopkins, Adna A. Jenkins, Herbert E. Richardson, Edward H. Fogg, J. Brodie Smith, Frederick W. Shontell, Fred W. Lamb, George I. McAllister, Bayard C. Ryder, Harrie M. Young, Frank H. Challis, Frank C. Livingston, Whiting R. Call.

The meeting was called to order by Joseph W. Fellows, William H. Huse was chosen chairman, and Albert L. Clough made clerk *pro tempore*. The articles of association were ratified and accepted, and a code of by-laws reported by a committee consisting of Joseph W. Fellows, George I. McAllister and Ezra B. Aldrich was adopted.

At an adjourned meeting held January 4th, 1899, the organization was perfected and permanent officers elected. The list of officers chosen will be found appended to the by-laws. The following letter was presented and read:

MANCHESTER, N. H., December 31, 1898.

E. J. BURNHAM, ESQ., MANCHESTER, N. H.

DEAR SIR: The weather is so unfavorable that I shall not attend the meeting to-night of the Manchester Institute of Arts and Sciences. I appreciate the compliment contained in the suggestion that I allow my name to be used as a candidate for the office of President of the Institute. As I think it over, I am persuaded that it is not for the best interest of the Institute that I should hold the office. I fully appreciate the good work you are about to undertake, and as an evidence of my good will I enclose herewith my check for $100, to be used in fitting up rooms and helping organize the Institute.

Very truly yours,

(Signed) G. BYRON CHANDLER.

Under these auspices the Manchester Institute of Arts and Sciences had its origin. The story of its subsequent work and influence must be sought in its Journal of Proceedings and in such other publications as may from time to time be issued.

The formal opening of the Institute was signalized by an open public meeting held at its rooms in The Kennard, on the evening of March 22d, 1899, at which Hon. George B. Chandler presided, introducing the Rev. B. W. Lockhart, who delivered the address of the evening.

# ADDRESS

BY THE REV. BURTON W. LOCKHART, D. D.

I extend to you, gentlemen, my most sincere congratulations on the establishment of the Institute of Arts and Sciences which you celebrate this evening. The soul lives in truth and beauty, and your worthy endeavor will be to minister to both, and thus be a "helper to all who would live in the spirit."

The changes of the last four decades are so tremendous that one can hardly realize through what a wonderful era he has been permitted to live. Darwin's Origin of Species appeared in 1859. In 1869 there were very few who accepted the new doctrine of evolution by natural selection. But now, says Professor William North Rice, "the fingers of one hand will more than suffice to count the anti-evolutionists who are competent to have an opinion on the subject." Thirty years have sufficed to revolutionize the world of thought on this great question of origins and to place the name of Charles Darwin side by side with that of Isaac Newton, in equal immortality and renown.

During this period Pasteur did his great work, forming the science of Bacteriology. The useful practical results that have come from this are beyond computation. Thus, for example, what lives are saved to-day by antiseptic surgery? What slaughter of babes and invalids avoided by the sterilization of milk and the simple cooking of water?

In 1866 Mr. Field succeeded in laying the great submarine cable. Now these miraculous nerves of thought thrid the labyrinths of all the seas. Then came the telephone, and electric motors and lights; and, just now, we have seen Tesla telegraphing through the ether without a wire. Nor can anybody dream what new births of knowledge and power may be near us in the development of this new agent called electricity.

Great improvements have been made in telescopes. In 1867 the diameter of the largest object glass was eighteen inches. The object glass of the Lick telescope is thirty-six inches. The three

new sciences of Meteorology, Spectroscopic Astronomy and Lithography have taken their places among the older ones.

The law known as the conservation of energy, the indestructibility of what is called force or matter, has been accepted in this period.

There have been many interesting and valuable discoveries in chemistry, one of them, that all gases, including air, are capable of liquefaction under cold and pressure.

Many things, too, have been settled with more or less satisfaction and certainty that had a theological or quasi-theological bearing. Thus, no informed man now limits the age of man on the earth to the old traditional six thousand years. Although the extreme antiquity of man in Lyell's Geology has not been accepted, scientists are agreed that man co-existed with the mammoth and cave bear. Theological opposition to evolution and to science in general is rapidly dying out. Asa Gray, the profoundest philosopher among modern evolutionists, demonstrated that the theory of evolution was not inconsistent with theistic faith, and Prof. James, of Harvard, has shown that the doctrine of immortality is not inconsistent with the facts of physiological psychology.

Churchmen are generally coming to see that a man may be both a convinced evolutionist and a good Christian. The *odium theologicum* is ceasing. Science has fought her fight with superstition and won the victory. There has come a faith that it cannot be injurious to discover and reveal the truth about the universe; that all truth is related and harmonious; consequently that what is true in science will not conflict with what is true in theology, and what is true in theology will not conflict with what is true in science. Among great leaders of science there are few pronounced atheists, and among great theologians few if any deniers of the generally accepted laws and facts of science. Science herself has been the greatest of all irenica. We have come to an age of peace and the echoes of an old controversy are dying.

What can be said of these thirty years from the standpoint of art? I confess that I am unable to speak of this as an expert. But to my thought, if you take art in the sense of the production

of beautiful things, whether literature, painting, sculpture or architecture, we need not fear for our quarter-century. In poetry it has seen the finest work of Tennyson, Browning, Swinburne, Lowell and Longfellow. Ruskin found in it a painter, Turner, worthy of the highest praise. Of course I am not competent to judge, but I should not be surprised if the work of the French and English painters of this epoch should challenge older masters in the race for immortality. Beautiful architecture, art creations, have been witnessed in the great expositions, no less beautiful because they were fragile—like dissolving cloud shapes on the horizon. As I walked through the fairy land of the Chicago exposition the word beautiful was always in my thought, and as I saw the people streaming through, the toilers from distant farms and workshops, I thought that these magnificent palaces, as of wind and cloud, would live in their memories as a beautiful dream forever, a joy, an education, an embodied ideal. Thus, though the epoch we speak of cannot be said to be distinctively artistic, in the same sense that it is distinctively scientific, we can say that it has had famous high priests of art; we can say that beauty has been shed abroad in widest commonalty as at no earlier time. Beauty, we may say, has become democratized by international expositions, by the throwing open of museums of art to the people, by the cheapening of noble literature, and the introduction of fine illustrations through the magazines into common homes. We are realizing today, that it must have been no small part of the education of a citizen of ancient Athens, that every morning he saw the sunlight reflected from the marbles of the Parthenon and glancing from the helm of Pallas Athene.

It is therefore in a time peculiarly fit that you establish your Institute. In a small community like ours we need, for such a work as you propose to do, to enlist all lovers of truth irrespective of religious creeds. Men of faith and men without faith can alike be made welcome here on the common ground of truth that can be proved, and beauty that can be felt and loved. Yes, they can be welcomed in a common faith also, the faith of all thoughtful and sincere men everywhere, that the truth is mighty and will prevail, that the truth is right and ought to prevail.

What, now, is it that you as an Institute of Art and Science can do?

First, you will be a nucleus, a center, toward which will be attracted the people who love science and art. Whether this class of people be large or small they need organization, they need union and they need fellowship. All things, both good and bad, are fostered by union. In this day of clubs and fraternities let us by all means have a fraternity devoted to the study of scientific truth and the production and appreciation of beautiful things. Moreover, people who have a liking for these things may need stimulus; for the cares of the world are with us all and often enough we feel like laying down the weapons of our intellectual warfare because no comrade stands by our side to urge us on. Then it does us good to feel the *esprit de corps* of a society like this, to drink from the fountain of a common inspiration, and hear the bugle blow from time to time from some leader who has gone further and seen more than we. It seems to me that this Institute will be a great help to its members, in the way of sustaining interest in useful studies when for any reason it falters; in furnishing direction, hints as to method, in keeping well informed concerning progress, and in establishing a stable centre for growth.

In the second place you ought to be able to do a good work in counteracting certain tendencies to deterioration which exist in every young civic community like ours. Our city is young, only a little more than a half-century old. There has not been time for culture to make a very deep and rich deposit. Considering our age we need not be discouraged. Perhaps with older cities we compare very favorably; but no spirit of boastfulness should prevent us from seeing where we are weak or from making an effort to strengthen ourselves. An institute of art and science ought to be able to make valuable contributions to that deposit of culture which, next to religion, makes life worth living.

Our city is a centre for manufacture. Its chief interests are industrial. Practically all of our citizens are engaged in making money. The spindles whirr and traffic hums up and down our river. Why not? There is no dishonor in that. There is bread

and meat, there are prosperity and the possibilities of a larger life for all in it. But we must beware of falling too deeply into the current of mere getting and spending. Commerce is good—but commercialism is bad. To devote ourselves wholly to business may at times be as necessary as for a soldier to devote himself wholly to battle. But human nature cannot endure the strain very long without becoming degraded in its finer fibre and vulgarized in soul. Always to be thinking money, always to be hunting it, is what no man can endure without the loss of his intellectual birthright. And only second to commercialism in its narrowing influence is professionalism; the shutting up of our life within the limits of the work by which we earn our bread; the provincialism, the bigotry, the philistinism of the lawyer who is nothing but a lawyer; of the doctor who is nothing but a doctor; of the preacher who is nothing but a preacher; of the banker who is nothing but a banker—of any drudge who is nothing but a drudge. An institute of art and science in a community is a breakwater against commercialism and professionalism. The creed you proclaim is that while it is necessary to have knowledge and professional skill which we can turn into cash it is also necessary to have knowledge which we can convert into mental tissue, into intellectual largeness and soundness, into life and life's worthier delights. You will say to the community that truth and beauty are needful to life in a deeper sense than bread and meat; that a mind without curiosity to know the truth of this divine world we live in, and a soul without a hunger for the beautiful, are little nobler than the mechanisms they ply, or "sheep and goats that nourish a blind life within the brain." The real value of life you will say is not measured by what it lays up in our safes but by what we lay up in mind, heart and spirit.

We live in a time when large numbers of men have ceased to be interested in churches and the religious life; not so much because they are devoting themselves to vicious things, as because they are unable to believe what the churches teach, or what they suppose it teaches. They are

> "Wandering between two worlds, one dead,
> The other powerless to be born."

This is not a comfortable situation for a man morally earnest and sincere. He cannot, or thinks he cannot, be at home in the church. At the same time he has no interest in any society which lives in denial, which preaches a negative philosophy, often enough in a crude and blatant way. He feels the needs of the inward life, the need of an ideal and of fellowship in an ideal. It occurs to me that your society might be a help to such a man. For supposing he has lost God, lost faith in a future life, there still remain three verities for him to follow—the truths and laws of science, the beauty of the world, and the moral law he finds within him, whose voice remains authentic and imperative amidst the ruins of religious faith. If he follow these he is following gleams of light which are no will-o-the-wisp, but celestial torches which will light the way to the great sun. Indeed I do not see how a genuine institute of art and science can fail to teach religion in an indirect way. To know how to love truth for its own sake is religion, and what is religion but the completest synthesis of beauty and truth, in its transcendent source, God; and our perception that the synthesis is both a necessity of thought and heart. Something like this perception I think must have been in the soul of Keats when he wrote,

> "Beauty is truth, truth beauty, that is all
> Ye know on earth and all ye need to know."

# THE MANCHESTER INSTITUTE

OF

# ARTS AND SCIENCES.

## ATTICLES OF ASSOCIATION.

The subscribers being residents of New Hampshire and twenty-one years of age associate themselves together by these articles of agreement to form a corporation under and by authority of Chapter 147 of the Public Statutes of New Hampshire for the following purposes:

The name of this corporation is THE MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

The objects for which the corporation is established are to promote the cultivation of the arts and sciences, to give a more general impulse and systematic direction to scientific research and encourage and stimulate the study of history, literature and industrial institutions.

The control and management of the affairs of the corporation shall be vested in a Council, which shall be constituted and elected as provided in the by-laws of the association and shall have all the powers of the corporation.

Membership and the rules and regulations for the government of the association and management of its affairs shall be provided for in the by-laws of the corporation, which may be ordained, established or amended by the association at any meeting duly notified.

The corporation shall have power to acquire by purchase, lease or otherwise, real, personal or mixed estate to such an amount as its purposes may require and it may sell and dispose of the same in such manner and at such time as shall be deemed expedient.

The first meeting for the purpose of organization shall be held at the rooms of the Manchester Art Association, No. 913 Elm street, in Manchester, New Hampshire, on the thirty-first day of December, 1898.

STATE OF NEW HAMPSHIRE.
OFFICE OF SECRETARY OF STATE.

Received and recorded in Records Voluntary Corporations, Volume 10, pages 228 and 229-30, at Concord, this 30th day of December, 1898.

[L. S.] SAML. H. STEARNS,
*Deputy Secretary of State.*

CITY CLERK'S OFFICE,
MANCHESTER, N. H.

Received December 29, 1898, and recorded in Book of Records of Voluntary Corporations of said city, Book Vol. 4, Pages 191-192. By me,

[L. S.] EDWARD C. SMITH,
*City Clerk.*

ROLL OF CHARTER MEMBERS.

Edward J. Burnham,
Joseph W. Fellows,
Wm. H. Huse,
Luther C. Baldwin,
Henri Schaeffer,
Edwin T. Richardson,
Norwin S. Bean,
Albert L. Clough,
Ezra B. Aldrich,
Arthur J. Smith,
Charles J. Abbott,
E. M. Bryant,
G. I. Hopkins,
Adna A. Jenkins,
Louis B. White,
Herbert E. Richardson,
Frederick W. Batchelder,
Edward H. Fogg,
H. B. Metcalf,
J. Brodie Smith,
F. W. Shontell,
W. T. Nichols,
John C. French,
Wm. C. Clarke,
Fred W. Lamb,
Nathan P. Kidder,
Gordon Woodbury,
George I. McAllister,
Lyman W. Colby,
Josiah Carpenter,
Edgar J. Knowlton,
Bayard C. Ryder,
David Cross,
Harrie M. Young,
John M. Chandler,
Frank H. Challis,
Walter G. Africa,
Frank C. Livingston,
George Byron Chandler,
Joel Daniels,
Wm. E. Buck,
W. R. Call.

# BY-LAWS OF THE

# Manchester Institute of Arts and Sciences.

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## OFFICERS.

The officers of this corporation shall be a President, Vice Presidents, (the number of which to be determined by provisions hereinafter made) a Treasurer, a Clerk, a Corresponding Secretary, a Curator, and a Council constituted as hereinafter provided, all of whom shall be elected annually and hold their offices respectively for one year and until their successors are elected and qualified.

## DUTIES.

*President.* The President shall preside at all meetings of the association and discharge the usual duties of that office. He shall be the executive officer of the corporation and also be the presiding officer of the Council.

*Vice Presidents.* In the absence of the President a Vice President shall preside in his stead and discharge all the duties of the office, excepting that he shall not be the executive officer of the corporation.

*Treasurer.* The Treasurer shall discharge all of the usual duties of that office and shall give bond for the faithful performance of his duty, in such amount with sufficient sureties as shall be determined by the Council. He shall have custody of the seal of the corporation and shall render a report, suitably audited, of the financial condition of the association at the time of the annual meeting.

*Clerk.* The Clerk shall perform all of the usual duties pertaining to his office and such other duties as may be required from time to time by the Council, and shall be sworn to the faithful performance of his duties. He shall also be clerk of the Council.

*Corresponding Secretary.* The Corresponding Secretary shall discharge all the duties customary to his office, shall conduct correspondence with other associations and persons alike interested, shall have the care and custody of the documents, books and papers not connected with or incident to the records and papers not properly belonging to the office of the Clerk, and he shall perform all such other duties as the Council may require.

*Curator.* The Curator shall have the care and custody of the library, cabinet, art gallery and other property of the Institute, and perform such other duties as may be required by the Council.

*Council.* The Council shall consist of not less than seven members, and the number required for such membership, in addition to President, Clerk, Corresponding Secretary, Treasurer, Curator, and Vice Presidents as hereinafter provided, shall be elected annually by the corporation. The Council shall have the power to appoint all necessary committees.

MEMBERSHIP.

Any association, club or organization may become a member of this corporation, with the approval of the Council, by filing with the Clerk an application stating the name and purpose of such organization, with a request to be admitted as a member, and the payment of one dollar. Such membership, when obtained, shall make by the operation of this by-law all of the members of said association, club or organization members of this corporation upon subscribing to the by-laws.

Any person may be elected to membership by the Council upon being recommended by two members, paying the Treasurer the sum of one dollar and subscribing to the by-laws. All applications for membership should designate the section or sections with which the applicant will unite.

Any person may be elected a corresponding member of the Institute by a unanimous vote of the Council, and such member shall be exempt from the payment of dues and membership fee. Any person who shall pay to the Institute the sum of one hundred dollars at any one time shall, on his request, be elected a life member, and as such shall be exempt from all further dues and assessments.

SECTIONS.

Any association, club or organization, admitted to membership as hereinbefore provided, may become a section, which shall be designated alphabetically by the Council, and have authority to establish its title, to maintain its autonomy and mange its affairs, not inconsistent with these by-laws.

Each section shall have a chairman who shall discharge all of the duties pertaining to such office and ex-officio be and become a Vice President of the association and a member of its Council. Such chairman shall be elected by the section at or before the time of the annual meeting of the association and his election shall be certified by the Secretary of the section to the Clerk of the corporation.

Five or more members may organize a section, with the approval of the Council.

MEETINGS.

The annual meeting of the corporation shall be held upon the first Wednesday of January, at such hour and place as the Clerk shall deem expedient. Special meetings may be held at such time and place as the Council shall deem expedient. Notice of all meetings shall be given by publication in some newspaper in the city of Manchester by one publication at least ten days prior to said meeting or by written or printed notice by mail to the last known address of each member at least ten days prior to the meeting.

DUES.

The annual dues shall be three dollars, payable in advance. New members shall be charged for whole months or fraction thereof to the time of the next annual meeting. Any person who fails to pay such dues for one year shall cease to be a member, and his or her name may be stricken from the roll by vote of the Council, after notice by the Clerk of the corporation setting forth such delinquency and the provision of this by-law, and any member may be removed by the Council for cause upon charges after due notice and hearing.

QUORUM.

At any meeting of the corporation ten members shall constitute a quorum.

AMENDMENTS.

These by-laws may be altered or amended at any meeting of the association, notice having been given of the proposed change.

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# OFFICERS

OF THE

## MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

## 1899.

ALBERT L. CLOUGH, *President.*
EDWARD J. BURNHAM, *Corresponding Secretary.*
NORWIN S. BEAN, *Treasurer.*
HARRIE M. YOUNG, *Clerk.*
GEORGE I. HOPKINS, *Curator.*

### COUNCIL.

ALBERT L. CLOUGH,
EDWARD J. BURNHAM,
NORWIN S. BEAN,
HARRIE M. YOUNG,
GEORGE I. HOPKINS,
HON. G. BYRON CHANDLER,
HON. WILLIAM C. CLARKE,
JOHN C. FRENCH,
CHARLES J. ABBOTT,
J. BRODIE SMITH,
WILLIAM K. ROBBINS,
LUTHER C. BALDWIN,
WILLIAM H. HUSE,
MRS. ALBERT O. BROWN,
MRS. FRED'K W. BATCHELDER,
GEORGE WINCH.

# ROLL OF MEMBERS.

## JAN. 1st, 1900.

Abbott, Charles J.
Abbott, Florence L.
Abbott, Maude C.
Abbott, Walter S.
Adams, Charlotte R.
Africa, Walter G.
Aldrich, Dr. E. B.
Aldrich, Mrs. E. B.
Andrews, Frank E.

Balch, Mrs. Chas. E.
Baldwin, E. T.
Baldwin, Mrs. E. W.
Baldwin, Luther C.
Baldwin, Mrs. L. C.
Bancroft, Clarence
Barker, Miss Ella F.
Barlow, Burton
Barnes, Miss Mary F.
Barney, Hial
Bartlett, Hon. Chas. H.
Batchelder, Fred'k W.
Batchelder, Mrs. F. W.
Batchelder, Miss Kate E.
Bean, Norwin S.
Beebe, C. E.
Bickford, Chas. W.
Bickford, Mrs. Emma S.
Bisco, George
Blodgett, Warren C.
Blodgett, Mrs. Warren C.
Bourne, Mrs. Harriet K.
Bourne, Henry D.
Bourne, Miss Meta
Bourne, Stephen N.
Boutwell, Mrs. Mary S.
Bower, Fred B.
Branch, Oliver E.
Branch, Mrs. Sarah C.
Broderick, James A.
Brooks, Miss Gertrude H.
Brown, Mrs. Abby S.
Brown, Mrs. S. C.
Brown, Dr. James S.
Brown, Mary E.
Bryant, E. M.
Buck, Wm. E.
Bullock, Dr. Lillian G.
Burbank, Wm. E.
Burnham, Miss Bessie I.
Burnham, Edward J.
Burnham, Mrs. E. J.
Burnham, George E.
Burnham, Henry E.
Burnham, Miss Ursula M
Butman, Mrs. Jennie C.
Byrne, Miss Edith N.

Call, W. R.
Carpenter, Frank P.
Carpenter, Mrs. F. P.
Carpenter, Josiah
Carpenter, Mrs. Josiah
Castor, Mrs. Edgar E.
Caswell, Fred M.
Challis, Frank H.
Chandler, Mrs. Fanny M.
Chandler, Geo. Byron
Chandler, Geo. H.
Chandler, Henry
Chandler, John M.
Chase, C. Edwin
Cheney, Miss Georgia M.
Cheney, Mrs. Harriet J.
Christophe, Sebastian
Christophe, Mrs. S.
Clapp, Allen N.
Clapp, Horace T.
Clarke, Wm. C.
Clement, Miss Mary A.
Cleworth, John
Cleworth, Mrs. John
Clough, Albert L.
Clough, Mrs. L. B.
Clough, Miss Nora B.
Coaker, Mrs. Elizabeth M.

Colby, Lyman W.
Collins, Mrs. E. H.
Connor, Miss Ellen E.
Corey, William
Cottrell, Benj. S.
Crafts, George P.
Crafts, Mrs. G. P.
Cross, David
Cross, Mrs. David
Crowell, Miss Mary E.
Currier, Dr. Edward H.
Currier, Mrs. Emma F.
Currier, Edward S.
Currier, Mrs. Moody,
Custer, Miss Anna

Dana, Miss Mary F.
Daniels, Miss Belle R.
Davis, Miss Edith H.
Davis, George M.
Davis, Mrs. G. M.
Davis, Miss May W.
Derby, Miss Lizzie M.
Dickey, Miss Esther M.
Dole, A. W.
Dow, Miss Sarah E.
Dowd, Mrs. Mary H.
Dowst, Miss Ella M.
Dowst, John
Drew, Mrs. Annette H.
Dustin, Charles R.

Eames, Wm. M.
Edgerly, Clarence M.
Ela, Miss Emma J.
Elliott, Mrs. Medora W.
Elliott Wm. H.
Elliott, Mrs. Wm. H.

Fairbanks, Miss Elsie D.
Farmer, Mrs. Lucinda L.
Farrell, L. J.
Felch, Miss Sadie C.
Fellows, Joseph W.
Fellows, Mrs. J. W.
Ferrin, A. W.
Ferren, Eben
Ferren, Miss Kittie J.
Fogg, Edward H.
Fogg, Miss Susy C.
Foster, Mrs. John
French, Charles H.
French, Mrs. Emma B.
French, John C.
French, Dr. L. Melville
French, Mrs. Mary E.

Gage, Miss Mary J.
Gault, John
Gay, Miss Annie M.
George, Miss Ethel L.
Gillan, Miss Jean
Gooden, Miss Kate M.
Gorrell, Mrs. M. M.
Graupner, Miss Amelia L.
Graupner, Miss Hulda C.

Hale. Arthur H.
Hartshorn, Fred G.
Hartshorn, Mrs. Minnie L.
Hassam, R. H.
Hawkes, Miss M. Clara
Hayes, Charles C.
Head, Miss Caroline E.
Heald, Frank E.
Heard, Arthur M.
Herrick, Henry W.
Hicken, Miss Blanche E.
Hoit, Miss Carrie E.
Holt, Miss E. Blanche
Hope, Miss Ella
Hope, Miss Lucy Maud
Hopkins, George I.
Hoyt, Wm. J.
Hubbard, Miss Martha W.
Hunt, Mrs. N. P.
Hunt, Miss Sara
Huse, Mrs. Isaac
Huse, Wm. H.
Huse, Mrs. Wm. H.

Jackson, George R.
Jenkins, A. A.

Kemp, Miss Bertha L.
Kendall, Willis B.
Knowlton, Mrs. Maude Briggs

Lamprey, Miss Alice M.
Lane, Thos. W.

Littlefield, Miss Minnie E.
Livingston, Frank C.
Lockhart, Mrs. Frances U.

Mack, Miss Isabella G.
MacLeod, Mrs. Alberta A.
MacLeod, Donald
Manning, Charles H.
Manning, Robert L.
Martin, Frank E.
Martin, Miss Winona M.
Marshall, Miss Alice
McAllister, Geo. I.
McAllister, Mrs. Mattie H.
McDuffie, Charles H.
McDuffie, Mrs. Laura B.
McKean, Mrs. Ellen E.
McLaren, Miss Emma L.
McLaren, H. N.
McLaren, Miss Mary E.
Means, Mrs. Elizabeth A.
Merrill, Albert
Mitchell, Miss Mary W.
Mooar, Linda Hunter
Moore, Wm. E.
Morse, Henry H.
Morse, Mrs. L. L.
Morse, Miss Millicent S.
Morse, Dr. M. V. B.
Moulton, Miss Mary E.
Murkland, Wm. E.

Nichols, Wm. T.
Nutt, Miss May F.
Nutting, Fred S.

Olzendam, Mrs. A. P.
Ormsby, R. S.

Parker, Miss Nellie C.
Parker, Walter M.
Parker, Mrs. W. M.
Patten, Miss Annie W.
Peaslee, Robert J.
Perkins, David W.
Phillips, Miss Grace A.
Phinney, George H.
Piper, F. S.
Price, Mrs. S. E.
Priest, Miss Electa M.
Priest, Mrs. Lucia M.
Reed, Miss Helen
Richardson, Charles L.
Richardson, Edwin P.
Richardson, Mrs. Harriet B.
Richardson, Herbert E.
Richardson, James M.
Richardson, Miss Theodora
Richardson, Miss Susan A.
Riddle, Pearly H.
Robbins, Mrs. Ellen R.
Robbins, Wm. K.
Robinson, Ed. R.
Robinson, Dr. J. Franklin
Rowe, Miss Olive A.
Ryder, Bayard C.

Sanborn, A. H.
Sargent, Herbert G.
Sawyer, Miss Frances Fay
Schaeffer, Henri
Shontell, Fred W.
Simmons, Mrs. E. M.
Simmons, Walter W.
Slayton, Edward M.
Smith, Mrs. A. D.
Smith, Arthur J.
Smith, Dante
Smith, J. Brodie
Smith, Leonard G.
Smith, Miss May L.
Smith, Miss Nellie M.
Snow, Miss Nellie W.
Spaulding, F. L. V.
Squire, Miss H. L.
Stanton, Miss Theresa B.
Staples, Rev. Chas. J.
Staples, Mrs. Grace D.
Stark, Augustus H.
Stark, Mrs. A. H.
Stearns, H. A.
Stevens, Victor E.
Stockbridge, Dana W.
Straw, Herman F.
Straw, Mrs. H. F.
Stuart, Miss Alice M.

Taintor, Chas. W.

Thompson, A. W.
Tolman, Miss Mary M.
Topliff, Miss Ellen A.
Tuson, Miss Eva F.
Tuttle, Miss Hattie S.

Varick, John B.
Varick, Mrs. John B.
Varick, Mrs. Thos. R.
Varick, Dr. W. R.
Varney, David B.
Varney, Miss Emma L.
Varney, Mrs. Harriet

Walker, Miss Flora M.
White, Louis B.
White, William L.
Whitten, John H.
Whitten, Mrs. John H.
Wiggin, Miss Ellen F.
Willand, Miss Alta C.
Willand, Miss Hattie O.
Williams, Miss Bertha M.
Williams, J. Arthur
Williams, Mrs. J. Arthur
Wilson, Miss Ida Belle
Wilson, R. W.
Winch, George
Wing, Miss Caroline E.
Woodbury, Gordon
Wooodman, Miss Susie G.

Young, Harrie M.
Young, Miss Jennie

CORRESPONDING MEMBERS.

Edwin A. Jones, Orlando, Fla. Miss Sarah E. Parker, Pembroke, N. H.

ZOÖLOGICAL AGENT—George E. Burnham.

AGENT — Sherburne Fowler, Pembroke, N. H.

CUSTODIAN AND LIBRARIAN—George E. Burnham

# THE MANCHESTER ELECTRIC CLUB.

On the evening of June 3d, 1892, a number of gentlemen interested in the electrical industry met at the rooms of the Manchester Board of Trade, with the idea in mind of forming an association to be known as The Manchester Electric Club.

This meeting was followed by another on June 7th, at which time the organization of the Club was perfected and its officers for the first year were elected.

The first regular meeting was held June 22d, 1892, at which time it was decided that the Club should have permanent quarters. Rooms were secured in Opera Block, Hanover street, and held by the Club until September 5th, 1894, on which evening the Club opened its new quarters in the Kennard building.

The Club gradually outgrew its quarters in The Kennard, and at the meeting of March 2d, 1898, it was decided to accept an offer made by the Manchester Art Association, that the Club occupy a part of their rooms in the Pickering building. The first meeting in the new rooms was held on Monday evening, April 11th, 1898, and the remainder of the life of the Club was passed in these quarters.

On Monday evening, January 9th, 1899, it was voted to join the Manchester Institute of Arts and Sciences.

The following list of subjects were discussed before the Club at its regular and special meetings, from June 22d, 1892, to January 9th, 1899:

1892.

June 22d, The First Principles of Electricity. Mr. G. I. Hopkins.
July 19th, Practical Talk on Electricity. Mr. G. I. Hopkins.
November 15th, Construction and Use of the Searchlight. Mr. Mark Lowd.

1893.

May 2d, Construction of the Dynamo Machine. Mr. Albert L. Clough.

June 2d, Scientific Methods. Mr. W. K. Robbins.

July 18th, Electrical Features at the World's Fair. Mr. Albert L. Clough.

December 19th, My Connection with the Telephone Business. Mr. W. H. Fairchild.

1894.

January 3d, Telephone Instruments. Mr. J. Brodie Smith.

January 24th, Principles of the Storage Battery. Mr. Albert L. Clough.

April 4th, The Relation of Electricity to Chemistry. Mr. Albert L. Clough.

April 18th, Illustrated Lecture. Mr. Clarence Bancroft.

May 2d, The Printing Telegraph. Mr. J. E. Wilson.

May 16th, The Telephone. Mr. J. Brodie Smith.

June 6th, Elementary Principles of Light. Rev. H. E. Cooke.

June 20th, A Manchester Orchid. Mr. E. J. Burnham.

July 11th. At this meeting Mr. E. J. Burnham spoke in favor of enlarging the scope of the Club, so that such sciences as botany, mineralogy, etc., might be discussed at the meetings, and thought that it would be an inducement for people interested in those sciences to join the Club. At this meeting it was decided to have the Club incorporated as a voluntary, non-dividend paying corporation.

October 31st, The Graphophone. Mr. A. J. P. McClure, of Philadelphia.

November 21st, The Nourishment of Living Organisms from a Scientific Point of View. Mr. W. K. Robbins.

December 19th, Instruments for Measuring Electricity. Mr. Albert L. Clough,

1895.

January 2d, The Human Eye. Dr. H. D. W. Carvelle.

March 6, Construction of the Piano. Mr. A. A. Jenkins.

June 5th, The Pollenation of Flowers. Mr. E. J. Burnham.
September 18th, Acetylene Gas. Mr. Albert L. Clough.
October 2d, The Honey Bee. Mr. Wm. H. Huse.

1896.

January 15th, The Norse City of Norembega. Mr. E. J. Burnham.
March 25th, Static Electricity. Mr. G. I. Hopkins.
April 15th, Coal Tar Colors. Mr. Henri Schaeffer.
October 7th, The X-Ray. Messrs. Albert L. Clough and Mr. A. W. Ferrin.
November 11th, Early American Workers in Scientific Fields. Mr. E. J. Burnham.

1897.

January 6th, Antiseptics. Mr. W. K. Robbins.
March 17th, Central Station Equipment and Management. Mr. F. H. Smith.
April 7th, Experiments with various Explosive Substances. Mr. Louis B. White.
November 17th, Our Insect Friends. Mr. Wm. H. Huse.
December 29th, Sun Spots and their Phenomena. Mr. G. I. Hopkins.

1898.

March 2d, World Building. Mr. E. P. Richardson.
April 11th, A Mediterranean Trip. Mr. Norwin S. Bean.

September 12th. Mr. E. J. Burnham gave an interesting and instructive talk on scientific study, pointing out the relationships of the various branches of science and their dependence on each other. The speaker dwelt at some length upon the field of usefulness open to the Club and urged upon the members the benefits to science, and to the city, which might come with the broadening of the Club's field of work. From a modest beginning along limited lines in electricity the organization had broadened its scope until its proceedings had comprehended many other branches of science, and it has become in fact, if not in name, the scientific society of Manchester.

September 26th, The Exposure of Mrs. Huston, Spirit Medium. Mr. Wm. H. Huse.

October 10th, The Chemistry of Food. Mr. W. K. Robbins.

October 24th, Psychic Facts. Mr. G. I. Hopkins.

November 28th, Kinetoscope Exhibition. Mr. J. Brodie Smith.

December 12th, The Attitude of the Scientific Mind. Mr. W. E. Moore.

December 27th. At this meeting Mr. J. W. Fellows was authorized to take the necessary legal steps looking toward the formation of the Manchester Institute of Arts and Sciences.

1899.

January 9th. At this meeting it was voted to join the Manchester Institute, the Club to be thenceforth known as —

## SECTION A—Physical Science.

### MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

The following subjects have been introduced and discussed during the year 1899:

January 23d, Experiments with Liquefied Air. Mr. W. K. Robbins and Albert L. Clough.

March 13th, The Weather. Mr. W. H. Huse.

March 23d, An Electrolytic Induction Coil Break. Mr. Albert L. Clough.

April 11th, A Lesson in a Looking-Glass — a Study in the Fourth Dimension. Mr. W. E. Moore.

April 24th, Travels in Cuba. Mr. Norwin S. Bean.

June 12th, Demonstration of the Nernst Light. Mr. Albert L. Clough.

October 23d, The Leonids. Mr. G. I. Hopkins.

November 27th, The Beet Sugar Industry. Mr. W. K. Robbins.

December 18th, Some Delusions of the Nineteeth Century. Dr. James S. Brown.

December 30th, Demonstration of the Rotation of the Earth by means of Foucault's Experiment. E. J. Burnham and Albert L. Clough.

OUTINGS.

The Club has conducted several field meetings, for the purpose of botanical, entomological and geological study. Among the points visited were the Uncanoonucks, Lake Massabesic, the Devil's Den, Kelley's Falls and Rock Rimmon.

The following public lectures have been given under the management of the Manchester Electric Club:

June 29th, 1894. The Future Developments of Electricity, its Present Limitations and Obvious Possibilities.
PROF. AMOS E. DOLBEAR, Tufts College.

February 6th, 1895. The Measurement of Electricity and Early Experiences in Electrical Engineering.
MR. CARYL D. HASKINS, Boston.

December 9th, 1896. Hawaii.
PROF. GEO. H. BARTON, Massachusetts Institute of Technology.

February 10th, 1897. Bacteriology and its Relation to Public Health.
PROF. WILLIAM T. SEDGWICK.

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## OFFICERS OF SECTION A--1899.

WILLIAM H. HUSE, *President.*
CHARLES J. ABBOTT, *Vice President.*
EDWARD J. BURNHAM, *Treasurer.*
ARTHUR J. SMITH, *Recording Secretary.*
FREDERICK W. SHONTELL, *Financial Secretary.*

EXECUTIVE COMMITTEE.

ALBERT L. CLOUGH, HENRI SCHAEFFER,
LUTHER C. BALDWIN.

MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

# SECTION B.

# ENTOMOLOGY.

## OFFICERS FOR 1899.

EDWARD J. BURNHAM, *President.*
WALTER S. ABBOTT, *Vice President.*
MISS SUSY C. FOGG, *Secretary.*
HERBERT E. RICHARDSON, *Treasurer.*

EXECUTIVE COMMITTEE.

WALTER S. ABBOTT, MISS MAY W. DAVIS,
GEORGE E. BURNHAM.

# PRELIMINARY CATALOGUE

OF THE

# ANISOPTERA

IN THE VICINITY OF MANCHESTER, N. H.

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BY EDWARD J. BURNHAM.

There is reason to believe that the Odonate type is slowly passing away. Representative of an ancient form of insect life, the Dragon-flies find themselves lacking in adaptability to change of environment. With many of our more recent forms change means development; with the Odonata change is extermination. Doryphora decemlineata, after feeding for centuries upon Solanum rostratum in its home at the base of the Rocky Mountains, met the outposts of civilization about the year 1859 and reached the Atlantic coast in 1874, having in the brief space of fifteen years spread over the intervening territory. Pieris rapæ, introduced from Europe, was first observed in Canada in 1860; by 1886 it had spread over a great part of the North American continent, certainly southward to Florida and westward to Colorado. The Odonata do not possess this power of adaptation to changed conditions. A few species, notably Libellula quadrimaculata, have been observed to migrate in large swarms; but these migrations were apparently undertaken in search of food rather than for the purpose of oviposition. As a rule, Dragon-flies are non-migratory.

Few groups of insect life so strikingly illustrate Darwin's observation that closely allied species cannot obtain in the same locality, since of two species attempting to occupy the same situation and feeding upon similar food one must possess in some respect a slight advantage, which will inevitably result in the extermination of the weaker species. The extent to which this principle has been carried among Dragon-flies constitutes one of the most interesting features of a careful study of the Odonata in any

given locality. In the collection of the Manchester Institute of Arts and Sciences the Anisoptera alone comprise 28 species, distributed among 16 genera and 4 sub-families. The specimens were gathered within the radius of an easy walk from the city, and it is certain that were the radius extended to twenty miles the result would be the addition of several genera — and probably of one sub-family, the Cordulegasterinæ. The cannibalistic habits of Dragon-flies, both in the nymph and imago states, combined with the tremendous external pressure of the many natural checks to increase, have resulted in so marked a separation of the types that with a few exceptions, such as Libellula pulchella, Diplax rubicundula and Gomphus exilis, which are common everywhere, each species may be said to have its particular brook, or pond, or series of pools, or its special season. It is obvious, therefore, that when a marsh is drained, a pool filled, or a brook condemned to servitude as part of the drainage system of city or village, a species formerly abundant may become extinct in a given locality. Another potent factor in the extinction of species among Dragon-flies is the introduction of new and strange varieties of fish to our ponds and streams. Between the Odonata and the old-time denizens of our waters there had come to be, if not an *entente cordiale*, at least a *modus vivendi;* but the new-comers, with the eyes of travelers, view everything from a novel standpoint, to the disadvantage of the Dragon-flies. The extent to which the introduction of German carp, feeding upon muddy bottoms, may be responsible for an increase in the number of mosquitoes, presents an interesting subject for investigation.

The above considerations indicate the desirability of a careful study of this interesting group of insects, that collections and records may be preserved for future students, who may find it difficult or impossible to secure specimens which may now be obtained with comparative ease. In some states, notably Massachusetts, New York, Pennsylvania, Ohio and Louisiana, this work has already been done with a tolerable degree of thoroughness. In the last-named state an effort has been made to interest the children of the schools, nets and full instructions for collecting and preservation being furnished the teachers in many parishes,

with the result that more than sixty species have already been identified, with the probability that others will be added to the list as the state is more fully explored. It is hoped that through the influence of the Manchester Institute all the species to be found in New Hampshire may soon be identified and recorded. As affording an admirable introduction to the study of this group of insects, and for ready reference to convenient tables, every student should possess a copy of Calvert's "Catalogue of the Odonata — Dragonflies of the Vicinity of Philadelphia," published by the American Entomological Society, at Philadelphia. If possible, Hagen's Neuroptera of North America, published by the Government among the papers of the Smithsonian Institution, should also be secured; but this valuable treatise is now out of print and can only be obtained at second-hand bookstores, as chance opportunities may occur. For collection, a net and cyanide bottle are indispensable. The insects should be carefully examined and described while still fresh, as the brilliant colors soon begin to disappear, and it is always desirable to insert in every specimen designed for preservation a bristle, or some other substance that is tolerably firm and at the same time slightly elastic. A corn broom will be found to furnish excellent material for the purpose. The student will soon learn to recognize the more common species on the wing, and only so many individuals should be secured as are desired for study and preservation. By reason of their usefulness as insect destroyers, no less than for their beauty of form and color and grace of motion, Dragon-flies deserve to be classed, in popular consideration, alongside of birds.

The identification of the Institute's specimens of Zygoptera, or Dragon-flies with front and hind wings similar, included in the family Agrionidæ, is not sufficiently complete to warrant their consideration in the present paper. Attention will therefore be given only to the representatives of the sub-order Anisoptera, or Dragon-flies with wings dissimilar and held horizontally in repose. This sub-order includes the families Aeschnidæ and Libellulidæ; representatives of the sub-families Gomphinæ, Aeschninæ, Cordulinæ and Libellulinæ being found in our collection. Familiarity with the limited collection now in the possession of the Insti-

tute will enable the members of the Entomological Section to bear in mind what vacancies it is desirable to fill during the coming summer, in order that the Odonata of our immediate vicinity may be fully represented.

## I. Family Aeschnidæ.

### I. Sub-Family Gomphinæ.

#### 1. **Hagenius** Selys.

Calvert, p. 225; Hagen, Syn. Neur. N. A. p. 114.

**1. Hagenius brevistylus** Selys.

Calvert, p. 241.

The Institute possesses one specimen of this magnificent representative of the Gomphine type; a male, length 75 millimetres, and wing expanse 100 millimetres.

#### 2. **Gomphus** Leach.

Calvert, p. 222; Hagen, Syn. Neur. N. A. p. 98.

**2. Gomphus exilis** Selys.

Calvert, p. 243; Hagen, Syn. Neur. N. A. p. 108.

The most common Gomphine about Manchester. Easily recognized by its prevailing brown and green, especially by its nearly straight, blackish-brown abdomen, marked with basal, dorsal green spot or band on segments 1–10. Length, 40–42; alar expanse, 50–52. Male and female in collection.

**3. Gomphus vastus** Walsh.

Calvert, p. 245.

This Gomphus, easily recognized by the dilation of abdominal segments 7–9, is a beautiful species, strongly marked with green-

ish yellow, brown and black. Its range is from Quebec to the District of Columbia, but it appears to be rare. Calvert's legend reads: "One male flew in shop at Sixth and Chestnut Sts. Phila. May 28, 1891." One female in collection. Length, 45; alar expanse, 57.

**4. Gomphus naevius** Hagen.

Calvert, p. 242.

This, the smallest of our Gomphines, appears to be rare, and is especially noticeable for its whitish abdominal appendages and very short vulvar-lamina — scarcely one-fifth as long as the ninth segment; the apical half is bilobed and the tips rounded. One female. Length, 39; alar expanse, 45.

**3. Dromogomphus** Selys.

Calvert, p. 222.

**5. Dromogomphus spinosus** Selys.

Calvert, p. 245. *G. spinosus*, Hagen, Syn. Neur. N. A. p. 102.

This vigorous representative of the Gomphine type, originally placed by Baron Selys-Longchamp in the genus Gomphus, and later, by the same eminent authority, given a place in his new genus, Dromogomphus, distinguished by its long third femora and the 5–7 long spines in the antero-inferior row, is more abundant about Lake Winnipisauke than it is around Manchester, where it is, however, occasionally to be met with. Length, 54–61; alar expanse, 76–80.

## II. Sub-Family Aeschninæ.

**4. Aeschna** Fabricius.

Calvert, p. 222; Hagen, Syn. Neur. N. A. p. 119.

**6. Aeschna verticalis** Hagen.

Calvert, p. 248; Hagen, Syn. Neur. N. A. p. 122.

This strong-flying "mosquito-hawk" is easily recognized by its

anal triangle of two cells, and the three basal, dorsal teeth on the tenth abdominal segment. One male in the collection. Length, 67; alar expanse, 90.

**7. Aeschna clepsydra** Say.

Calvert, p. 248; Hagen, Syn. Neur. N. A. p. 122.

Of special interest by reason of the denticles on the superior carina of the male abdominal appendages. One male in collection. Length, 66; alar expanse, 90.

**8. Aeschna constrictor** Say.

Calvert, p. 249; Hagen, Syn. Neur. N. A. p. 123; Scudder, Proc. Bost. Soc. N. H. p. 212, 1886.

Male with anal triangle of three cells; no dorsal teeth on ten. Common about Manchester. Male and female in the collection. Length, 70; alar expanse, 94.

### 5. Anax Leach.

Calvert. p. 222; Hagen, Syn. Neur. N. A. p. 117.

**9. Anax junius** Drury.

Calvert, p. 249; Hagen, Syn. Neur. N. A. p. 118.

The prince of Dragon-flies. A strong, audacious flyer, putting the skill and patience of the collector to the extreme test. Especially distinguished by the round black spot on the frons, surrounded by yellow, and this again by a dark blue ring. One male in collection. Length, 70; alar expanse, 100.

## III. Sub-Family Cordulinæ.

### 6. Macromia Rambur.

Calvert, p. 223.

**10. Macromia illinoensis** Walsh.

Calvert, p. 251.

The Cordulinæ are preëminently thicket dwellers, their long, slender legs and unusually developed feet being specially adapted for clinging to twigs, while their wings, although large in Macromia, do not appear to be capable of sustained flight. The road across the sandy plain between the Harvey school-house and Goffe's Falls is the particular station for this species in the vicinity of Manchester. Here they are found, about the first week in June, in well-nigh countless numbers, resting in dark thickets by the roadside and ever and anon darting in quick, jerky flight across the roadway, returning, if nothing befalls, almost instantly. Sooner or later, however, it makes its last excursion, for the birds have learned something of the habits of Macromia. One need but remain motionless and watchful to observe many a tragedy of a bright June day on the Goffe's Falls road. Sometimes for minutes there will be neither Dragon-fly nor bird in sight — only small insects dancing in the sun. Suddenly a Macromia will dart zig-zag across the roadway, and as suddenly a bird will swoop down from a tree above. The bird is not always successful, but not infrequently its aim is correct, and it flies triumphantly to a neighboring bough, where it leisurely swallows the victim, in the process breaking off the wings, which float slowly to the ground. The destruction by the birds is so great that whereas on some particular day hundreds of these Dragon-flies may be observed it will be found next to impossible a week later to secure a single specimen, while a careful observer will discover wings in vast numbers scattered beneath the trees. Terrific as is the slaughter, certain species of birds apparently giving their attention to nothing else while the Dragon-flies last, the succeeding generation of Macromia is unaffected, for oviposition has taken place in the dark pools of Cohas brook before the fatal migration to the roadway on the plains is undertaken. The female of Macromia is strikingly beautiful, marked with orange and yellow bands upon the abdominal segments. The male is smaller and would not be recognized as being of the same species if the two were not taken together. Length of female, 90 millimetres ; alar expanse, 98 millimetres. Length of male, 55–60 ; alar expanse, 72.

### 7. **Tetragoneuria** Hagen.

Calvert, p. 223; Hagen, Syn. Neur. N. A. p. 140.

**11. Tetragoneuria semiaquea** Burmeister.

Calvert, p. 252; Hagen, Syn. Neur. N. A. p. 140.

Smaller than Macromia illinoensis and distinctly marked, but with the same Corduline, thicket-haunting characteristics. The station for Tetragoneuria near Manchester is in the woods between the Stevens Pond road, beyond Youngsville, and Bald Hill. There is a pool here in which they breed, apparently without competition with other Dragon-flies. The adults emerge the last of May and soon scatter through the woods, choosing spots where the sunlight shimmers through the branches. Here they dart for their insect prey, as does Macromia, and are similarly persecuted by the birds. During the severe drought of 1899 the pool was dried up for a considerable period, and it will be of interest to note what effect this circumstance may have upon the species at this station. It is known that some species of Dragon-flies have the power of lying dormant under similar conditions, and it is certain that this particular pool must have been dried in many seasons previous to 1899. Male and female in collection. Length, 38; alar expanse, 58.

### 8. **Neurocordulia** Selys.

Calvert, p. 223.

**12. Neurocordulia obsoleta** Say.

Calvert, p. 252.

A beautiful species, distinguished by the small spots on anticubitals, two cross-veins beneath the pterostigma, and the slightly produced, rounded apical margin of tenth segment. One male. Length, 52; alar expanse, 74.

### 9. **Somatochlora** Selys.

Calvert, p. 223.

**13. Somatochlora lepida** Hagen.

Calvert, p. 253.

The pale yellow wings and the bi-colored membranule will catch the eye of the student. One male. Length, 52; alar expanse, 62.

## II. Family Libellulidæ.

## IV. Sub-Family Libellulinæ.

### 10. **Pantala** Hagen.

Calvert, p. 223; Hagen, Syn. Neur. N. A. p. 141.

### 14. **Pantala flavescens** Fabricius.

Calvert, p. 254; Hagen, Syn. Neur. N. A. p. 142.

This insect, almost world-wide in its distribution, is very rare about Manchester. One male was taken on the island below Amoskeag Falls, September 6, 1898. A female which had been observed in its company escaped. No other individual of Pantala flavescens has been taken or seen during three years. One male in collection. Length, 50; alar expanse, 87.

### 11. **Libellula** Linné.

Calvert, p. 224; Hagen, Syn. Neur. N. A. p. 150.

### 15. **Libellula cyanea** Fabricius.

Calvert. p. 258; *L. quadrupla* Say, Hagen, Syn. Neur. N. A. p. 157.

A beautiful species and not uncommon about Manchester. Male and female in collection. Length, 45; alar expanse, 72; female same expanse; length, 39.

### 16. **Libellula exusta** Say.

Calvert, p. 258; *L. deplanata* Rambur, Hagen, Syn. Neur. N. A. p. 154.

Male and female in collection. Length, 43; alar expanse, 72; female same expanse; length, 39.

**17 Libellula quadrimaculata** Linné.

Calvert, p. 258; Hagen, Syn. Neur. N. A. p. 150.

This beautiful species, with black and yellow or olive markings, is comparatively rare about Manchester. Migrations of this species have been recorded as follows: Bielfeld, 1881; Dresden, 1881; Neisse Valley, 1881—"two hours in passing;" North Germany, "large swarm," 1881; "every year" in Charento Inferieure, at the end of September; Zierikzee, Holland, May 30, 1883, "from 11 A. M. to 11 P. M.," coming from the southwest; Malino, Sweden, 1883; The Hague, 1884. One male in collection. Length, 45; alar expanse, 74.

**18 Libellula semifasciata** Burmeister.

Calvert, p. 258; Hagen, Syn. Neur. N. A. p. 151.

This strong flyer, at first glance resembling Libellula pulchella, but readily distinguished by its yellow wing-veins and reddish brown markings, is not very abundant about Manchester. One male in collection. Length, 44; alar expanse, 77.

**19 Libellula axillena** Westwood; form **incesta** Hagen.

Calvert, p. 257; Hagen, Syn. Neur. N. A. p. 155.

One male in collection. Length, 52; alar expanse, 74.

**20 Libellula pulchella** Drury.

Calvert, p. 259; Hagen, Syn. Neur. N. A. p. 153.

To the collector about Manchester this species soon becomes the most familiar of all the larger Dragon-flies. It is common everywhere but is here most abundant at Dorr's Pond, where great numbers may be found during the first two weeks of July. Three specimens in collection—one male, two females, one of these teneral. Length, 53; alar expanse, 89.

**12 Plathemis** Hagen.

Calvert, p. 224; Hagen, Syn. Neur. N. A. p. 149.

**21 Plathemis trimaculata** De Geer.

Calvert, p. 259; Hagen, Syn. Neur. N. A. p. 149.

The genus Plathemis, like Libellula, is characterized by the sinuous nodal sector, which is distinctly waved, but is readily distinguished by the pair of ventral hooks on the first abdominal segment of the male. Trimaculata, representing this genus, is comparatively common but difficult to capture. One male in collection. Length, 48; alar expanse, 70.

### 13 **Celithemis** Hagen.

Calvert, p. 224; Hagen, Syn. Neur. N. A. p. 147.

**22 Celithemis ornata** Rambur.

Calvert, p. 261; Hagen, Syn. Neur. N. A. p. 182.

Rare. One female. Length, 42; alar expanse, 59.

**23 Celithemis elisa** Hagen.

Calvert, p. 261; *Diplax elisa* Hagen, Syn. Neur. N. A. p. 182.

The specimens of this beautifully marked species were taken at Beaver Pond, in Derry, where it is not uncommon. Male and female in collection. Length, 44; alar expanse, 56.

### **Leucorhinia** Brittinger.

Calvert, p. 224.

**24 Leucorhinia intacta** Hagen.

Calvert, p. 262; *Diplax intacta* Hagen, Syn. Neur. N. A. p. 179.

Abundant throughout August. Male and female in collection. Length, 31; alar expanse, 51.

### 15 **Diplax** Charpentier.

Calvert, p. 224; Hagen, Syn. Neur. N. A. p. 173.

**25 Diplax rubicundula** Say.

Calvert, p. 262; Hagen, Syn. Neur. N. A. p. 176.

The most abundant of all the Anisoptera. Male and female in collection. Length, 33; alar expanse, 50.

**26 Diplax semicincta** Say.

Calvert, p. 263; Hagen, Syn. Neur. N. A. p. 176.

This beautiful little Dragon-fly has a wide range in America, being credited from Maine to Maryland, Colorado, New Mexico, Nevada and California. Male and female in collection. Length, 28; alar expanse, 45.

**27 Diplax vicina** Hagen.

Calvert, p. 264; Hagen, Syn. Neur. N. A. p. 175.

Nearly as abundant as rubicundula, and easily mistaken for it by a careless observer, but readily distinguished by the superior appendages of the male, which have no median, inferior tooth, but bear from 4 to 9 inferior denticles, of which the apical is the largest. Male and female in the collection. Length, 37; alar expanse, 53.

**16 Mesothemis** Hagen.

Calvert, p. 225; Hagen, Syn. Neur. N. A. p. 170.

**28 Mesothemis simplicicollis** Say.

Calvert, p. 265; Hagen, Syn. Neur. N. A. p. 170.

This peculiarly beautiful bright-green species is very rare about Manchester, the only individual yet secured being taken at Cohas brook, June, 1899. Female in the collection. Length, 41; alar expanse, 67.

# PRELIMINARY NOTES

ON THE

# ORTHOPTERA.

IN THE VICINITY OF MANCHESTER.

BY MISS SUSY C. FOGG.

During the summer of 1899, to aid in broadening the defined work of the Entomological Section of the Manchester Institute of Arts and Sciences, an effort was made to ascertain existing forms of Orthoptera within a short radius of the surrounding country.

We realize the list to be incomplete, but hope that it may be augmented by future observation and that species may be added which shall be significant of our location on or near the isothermal line separating the great continental provinces.

This ancient order, fossil remains of which are found belonging to the Tertiary period and which, with forms of Neuroptera, are among the oldest types of insects known, has come down to us with its ranks shattered by the severe struggle of competition through the ages, and to-day there is no other order containing so few families and genera as the Orthoptera, which is at the same time proportionately numerous in individuals.

The Grasshopper is a representative type of this order, and although not a form of high specialization, neither has it degenerated, as is true of many types of insects. All that it has ever been it still is.

The variation in form of the several Orthopteran groups, their long, long history, interwoven with the world's own, their economic bearing, which is of vital importance, the beauty of certain species included within the Acrididæ and Locustidæ, and their peculiar place in literature, all tend to make the order an interesting study to the entomologist.

With some exceptions, however, the paths are not all straight to the would-be explorer, as he often loses himself in the tangle and confusion of, shall I say, a too diversified nomenclature.

S. H. Scudder, in his most admirable work on "Revision of Melanopli," gives a striking though perhaps exaggerated illustration of this in Melanoplus femur-rubrum, our common red-legged locust. This insect has appeared under the following names, applied to it by various authorities :

| | | |
|---|---|---|
| Acridium femur-rubrum, | De Geer, | 1773 |
| Gryllus (Locusta) femur-rubrum, | Goeze, | 1778 |
| Gryllus (Locusta) erythropus, | Gmelin, | 1788 |
| Acridium femorale, | Olivier, | 1791 |
| Gryllus erythropus, | Turton, | 1806 |
| Caloptenus femur-rubrum, | Burmeister, | 1838 |
| Acridium (Caloptenus) femur-rubrum, | De Haan, | 1842 |
| Pezotettix (Melanoplus) femur-rubrum, | Stal, | 1873 |
| Melanoplus femur-rubrum, | Scudder, | 1874 |
| Caloptenus devorator, | Scudder, | 1875 |
| Caloptenus sanguinolentus, | Provancher, | 1876 |
| Caloptenus atlanis, | Provancher, | 1877 |
| Pezottetix femur-rubrum, | Stal, | 1878 |
| Melanoplus interior, | Scudder, | 1879 |
| Melanoplus devorator, | Scudder, | 1879 |
| Caloptenus (Melanoplus) femur-rubrum, | Cauldfield, | 1887 |

This observation is made with due respect and sympathy for those who have striven to overcome the difficulty.

If we choose to include the Forficulidæ, about which there has been much difference of opinion, six of the seven families of Orthoptera are represented within our limits, the Blattidæ and saltatorial divisions being greatly in excess, the former having, doubtless, been protected by their secluded habits, the latter by their increased power of locomotion, and in many instances by protective coloring.

As two abundant species of like habits and food requirements cannot long coëxist in any small area — the stronger being destined to survive, the other to perish — so, probably, many former species have disappeared from our midst, and the number is small compared with the distribution over the country as a whole.

On the other hand we may not be surprised to find new arriv-

als in our fields, as the range of any species is constantly undergoing change through migration, and transportation of eggs and young nymphs by means of timber, hay and other commercial products, and climatic conditions.

In the list given below the division into families is that employed by Prof. Comstock, in his "Manual for the Study of Insects," and in determining genera and species reference has been made to the following works:

Comstock, J. H., An Introduction to Entomology.
Fernald, G. H., The Orthoptera of New England.
Hancock, J. L., Treatise on Grouse Locusts.
Harris, T. W., Insects Injurious to Vegetation.
Packard, A. S., Guide to the Study of Insects.
Scudder, S. H., Catalogue of the Orthoptera of North America.
Scudder, S. H., Revision of the Orthopteran Group Melanopli.

As before noted, the scientists have not agreed upon the order in which the family Forficulidæ should be placed.

In general appearance the Earwig closely resembles the rover-beetle, if to the elongated body of the latter, with its short wing-covers beneath which the true wings are neatly folded, could be added abdominal appendages in the form of sharp, pointed forceps, which probably suggested the name, Forficula, meaning literally "little nippers." It was classed with the Coleoptera by Linnæus.

Leach and Kirby ranked the family as a distinct order, to which they gave the name Dermaptera, and Westwood called it Euplexoptera.

Other writers, noting that the family had apparently four wings, biting mouth-parts and incomplete metamorphosis, in common with well-regulated families of Orthoptera, so included it.

The Earwig is rare in this section. Contrary to nursery tales and delusions of childhood, it is not harmful to man.

In Europe, where they abound in great numbers, they are said to become serious pests, feeding upon different kinds of vegetation and having no objection to a diet more especially designed for the human family.

One small species is found within our city limits, Labia minor Linnæus, or Labia minuta Scudder.

## GROUP I. **Cursoria or Runners.**

### FAMILY 1. **Blattidæ or Cockroaches.**

**1 Blatta germanica** Fabricius.

**2 Periplaneta americana** Fabricius.

**3 Pycnoscelus obscurus** Scudder.

*B. germanica* is a foreign species, commonly known as the "Croton Bug," from its having been first observed about the Croton aqueduct in New York city. Though introduced from Europe it is everywhere abundant. This species requires several months to reach maturity, and structurally has attained some degree of specialization, but it is notoriously unpopular and the best that can be said of it is that it is a good destroyer of bed-bugs, which abound in tenement districts and on ship-board.

*P. americana* is commonly distributed about our fields and appears identical with the well-developed species found about our mills.

*P. obscurus* is a wingless species which is also common.

## GROUP II. **Ambulatoria or Walkers.**

### FAMILY 2. **Phasmidæ or Walking Sticks.**

**1 Diapheromera femorata** Say.

The Phasmidæ are represented in our vicinity by a single genus, and during the past summer but few specimens have been found. One of these, however, was of unusual size, measuring fully six inches, including length of body and antennæ.

## GROUP III. **Saltatoria or Jumpers.**

### FAMILY 3. **Acrididæ or Locusts—Short-horned Grasshoppers.**

#### I. SUB-FAMILY **Tryxalinæ.**

**1 Chloealtis conspersa** Harris.

2 **Stenobothrus curtipennis** Harris.

3 **Stenobothrus maculipennis** Scudder.

*C. conspersa* and *S. maculipennis* appeared to be rare, but *S. curtipennis* was everywhere abundant.

## II. SUB-FAMILY **Œdipodinæ.**

1 **Arphia sulphurea** Fabricius.

2 **Arphia xanthoptera** Burmeister.

3 **Chortophaga viridifasciata** De Geer.

4 **Dissosteria æqualis** Say.

5 **Dissosteria carolina** Linnæus.

6 **Encoptolophus sordidus** Burmeister.

7 **Hippiscus rugosus** Scudder.

8 **Hippiscus tuberculatus** Pallisot de Beauvois.

9 **Psinidia fenestralis** Serville.

*A. xanthoptera* and *D. æqualis* were found to be abundant on the sandy plains near Rock Rimmon, and *D. carolina* and *D. sordidus* were everywhere conspicuous on account of their great numbers, the specific name of the former, *carolina*, having no significance as to range. Specimens of *P. fenestralis*, both with rose and orange colored wings, were also found in the vicinity of Rock Rimmon.

## III. SUB-FAMILY **Acridinæ or Spine-breasted Locusts.**

1 **Acridium alutaceum** Harris.

2 **Acridium rubiginosum** Harris.

3 **Melanoplus atlanis** Riley.

4 **Melanoplus femoratus** Burmeister.

5 **Melanoplus femur-rubrum** De Geer.

*A. alutaceum* has been taken at but one station, Plumer Hill,

on the border line between this city and Bedford. It is a fact worthy of investigation that, so far as is known, *A. rubiginosum* has not been found upon this side of the river, while upon the west bank it is not uncommon.

*M. atlanis* and *M. femur-rubrum*, two closely allied species, are the most numerous of all the Acrididæ. They are probably both destructive in their habits to a greater degree than is generally realized, but S. H. Scudder, in his "Revision of the Melanopli," says of *M. atlanis:* "Next to *M. spretus* this is our most destructive locust, and east of the Mississippi probably the only one ever doing much damage. Its injuries, however, are not for a moment to be compared to *M. spretus*, for, though possessing good powers of flight and on rare occasions known to migrate in swarms, its injuries can only be classed as local, and they are never so serious as those inflicted by *M. spretus;* nevertheless, they are by no means slight, and immense destruction of grain is to be laid at its door."

And again, under *M. femur-rubrum*, in Hayden's Report of the Survey of Nebraska, 1872: "I collected several accounts, printed and unpublished, of the injury to crops attributed to this species in the eastern United States. As up to that time *M. atlanis* had not been distinguished from *M. femur-rubrum*, it is possible, and I am now inclined to think it probable, that all the serious injury done to the crops in the East is done by *M. atlanis;* for, although almost everywhere less numerous than *M. femur-rubrum*, *M. atlanis* has been shown to have the capacity for immense multiplication, and has been directly proved to be the culprit in some instances; as it is also much more closely, and indeed very closely, related to the destructive locust of the West. At least until direct, provable charges are made against it, *M. femur-rubrum* should be looked upon as less injurious than *M. atlanis*."

## IV. SUB-FAMILY **Tettiginæ.**

The members of this curious and interesting sub-family are easily recognized by their small size, absence of pulvilli between the claws, extended pronotum over the abdomen, and their remarkable activity. Four local species have been collected during the past season:

1 **Tettix cucullatus** Scudder.

2 **Tettix granulatus** Kirby.

3 **Tettix ornatus** Say.

4 **Tettigidæ lateralis** Say.

### FAMILY 4. **Locustidæ or Long-horned Grasshoppers.**

#### GROUP I. **The Cricket-like Grasshoppers.**

1 **Ceuthophilus maculatus** Harris.

This is the only species known to exist about here.

#### GROUP II. **The Meadow Grasshoppers.**

1 **Conocephalus ensiger** Harris.

2 **Xiphidium brevipenne** Scudder.

3 **Xiphidium fasciatum** De Geer.

One cannot walk in our grassy fields late in summer without being surrounded by myriads of these graceful little forms, and the two species of Xiphidium seem equally abundant. Both the green and the brown forms of *C. ensiger* occur.

#### GROUP III. **The Katydids.**

1 **Scudderia curvicauda** De Geer.

Specimens of Amblicoryphora rotundifolia Scudder, have been received from near Boston, Mass., and in the Boston Museum of Natural History is a specimen credited to the White Mountains, marked "Bequest of C. A. Shurtleff." This species has not yet been found about here, but we hope to determine whether it has a continuous range between the two stations.

### FAMILY V. **Grillidae or Crickets.**

1 **Gryllotalpa borealis** Burmeister.

2 **Gryllus abbreviatus** Serville.

3 **Gryllus luctuosus** Serville.

4 **Nemobius fasciatus** De Geer.

5 **Œcanthus niveus** Serville.

*G. borealis* is rare, but several individuals have been found near an artificial pond at Manchester Centre.

*G. luctuosus* is *G. niger* Harris or *G. neglectus* Scudder.

Both varieties of *N. fasciatus* occur. In one the wings are wanting, and the wing-covers extend half the length of the abdomen; in the other the wings are long and cordate, reaching the tip of the ovipositor in the female, and the wing-covers nearly equal the abdomen.

*Œ. niveus* is generally distributed.

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The poetry of earth is never dead.
When all the birds are faint with the hot sun,
And hide in cooling trees, the voice will run
From hedge to hedge about the new mown mead.
That is the Grasshopper's — he takes the lead
In summer luxury — he has never done
With his delights; for when tired out with fun
He rests at ease beneath some pleasant weed.

The poetry of earth is ceasing never.
On a lone winter evening when the frost
Has wrought a silence, from the stove there shrills
The Cricket's song, in warmth increasing ever,
And seems to one in drowsiness half lost,
The Grasshopper among some grassy hills.

— *Keats.*

## MISCELLANEOUS OBSERVATIONS.

BY EDWARD J. BURNHAM.

During the autumn of 1899 the attention of the Section was called to two individuals of Doryphora decemlineata, in which there was a marked deviation from the type for this species, the third line of each elytron, in one specimen, being supplanted by a distinct row of yellow spots, while in the other specimen the same line was irregularly interrupted. The query suggested is whether this is a recent variation, or whether it may be an instance of reversion to some ancient type in which the elytra were spotted, the spots having gradually united to form lines, in accordance with the theory now quite generally accepted with reference to the development of stripes in the higher animals. It should be remarked that in both specimens the rows of heavy punctures, which border the lines in the typical decemlineata, here unite at each interruption, thus more completely isolating each spot or fascia. As the relative frequency of the occurrence of this variation is certain to be of some interest, it is hoped that members of the Section will make careful and extended observations during the coming season.

In his paper on "The Distribution of Insects in New Hampshire," prepared for Hitchcock's Geological Report, Prof. Scudder says of Labia minuta: "Smith records the capture of a number of specimens of this earwig at Norway, Me., and we may therefore conclude that it inhabits New Hampshire." Mr. Herbert E. Richardson of this city found the insect in his stable in 1898, and again in 1899. Prof. Scudder's inference was, therefore, correct. The earwig inhabits New Hampshire, at least as far north as Manchester, but it is certainly rare.

Gryllotalpa borealis belongs to the Alleghanian fauna, and probably does not extend far into the zone of doubt dividing the two great provinces, but it is occasionally found in Manchester. The four specimens in the Institute collection were secured on the shore of a small pond near Mr. Isaac Huse's, in East Manchester, and an individual was found at Lake Massabesic in the summer of 1899.

It is probable that Termes flavipes finds the northern limit of its range near Manchester. Colonies were fairly abundant about the city during the season of 1899, and a few were observed near Sawyer's Pond in Hooksett, but careful search by Mr. George W. Fowler failed to reveal a single specimen in Pembroke, a few miles further to the northward.

It is a significant fact that boys, interested in the collection of butterflies, but ignorant of theories relative to faunal areas, noticed long since that if the Spotted Purple, Basilarchia astyanax, was desired, the collecting trip should be made to the southward of Manchester, while if the Banded Purple, Basilarchia arthemis, was the object of pursuit, it must be sought to the northward. It is probable that the band of territory common to these two species, and within the limits of which is to be found the hybrid, Basilarchia astyanax-arthemis, crossing New

Hampshire irregularly, falls between Manchester and Concord. This last-named butterfly, a variety resulting from the meeting of the Banded Purple of the Canadian province with the Spotted Purple of the Alleghanian, is restricted in its range to a narrow strip which, entering New Hampshire from the vicinity of Norway, Me., bends southward and again northward, passing diagonally across Vermont, skirting the great lakes, crossing Michigan, and disappearing somewhere in the British possessions westward. Scudder, making his map about 1873, located this band with Concord about in the middle, but there is reason to believe that, as determined by the range of Basilarchia astyanax-arthemis, it should be brought somewhat southward. There cannot, of course, be any line determined with inflexibility and mathematical exactitude, but careful study through a long series of years — such study as is practicable under the auspices of the Institute — cannot fail to place the boundaries of the two great provinces with approximate precision. Observations, carefully made and faithfully recorded during the next decade, relative to Basilarchia astyanax-arthemis, Gryllotalpa borealis, Œcanthus niveus, Thyreonotus dorsalis, Diapheromera femorata, Labia minuta and Termes flavipes will aid materially in the prosecution of this interesting inquiry.

Writing in 1873, Prof. Scudder said: "Probably no State in the Union presents so striking a variety in its animal life as New Hampshire;" and with reference to the determination of the boundary between the Canadian and Alleghanian fauna he added: "The local zoologists of New Hampshire can render science an important service by a careful record of such facts in as many distinct localities as possible." In attempting to carry out this suggestion the Manchester Institute of Arts and Sciences has undertaken a work which, if faithfully performed, will in future years redound to its credit.

One individual of Cicada septendecem was found near the Bald Hill road by Mr. Herbert E. Richardson, in June, 1899. Presumably it was one of a limited number composing a sort of advance guard to a more formidable host in 1900. The Seventeen-year Locust was found in considerable numbers about Manchester in 1883, and there is probably a distinct brood in this section, although it appears not to have attracted the attention of hemipterists. Marlett, in his comprehensive monograph of Cicada septendecem, makes no reference to this New Hampshire 1883-1900 brood.

Packard, in his "Guide," conveys the inference that Massachusetts is practically the limit of the range of the Ant-Lion northward. He says: "Myrmeleon obsoletus Say is not rare in the warmer parts of the country, and has been found at Salem, Mass., by Dr. E. P. Colby. M. abdominalis Say has also been found as far north as Milton, Mass., by Mr. J. Schofield." M. abdominalis is quite abundant about Manchester. The larvæ are found in the ledges at Rattlesnake Hill in Auburn, and beneath an over-hanging bank on an island in the Merrimack river, immediately below Amoskeag Falls. Specimens of these larvæ were reared to adults by Mr. George E. Burnham, in 1898 and 1899, and also by Mr. Edward H. Fogg in the latter year.

Say's description holds remarkably, the principal variations being in the markings of the feet and the tips of the antennæ; and even here the variations are

slight, although his type was secured near the Rocky Mountains. M. obsoletus Say, three individuals, flew into our tent at Cohas brook, in July, 1899, but the larvæ have not been found in this vicinity and the species is not so abundant as is abdominalis.

The earth is comparatively small, and whatever transpires upon its surface can be of but slight concern to the universe. Man's egotism not infrequently distorts the perspective through which he contemplates the relations of things. It is undoubtedly true, although it is difficult to comprehend the truth, that the determination on this continent of the extent of the great provinces of fauna and flora, involving as it must unceasing changes for ages in multitudinous forms of life, is of more importance in the history of the earth's development than all that has been accomplished by the red man in the wanderings of ten thousand years, or by the white man in three centuries of occupation.

MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

## SECTION C.

# BOTANY.

### OFFICERS FOR 1899.

MRS. ALBERT O. BROWN, *President.*
MRS. CLARA E. WILLIAMS *Vice President.*
MISS ELLEN E. CONNOR, *Secretary.*
MISS ELLEN F. WIGGIN, *Treasurer.*

EXECUTIVE COMMITTEE.

LUTHER C. BALDWIN, FREDERICK W. BATCHELDER,
MISS SUSAN RICHARDSON.

# SECTION C—BOTANY.

On Tuesday evening, January 17th, 1899, members of the Natural Science Club, of Manchester, met at the residence of Mrs. J. W. Fellows, for the purpose of organizing a botanical section of the Institute of Arts and Sciences.

Mr. William H. Huse was chosen chairman and Mrs. Alberta A. McLeod secretary of the meeting. After a free discussion it was voted to apply for admission to the Institute as Section C, Botany. The meeting then adjourned to the call of the chairman.

The need of an association of botanical students in central southern New Hampshire has long been felt, for the flora of the region has been very inadequately represented in the catalogues and manuals hitherto published. Observers from the centres of learning who visit the state have almost without exception confined their researches to the mountain districts or along the narrow strip of seacoast, and they have apparently conceived the idea that the northern boundary of Massachusetts extends not only several miles into the air but also several feet under ground, thus constituting an impassable barrier to the northerly distribution of plants as well as of birds. Yet it is not they who are to blame for the unsatisfactory representation of our local flora — we must take that burden upon ourselves. It is not from the lack of floral wealth that we have suffered but from the lack of local botanists. It is astonishing how the flora of a given region will suddenly expand and bloom with rare and unsuspected treasures, when scrutinized by a few pairs of observant eyes. Soon an intellectual springtime is inaugurated and botanists begin to bud on every bush. It is the mission of such an organization as ours to see that these buds are properly developed with a view to the production in due course of time of sound fruit.

The botanists connected with Dartmouth College have published a flora of their district, i. e., an area enclosed by a circle of thirty miles radius, with Hanover as the centre. Half of this area being within the state of Vermont, and the other half chiefly

within the White Mountain region of our own state, the characteristic flora of the Merrimack valley is practically unrepresented. The botanists in the vicinity of the seacoast also, while they have made many valuable contributions to the knowledge of plants in their peculiar and restricted area, have done and can do nothing to relieve us of the burden of original investigation within our own area. The "Preliminary List of Plants" published herewith represents the first step towards the accomplishment of a systematic and exhaustive investigation of the flora of central southern New Hampshire.

## REPORTS OF MEETINGS—1899.

Monday evening, February 6th. At the call of the chairman of the preliminary meeting of January 17th the first regular meeting of the section was held at the rooms of the Institute, for the purpose of organization, Mr. Luther C. Baldwin in the chair. Mr. E. H. Fogg, Mr. F. W. Batchelder and Miss May W. Davis were appointed a committee to nominate officers, and reported the following names: President, Mrs. Alberta A. McLeod; Vice President, Mrs. Clara E. Williams; Secretary, Miss Ellen E. Connor; Treasurer, Miss Ellen F. Wiggin; Corresponding Secretary, Mr. F. W. Batchelder; Executive Committee, Mr. Luther C. Baldwin, Miss Isabelle R. Daniels, Miss Susan Richardson.

The report of the committee was accepted and the officers nominated were unanimously elected by ballot.

Mrs. Bessie Burnham and Miss Theodora Richardson were appointed a committee to draw up by-laws and report at the next meeting.

It was voted to hold meetings for the present every Tuesday evening at 7.45 P. M. Adjourned to February 14th.

Tuesday evening, February 14th. Regular meeting, the President in the chair. Miss Daniels having declined to serve as a member of the executive committee, the nominating committee was instructed to fill the vacancy at its own discretion.

The committee on by-laws presented their report, which was accepted. The by-laws were then voted upon section by section and unanimously adopted. Adjourned to February 21st.

Tuesday evening, February 21st. Regular meeting, the President in the chair. Mr. Batchelder gave an informal talk on the present unfortunate lack of agreement in regard to botanical nomenclature. Adjourned to February 28th.

Tuesday evening, February 28th. Regular meeting, the Vice President in the chair. After the transaction of routine business adjourned to March 7th.

Tuesday evening, March 7th. Regular meeting. On account of the absence of many members no business was transacted. Adjourned to March 14th.

Tuesday evening, March 14th. Regular meeting, the President in the chair. The office of Corresponding Secretary of the Section having been after due consideration declared superfluous, its duties being comprehended in those of the Corresponding Secretary of the Institute, to facilitate matters Mr. Batchelder tendered his resignation of the office and it was accepted. Mr. Baldwin gave notice that an amendment to the by-laws abolishing the office would be considered at the next meeting.

After the transaction of business Mr. Batchelder gave an introductory talk on the "Unity of the Vegetable Kingdom." After first remarking that during the floral season close at hand the diversity of that kingdom would become sufficiently manifest he proceeded to show its essential unity. With the aid of diagrams and drawings it was shown how the higher plants have been evolved from the lower ones; how the apparent breaks between the sub-kingdoms, instead of being fatal to the evolutionary theory tend rather to corroborate it; how the most complex

organizations may be traced back through less complex to simple ones and finally to the protophytes, ambiguous forms so closely related to corresponding forms in the animal kingdom that it is often difficult and sometimes impossible to decide to which kingdom certain forms should be referred.

Adjourned to March 21st.

Tuesday evening, March 21st. Regular meeting, the President in the chair. The amendment to the by-laws abolishing the office of Corresponding Secretary, due notice of which had been given at the last meeting, was proposed and adopted by a unanimous vote. The Executive Committee reported that they had elected Mr. F. W. Batchelder to fill the vacancy made by the resignation of Miss Isabelle R. Daniels.

At the conclusion of business Mr. Batchelder continued his demonstration of the unity of the vegetable kingdom. Following a review of the last talk an explanation was made of the term "alternation of generations," illustrations being drawn from the life history of the bryophytes and pteridophytes, where the process is more evident than in the thallophytes and spermaphytes. Then followed an explanation of the terms sporophyte and gametophyte and an endeavor to show that in the highest and lowest subkingdoms the alternation of generations, though obscure, is nevertheless a factor in the life history of the plant. The talk concluded with a statement of some of the homologies of the subkingdoms, the cell being the unit of growth and the spore the unit of reproduction in all, while the seed in the spermaphytes is but a highly specialized spore.

Adjourned to March 28th.

Tuesday evening, March 28th. Regular meeting, the President in the chair. There being no business before the meeting the talk of the last session was continued. The particular subjects considered were the parasitism and saprophytism of fungi and of *Buxbaumia* among mosses; the tendency to degradation shown by parasites and saprophytes, e. g., Indian pipe and the broom-rapes among flowering plants; the vascular structure of the sporophyte of *Anthoceros* as foreshadowing the structure of

the pteridophytes. An explanation was made of the words microspore and macrospore, and the homology of the microspore with the pollen of flowering plants shown. The talk concluded with a comparison of the protonema of mosses with the prothallium of ferns, and a definition of the terms antheridium and archegonium.

Adjourned to April 4th.

Tuesday evening, April 4th. Regular meeting, the Vice President in the chair. There being no business to transact the section gave attention to a concluding talk on the unity of the vegetable kingdom. After an explanation of the words heterospory and homospory, a presentation was made of the homologies of pteridophytes and spermaphytes. The pollen-tube was shown to be the male gametophyte or antheridium and the endosperm with ovum or ova the female gametophyte or archegonium, so that the essential parts of the flower, i. e., the stamens and pistils, answer to the essential reproductive organs in the lower sub-kingdoms. The flower having thus been approached from the inside, instead of from the outside as usual, the study of its plan, parts, variations and special adaptations might now properly claim attention.

Adjourned to April 11th.

Tuesday evening, April 11th. Regular meeting, the Vice President in the chair. The resignation of the President, Mrs. Alberta A. McLeod, was read and accepted.

The subject of Mr. Batchelder's talk was the "Plan of the Flower." The terms sporophyll, microsporophyll and macrosporophyll having been explained, it was shown that the stamens are a whorl of microsporophylls and the pistils a whorl of macrosporophylls, i. e., leaves altered for purposes of reproduction. The stonecrop being selected as a typical flower the succession of four whorls of altered leaves was described as follows: An inner whorl of five leaves which are really microsporophylls, i. e., there are five pistils; next, another whorl of five leaves which are really microsporophylls, i. e., there are five stamens; next, a whorl of five colored leaves — supposed to be modified especially to attract insects — i. e., there are five petals; finally, an outer whorl of five leaves which are chlorophyllous like ordinary leaves and serve for

the protection of the flower before it opens, i. e., there are five sepals. The talk concluded with an explanation of the terms monœcious and dicœcious, illustrated by flowers of alder, poplar and willow, after which the section proceeded to the analysis of *Symplocarpus fœtidus.*

Adjourned to April 18th.

Tuesday evening, April 18th. Regular meeting, the Vice President in the chair. There being no business the section listened to a talk by Mr. Batchelder, who gave a more particular explanation of the spore as the essential factor in the reproductive process throughout the vegetable kingdom. The microspores known as pollen were then considered, the different modes of their distribution by wind and insects enumerated and the function of the pollen-tube described.

Adjourned to April 25th.

Tuesday evening, April 25th. Regular meeting. On account of the absence of many members the meeting was informal. A profitable hour was spent in the analysis of *Epigæa repens, Sanguinaria Canadensis, Houstonia cerulea* and a cultivated species of *Scylla.*

Adjourned to May 2d.

Tuesday evening, May 2d. Regular meeting, the Vice President in the chair. After routine business, Mr. Burnham made an earnest plea in behalf of the mayflower, deploring its wanton destruction by selfish or thoughtless persons and suggesting that the members of the section do all in their power to arrest its impending extinction by instructing their friends and the public as to the proper method of gathering the flowers. The suggestions were approved and a resolution embodying them was adopted by a unanimous vote.

Mr. Batchelder then gave a talk on the present status of systematic botany as developed by modern evolutionary methods, and particularly as elaborated in the works of Engler and Prantl, the German authorities, where the sequence of orders and families is by far the best because the most natural of any yet pro-

pounded. After an explanation of the terms choripetalæ and gamopetalæ it was shown why the Orchidaceæ are considered the highest of the monocotyledons and Compositæ the highest of the dicotyledons. Just as in ornithology the thrush has been dethroned and the crow put in his place so in botany the rose and the lily have been compelled to yield in favor of the thistle! A diagram of the primal orchid having been drawn upon the blackboard it was shown how the original fifteen parts, viz., three sepals, three petals, three outer and three inner stamens and three pistils have been reduced by suppression and coalescence to the present three sepals, three petals, of which one has been transformed into that characteristic feature of the orchid family called the lip, one stamen (or sometimes two) and one exceedingly complex pistil. The peculiar alteration in the position of the parts, caused by the twisting of the ovary so that the lip, which was formerly the upper petal, is directed downward in all our genera, except Calopogon, was then described. The talk closed with a hint of the close connection between botanical and entomological studies, revealed by the remarkable specialization which orchids have undergone in the endeavor to secure cross-fertilization by means of insects.

The meeting closed with the examination of fine specimens of *Corema Conradii*, brought from Truro, Mass., by Miss Ellen F. Wiggin.

Adjourned to May 9th.

Tuesday evening, May 9th. Regular meeting, the Vice President in the chair. There being no business on hand the members engaged in the analysis of flowers of the season. Cross sections of the ovaries of *Rhodora*, *Uvularia* and *Coptis* were shown under the compound microscope.

Adjourned to May 16th.

Tuesday evening, May 16th. Regular meeting, the Vice President in the chair. There being no business to transact the members devoted the time to the examination of flowers, of which twenty species were presented for analysis. Suggestions were offered regarding collections for the future herbarium of the Insti-

tute, and instruction was given in the proper method of collecting, pressing and mounting specimens. All members were urged to contribute specimens, so that at the close of the season the foundation of an herbarium adequately representing the local flora might be well established.

Adjourned to May 23d.

Tuesday evening, May 23d. Regular meeting, the Vice President in the chair. After the transaction of business the evening was devoted to the study of flowers. The dicœcious flowers of the oak suggested an account of the distribution of that genus in this locality and a description and classification of the eight species found.

Adjourned to May 30th.

Tuesday evening, May 30th. Regular meeting, the Vice President in the chair. There being no business before the section the members devoted the time to the examination of specimens, of which a large number were presented. Among those of special interest were *Nyssa sylvatica* and *Cystopteris fragilis*, brought by members of a picnic-party from Rattlesnake hill. The meeting closed with a systematic analysis of *Sisyrinchium augustifolium*.

Adjourned to June 6th.

Tuesday evening, June 6th. Regular meeting, the Vice President in the chair. There being no business, Mr. Baldwin took charge of the meeting, showing specimens from his herbarium and explaining his method of collecting, pressing and mounting specimens.

Adjourned to June 13th.

Tuesday evening, June 13th. Regular meeting, the Vice President in the chair. The executive committee reported the name of Mrs. Albert O. Brown for President of the section, in place of Mrs. Alberta A. McLeod, resigned. The section then proceeded to ballot and Mrs. Brown was unanimously elected. The Vice President then vacated the chair and it was taken by the newly elected President.

It was voted to discontinue regular meetings until the first Tuesday in September.

A field day was proposed for Friday, June 30th, and Mr. Fogg was appointed a committee of one to make all arrangements.

The members were urgently requested to make collections during vacation, and pressing and drying papers were furnished to all who desired to take them.

Adjourned to September 5th.

## FIELD DAY.

Friday, June 30th. A most delightful day was spent in a trip to Hooksett Pinnacle. The weather was perfect and a large party, consisting of members of the section and invited guests, left the city by the morning train north. After a forenoon spent in strolling about the woods at the base of the Pinnacle and around the lovely lake, a picnic dinner was spread in the pavilion. Refreshments disposed of the party ascended the eminence and enjoyed the superb view from the top of the tower. Before leaving the summit the curious little station of *Potentilla tridentata* was inspected and specimens collected. The party returned late in the afternoon, unanimously declaring that the first field-day of Section C had been an unqualified success.

Tuesday evening, September 5th. Owing to the small number present the meeting was informal.

Adjourned to September 12th

Tuesday evening, September 12th. Regular meeting, the Vice President in the chair. The great increase in the number of meetings, caused by the recent addition of new sections to the Institute, having rendered it inexpedient for this section to meet week-

ly as hitherto it was accordingly decided to meet fortnightly in future. Adjourned to September 26th.

Tusday evening, September 26th. Regular meeting, Mr. W. E. Moore in the chair. There being no business to transact, Mr. Batchelder proceeded to give an account of new stations of interesting plants in New Hampshire. Before presenting the list he urged the members to carry on the work of investigating the local flora in so systematic and accurate a manner that in the course of time there might be issued by the Institute a full catalogue, similar to those compiled by the botanists of Dartmouth College in New Hampshire and Amherst College in Massachusetts for their respective districts. Preliminary lists should be prepared, to which supplements should be made annually, and original observations recorded—all this with the view of assisting to accomplish some day for New Hampshire what has not yet been done, a just and authoritative presentation of her claim to the most varied flora of any state in the union. He alluded to the very inadequate representation of this district in particular in the published manuals and attributed it solely to the lack of botanists hitherto, a lack which it was preëminently the mission of Section C of the Institute to offset. The list of plants was then read.

Among the rarer ones were the following: *Potentilla tridentata, Sorbus sambucifolia, Ranunculus multifidus, Polygala verticillata, Lechea tennifolia, Viola rotundifolia, Hudsonia ericoides, Lonicera ciliata* and *cerulea, Triosteum perfoliatum, Cassia Marilandica, Utricularia resupinata,* (and another species not yet determined from the specimens thus far collected) *Panicum sphærocarpon, Aristida gracilis, Muhlenbergia tenniflora* and *Eragrostis capillaris.*

Adjourned to October 10th.

Tuesday evening, October 10th. Regular meeting, Mr. Moore in the chair. After business the meeting was devoted to the examination of specimens. Adjourned to October 24th.

Tuesday evening, October 24th. Regular meeting, Miss Caroline E. Wing in the chair. After business Mr. Batchelder by

request gave a review of his talks of last spring. Incidentally he referred to the enormous increase in the number of species of plants known and named since the days of Linnæus. He attributed this increase to a concurrence of several causes, among which were, first, the impetus imparted to botanical study by the introduction of the natural system of classification; second, the exploration of new regions; third, the greater number of observers; fourth, closer and more systematic observation. Another cause, not so legitimate as these, was the tendency now prevalent of magnifying minute differences and of restricting specific definitions, thus multiplying specific and varietal names beyond all due bounds.

Adjourned to November 7th.

Tuesday evening, November 7th. Regular meeting, the Vice President in the chair. After business Mr. Batchelder conducted a special review of the Pteridophyta, illustrating the subject by specimens of *Equisetum*, *Botrychium* and *Lycopodium*.

Adjourned to November 21st.

Tuesday evening, November 21st. Regular meeting, the Vice President in the chair. Adjourned to December 5th.

Tuesday evening, December 5th. Annual meeting, Miss May W. Davis in the chair. The annual report of the Secretary was read and accepted and ordered placed on file. The annual report of the Treasurer was similarly disposed of. Mr. William E. Moore and Mr. Edward H. Fogg were appointed a committee to nominate officers for the ensuing year. They reported the following names: President, Mrs. Albert O. Brown; Vice President, Mrs. J. Arthur Williams; Secretary, Miss Ellen E. Connor; Treasurer, Miss Ellen F. Wiggin. Executive Committee: Mr. F. W. Batchelder, Miss Ellen F. Wiggin, Rev. Charles J. Staples.

The secretary elect having positively declined to serve, the nomination of some other person was left to the nominating committee. The committee then asked for more time, and their request was granted. A very interesting letter from Mr. William H. Huse was read, relating to certain tupelos, from which speci-

mens of bark presented by him to the Institute had been obtained. Adjourned to December 19th.

Tuesday evening, December 19th. Regular meeting, the President in the chair. The resignation of Mrs. Williams as Vice President was read and accepted, and the nominating committee appointed at the last meeting was instructed to bring in the name of some person to fill the vacancy. The nominating committee then reported the name of Mr. F. W. Batchelder for Secretary and he was unanimously elected by ballot. They also reported the name of Miss Caroline E. Wing for Vice President and she was unanimously elected by ballot. Miss Wing was also appointed a member of the executive committee to fill the vacancy caused by the resignation of Miss Connor, the former secretary. Business having been concluded Mr. Batchelder gave a talk on "Fruits Botanically Considered," tracing, as an example, the evolution of the apple from seed to seed.

Adjourned to January 2d, 1900.

# INTRODUCTORY.

The botanists of Dartmouth College in New Hampshire and of Amherst College in Massachusetts in the publication of their local floras defined their areas as circles with a radius of thirty miles from Hanover and Amherst respectively. It will be advantageous to define at the outset what shall be the working area, botanically, of the Manchester Institute. Certain natural and artificial boundaries suggest themselves, within which there is plenty of room, abundance of material and the certainty of not interfering with or being crowded by workers in other areas. Broadly speaking, then, we claim as our proper area the whole of Hillsborough county, the west half of Rockingham county and the south half of Merrimack county. In other words this area may be described as bounded on the west by the Connecticut valley watershed, on the south by the state line, on the east by the Atlantic watershed and on the north by the arc of a circle drawn through Merrimack county with a radius of twenty-five miles from Manchester.

The Preliminary List is precisely what its title implies, the first step towards the goal that is set before us. The most of it is drawn from the observations and collections of the compiler, whose researches have been principally confined to the towns of Pelham and Hudson, Manchester and adjoining towns, and Concord. The intention is to extend observations as soon as may be over the whole area named, and in this work the assistance of all persons interested is solicited. Communications and specimens forwarded to E. J. Burnham, Corresponding Secretary of the Institute, Manchester, N. H., will receive due consideration.

The arrangement of families is that of Engler and Prantl, the great German systematists. The nomenclature is that of Gray's Manual, sixth edition, except in certain families where for good and sufficient reasons the use of a later nomenclature appeared to be preferable.

# PRELIMINARY LIST

OF

# PLANTS

GROWING WITHOUT CULTIVATION IN THE VICINITY OF MANCHESTER, NEW HAMPSHIRE.

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COMPILED BY FREDERICK W. BATCHELDER.

1899.

## PTERIDOPHYTA.

### OPHIOGLOSSACEÆ.

| | | |
|---|---|---|
| | **Ophioglossum vulgatum,** L. | Rare. |
| | **Botrychium matricariaefolium,** A. Br. | Locally abundant. |
| | **ternatum** (Thunb) Sw. | |
| | var. **intermedium,** | Common. |
| | var. **obliquum,** | Common. |
| *1 (see notes.) | var. **dissectum,** | Common, constantly found with the two preceding. |
| | **lanceolatum,** (S. G. Gmel.) Angs. | Not common. |
| | **Virginianum,** (L.) Sw. | Common. |

### Osmundaceæ.

| | | |
|---|---|---|
| | **Osmunda regalis,** L. | Common. |
| | **cinnamomea,** L. | Common. |
| | **Claytoniana,** L. | Common. |

## Polypodiaceæ.

**Onoclea sensibilis,** L. Common.

**Struthiopteris,** (L.) Hoffm. Concord. Locally abundant.

**Woodsia Ilvensis,** (L.) R. Br. Not rare.

**obtusa,** (Spreng.) Torr. Hudson. Apparently rare.

**Dicksonia punctilobula,** (Michx.) A. Gray. Common.

**Cystopteris fragilis,** (L.) Bernh. Not common.

**Dryopteris acrostichoides,** (Michx.) Kuntze. Common.

**Noveboracensis,** (L.) A. Gray. Common.

**Thelypteris,** (L.) A. Gray. Common.

**cristata,** (L.) A. Gray. Common.

" var. **Clintoniana,** (D. C. Eaton) Underw. Occasional.

**marginalis,** (L.) A. Gray. Common.

**spinulosa,** (Retz.) Kuntze. The occurence of the typical form is not yet established.

" var. **intermedia,** (Muhl.) Underw. Common.

**Bootii,** (Tuckerm.) Underw. Common.

**Phegopteris Phegopteris,** (L.) Underw. Common.

**hexagonoptera,** (Michx.) Fée. Less common.

**Dryopteris,** (L.) Fée. Common.

**Woodwardia Virginica,** (L.) J. E. Smith. Locally abundant.

**Camptosorus rhizophyllus,** (L.) Link. Reported from Windham.

**Asplenium platyneuron,** (L.) Oakes. Locally abundant; often called "rock fern."

**Trichomanes,** L. Rare.

**acrostichoides,** Sw. Not common.

**Filix-fœmina,** (L.) Bernh. Common.

**Adiantum pedatum,** L. Not common.

**Pteris aquilina,** L. Common.

**Polypodium vulgare,** L. Common.

### Equisetaceæ.

**Equisetum arvense,** L. Common.

**sylvaticum,** L. Common.

*2 **palustre,** L. Near Amoskeag Falls, Manchester, F. W. Batchelder. Rare.

**limosum,** L. Rare?

**hyemale,** L. Common.

### Lycopodiaceæ.

**Lycopodium lucidulum,** Michx. Common.

**inundatum,** L. Not common.

**obscurum,** L. Common.

**clavatum,** L. Common.

**complanatum,** L. Common.

### Selaginellaceæ.

**Selaginella rupestris,** Spring. Common.

**apus,** Spring. On banks of meadow brooks.

### Isoetaceæ.

**Isoetes echinospora,** Durieu. var. **Braunii,** Engelm. In sandy ponds.

## SPERMATOPHYTA.

### GYMNOSPERMÆ.

#### Pinaceæ.

| | |
|---|---|
| **Pinus Strobus,** L. | Common. |
| **resinosa,** Ait. | Less common. |
| **rigida,** Mill. | Common. |
| **Larix Americana,** Michx. | Common. |
| **Picea nigra,** Link. | Common in swamps. |
| **rubra,** (Lamb) Link. | Common in higher localities. |
| **Tsuga Canadensis,** Carr. | Common. |
| **Abies balsamea,** Miller. | Not common. |
| *3 **Chamæcyparis sphæroidea,** Spach. | One known station. |
| **Juniperus communis,** L. Francestown. | Not common. |
| **nana,** Willd. | Common. |
| **Virginiana,** L. | Common. |

#### Taxaceæ.

| | |
|---|---|
| **Taxus Canadensis,** Willd. | Common. |

### ANGIOSPERMÆ.

### MONOCOTYLEDONES.

#### Typhaceæ.

| | |
|---|---|
| **Typha latifolia,** L. | Common. |

### Sparganiaceæ.

**Sparganium eurycarpum,** Engelm. Common.

**simplex,** Huds. Common.

### Scheuchzeriaceæ.

**Scheuchzeria palustris,** L. Not common.

### Alismaceæ.

**Alisma Plantago,** L. Common.

**Sagittaria variabilis,** Engelm. Common.

**heterophylla,** Pursh. Not rare.

**graminea,** Michx. Not rare.

### *4 Gramineæ.

**Spartina cynosuroides,** Willd. Not common.

**Paspalum ciliatifolium,** Michx. Common.

**Syntherisma linearis,** (Krock) Nash. Common.

**sanguinalis,** (L.) Nash. Common.

**Panicum proliferum,** Lam. Rather rare.

**capillare,** L. Common.

**minus,** (Muhl.) Nash. Common?

**agrostoides,** Trin. (**agrostidiforme,** Lam.) Common.

**virgatum,** L. Not common.

**xanthophysum,** A. Gray. Rather rare.

**sphaerocarpon,** Ell. Not rare.

**Porterianum,** Nash. Common.

**macrocarpon,** Le Conte. Common.

**clandestinum,** L. Common.

**Scribnerianum,** Nash. Common.

**pubescens,** Lam. Common.

| | |
|---|---|
| **psammophilum,** Nash. | Common. |
| **linearifolium,** Scribn. | Common. |
| **dichotomum,** L. | Common. |
| **miliaceum,** L. | On dumps. |
| **Crus-galli,** L. | Common. |
| **Setaria glauca,** Beauv. | Common. |
| **viridis,** Beauv. | Common. |
| **Italica,** Kunth. | A common escape. |
| **Cenchrus tribuloides,** L. | Common on river banks. |
| **Leersia Virginica,** Willd. | Common. |
| **oryzoides,** Swartz. | Common. |
| **Andropogon furcatus,** Muhl. | Common. |
| **scoparius,** Michx. | Common. |
| **Chrysopogon nutans,** Benth. | Not common. |
| **Phalaris Canariensis,** L. | A rare escape. |
| **arundinacea,** L. | Not common. |
| **Anthoxanthum odoratum,** L. | Common. |
| **Aristida dichotoma,** Michx. | Common. |
| *5 **gracilis,** Ell. | Pelham. F. W. Batchelder. Rare? |
| **Oryzopsis melanocarpa,** Muhl. | Windham. Rare. |
| **asperifolia,** Michx. | Common. |
| **Canadensis,** Torr. | Common. |
| **Muhlenbergia glomerata,** Trin. | Common. |
| **Mexicana,** Trin. | Common. |
| **sylvatica,** Torr. & Gray. | Common. |
| **Willdnovii,** Trin. | Concord. Rare. |
| **diffusa,** Schreber. | Manchester. Rare. |
| **Brachyelytrum aristatum,** Beauv. | Common. |

**Phleum pratense,** L. Common.

**Alopecurus pratensis,** L. Not common.

**Sporobolus neglectus,** Nash. Common.

*6 " " " A form. Concord. Rare?

**serotinus,** Gray. Common.

**Agrostis alba,** L. Common.

" " var. **sylvatica,** L. Occasional.

**perennans,** (Walt.) Tuckerm. Common.

**intermedia,** Scribn. Common.

**scabra,** Willd. Common.

**Cinna arundinacea,** L. Less common than the next.

**pendula,** Trin. Common.

**Calamagrostis Canadensis,** Beauv. Common.

**Nuttalliana,** Steud. Not common.

*7 **Ammophila arundinacea,** Host. Hudson. Introduced.

**Holcus lanatus,** L. Not common.

**Deschampsia flexuosa,** Trin. Common.

**Danthonia spicata,** Beauv. Common.

**compressa,** Aust. Common.

*8 **Triodia sesleriodes,** (Michx.) Benth. Pelham. Accidental?

**Eragrostis major,** Host. By railroads.

**Purshii,** Schrader. Common.

**capillaris,** Nees. Rare.

**pectinacea,** Gray. Common.

**Dactylis glomerata,** L. Common.

**Poa annua,** L. Common

**compressa,** L. Common.

**nemoralis,** L. Not rare.

**serotina,** Ehrhart. Common.

**pratensis,** L. Common.

**trivialis,** L. Not common.

**Glyceria laxa,** Scribn. Concord. Rare?

**Canadensis,** Trin. Common.

**obtusa,** Trin. Rare.

**elongata,** Trin. Common.

**nervata,** Trin. Common.

**pallida,** Trin. Common.

**grandis,** Watson. Common.

*9 **Glyceria borealis,** (**G. fluitans,** R. Br.; var. **angustata,** Vasey in Fernald, Proc. Port. Soc. Nat. Hist. ii, 91; **Panicularia borealis,** Nash. Bull. Torr. Cl. xxiv, 348.) Common.

**Festuca ovina,** L. Common.

" " var. **duriuscula,** Koch. Common.

**rubra,** L. Common.

**nutans,** Willd. Not common.

**elatior,** L. Common.

**Bromus secalinus,** L. Not common.

**ciliatus,** L. Common.

" var. **purgans,** Gray. Occasional.

**Agropyrum repens,** Beauv. Common.

**Hordeum jubatum,** L. Manchester. Rare.

**Elymus Virginicus,** L. Common.

**Canadensis,** L. Common.

**Asprella Hystrix,** Willd. Hudson. Not common.
**Triticum vulgare,** An occasional escape.
**Secale cereale,** A common escape.
**Hordeum vulgatum,** An occasional escape.
**Avena sativa,** A common escape.
**Zea Mays,** An occasional escape.

### Araceæ.

**Arisaema, triphyllum,** Torr. Common.
**Peltandra undulata,** Raf. Common.
**Calla palustris,** L. Concord. Rare.
**Symplocarpus fœtidus,** Salisb. Common.
**Acorus Calamus,** L. Not common.

### Lemnaceæ.

**Spirodela polyrrhiza,** Schleid. Common.
**Lemna minor,** L. Common.

### Xyridaceæ.

**Xyris flexuosa,** Muhl. Not common.
" " " var. **pusilla,** Gray. Concord.
Miss S. F. Sanborn. Not common.

### Eriocaulaceæ.

**Eriocaulon septangulare,** Withering. Common.

### Pontederiaceæ.

**Pontederia cordata,** L. Common.
A white flowered form is found, retaining its characters in cultivation.

### Juncaceæ.

**Luzula campestris,** DC. Common.

### Melanthaceæ.

**Veratrum viride,** Ait. Common.

**Uvularia perfoliata,** L. Common.

**sessilifolia,** L. Common.

### Liliaceæ.

**Lilium Philadelphicum,** L. Common.

**Canadense,** L. Common.

**Erythronium Americanum,** Ker. Common.

### Convallariaceæ.

**Clintonia borealis,** Raf. Common.

**Smilacina racemosa,** Desf. Common.

**stellata,** Desf. Common.

**Maianthemum Canadense,** Desf. Common.

**Streptopus amplexifolius,** DC. Manchester. Rare.

**roseus,** Michx. Concord. Less rare.

**Polygonatum biflorum,** Ell. Common.

**giganteum,** Dietrich. Not common.

**Medeola Virginiana,** L. Common.

**Trillium erectum,** L. Not common.

**cernuum,** L. Common.

**erythrocarpum,** Michx. Locally abundant.

**Asparagus officinalis,** L. Escaped from cultivation.

### Smilaceæ.

**Smilax herbacea,** L. Common.

**rotundifolia,** L. Common.

### Amaryllidaceæ.

**Hypoxis erecta,** L. Common.

### Iridaceæ.

**Iris versicolor,** L. Common.

*10 **Sisyrinchium angustifolium.** Mill. Common.

**anceps,** Cav. Common.

### Orchidaceæ.

**Microstylis ophioglossoides,** Nutt. Manchester. Two stations.

**Liparis liliifolia,** Richard. Manchester. Rare.

**Loeselii,** Richard. Concord. Rare.

**Corallorhiza innata,** R. Br. Not common.

**odontorhiza,** Nutt. Rare.

**multiflora,** Nutt. Common.

*11 **Spiranthes cernua,** Richard. Common.

**gracilis,** Bigelow. Common.

*12 **Goodyera repens,** R. Br. Common.

**pubescens,** R. Br. Common.

**Arethusa bulbosa,** L. Locally abundant.

**Calopogon pulchellus,** R. Br. Common.

**Pogonia ophioglossoides,** Nutt. Common.

**verticillata,** Nutt. Manchester. Auburn. Locally abundant.

| | | | |
|---|---|---|---|
| | **Habenaria tridentata,** Hook. | | Common. |
| | **virescens,** Spreng. | | Common. |
| | **bracteata,** R. Br. | | Rare. |
| | **hyperborea,** R. Br. | | Rare. |
| | **Hookeri,** Torr. | | Common. |
| | **orbiculata,** Torr. | | Not common. |
| *13 | **blephariglottis,** Torr. | | Very rare. |
| | **lacera,** R. Br. | | Common. |
| | **psychodes,** Gray. | | Less common than the next. |
| *14 | **fimbriata,** R. Br. | | Common. |
| *15 | **Cypripedium pubescens,** Willd. | Manchester. | Rare. |
| | **spectabile,** Salisb. | Concord. | Very rare. |
| | **acaule,** Ait. | | Common. |

## DICOTYLEDONES.

### Juglandaceæ.

| | |
|---|---|
| **Juglans cinerea,** L. | Common. |
| **Carya alba,** Nutt. | Common. |
| **porcina,** Nutt. | Common. |

### Myricaceæ.

| | |
|---|---|
| **Myrica Gale,** L. | Common. |
| **asplenifolia,** Endl. | Common. |

### Salicaceæ.

| | |
|---|---|
| **Populus alba,** L. | Escaped from cultivation. |
| **dilatata,** | Escaped from cultivation. |
| **tremuloides,** Michx. | Common. |
| **grandidentata,** Michx. | Common. |
| **balsamifera,** L. var. **candicans,** Gray. | Commonly cultivated. |
| *16 **Salix nigra,** Marsh. | Common. |
| " " " var. **falcata,** Torr. | Not rare. |
| **lucida,** Muhl. | Common. |
| **alba,** L. | Escaped from cultivation. |
| **Babylonica,** Tourn. | Escaped from cultivation. |
| **rostrata,** Richardson. | Common. |
| **discolor,** Muhl. | Common. |
| **humilis,** Marsh. | Common. |
| **tristis,** Ait. | Common. |
| **cordata,** Muhl. | Common. |

## Betulaceæ.

| | | |
|---|---|---|
| **Betula lenta,** L. | | Common. |
| **lutea,** Michx. f. | | Common. |
| **populifolia,** Ait. | | Common. |
| **papyrifera,** Marsh. | | Common. |
| *17 **nigra,** L. | Pelham, along Beaver brook. | Local. |
| **Alnus incana,** Willd. | | Common. |
| **serrulata,** Willd. | | Less common. |
| **Corylus Americana,** Walt. | | Common. |
| **rostrata,** Ait. | | Common. |
| **Ostrya Virginica,** Willd. | | Common. |
| **Carpinus Caroliniana,** Walter. | | Common. |

## Fagaceæ.

| | | |
|---|---|---|
| **Fagus ferruginea,** Ait. | | Common. |
| **Castanea sativa,** Mill. | var. **Americana,** Watson. | Common. |
| *18 **Quercus alba,** L. | | Common. |
| **bicolor,** Willd. | | Common along streams. |
| *19 **Prinus,** L. | | Not rare. |
| *20 **prinoides,** Willd. | | Common. |
| **rubra,** L. | | Common. |
| **coccinea,** Wang. | | Common. |
| " " | var. **tinctoria,** A. Gray. | Less common. |
| *21 " " | " **ambigua,** A. Gray. | ? |
| **ilicifolia,** Wang. | | Common. |

## Ulmaceæ.

| | | |
|---|---|---|
| *22 **Ulmus fulva,** Michx. | | Rare. |
| **Americana,** L. | | Common. |

### Moraceæ.

| | |
|---|---|
| *23 **Morus alba,** L. | Escaped from cultivation. |

### Urticaceæ.

| | |
|---|---|
| **Urtica gracilis,** Ait. | Common. |
| **Laportea Canadensis,** Gaudichaud. | Not rare. |
| **Pilea pumila,** Gray. | Not rare. |
| **Bœhmeria cylindrica,** Willd. | Not rare. |

### Santalaceæ.

| | |
|---|---|
| **Comandra umbellata,** Nutt. | Common. |

### Polygonaceæ.

| | |
|---|---|
| **Rumex crispus,** L. | Common. |
| **obtusifolius,** L. | Less common. |
| **sanguineus,** L. | Not common. |
| **Acetosella,** L. | Common. |
| **Polygonum aviculare,** L. | Common. |
| **erectum,** L. | Less common. |
| **Pennsylvanicum,** L. | Common. |
| **amphibium,** L. | Rare. |
| **Hartwrightii,** Gray. | Rare |
| **orientale,** L. | Escaped. |
| **Persicaria,** L. | Common. |
| **hydropiperoides,** Michx. | Common. |
| **Hydropiper,** L. | Common. |
| **acre,** H. B. K. | Common. |
| **arifolium,** L. | Common. |
| **sagittatum,** L. | Common. |
| **cilinode,** Michx. | Not common. |

| | |
|---|---|
| **dumetorum,** L. var. **scandens,** Gray. | Common. |
| **Fagopyrum esculentum,** Mœnch. | Escaped. |
| **Polygonella articulata,** Meisn. | Abundant. |

### Chenopodiaceæ.

| | |
|---|---|
| **Chenopodium album,** L. | Common. |
| **hybridum,** L. | Not rare. |
| **Botrys,** L. | On dumps. |
| **ambrosioides,** L. | Rare. |

### Amarantaceæ.

| | |
|---|---|
| **Amarantus paniculatus,** L. | Common. |
| **retroflexus,** L. | Common. |
| **chlorostachys,** Willd. | Less common. |
| **albus,** L. | Common. |
| **blitoides,** Watson. Manchester. | By railroads. |

### Phytolaccaceæ.

| | |
|---|---|
| **Phytolacca decandra,** L. | Rather common. |

### Aizoaceæ.

| | |
|---|---|
| **Mollugo verticillata,** L. | Common. |

### Portulacaceæ.

| | |
|---|---|
| **Portulaca oleracea,** L. | Common. |

### Caryophyllaceæ.

| | |
|---|---|
| **Dianthus Armeria,** L. | An occasional escape. |
| **Saponaria officinalis,** L. | Common. |
| **Silene Cucubalus,** Wibel. | A frequent escape. |
| **Pennsylvanica,** Michx. | Rare. |
| **antirrhina,** L. | Rather rare. |
| **Armeria,** L. | An occasional escape. |

**noctiflora,** L. An occasional escape.
**Lychnis Githago,** Lam. Rare.
**Arenaria lateriflora,** L. Not common.
**Stellaria media,** Smith. A pest in lawns. Common.
**longifolia,** Muhl. Rather common.
**graminea,** L. Becoming common.
**uliginosa,** Murr. Not rare.
**borealis,** Bigel. Concord. Rare.
**Cerastium vulgatum,** L. Common.
**arvense,** L. Not common.
**Sagina procumbens,** L. Rare.
**Buda rubra,** Dumort. Common.
**Spurgula arvensis,** L. Not common.

### Nymphæaceæ.

**Brasenia peltata,** Pursh. Common.
**Nymphæa odorata,** Ait. Common.
**Nuphar advena,** Ait. f. Common.

### Ranunculaceæ.

**Clematis Virginiana,** L. Common.
**Anemone cylindrica,** Gray. Not rare.
**Virginiana,** L. Common.
**quinquefolia,** L. Common.
**Hepatica triloba,** Chaix. Rare.
**Anemonella thalictroides,** Spach. Bedford. Rare.
**Thalictrum polygamum,** Muhl. Common.
**purpurascens,** L. Common.
**Ranunculus multifidus,** Pursh. Hudson. Rare.
**Flammula** L. var. **reptans,** E. Meyer. Common.
**abortivus,** L. Common.

| | |
|---|---|
| **Ranunculus recurvatus,** Poir. | Common. |
| **septentrionalis,** Poir. | Common. |
| **repens,** L. A pest in lawns. | Common. |
| **Pennsylvanicus,** L. f. | Not common. |
| **bulbosus,** L. | Not common. |
| **acris,** L. | Common. |
| **Caltha palustris,** L. | Not common. |
| **Coptis trifolia,** Salisb. | Common. |
| **Aquilegia Canadensis,** L. | Common. |
| **Actæa spicata,** L. var. **rubra,** Ait. | Common. |
| **alba,** Bigel. | Common. |

### Berberidaceæ.

| | |
|---|---|
| **Berberis vulgaris,** L. | Common. |

### Lauraceæ.

| | |
|---|---|
| **Sassafras officinale,** Nees. | Common. |
| **Lindera Benzoin,** Blume. | Not common. |

### Fumariaceæ.

| | |
|---|---|
| **Corydalis glauca,** Pursh. | Common. |
| **Fumaria officinalis,** L. | An occasional escape. |

### Papaveraceæ.

| | |
|---|---|
| **Sanguinaria Canadensis,** L. | Rare. |
| **Chelidonium majus,** L. | Common near dwellings. |

### Cruciferæ.

| | |
|---|---|
| **Lepidium Virginicum,** L. | Common. |
| **Sysimbrium officinale,** Scop. | Common. |
| **Brassica nigra,** Koch. | Common. |
| **campestris,** L. | Common. |

**Barbarea vulgaris,** R. Br. Common.
**Nasturtium palustre,** DC. Common.
**officinale,** R. Br. Becoming common.
**Capsella Bursa-pastoris,** Mœnch. Common.
**Arabis Canadensis,** L. Pelham. Rare.

### Sarraceniaceæ.

**Sarracenia purpurea,** L. Common.

### Droseraceæ.

**Drosera rotundifolia,** L. Common.
**intermedia,** Hayne. More abundant than the preceding.

### Crassulaceæ.

**Penthorum, sedoides,** L. Common.
**Sedum acre,** L. A common escape.
**Telephium,** L. A common escape.

### Saxifragaceæ.

**Saxifraga Virginiensis,** Michx. Common.
**Pennsylvanica,** L. Common.
**Tiarella cordifolia,** L. Locally abundant.
**Chrysosplenium Americanum,** Schwein. Common.

### Grossulariaceæ.

**Ribes rotundifolium,** Michx. Rather rare.
**floridum,** L'Her. Rare.

### Hamamelideæ.

**Hamamelis Virginiana,** L. Common.

### Platanaceæ.

**Platanus occidentalis,** L. Common along streams.

### Rosaceæ.

| | |
|---|---|
| **Spiræa salicifolia,** L. | Common. |
| **tomentosa,** L. | Common. |
| **Rubus odoratus,** L. | Not common. |
| **triflorus,** Richardson. | Common. |
| **strigosus,** Michx. | Common. |
| **occidentalis,** L. | Common. |
| **villosus,** Ait. | Common. |
| **Canadensis,** L. | Common. |
| **hispidus,** L. | Common. |
| **Dalibarda repens,** L. | Common. |
| **Geum album,** Gmelin. | Common. |
| **Virginianum,** L. | Common. |
| **strictum,** Ait. | Common. |
| **rivale,** L. | Not rare. |
| **Fragaria Virginiana,** Mill. | Common. |
| **Potentilla Norvegica,** L. | Common. |
| **argentea,** L. | Common. |
| **fruticosa,** L. Hudson. | Not common. |
| *24 **tridentata,** Ait. Hooksett. | Rare. |
| **Canadensis,** L. | Common. |
| **Agrimonia hirsuta,** (Muhl.) Bicknell. | Common. |
| **Poterium Canadense,** Benth. & Hook. | Common. |
| **Rosa Carolina,** L. | Common. |
| **humilis,** Marsh. | Common. |
| **nitida,** Willd. | Common. |

### Pomaceæ.

| | |
|---|---|
| **Sorbus Americana,** Marsh. | Not common. |

**sambucifolia,** (C. & S.) Roem. Concord. Rare.

**Aronia arbutifolia,** Ell. Less common than the next.

**nigra,** (Willd.) Britton. Common.

**Amelanchier Canadensis,** Torr. & Gray. Common.

**Cratægus coccinea,** L. Common.

### Drupaceæ.

**Prunus cuneata,** Raf. Manchester. Not rare.

**Pennsylvanica,** L. f. Common.

**Virginiana,** L. Common.

**serotina,** Ehrh. Common.

### Cæsalpinaceæ.

**Cassia Marilandica,** L. Pelham. Rare.

### Papilionaceæ.

**Baptisia tinctoria,** R. Br. Not common.

**Lupinus perennis,** L. Common.

**Medicago lupulina,** L. Occasional.

**Melilotus officinalis,** Willd. Common.

**alba,** Lam. Common.

**Trifolium arvense,** L. Common.

**pratense,** L. Common.

**repens,** L. Common.

**hybridum,** L. Common.

**agrarium,** L. Common.

**incarnatum,** L. Becoming common.

**Tephrosia Virginiana,** Pers. Pelham. Not common.

**Robinia Pseudacacia,** L. A persistent escape.

**viscosa,** Vent. A persistent escape.

**hispida,** L. Sometimes persists.

**Desmodium nudiflorum,** D C. Common.

**acuminatum,** D C. Common.

**rotundifolium,** D C. Manchester. Pelham. Not common.

**Canadense,** D C. Common.

**Marilandicum,** F. Boott. Pelham. Not common.

**Lespedeza reticulata,** Not rare.

**Stuvei,** Nutt. var. **intermedia,** Watson. Common.

**polystachya,** Michx. Common.

**capitata,** Michx. Common.

**Vicia sativa,** L. Common.

**Cracca,** L. Common.

**Amphicarpæa monoica,** Nutt. Common.

**Apios tuberosa,** Mœnch. Common.

### Geraniaceæ.

**Geranium maculatum,** L. Common.

**Carolinianum,** L. Not rare.

### Oxalidaceæ.

**Oxalis corniculata,** L. var. **stricta,** Sav. Common.

### Linaceæ.

**Linum usitatissimum,** L. An occasional escape.

### Polygalaceæ.

**Polygala paucifolia,** Willd. Common.

**polygama,** Walt. Goffstown. Concord. Rare.

**sanguinea,** L. Common.

**verticillata,** L. Concord. Rare.

### Euphorbiaceæ.

**Euphorbia maculata,** L. Common.
**Cyparissias,** L. A common escape.

**Acalypha Virginica,** L. Common.

### Callitrichaceæ.

**Callitriche verna,** L. Common.

### Anacardiaceæ.

**Rhus typhina,** L. Common.
**glabra,** L. Common.
**copallina,** L. Common.
**venenata,** D.C. Common, at least in the southern towns.
**Toxicodendron,** L. Common.

### Ilicaceæ.

**Ilex verticillata,** Gray. Common.
**lævigata,** Gray. Rare.

**Nemopanthes fascicularis,** Raf. Common.

### Celastraceæ.

**Celastrus scandens,** L. Common.

### Aceraceæ.

**Acer Pennsylvanicum,** L. Common in the northern towns.
**spicatum,** Lam. Concord. Less common than the preceding.
**saccharinum,** Wang. Common.
**dasycarpum,** Ehrh. Common.
**rubrum,** L. Common.

### Balsaminaceæ.

**Impatiens fulva,** Nutt. Common.

### Rhamnaceæ.

**Ceanothus Americanus,** L. Common.

### Vitaceæ.

**Vitis Labrusca,** L. Common.
**æstivalis,** Michx. Not rare.
**cordifolia,** Michx. Not rare.
**Ampelopsis quinquefolia,** Michx. Common.

### Tiliaceæ.

**Tilia Americana,** L. Common.

### Malvaceæ.

**Malva rotundifolia,** L. Common.

### Hypericaceæ.

**Hypericum ellipticum,** Hook. Common.
**perforatum,** L. Common.
**maculatum,** Walt. Common.
**mutilum,** L. Common.
**Canadense,** L. Common.
**nudicaule,** Walt. Common.
**Elodes campanulata,** Pursh. Common.

### Cistaceæ.

**Helianthemum Canadense,** Michx. Common.
**majus,** (L.) B. S. P. Hudson. Less common.
*25 **Hudsonia ericoides,** L. Concord. Rare.

**Lechea intermedia,** Leggett. Common.

**maritima,** Leggett. Common.

**tenuifolia,** Michx. Pelham. F. W. Batchelder, 1899. Rare.

## Violaceæ.

**Viola pedata,** L. Common.

**palmata,** L. var. **cucullata,** Gray. Common.

**sagittata,** Ait. var. **ovata,** Torr. & Gray. Common.

**blanda,** Willd. Common.

**primulæfolia,** L. Not common.

**lanceolata,** L. Common.

**rotundifolia,** Michx. Rare.

**pubescens,** Ait. Not common.

" " var. **scabriuscula,** Torr. & Gray. Common.

**canina,** L. var. **Muhlenbergii,** Gray. Common.

## Lythraceæ.

**Decodon verticillatus,** Ell. Common.

## Melastomaceæ.

**Rhexia Virginica,** L. Manchester. Goffstown. Concord. Rare.

## Onagraceæ.

**Ludwigia palustris,** Ell. Common.

**Epilobium angustifolium,** L. Common.

**lineare,** Muhl. Common.

*26 **strictum,** Muhl. Common.

**coloratum,** Muhl. Common.

**adenocaulon,** Haussk. Common.

| | |
|---|---|
| **Oenothera biennis,** L. | Common. |
| " " var. **cruciata,** Torr. & Gray. | Common. |
| **pumila,** L. | Common. |
| **Circæa Lutetiana,** L. | Common. |
| **alpina,** L. | Less common. |

### Haloragidaceæ.

| | |
|---|---|
| **Proserpinaca palustris,** L. | Common. |

### Araliaceæ.

| | |
|---|---|
| **Aralia racemosa,** L. | Not rare. |
| **hispida,** Vent. | Common. |
| **nudicaulis,** L. | Common. |
| **trifolia,** Decsne. & Planch. | Common. |

### Umbelliferæ.

| | |
|---|---|
| **Daucus Carota,** L. | Common. |
| **Angelica atropurpurea,** L. | Not common. |
| **Pastinaca sativa,** L. | Common. |
| **Cryptotænia Canadensis,** D.C. | Common. |
| **Sium cicutæfolium,** Gmelin. | Common. |
| **Carsonii,** Durand. Manchester. | Rare. |
| **Zizia aurea,** Koch. | Common. |
| **Carum Carui,** L. | A common escape. |
| **Petroselinum,** Benth. | An occasional escape. |
| **Cicuta maculata,** L. | Common. |
| **bulbifera,** L. Fruits abundantly. | Common. |
| **Hydrocotyle Americana,** L. | Common. |
| **Sanicula Marilandica,** L. | Common. |

### Cornaceæ.

| | |
|---|---|
| **Cornus Canadensis,** L. | Common. |
| **florida,** L. | Locally abundant. |
| **circinata,** L'Her. | Common. |
| **sericea,** L. | Common. |
| **stolonifera,** Michx. | Common. |
| **paniculata,** L'Her. | Common. |
| **alternifolia,** L. f. | Common. |
| *27 **Nyssa sylvatica,** Marsh. | Common. |

### Clethraceæ.

| | |
|---|---|
| **Clethra alnifolia,** L. | Locally abundant. |

### Pyrolaceæ.

| | |
|---|---|
| **Pyrola secunda,** L. | Common. |
| **chlorantha,** Swartz. | Common. |
| **elliptica,** Nutt. | Common. |
| **rotundifolia,** L. | Common. |
| **Moneses grandiflora,** Salisb. | Concord, Miss S. F. Sanborn. Rare. |
| **Chimaphila umbellata,** Nutt. | Common. |
| **maculata,** Pursh. | Less common. |

### Monotropaceæ.

| | |
|---|---|
| **Monotropa uniflora,** L. | Common. |
| **Hypopitys,** L. | Common. |

### Ericaceæ.

| | |
|---|---|
| **Arctostaphylos Uva-ursi,** Spreng. | Not rare. |
| **Epigæa repens,** L. | Common. |

| | |
|---|---|
| **Gaultheria procumbens,** L. | Common. |
| **Andromeda polifolia,** L. | Common. |
| **ligustrina,** Muhl. | Common. |
| **Cassandra calyculata,** Don. | Common. |
| **Kalmia latifolia,** L. | Common. |
| **angustifolia,** L. | Common. |
| **glauca,** Ait. Manchester. Hooksett. | Rather rare. |
| **Rhododendron nudiflorum,** Torr. | Common. |
| **Rhodora,** Don. | Common. |
| *28 **maximum,** L. Manchester. | Very rare. |

### Vacciniaceæ.

| | |
|---|---|
| **Gaylussacia resinosa,** Torr. & Gray. | Common. |
| **Vaccinium Pennsylvanicum,** Lam. | Common. |
| **nigrum,** (Wood.) Britton. | Common. |
| **vacillans,** Solander. | Common. |
| **corymbosum,** L. | Common. |
| **atrococcum,** (A. Gray.) Heller. | Common. |
| **Oxycoccus Oxycoccus,** (L.) MacM. | Rare. |
| **macrocarpus,** (Ait.) Pers. | Common. |

### Primulaceæ.

| | |
|---|---|
| **Trientalis Americana,** Pursh. | Common. |
| **Steironema ciliatum,** Raf. | Common. |
| **lanceolatum,** Gray. | Less common. |
| **Lysimachia quadrifolia,** L. | Common. |
| **stricta,** Ait. | Common. |
| **nummularia,** L. | Escaped. |

### Oleaceæ.

| | |
|---|---|
| **Fraxinus Americana,** L. | Common. |
| **pubescens,** Lam. | Common along streams. |
| **sambucifolia,** Lam. | Common in swamps. |

### Gentianaceæ.

| | |
|---|---|
| **Gentiana crinita,** Frœl. | Becoming scarce. |
| **Andrewsii,** Griseb. | Common. |
| **linearis,** Frœl. | Common. |
| **Bartonia tenella,** Muhl. | Common. |

### Menyanthaceæ.

| | |
|---|---|
| **Menyanthes trifoliata,** L. | Not rare. |
| **Limnanthemum lacunosum,** Griseb. | Manchester—Cohas brook. Rare. |

### Apocynaceæ.

| | |
|---|---|
| **Apocynum androsæmifolium,** L. | Common. |
| **cannabinum,** L. | Not common. |

### Asclepiadaceæ.

| | |
|---|---|
| **Asclepias tuberosa,** L. Merrimack. Concord. | Rare. |
| **purpurascens,** L. | Common. |
| **incarnata,** L. | Common. |
| **Cornuti,** Decaisne. | Common. |
| **obtusifolia,** Michx. | Common. |
| **phytolaccoides,** Pursh. | Common. |

### Convolvulaceæ.

| | |
|---|---|
| **Convolvulus sepium,** L. var. **repens,** Gray. | Not common. |

### Cuscutaceæ.

**Cuscuta Gronovii,** Willd. Common.

### Borraginaceæ.

**Cynoglossum officinale,** L. Not common.

**Echinospermum Virginicum,** Lehm. Common.

**Myosotis laxa,** Lehm. Piscataquog river meadows. Rare.

**verna,** Nutt. Manchester, on a ledgy hillside. Rare.

**Symphytum officinale,** L. Occasional.

### Verbenaceæ.

**Verbena urticæfolia,** L. Common.

**angustifolia,** Michx. Not rare.

**hastata,** L. Common.

### Labiatæ.

**Trichostema dichotomum,** L. Common.

**Teucrium Canadense,** L. Not common.

**Collinsonia Canadensis,** L. Pelham. Not common.

**Mentha viridis,** L. Common.

**piperita,** L. Common.

**Canadensis,** L. Common.

**Lycopus Virginicus,** L. Common.

**sinuatus,** Ell. Common.

**Pyknanthemum lanceolatum,** Pursh. Manchester. Pelham. Not rare.

**linifolium,** Pursh. Manchester. Not common.

**muticum,** Pers. Not common.

**incanum,** Michx. Not common.

**Hedeoma pulegioides,** Pers. Common.

| | | |
|---|---|---|
| **Monarda fistulosa,** L. | Bedford. | Rare. |
| **Nepeta Cataria,** L. | | Common. |
| **Glechoma,** Benth. | | Common. |
| **Scutellaria lateriflora,** L. | | Common. |
| **galericulata,** L. | | Common. |
| **Brunella vulgaris,** L. | | Common. |
| **Leonurus Cardiaca,**L. | | Common. |
| **Galeopsis Tetrahit,** L. | Waste places. | Common. |

### Solanaceæ.

| | | |
|---|---|---|
| **Solanum Dulcamara,** L. | | Common. |
| **Physalis pubescens,** L. | Manchester. | Rare. |
| **Datura Stramonium,** L. | | On dumps. |
| **Tatula,** L. | | On dumps. |

### Scrophulariaceæ.

| | |
|---|---|
| **Verbascum Thapsus,** L. | Common. |
| **Linaria Canadensis,** Dumont. | Common. |
| **vulgaris,** Mill. | Common. |
| **Chelone glabra,** L. | Common. |
| **Pentstemon pubescens,** Solander. | Not common. |
| **Mimulus ringens,** L. | Common. |
| **Gratiola Virginiana,** L. | Not common. |
| **aurea,** Muhl. | Common. |
| **Ilysanthes riparia,** Raf. | Common. |
| **Veronica Americana,** Schweinitz. | Common. |
| **scutellata,** L. | Common. |
| **serpyllifolia,** L. | Rather common. |
| **peregrina,** L. | Rather common. |

**Gerardia pedicularia,** L. Not rare.
**flava,** L. Common.
**quercifolia,** Pursh. Common.
**purpurea,** L. var. **paupercula,** Gray. Common.
**tenuifolia,** Vahl. Not rare in the southern towns.
**Pedicularis Canadensis,** L. Common.
**Melampyrum Americanum,** Michx. Common.

### Lentibulariaceæ.

*29 **Utricularia vulgaris,** L. Common.
**resupinata,** B. D. Greene. Manchester. Rare.
**cornuta,** Michx. Common.

### Orobanchaceæ.

**Epiphegus Virginiana,** Bart. Not common.
**Aphyllon uniflorum,** Gray. Common.

### Plantaginaceæ.

**Plantago major,** L. Common.
**Rugelii,** Decaisne. Common.
**lanceolata,** L. Common.
**Patagonica,** Jacq. var. **aristata,** Gray. Occasional.

### Rubiaceæ.

**Houstonia cerulea,** L. Common.
**purpurea,** L. var. **longifolia,** Gray. Locally abundant.
**Cephalanthus occidentalis,** L. Common.
**Galium aparine,** L. Common.
**pilosum,** Ait. Hudson. F. W. Batchelder. Rare?
**circæzans,** Michx. Common.

**trifidum,** L. Common.

**asprellum,** Michx. Common.

**triflorum,** Michx. Common.

### Caprifoliaceæ.

**Sambucus Canadensis,** L. Common.

**racemosus,** L. Goffstown. Auburn. Not common.

**Viburnum lantanoides,** Michx. Not rare.

**Opulus,** L. Common.

**acerifolium,** L. Common.

**dentatum,** L. Common.

**cassinoides,** L. Common.

**Lentago,** L. Common.

**Triosteum perfoliatum,** L. Hudson. F. W. Batchelder. Rare.

**Linnæa borealis,** L. Rather rare.

**Lonicera ciliata,** Muhl. Not rare.

**cærulea,** L. Manchester. W. H. Huse. Rare.

**Diervilla trifida,** Mœnch. Common.

### Cucurbitaceæ.

**Sicyos angulatus,** L. Less common than the next.

**Echinocystis lobata,** Torr. & Gray. Common.

### Campanulaceæ.

**Specularia perfoliata,** A. DC. Not common.

**Campanula rotundifolia,** L. Common.

**aparinoides,** Pursh. Common.

### Cichoriaceæ.

**Cichorium Intybus,** L. Not common.

| | |
|---|---|
| **Leontodon autumnalis,** L. | Common. |
| **Taraxacum officinale,** Weber. | Common. |
| **erythrospermum,** Andrz. | Not rare. |
| **Sonchus arvensis,** L. | Becoming common. |
| **oleraceus,** L. | Common. |
| **asper,** Vill. | Common. |
| **Lactuca Canadensis,** L. | Common. |
| **integrifolia,** Bigel. | Common. |
| **leucophæa,** Gray. | Common. |
| **Hieracium aurantiacum,** L. | Rare. |
| **Canadense,** Michx. | Common. |
| **paniculatum,** L. | Common. |
| **venosum,** L. | Common. |
| **scabrum,** Michx. | Common. |
| **Prenanthes alba;** L. | Common. |
| **serpentaria,** Pursh. | Common. |
| **altissima,** L. | Common. |

### Ambrosiaceæ.

| | |
|---|---|
| **Ambrosia artemisiæfolia,** L. | Common. |
| **trifida,** L. | Not common. |
| **Xanthium Canadense,** Mill. | Common. |

### Compositæ.

| | |
|---|---|
| **Mikania scandens,** L. Goffstown. | Rare? |
| **Eupatorium purpureum,** L. | Common. |
| **teucrifolium,** Willd. | Common. |
| **rotundifolium,** L. var. **ovatum,** Torr. | Rare? |
| **perfoliatum,** L. | Common. |
| **ageratoides,** L. | Common. |

**Liatris scariosa,** Willd. Hooksett. Rare.
**Solidago cæsia,** L. Common.
**latifolia,** L. Common in the southern towns.
**bicolor,** L. Common.
**puberula,** Nutt. Common.
**uliginosa,** Nutt. Common.
**speciosa,** Nutt. Not common.
**odora,** Ait. Not common.
**patula,** Muhl. Not common.
**rugosa,** Mill. Common.
**ulmifolia,** Muhl. Common.
**Elliottii,** Torr. & Gray. Not rare.
**neglecta,** Torr. & Gray. Common.
**arguta,** Ait. Common.
**juncea,** Ait. Common.
**serotina,** Ait. Common.
" " var. **gigantea,** Gray. Common.
**Canadensis,** L. Common.
**nemoralis,** Ait. Common.
**lanceolata,** L. Common.
**Sericocarpus conyzoides,** Nees. Common.
**solidagineus,** Nees. Common.
**Aster corymbosus,** Ait. Common.
**macrophyllus,** L. Not common.
**radula,** Ait. Not common.
**Novæ-Angliæ,** L. Not common.
**patens,** Ait. Common.
**undulatus,** L. Common.

| | | |
|---|---|---|
| | **cordifolius,** L. | Common. |
| | **lævis,** L. | Common. |
| | **polyphyllus,** Willd. | Not common. |
| | **ericoides,** L. | Common. |
| | **multiflorus,** Ait. | Common. |
| | **vimineus,** Lam. | Common. |
| | **diffusus,** Ait. | Common. |
| | **paniculatus,** Lam. | Not common. |
| | **junceus,** Ait. | Not common. |
| | **longifolius,** Lam. | Not common. |
| | **Novi-Belgii,** L. | Not common. |
| | **patulus,** Lam. | Common. |
| | **tardiflorus,** L. | Common. |
| | **puniceus,** L. | Common. |
| | **umbellatus,** Mill. | Common. |
| | **linariifolius,** L. | Common. |
| | **acuminatus,** Michx. | Common. |
| | **nemoralis,** Ait. | Not common. |
| **Erigeron Canadensis,** L. | | Common. |
| | **annuus,** Pers. | Not common. |
| | **strigosus,** Muhl. | Common. |
| | **bellidifolius,** Muhl. | Common. |
| | **Philadelphicus,** L. | Less common. |
| *30 | **Antennaria plantaginea,** R. Br. | Less common than the other species. |
| | " " " | var. **petiolata,** With the type. |
| | **Parlinii,** Fernald. | Common. |
| | **neodioica,** Greene. | Common. |

| | |
|---|---|
| **neglecta,** Greene. | Common. |
| **Canadensis,** Greene. | Common. |
| **Anaphalis margaritacea,** Benth & Hook. | Common. |
| **Gnaphalium polycephalum,** Michx. | Common. |
| **decurrens,** Ives. | Common. |
| **uliginosum,** L. | Common. |
| **Inula Helenium,** L. | Not rare. |
| **Rudbeckia laciniata,** L. | Common in the southern towns. |
| **hirta,** L. | Common. |
| **Helianthus annuus,** L. | Escaped. |
| **divaricatus,** L. | Common. |
| **strumosus,** L. | Common. |
| **decapetalus,** L. | Common. |
| **tuberosus,** L. | Escaped. |
| **Bidens frondosa,** L. | Common. |
| **connata,** Muhl. | Common. |
| **chrysanthemoides,** Michx. | Common. |
| **Galinsoga parviflora,** Cav. | Lately introduced. |
| **Anthemis Cotula,** DC. | Common. |
| **Achillea Millefolium,** L. | Common. |
| **Chrysanthemum Leucanthemum,** L. | Common. |
| **Tanacetum vulgare,** L. | Common. |
| **Artemisia vulgaris,** L. | Not rare. |
| **Tussilago Farfara,** L. | Rare. |
| **Senecio aureus,** L. | Common. |
| **Erechtites hieracifolia,** Raf. | Common. |

| | |
|---|---|
| **Arctium Lappa,** L. | Common. |
| **Cnicus lanceolatus,** Hoffm. | Common. |
| **muticus,** Pursh. | Not rare. |
| **pumilus,** Torr. | Common. |
| **arvensis,** Hoffm. | Common. |
| **Krigia Virginica,** Willd. | Common. |

# NOTES TO PLANT LIST.

## *1 **Botrychium ternatum,** (Thunb.) Sw. var. **dissectum.** (**Botrychium dissectum,**) Spreng.

This plant is by no means rare in this section of New Hampshire. It is commonly found growing with the other varieties in about the proportion of one to five. The plants are extremely variable in size and also in the fineness of the cutting of the lobes in the sterile segment of the leaf. The fertile segment is seldom developed. There are numberless gradations between *dissectum* and the other typical forms and it is frequently impossible to decide to which named variety certain plants should be referred. The particularly close connection of *dissectum* with *obliquum* through intermediate forms militates against the propriety of separating the former as a species.

## *2 **Equisetum palustre,** L.

[See **Rhodora,** i. 75.]

## *3 **Chamæcyparis sphæroidea,** Spach.

The only station yet reported is the "rhododendron swamp" located near the northwest corner of Manchester.

[See note on *Rhododendron maximum*, below.]

## *4 **Gramineæ.**

All doubtful or ambiguous plants of this order have been submitted to the most competent authorities for examination and classification. In the difficult and as yet unsettled genus *Panicum* specimens have been verified by Prof. F. L. Scribner, the expert agrostologist of the Department of Agriculture, Washington, D. C.

## *5 **Aristida gracilis,** Ell.

Abundant in Pelham along Beaver brook, the plants varying greatly in size and form, some being single and slender, others rather densely tufted and quite stout.

## *6 **Sporobolus neglectus,** Nash.

Common at least as far north as Concord, where there occurs a form more robust than usual, mostly purplish, and with spikelets approaching those of *S. asper*.

### *7 **Ammophila arundinacea,** Hots.

In Hudson near the bridge at Taylor's falls there was formerly a tract of several acres of fine sand, called locally the "great desert." During the prevalence of northwest winds this sand drifted in such quantities as to block the road and seriously impede travel, and also to damage the cultivated fields to the southward. About sixty years ago attempts were made by the town authorities to check the evil. A fence was built on the north side of the road and a row of willows planted on both sides. These means not proving effectual a few years later some persons were authorized by the town to procure this grass from the seashore and a quantity of it was sown or planted on the tract. In the course of time the grass covered the ground to such an extent as to check the drifting sand and make the reclamation of the tract comparatively easy. A large part of the land has been sold for house lots and the "great desert" will soon be obliterated by the eastward growth of this pleasant suburb of Nashua.

### *8 **Triodia sesleriodes,** (Michx.) Benth.

This handsome grass was found growing abundantly in the vicinity of a grist mill in Pelham. It had the appearance of being perfectly at home, and if introduced, which is altogether probable, must have persisted for a number of years.

[See also **Rhodora,** i. 67, concerning a Connecticut station of this species.]

### *9 **Glyceria borealis.**

This northern grass appears to be well distinguished from its southern ally, *G. fluitans*, by the *more erect culms, narrower leaves, membranous ligule, narrower panicle with more appressed branches and spikelets and membranous flowering scales with hispidulous nerves.*

It here receives for the first time its proper designation as a *Glyceria.*

### *10 **Sisyrinchium.**

There are at least three well marked forms in our area. The genus is at present undergoing critical study and revision, and observers are advised to be on the lookout for hitherto undescribed forms.

### *11 **Spiranthes cernua,** Richard.

The excessive drought of the season of 1899 prevented satisfactory observations of this species, the plants being very scarce and poorly developed. In Gray's Manual, 6th edition, the species is placed in the same section with *S. latifolia* and *Romanzoffiana* as having "the flowers in three ranks crowded in a close spike." In Britton & Brown's Illustrated Flora the description reads, "flowers three-ranked—stems not twisted, or but slightly so," and under the species, "flowers in three rows." Careful observation in our area shows that from thirty

to forty per cent of the plants have the flowers in a one-ranked spike, as in *S. gracilis*. As regards the twisting of the spike there is every gradation from the straight spike to the extreme twisted or corkscrew form. As a rule the one-ranked spikes are more twisted than the three-ranked ones, and the corkscrew form occurs principally in many-flowered one-ranked spikes, the degree of twist being about in proportion to the number of flowers. In large and vigorous plants the one-ranked arrangement is as frequent as in small ones, though less evident at first glance on account of the crowding of the flowers. No difference in the flowers themselves ha yet been observed to accompany the different arrangements of the inflorescence.

[See also **Rhodora**, i, 110.]

## *12 **Goodyera.**

This genus is now undergoing revision. Plants hitherto known as *G. repens* are more than likely to be the variety *ophioides* or the species *tesselata*. Observations will be in order.

[See **Rhodora**, i, 2.]

## *13 **Habenaria blephariglottis**, Torr.

The single station of this species in Manchester has been, unhappily, too well known, and the plants are now nearly if not quite exterminated.

## *14 **Habenaria fimbriata**, R. Br.

Abundant in the vicinity of Manchester. The study of its forms is extremely interesting. There are two well marked forms which are so constant in their differences as to demand a special account. What may be called typical *fimbriata* begins to bloom about the 1st of June. The flowers are scentless, except for the rank odor common to the orchid family, and are gone by the 1st of July. Soon after July 1st the other form begins to flower, some plants being found in flower as late as August 25th. In this form the flowers are richly scented, having a fragrance similar to that of *H. psycodes*, but less heavy. The lip and petals are deeply cut, sometimes almost as much as in *H. lacera*, the pedicels are more slender than in the early form and the whole plant has a more delicate and graceful aspect. There are two abundant stations of this late form known. In one of them the flowers vary in shade from pinkish to rather dark purple; in the other, besides the plants with light and dark purple flowers, there are always some with pure white flowers.

The differences may be summarized thus: Early form, June 1st to July 1st, flowers purple, not fragrant, rather stoutly pedicelled, with lip and petals not deeply cut; late form, July 1st to August 25th, flower dark to light purple, pinkish or pure white, very fragrant, with rather slender pedicels and with lip and petals deeply cut.

So far as observed the two forms do not grow together, though *H. psychodes* is found in both stations of the late form. The forms are persistent, being found in the same stations year after year. The personal observations of the compiler extend over a period of six years. The white form had been known for an indefinite period before his observations began.

## *15 **Cypripedium pubescens,** Willd.

A number of these plants were removed to a "wild bed" in a city lot. There they have thriven and multiplied for several years. During this time the plants have undergone a marked change in appearance, becoming smaller and producing smaller flowers, in which the lip is strongly compressed laterally, is more pointed at the apex and has assumed a paler shade of yellow. Several plants of *C. parviflorum* which were set out at the same time have undergone no apparent change from year to year. It seems, therefore, more likely that the changes in *C. pubescens* are the result simply of the changed habitat and not of cross-fertilization with *C. parviflorum*.

## *16 **Salix.**

This baffling genus is not yet well understood. The list given is but tentative and takes no account of the numerous hybrids, which doubtless exist here as everywhere.

## *17 **Betula nigra,** L.

The red or river birch is very abundant along Beaver brook in Pelham for at least four miles north of the Massachusetts line. The trees are undoubtedly members of a westerly extension into this corner of New Hampshire of the remarkable station discovered many years ago at Spickett Falls in Methuen, by Mr. George B. Emerson, and described in his **Trees and Shrubs of Massachusetts,** (*q. v.*)

## *18 **Quercus.**

Manchester is unusually rich in oaks. Of the eight species named the most abundant is *coccinea*, the rest following in about this order — *alba*, *ilicifolia*, *rubra*, *prinoides*, *tinctoria*, *bicolor*, *Prinus*. They may all be found in the compass of a square mile in West Manchester.

## *19 **Quercus Prinus,** L.

Two stations of the rock chestnut oak have been examined, one in Manchester at Rock Rimmon, the other in Auburn, six miles distant. The cutting of the leaves varies greatly, those on the finest, best-developed trees being often as nearly entire as those of typical *bicolor* or of the chestnut, while on stunted, ill-devel-

oped trees they are often as deeply lobed as in *alba*. There are also at both stations trees with long-peduncled fruit as in *bicolor*, the leaves accompanying them being of the less deeply-lobed sort.

### *20 **Quercus prinoides,** Willd.

Abundant as far as several miles north of Manchester but not yet observed at Concord. Tree-like plants are not rare. Some such in Hudson are 15 feet high with stems 5 inches in diameter. Others in Manchester are 20 to 22 feet high with stems 3 inches in diameter. These large forms appear to be old and little or no fruit is found on them. So far as observed they do not show any approach to *Q. Muhlenbergii* except in size.

### *21 **Quercus coccinea,** Wang. var. **ambigua,** Gray.
### (**Quercus ambigua,** Michx.)

There are several trees at Manchester which are puzzling, from their combination of the characters of *Q rubra* and *Q. coccinea*. Since it is not known precisely what Michaux meant by his *Q. ambigua* intermediate forms cannot with propriety be given that name. The trees observed have the aspect and foliage of *Q. rubra* while the fruit resembles that of *Q. coccinea;* but the fruit varies on different plants, being large on some and small on others, having the cups sometimes thick and sometimes thin and the scales sometimes appressed and sometimes slightly squarrose.

The tendency among recent students of the genus is to consider such intermediate forms as forms only. One of our best authorities is of the opinion that the group "*Q. rubra*, *Q. coccinea*, *Q. tinctoria* and *Q. palustris* constitutes a polymorphous species from which we separate extreme forms as a convenience in study."

### *22 **Ulmus fulva,** Michx.

There are two good-sized trees at "Arcadia" by Piscataquog river. They are to all appearance indigenous, but the proximity of old houses and abandoned farms renders their spontaneousness at least questionable. Until more trees are discovered it will not be entirely safe to claim the species as indigenous within our area.

### *23 **Morus alba,** L.

A plantation of these trees in Pelham still survives to bear witness that our ancestors were not entirely free from money-making schemes. It was made sixty or seventy years ago during the "silkworm" craze. Tradition says that more than one resident of the town sank his little fortune in a similar unprofitable venture. The trees still bear fruit, though but scantily, for lack of cultivation.

### *24 **Potentilla tridentata,** Ait.

On Hooksett "Pinnacle," a small rocky elevation eight miles above Manchester, there is a station of this species, which is usually found either at the seashore or on high mountains. The "Pinnacle" is a little way back from the Merrimack river bank, rising to the height of some two hundred feet, the eastern and southern sides being precipitous and mostly bare.

[See **Rhodora,** i., 90.]

### *25 **Hudsonia ericoides,** L.

There is an immense station of this species at Concord on the high sand bluffs east of Merrimack river. The principal station examined extends along the top and slope of the bluff for about 1500 feet from south to north. There is more on the next bluff northward and still more south of the highway below the principal station. The trees growing with it are mostly *Pinus rigida* and *resinosa*, *Betula populifolia* and *Quercus ilicifolia;* grasses — *Agrostis scabra*, *Deschampsia flexuosa*, *Danthonia spicata* and *Andropogon scoparius;* shrubs — *Kalmia angustifolia* and *Myrica asplenifolia;* smaller plants — *Comandra umbellata* and *Polygala polygama* and two or three species of *Antennaria*. The soil is dry and very nearly clear sand. There are no rocks in the vicinity.

[See also **Rhodora,** i, 213, 214.]

### *26 **Epilobium strictum,** Muhl.

Abundant at least as far north as Lake Winnipesauke.

### *27 **Nyssa sylvatica,** Marsh.

The tupelo is much more abundant than is generally supposed. In the "rhododendron swamp" (see *Rhododendron maximum* below) there are very large old trees which the woodman's axe has willingly spared. Large trees may be recognized at a distance by the contour of the trunk, which has a columnar aspect, the diameter diminishing but slightly from base to summit. The trunk is usually bare for more than one-half its height and often appears as if broken off at the top. The bark is very thick and rough and is seamed and cross-seamed in a characteristic manner.

### *28 **Rhododendron maximum,** L.

A high, wet swamp, difficult of access, near the northwest corner of Manchester, has long been known as a station of the beautiful "rose bay." The plants are usually in flower about July 4th. The swamp having recently been denuded of its trees the rhododendrons have not flowered as well as formerly and after very cold winters the buds are mostly blighted. No success has attended the transplanting of individuals.

A matter worthy of note is the presence in this same locality of *Chamæcyparis sphæroidea* and *Chiogenea serpyllifolia*, not yet reported elsewhere in our area.

### *29 Utricularia.

A boggy pond in Manchester affords the three species named. Besides these there has been found there a small species rooting in mud and bearing small bright yellow flowers. No specimens having yet been examined which were in good condition further collections and observations must be awaited before the plants can be referred to the proper species.

### *30 Antennaria.

The attention of observers is called to this genus as affording a peculiarly interesting field of study. Besides the five species and the variety named there are doubtless several others in our area.

[See also **Rhodora**, i, 71 and 150.]

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## SUMMARY.

| | |
|---|---|
| Number of Families represented | 115 |
| Number of Genera represented | 368 |
| Number of Species | 804 |
| Number of Varieties | 13 |
| Total number of names, | 817 |

MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

## SECTION D.

# ORNITHOLOGY.

### OFFICERS FOR 1899.

MRS. F. W. BATCHELDER, *President.*
MRS. JOHN C. BICKFORD, *Vice President.*
MR. HERBERT E. RICHARDSON, *Secretary.*
MR. GEORGE E. BURNHAM, *Treasurer.*

EXECUTIVE COMMITTEE.

MR. EDWARD H. FOGG, MISS THEODORA RICHARDSON,
DR. EDWARD H. CURRIER.

# SECTION D—ORNITHOLOGY.

This Section was organized February 15th, 1899, and admitted to the Institute January 17th, 1899.

It has for its objects the systematic study of the structure and life-history of birds in general and the observation, record and classification of the avifauna of Manchester and vicinity. Special subjects for investigation will be the distribution of species locally with relation to climatic, geologic and floral conditions, the habits of birds, their food in its relation to insect pests and thereby to agriculture, their songs and calls, their variations—in short, anything which may increase our knowledge of their life-histories and of the links which join them to the lower and the higher animals and to man.

Two important collateral branches of the work will be these: First, the collection of a local museum of ornithology, in which in the course of time all the species incident to the region shall be represented by mounted specimens and skins prepared according to the latest and most approved methods; second, the compilation of as full a list as possible of resident, migrant, visitant and accidental species. The list will of necessity be at first a modest one. The addition of supplements annually will render practicable at no distant date the publication of a list more nearly commensurate with our ambition and with the avian wealth of an exceptionally favored locality.

The situation of Manchester is favorable to variety in its fauna no less than in its flora. The overlapping of the Boreal and Alleghanian areas gives rise to a corresponding overlapping of the breeding ranges of various species of birds. In illustration and proof of this may be cited the fact that the breeding range of the wood thrush extends not less than twenty miles north and of the hermit thrush not less than twenty miles south of Manchester, and that the white-throated sparrow or peabody bird is a summer resident.

In order to systematize the results of observation a perpetual bird-calendar is kept. by members specially appointed from time to time, who incorporate with their own observations those of all the other members. Field-days are held at the pleasure of the section. Two were held this year and proved to be equally enjoyable and profitable.

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# LECTURES.

A COURSE OF

## SIX LECTURES BY MR. RALPH HOFFMANN,

## OF BOSTON, MASS.

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This course was tendered to members of the Institute by the Ornithological Section. The lectures already given have been well attended and listened to with marked and increasing interest. Mr. Hoffman possesses the happy faculty of imparting his own enthusiasm to others and of relating his personal experiences in a vivid and picturesque manner.

The following are the dates and subjects of the course:

October 20th, 1899. A Bird's Year.
November 19th, 1899. Thrushes, Chickadees and Wrens.
December 15th, 1899. Warblers and Vireos.
January 12th, 1900. Swallows and Sparrows.
February 9th, 1900. Blackbirds, Flycatchers and Woodpeckers.
March 9th, 1900. Birds of Prey, Game Birds and Water Birds.

# REPORTS OF MEETINGS—1899.

Wednesday evening, February 15th. A meeting was held in the section-room of the Institute for the purpose of organization. Mr. E. J. Burnham was chosen chairman, and Mrs. F. W. Batchelder, Secretary. After the adoption of by-laws, Mr. E. H. Fogg, Mrs. J. W. Fellows and Miss May W. Davis were appointed a committee to nominate officers. The report of the committee was accepted and the officers nominated were unanimously elected by ballot. (See list of officers, page 113.)

After the completion of business the members were addressed by Mr. E. J. Burnham, who offered valuable suggestions relating to the work of the Section. He pointed out the exceptional character of our locality by reason of the overlapping of the Boreal and Alleghanian faunal areas and the proximity of the isothermal line and belt which divide and are at the same time common to both.

Mr. E. H. Fogg gave an extremely interesting account of various occasions when he was successful in approaching a wood thrush's nest and feeding the mother bird. Adjourned to March 1st.

Wednesday evening, March 1st. Mr. Fogg, as chairman of the executive committee, made the following recommendations: That steps be taken towards the collection of a local museum of ornithology; that the Check-List of the American Ornithologists Union be adopted as the standard in nomenclature; that the systematic study of the structure and life history of birds be undertaken by the Section; that papers and talks be voluntary; that a perpetual record of birds be kept in an ornithological bulletin of the Section, and that to this end two members be appointed at each meeting whose duty it shall be to present at the following meeting special reports of birds observed in the interval; that

after the transaction of business the remainder of each session be devoted to the study of birds and the examination of specimens.

The report was accepted and the recommendations approved.

An hour of study followed under the leadership of Mr. Fogg, the subject being "The Parts of a Bird." Adjourned to March 15th.

Wednesday evening, March 15th. A stormy evening. After routine business adjourned to March 29th.

Wednesday evening, March 29th. The executive committee reported in favor of the *Auk* and *Bird Lore* as two of the ornithological periodicals to be recommended to the Council for subscription. Further time was asked and granted. The calendar was read by Mr. F. W. Batchelder. Reports concerning wild geese were made by Mr. Burnham, Mr. Fogg and Mr. Batchelder. [See Bird List, under Wild Goose.] Mr. Fogg led the Section in an hour's study of the characteristics of grebes, loons and auks. Adjourned to April 12th.

Wednesday evening, April 12th. The executive committee presented a complete report, adding the *Wilson Bulletin* and the *A. O. U. Check List* to the number of periodicals desired.

After the reading of the calendar Mr. Burnham gave a very suggestive talk on the "Muscles of Birds." An hour of study followed, led by Mr. Fogg, the subject being, the Orders of Land and Water Birds. Adjourned to April 26th.

Wednesday evening, April 26th. After routine business adjourned to May 10th.

Wednesday evening, May 10th. Routine business. A vote of thanks was extended to Mr. Fogg for his services in leading the field day excursion of April 30th. Adjourned to May 24th.

Wednesday evening, May 24th. Routine business. After the reading of the calendar Mr. Burnham entertained the Section with a talk on the language of birds, suggested by the cry of the

night-hawk. Mr. Batchelder followed with a talk on the songs of the wood, hermit, olive-backed and Wilson's thrushes, with illustrations and transcriptions on the blackboard.

A Tennessee warbler which had been found dead was presented by Miss Tuson. The species is very rare in this region and the specimen excited unusual interest. Adjourned to June 7th.

Wednesday evening, June 7th. Routine business. Adjourned to June 21st.

Wednesday evening, June 21st. Routine business. Adjourned to September 20th.

Wednesday evening, September 20th. Routine business. Mr. Batchelder was by vote of the Section appointed to take charge of the calendar and compare the local list up to January 1st, 1900, with Chapman's list in his "Birds of Eastern North America." The members engaged in a free discussion of plans for the coming winter's work. A course of lectures was suggested. Adjourned to October 4th.

Wednesday evening, October 4th. The executive committee reported the engagement of Mr. Ralph Hoffmann, of Belmont, Mass., to give a course of six lectures, one monthly, from October, 1899, to March, 1900.

The calendar was read by Mr. F. W. Batchelder, who reported the white-throated sparrow as a local summer resident. [See Bird List.] He also stated that the olive-backed thrush had been heard in full song on the 1st and 2d of June last. An incursion of red-breasted nuthatches in large numbers was reported as having taken place in August and September, and a discussion followed as to the cause of such an unusual occurrence, some attributing it to circumstances relating to the food supply, others to the exceptional coolness of the past summer.

The Section, led by Mr. Fogg, made a special study of the white-crowned sparrow, yellow-bellied sapsucker and Tennessee warbler, of which finely prepared specimens were exhibited.

Mr. W. E. Moore gave a detailed account of the birds seen by

him during his summer outing on the Piscataqua river north of Portsmouth. Adjourned to October 20th.

Friday evening, October 20th. Lecture by Mr. Ralph Hoffman. Subject, "A Bird's Year." Adjourned to November 1st.

Wednesday evening, November 1st. After routine business, attended lecture in the "Chandler Course," by Prof. Mendenhall. Adjourned to November 17th.

Friday evening, November 17th. Lecture by Mr. Ralph Hoffman. Subject, "Thrushes, Chickadees and Wrens." Adjourned to November 29th.

Wednesday evening, November 29th. Routine business. Mr. Fogg gave suggestions as to attracting birds to our homes, with very interesting personal reminiscences of his success in that line. Mr. Batchelder read a paper on "Bird Songs and Calls," giving blackboard musical illustrations. Adjourned to December 15th.

Friday evening, December 15th. Lecture by Mr. Ralph Hoffman. Subject, "Warblers and Vireos." Adjourned to December 27th.

Wednesday evening, December 27th. Annual meeting, the Vice President in the chair; Miss Susan Richardson, Secretary *pro tem;* records read and approved. Mr. Wm. E. Moore and Miss Hattie Tuttle having been appointed a nominating committee reported the following list:

MRS. F. W. BATCHELDER, *President.*
MRS. J. C. BICKFORD, *Vice President.*
MISS MAY W. DAVIS, *Secretary.*
MISS THEODORA RICHARDSON, *Treasurer.*

EXECUTIVE COMMITTEE.

MR. EDWARD H. FOGG, MRS. JOHN C. BICKFORD.
MISS THEODORA RICHARDSON.

The report was accepted and the officers named were unanimously elected by ballot.

The annual report of the Secretary was read and approved. Miss Theodora Richardson read a paper on "The Feather Structure and Flight of Birds," illustrated by blackboard sketches. Personal observations were contributed by Mr. Fogg and Mr. Moore, and the flight of birds was discussed. Adjourned to January 12th, 1900.

# INTRODUCTION TO LIST.

With the exception of the few changes authorized by the Eighth and Ninth Supplements to the Check List of the American Ornithologists' Union the nomenclature employed in this list is identical with that in Chapman's Hand-book of the Birds of Eastern North America, third edition. In the preparation of the notes the compilers have taken the utmost care to incorporate nothing which was of doubtful authenticity or which might be the result of insufficient observation. The poverty of the list in items relating to the habits and life history of many of the species named should be attributed to the fact that but a short time has elapsed since systematic observations were inaugurated. It is hoped that these records, meeting the eyes of persons interested, may be instrumental in bringing in reports from other localities in our area which is, broadly speaking, central southern New Hampshire, embracing the whole of Hillsborough County, the west half of Rockingham County and the south half of Merrimack County. All properly authenticated reports will be incorporated with the supplementary lists to be published annually hereafter in the Proceedings of the Institute.

Communications addressed to E. J. Burnham, Corresponding Secretary of the Institute, Manchester, N. H., will receive due consideration.

# PRELIMINARY LIST OF BIRDS

RESIDENT, VISITANT, MIGRANT OR ACCIDENTAL, OBSERVED IN THE VICINITY OF MANCHESTER, N. H.

COMPILED BY

FREDERICK W. BATCHELDER,

ASSISTED BY

EDWARD H. FOGG.

1899.

**7. Gavia imber** (*Gunn.*) LOON.

Formerly an abundant summer resident, breeding about our lakes and larger ponds; now scarce south of Lake Winnipesauke.

**106. Oceanodroma leucorhoa** (*Vieill.*)
LEACH'S PETREL.

A stray individual was shot near the mill-dam at Lake Massabesic, in Manchester, October 4th, 1899.

**129. Merganser americanus** (*Cass.*)
AMERICAN MERGANSER. SHELDRAKE.

A transient visitant, mostly in November and December. Possibly a few winter. A very large flock was seen in the Merrimack river, about two miles below Nashua, December 2d, 1899.

**133. Anas obscura** (*Gmel.*) BLACK DUCK.

A summer resident, now becoming very scarce.

**144. Aix sponsa** (*Linn.*) WOOD DUCK.

A summer resident, also becoming very scarce. Reported recently from Pelham and Concord.

**172. Branta canadensis** (*Linn.*) WILD GOOSE.

Spring and fall migrant.

The rapidity of flight attained by the wild geese in their migrations is very remarkable, as the following incident may serve to show. On the 12th of March, 1898, an observer who was on board an express train between Nashua and Manchester, where the road runs along the west bank of the Merrimack river, saw a large flock rise from the water a little way ahead of the train. The main part of the flock went off in a northeasterly direction, apparently towards Lake Massabesic, and soon disappeared. The remainder of the flock, comprising seven individuals, the leader of which was noticeably larger than his companions, kept on straight up the river at a rather low altitude, maintaining the familiar harrow-shaped form in their arrangement. From Reed's Ferry to Goffe's Falls, a distance of four miles, they kept up with the train so exactly that in relation to it they appeared absolutely motionless. At the latter place, where the train crossed the river, the birds were lost sight of. On making inquiries of the trainmen as to the rate of speed attained it was found that it had not been less than forty-five miles an hour, probably more. During the race the birds appeared to fly with ease as if making no unusual effort.

At Manchester on several occasions flocks have been observed during foggy nights to fly to and fro across the city, making a great noise, as if bewildered and trying to get their bearings. In the spring of 1899 a flock approaching the city from the westward was seen suddenly to swerve to the southward, as if to avoid the smoke of the manufacturing district, for as soon as it had passed beyond it another sudden turn was made and the flock again took a straight easterly course till out of sight.

**190. Botaurus lentiginosus** (*Montag.*)
AMERICAN BITTERN. STAKEDRIVER.

Fairly common summer resident. Almost always called the "Stakedriver."

**194. Ardea herodias** (*Linn.*) GREAT BLUE HERON.

Very rare summer resident. One was shot near Dorr's pond in Manchester, in the summer of 1899. These beautiful birds not being protected by law, any man who can "hit a barn door" is privileged to blaze away at them at long or short range, and the great blue heron will soon be as extinct as the dodo, so far as our area is concerned.

**201. Ardea virescens** (*Linn.*) LITTLE GREEN HERON.

Common summer resident.

**228. Philohela minor** (*Gmel.*) AMERICAN WOODCOCK.

Common summer resident.

**242. Tringa minutilla** (*Vieill.*)
LEAST SANDPIPER. PEEP.

Transient visitant in late spring and late summer. Observations recorded at Manchester June 3d and July 10th, 1898, and May 27th, 1889. May it not possibly be a rare summer resident?

**254. Totanus melanoleucus** (*Gmel.*)
GREATER YELLOW-LEGS.

Transient visitant, rarely seen. Recorded August 27th, 1896.

**255. Totanus flavipes** (*Gmel.*) SUMMER YELLOW-LEGS.

Rare transient visitant.

**256. Totanus solitarius** (*Wils.*) SOLITARY SANDPIPER.

Transient visitant. Observations recorded at Manchester September 6th, 1898; July 17th, 1899. May it not possibly, like *T. minutilla*, be a rare summer resident?

**263. Actitis macularia** (*Linn.*) SPOTTED SANDPIPER.

Common summer resident.

**289. Colinus virginianus** (*Linn.*) QUAIL. BOB-WHITE.

Common permanent resident.

**300. Bonasa umbellus** (*Linn.*)
RUFFED GROUSE. PARTRIDGE.

Common permauent resident.

**315. Ectopistes migratorius** (*Linn.*)
PASSENGER PIGEON,

Rare and irregular transient visitant. Reported from Concord.

**316. Zenaidura macroura** (*Linn.*) MOURNING DOVE.

Occasional in summer.

**331. Circus hudsonius** (*Linn.*) MARSH HAWK.

Not common summer resident.

**332. Accipiter velox** (*Wils.*) SHARP-SHINNED HAWK.

Common summer resident; occasional winter visitant.

**333. Accipiter cooperi** (*Bonap.*) COOPER'S HAWK.

Common summer resident.

**334. Accipiter atricapillus** (*Wils.*) GOSHAWK.

Irregular summer resident.

**337. Buteo borealis** (*Gmel.*) RED-TAILED HAWK.

Not common summer resident.

**339. Buteo lineatus** (*Gmel.*) RED-SHOULDERED HAWK.

Common permanent resident.

**352. Haliaëtus leucocephalus** (*Linn.*) BALD EAGLE.

Permanent resident, but becoming scarce south of Lake Winnipesauke.

The bald eagle is occasionally seen in the vicinity of lakes and streams throughout our area, especially along the Merrimack river. It is known to breed as far south as Franklin. While it is highly probable that it nests farther south in the more secluded and mountainous districts of Hillsborough county authentic reports to that effect are lacking. Birds which have been reported by inexperienced observers as "large hawks" have sometimes on investigation turned out to be eagles. In fact, the eagle, while not common in our area, is not so rare as is popularly imagined and there is much to learn in regard to its distribution and annual movements.

**357. Falco columbarius** (*Linn.*) PIGEON HAWK.

Common summer resident.

**360. Falco sparverius** (*Linn.*)
AMERICAN SPARROW HAWK.

Rather common summer resident.

**364. Pandion haliaëtus carolinensis** (*Gmel.*)
AMERICAN OSPREY. FISH HAWK.

Common summer resident.

**372. Nyctala acadica** (*Gmel.*)
SAW-WHET OWL. ACADIAN OWL.

Occasional winter visitant.

**373. Megascops asio** (*Linn.*) SCREECH OWL.

Uncommon permanent resident.

**387. Coccyzus americanus** (*Linn.*)
YELLOW-BILLED CUCKOO.

Rare summer resident.

**388. Coccyzus erythrophthalmus,** (*Wils.*)
BLACK-BILLED CUCKOO.

Common summer resident.

**390. Ceryle alcyon** (*Lynn.*) BELTED KINGFISHER.

Common summer resident.

**393. Dryobates villosus** (*Linn.*) HAIRY WOODPECKER.

Common permanent resident.

**394c. Dryobates pubescens medianus** (*Swains.*)
DOWNY WOODPECKER.

Common permanent resident.

**402. Sphyrapicus varius** (*Linn.*)
YELLOW-BELLIED WOODPECKER. SAPSUCKER.

Common transient visitant.

**405a. Ceophlœus pileatus abieticola** (*Bangs.*)
NORTHERN PILEATED WOODPECKER.

Reported from Concord.

**406. Melanerpes erythrocephalus** (*Linn.*)
RED-HEADED WOODPECKER.

Very rare occasional visitant. Recorded at Manchester, May 28th, 1899. Also reported from Londonderry.

**412a. Colaptes auratus luteus** (*Bangs.*)
GOLDEN-WINGED WOODPECKER. NORTHERN FLICKER.

Common summer resident.

**417. Antrostomus vociferus** (*Wils.*) WHIP-POOR-WILL.

Common summer resident.

**420. Chordeiles virginianus** (*Gmel.*) NIGHTHAWK.

Common summer resident.

**423. Chætura pelagica** (*Linn.*)
CHIMNEY SWIFT. CHIMNEY "SWALLOW."

Common summer resident.

**428. Trochilus colubris** (*Linn.*)
RUBY-THROATED HUMMING BIRD.

Common summer resident.

**444. Tyrannus tyrannus** (*Linn.*) KINGBIRD.

Common summer resident.

**452. Myriarchus crinitus** (*Linn.*)
GREAT CRESTED FLYCATCHER.

Uncommon summer resident.

**456. Sayornis phœbe** (*Lath.*) PHŒBE.

Common summer resident.

**459. Contopus borealis** (*Swains.*)
OLIVE-SIDED FLYCATCHER.

Not uncommon summer resident.

**461. Contopus virens** (*Linn.*) WOOD PEWEE.

Common summer resident.

**463. Empidonax flaviventris** (*Baird.*)
YELLOW-BELLIED FLYCATCHER.

Uncommon transient visitant. Recorded at Manchester, August 30th, 1899.

**467. Empidonax minimus** (*Baird.*)
LEAST FLYCATCHER. CHEBEC.

Common summer resident.

**474. Otocoris alpestris** (*Linn.*) HORNED LARK.

Very rare winter visitant.

**477. Cyanocitta cristata** (*Linn.*) BLUE JAY.

Common permanent resident.

**488. Corvus americanus** (*Aud.*) AMERICAN CROW.

Common permanent resident.

**494. Dolichonyx oryzivorus** (*Linn.*) BOBOLINK.

Common summer resident.

**495. Molothrus ater** (*Bodd.*) COWBIRD.

Common summer resident.

**498. Agelaius phœniceus** (*Linn.*)
RED-WINGED BLACKBIRD.

Common summer resident.

**501. Sturnella magna** (*Linn.*) MEADOW LARK.

Common summer resident.

**507. Icterus galbula** (*Linn.*) BALTIMORE ORIOLE.

Common summer resident.

**509. Scolecophagus carolinus** (*Müll.*)
RUSTY BLACKBIRD.

Transient visitant.

**511b. Quiscalus quiscula æneus** (*Ridgw.*)
BRONZED GRACKLE. CROW BLACKBIRD.

Rare transient visitant.

**515. Pinicola enucleator canadensis** (*Cab.*)
PINE GROSBEAK.

Irregular winter visitant. Very numerous in January and February, 1896.

**517. Carpodacus purpureus** (*Gmel.*)
PURPLE FINCH. LINNET.

Common summer resident.

—— **Passer domesticus** (*Linn.*)
HOUSE SPARROW. ENGLISH SPARROW.

Very common permanent resident.

**521. Loxia curvirostra minor** (*Brehm.*)
AMERICAN CROSSBILL. RED CROSSBILL.

Irregular winter visitant.

**522. Loxia leucoptera** (*Gmel.*)
WHITE-WINGED CROSSBILL.

Irregular and rare winter visitant. Recorded at Manchester, October 16th, 1899, and observed frequently during the remainder of the year. Reports from other sections of New England indicate an incursion in unusually large numbers of these rare birds during the winter of 1899–1900.

**528. Acanthis linaria** (*Linn.*) REDPOLL LINNET.

Rather common winter visitant.

**529. Astragalinus tristis** (*Linn.*)
AMERICAN GOLDFINCH. THISTLE BIRD.

Permanent resident, less common in winter.

**534. Passerina nivalis** (*Linn.*)
SNOW BUNTING. SNOW BIRD.

Winter visitant, not often abundant. Contrary to the opinion of some ornithological writers these birds do frequently alight in trees.

**540. Pooecetes gramineus** (*Gmel.*)
BAY-WINGED BUNTING. GRASS FINCH. VESPER SPARROW.

Common summer resident.

**554. Zonotrichia leucophrys** (*Forst.*)
WHITE-CROWNED SPARROW.

Transient visitant, ccasionally abundant. Earliest spring arrivals recorded at Manchester, May 6th, 1896; average date, 1896 to 1899, May 9th. The birds are occasionally heard in full song about the 13th of May. The song is brilliant and sweet, somewhat resembling that of the vesper sparrow but wilder. The usual notes, given at intervals while the birds are feeding, are a plaintive imitation of the white throat's notes, the first phrase like "*Oh–dear–me*," uttered very slowly with a rising inflection; the second, after a long pause, "*pee–pew–pew*," also very slowly, but with a falling inflection.

**558. Zonotrichia albicollis** (*Gmel.*)
WHITE-THROATED SPARROW. PEABODY BIRD.

Common transient visitant; also not common summer resident.

The fact that this species, formerly supposed to be only a transient visitant, is also a summer resident, at least in the vicinity of Manchester, has been verified beyond question. Nests and eggs have been found in Bedford by Mr. Louis H. Rundlett, now superintendent of schools in Concord, and on Oak hill in Manchester by Mr. George Bisco and the late Mr. William W. Colburn, and the characteristic song has been heard for several successive summers on the plains in the vicinity of Goffe's Falls.

**559. Spizella monticola** (*Gmel.*) TREE SPARROW.

Common transient visitant in spring and fall. Less common winter visitant.

**560. Spizella socialis** (*Wils.*) CHIPPING SPARROW.

Common summer resident.

**563. Spizella pusilla** (*Wils.*) FIELD SPARROW.

Common summer resident.

**567. Junco hyemalis** (*Linn.*)
JUNCO. SLATE-COLORED SNOWBIRD.

Common transient visitant in spring and fall; rare winter visitant.

**581. Melospiza fasciata** (*Gmel.*) SONG SPARROW.

Very common summer resident.

**584. Melospiza georgiana** (*Lath.*) SWAMP SPARROW.

Not uncommon summer resident.

**585. Passerella iliaca** (*Merr.*) FOX SPARROW.

Common transient visitant.

**587. Pipilo erythrophthalmus** (*Linn.*)
TOWHEE BUNTING. CHEWINK.

Common summer resident.

**595. Zamelodia ludoviciana** (*Linn.*)
ROSE-BREASTED GROSBEAK.

Common summer resident.

**598. Cyanospiza cyanea** (*Linn.*) INDIGO BIRD.

Common summer resident.

**608. Piranga erythromelas** (*Vieill.*)
SCARLET TANAGER.

Common summer resident, and becoming more abundant since protected by law.

**611. Progne subis** (*Linn.*) PURPLE MARTIN.

Less common than formerly but locally abundant.

**612. Petrochelidon lunifrons** (*Say.*) EAVE SWALLOW.

Not common summer resident, of very irregular distribution.

**613. Hirundo erythrogaster** (*Bodd.*) BARN SWALLOW.

Common summer resident.

**614. Trachycineta bicolor** (*Vieill.*)
WHITE-BELLIED SWALLOW. TREE SWALLOW.

Not common summer resident.

**616. Clivicola riparia** (*Linn.*) BANK SWALLOW.

Common summer resident.

**618. Ampelis garrulus** (*Linn.*) BOHEMIAN WAXWING.

Rare and irregular winter visitant. Recorded for the winter of 1897–8.

**619. Ampelis cedrorum** (*Vieill.*)
CEDAR WAXWING. CEDAR BIRD.

Permanent resident, not common in winter.

**621. Lanius borealis** (*Vieill.*) SHRIKE. BUTCHER BIRD.

Common winter visitant — not rare in spring and fall.

**624. Vireo olivaceus** (*Linn.*) RED-EYED VIREO.

Common summer resident.

**627. Vireo gilvus** (*Vieill.*) WARBLING VIREO.

Common summer resident — especially abundant in the cities and villages.

**628. Vireo flavifrons** (*Vieill.*)
YELLOW-THROATED VIREO.

Common summer resident; also, like the last, abundant in the cities and villages.

**629. Vireo solitarius** (*Wils.*)
BLUE-HEADED VIREO. SOLITARY VIREO.

Transient visitant in spring and fall — perhaps a rare summer resident.

**631. Vireo noveboracensis** (*Gmel.*)
WHITE-EYED VIREO.

Rare summer resident. A pair nested near Lake Massabesic, Manchester, in 1899. A nest had previously been found on the Hooksett road in Manchester.

**636. Mniotilta varia** (*Linn.*)
BLACK AND WHITE WARBLER. BLACK AND WHITE CREEPER.

Common summer resident.

**647. Helminthophila peregrina** (*Wils.*)
TENNESSEE WARBLER.

Rare transient visitant.

**648a. Compsothlypis americana usneæ** (*Brewster.*)
NORTHERN PARULA WARBLER. BLUE YELLOW-BACKED WARBLER.

Common transient visitant; a few breed.

**652. Dendroica æstiva** (*Gmel.*) YELLOW WARBLER.

Very common summer resident.

**654. Dendroica cærulescens** (*Gmel.*)
BLACK-THROATED BLUE WARBLER.

Rare transient visitant.

**655. Dendroica coronata** (*Linn.*)
YELLOW-RUMPED WARBLER. MYRTLE WARBLER.

Common transient visitant.

**657. Dendroica maculosa** (*Gmel.*)
MAGNOLIA WARBLER. BLACK AND YELLOW WARBLER.

Rare transient visitant.

**659. Dendroica pennsylvanica** (*Linn.*)
CHESTNUT-SIDED WARBLER.

Common summer resident.

**660. Dendroica castanea** (*Wils.*)
BAY-BREASTED WARBLER.

Transient visitant.

**661. Dendroica striata** (*Forst.*) BLACK-POLL WARBLER.

Common transient visitant.

**662. Dendroica blackburniæ** (*Gmel.*)
BLACKBURNIAN WARBLER.

Rare transient visitant.

**667. Dendroica virens** (*Gmel.*)
BLACK-THROATED GREEN WARBLER.

Common summer resident.

**671. Dendroica vigorsii** (*Aud.*) PINE WARBLER.

Common summer resident.

**672a. Dendroica palmarum hypochrysea** (*Ridgw.*)
YELLOW PALM WARBLER. YELLOW REDPOLL.

Common transient visitant.

**674. Seiurus aurocapillus** (*Linn.*)
OVEN BIRD. GOLDEN-CROWNED THRUSH.

Common summer resident.

**675. Seiurus noveboracensis** (*Gmel.*)
WATER THRUSH.

Not common summer resident.

**681. Geothlypis trichas** (*Linn.*)
MARYLAND YELLOW-THROAT.

Common summer resident.

**685. Wilsonia pusilla** (*Wils.*)
WILSON'S WARBLER. BLACK-CAP WARBLER.

Rare transient visitant.

**686. Wilsonia canadensis** (*Linn.*)
CANADIAN WARBLER.

Not rare transient visitant.

**687. Setophaga ruticilla** (*Linn.*)
AMERICAN REDSTART.

Common summer resident.

**704. Galeoscoptes carolinensis** (*Linn.*) CATBIRD.

Common summer resident.

**705. Harporhynchus rufus** (*Linn.*)
BROWN THRASHER. BROWN THRUSH.

Common summer resident.

**721. Troglodytes aëdon** (*Vieill.*) HOUSE WREN.

Very rare summer resident.

**724. Cistothorus stellaris** (*Licht.*)
SHORT-BILLED MARSH WREN.

Very rare summer resident. Nest found at Manchester in Cohas brook meadows, 1899.

**726. Certhia familiaris fusca** (*Barton.*)
BROWN CREEPER.

Common winter resident.

**727. Sitta carolinensis** (*Lath.*)
WHITE-BREASTED NUTHATCH.

Common permanent resident.

**728. Sitta canadensis** (*Linn.*)
RED-BREASTED NUTHATCH.

Common transient visitant, occasional in winter. Numerous flocks were seen in August and September, 1899; an unusual occurrence.

**735. Parus atricapillus** (*Linn.*) CHICADEE.

Common permanent resident.

**748. Regulus satrapa** (*Licht.*)
GOLDEN-CROWNED KINGLET.

Not common transient visitant in late fall and darly spring.

**749. Regulus calendula** (*Linn.*)
RUBY-CROWNED KINGLET.

Common transient visitant.

**755. Hylocichla mustelina** (*Gmel.*) WOOD THRUSH.

Common summer resident.

The opinion of ornithological writers and lecturers that the southern boundary line of New Hampshire constitutes an impassable barrier to the further northward migration of the wood thrush is proved by observation to be erroneous. The species is abundant in the Merrimack valley at least as far north as Concord and there is little doubt that individuals may be found still further north. At Manchester the wood thrush appears to exceed the hermit thrush in numbers, while at Concord the latter exceeds the former. Other considerations than those of latitude evidently control the relative distribution of the two species. For example,

at Pelham on the Massachusests line the hermits outnumber the wood thrushes, while at Manchester, twenty miles further north, the latter, as noted above, are the more numerous. It is stated on good authority that at Dover, which is in the same latitude as Concord, the wood thrush is unknown. The species has been reported from Lake Winnipesauke, but as yet without sufficient verification. Studies of the distribution of the wood thrush in southern and central New Hampshire will well repay those who shall undertake them.

### 756. Hylocichla fuscescens (*Steph.*)

WILSON'S THRUSH. VEERY.

Common summer resident.

### 758a. Hylocichla ustulata swainsoni (*Cab.*)

OLIVE-BACKED THRUSH.

Common transient visitant.

Very abundant in the spring and fall migrations, arriving at Manchester about May 16th, a week after the wood thrush, and tarrying till about June 4th. In 1899 a pair took up their temporary residence for more than two weeks in a city garden well supplied with closely trimmed evergreens. During the last two days, June 1st and 2d, the male was in full song. The song is described as being rich, full and very sweet, with a penetrating, vibrant quality, and in form very like the first six notes of Handel's air, "*O had I Jubal's lyre.*" It is suspected that the species may breed not far to the northward of Manchester, possibly in the immediate vicinity.

### 759b. Hylocichla aonalaschkæ pallasii (*Cab.*)

HERMIT THRUSH.

Common summer resident.

This species, as noted above under "Wood Thrush," (q. v.) is irregularly distributed over our area with little apparent relation to latitude. The hermit thrush being abundant in some of the southern towns and the wood thrush being not rare as far north as Concord it is evident that the southerly range of the former and the northerly range of the latter overlap at least forty miles in the vicinity of the Merrimack valley. The earliest spring arrivals usually appear between the 14th and 16th of April, though individuals have been recorded as early as the 4th. The males are sometimes in full song by the 23d.

As migrants the hermits far outnumber the other thrushes, being especially numerous in fall, when they visit cultivated fields and gardens and mingle freely with birds of other species, even with the despised house sparrows. They are very friendly with the robins, as if recognizing their close relationship. With the sparrows they are on their dignity, driving them off with a considerable show of spitefulness when they become too numerous for comfort. After November 1st they rapidly diminish and soon disappear.

**761. Merula migratoria** (*Linn.*) AMERICAN ROBIN.

Very common summer resident; a few winter.

**766. Sialia sialis** (*Linn.*) BLUEBIRD.

Common summer resident.

MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

## SECTION E.

# FINE ARTS.

### OFFICERS FOR 1898-1899.

EDWARD J. BURNHAM, *President.*
WILLIS B. KENDALL, *Treasurer.*
WILLIAM E. BUCK, *Auditor.*
WILLIAM H. HUSE, *Clerk.*

DIRECTORS.

HENRY W. HERRICK,
JOEL DANIELS,
NORWIN S. BEAN,
W. R. CALL,
LUTHER C. BALDWIN,
WILLIAM E. BUCK,
J. BRODIE SMITH,
WILLIAM K. ROBBINS.

# SECTION E—FINE ARTS.

In September, 1871, an organization of amateur and professional artists was formed and assumed the name of the Manchester Art Association. The purpose of the association was mutual instruction in the principles of art. A class was soon formed for drawing from life, the study of text books on art, and lectures on art principles. During the second year of its existence the association secured rooms in the Court House and fitted them for its use. It soon accummulated a goodly collection of casts, models, pictures and books.

In 1874 steps were taken to incorporate the association. A committee was appointed to draft articles of association, and on October 13th of this year the articles as prepared by the committee were adopted, and the association became a corporation. For a number of years the association occupied its rooms in the Court House, the use of the rooms being donated by the city. In 1893 the association was notified that the city needed the rooms for uses of its own and a room was secured in the Pickering block at an expense that proved a severe burden to the treasury of the association. This burden was successfully carried for years by the voluntary subscriptions of enthusiastic members, but in time became too great to be borne by one association alone.

At a meeting of the association, held February 9th, 1899, the recommendation of the directors that the association apply for admission as a Section of the Manchester Institute of Arts and Sciences was adopted, and the clerk was instructed to make application for such admission. By vote of the council of the Institute the Art Association was admitted and designated as "Section E—Fine Arts."

The Manchester Art Association has had an honorable history. From the time of its incorporation till its union with the Institute, the office of President has been filled by the following honored citizens of this city: Mr. Henry W. Herrick, the able and distinguished water color artist; Dr. E. M. Tubbs; Mr. George

W. Stevens, the skillful architect and civil engineer; Ex-Governor Moody Currier, and Edward J. Burnham, editor of the Manchester Union.

For a number of years the association has each year held an exhibition of works of art. These exhibitions have been successfully managed and largely attended by the citizens of Manchester.

The art collection belonging to the association includes casts from the antique, prints and photographs of famous paintings and a complete collection of the works of John Rogers. The library of the association comprises nearly seven hundred books and pamphlets on art and kindred subjects.

At the annual meeting of the Manchester Art Association, October 11th, 1898, the following officers were elected. (See list, page 139.)

Upon becoming a Section of the Manchester Institute of Arts and Sciences the Art Association moved its property to the rooms of the Institute and its treasury was at once relieved of the heavy burden of rent under which it had been struggling. The past year has been one of the most prosperous since the early years of its existence, when the enthusiasm of the members of the young organization kept it upon the high tide of popularity and prosperity.

The following entertainment and lecture course was given under the auspices of the association during the winter of 1898-9:

December 15th, 1898. J. Brodie Smith, "Kinetoscope Exhibition."

January 7th, 1899. Caryl D. Haskins, "The Coast Defences in Our Late War." Illustrated.

January 26th. Albert L. Clough, "The Automobile, the Vehicle of the Future." Illustrated.

February 16th. Clarence Bancroft, "An Oriental Journey." Illustrated.

March 2d. Edward J. Burnham, "Some facts in Natural History." Illustrated.

March 16th. William K. Robbins, "The Chemistry of Food."

At a special meeting held April 13th, 1899, Mrs. John B. Varick exhibited a large number of skillfully executed wood carvings, specimens of her ability in that art.

At the same meeting announcement was made of two art classes to be formed under the instruction of Prof. J. Warren Thyng, supervisor of drawing in the public schools, and Mr. Wm. E. Burbank. Beginning the same week as the meeting when the announcement was made and lasting till July Mr. Burbank met his class on every Thursday evening for work in drawing from the antique, and Prof. Thyng lectured before his class upon perspective and composition. These classes were free to members of the Institute and were largely attended.

Messrs. Burbank and Thyng began their classes again in the fall and have at times had so large an attendance as to tax the accommodations of the rooms. At the annual meeting of Section E, held October 10th, 1899, the following officers were elected for the ensuing year:

WILLIAM H. HUSE, *President.*
WILLIS B. KENDALL, *Treasurer.*
WILLIAM E. BUCK, *Auditor.*
MISS EVA F. TUSON, *Clerk.*

DIRECTORS.

| | |
|---|---|
| HENRY W. HERRICK, | WILLIAM E. BUCK, |
| NORWIN S. BEAN, | J. BRODIE SMITH, |
| W. R. CALL, | WILLIAM K. ROBBINS, |
| LUTHER C. BALDWIN, | CHARLES H. BARTLETT. |

The following gentlemen have served as President of the Manchester Art Association in the order named: Henry W. Herrick, three years; Edward M. Tubbs, six months; George W. Stevens, three and one-half years; Henry W. Herrick, two years; Moody Currier, fourteen years; Edward J. Burnham, one year.

MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

## SECTION F.

# MINERALOGY AND GEOLOGY.

### OFFICERS FOR 1899.

GEORGE WINCH, *President.*
MISS SUSIE C. FOGG, *Vice President.*
WILLIAM H. HUSE, *Secretary.*
MISS SARA HUNT, *Treasurer.*

EXECUTIVE COMMITTEE.

HERBERT E. RICHARDSON, CHARLES J. ABBOTT.

# SECTION F—MINERALOGY AND GEOLOGY.

On the evening of June 7th, 1899, a number of members of the Institute met at the rooms for the purpose of organizing a Section of mineralogy. The meeting was called to order by W. H. Huse. E. J. Burnham was elected temporary chairman and Geo. Winch temporary clerk.

After informal remarks by several present, upon motion it was voted that a Section be organized and that it be known as the Section of "Mineralogy and Geology."

Upon motion it was voted that a committee be appointed to recommend a constitution and by-laws. The committee appointed consisted of Messrs. G. I. Hopkins, C. J. Abbott, W. H. Huse and E. J. Burnham. This committee reported a short constitution and by-laws which were adopted.

Upon motion it was voted to ballot for officers. The following were elected to serve till the annual meeting in December. (See list, page 145.)

Upon motion the Secretary was instructed to apply to the council for recognition as a Section in the Institute.

June 28th, 1899. The President in the chair. Mr. E. P. Richardson was introduced and gave a very interesting talk upon some of the minerals to be found in this vicinity. He said in part:

"Granite exists in numerous ledges and in erratic or drift boulders scattered over this vicinity. Although but little attention is paid to the quarrying at present, still some specimens are of fine and desirable character. At the old Clark ledge, just south of Stark park, may be found very fine specimens of a soda feldspar known as albite. It is of a pure white color and often associated with granite, carrying minute red garnets, also very good specimens of black tourmaline crystals. Very good specimens of black mica or biotite abound in the same locality. On the whole it is an interesting place for the student to visit.

Of feldspar, very fine specimens of orthoclase, the flesh red, are abundant at the city ledge near the poor farm. I have secured some fine crystals, though not abundantly. This orthoclase is rich in potash. Dana gives in his analysis 16.9 parts in the 100. It appears to me that if pulverized it might be a valuable fertilizer and a great benefit to our worn-out lands. The varieties of feldspar are so numerous in this vicinity that it is needless to particularize localities.

I will call attention also to the numerous detached boulders of porphyritic gneiss that may be observed existing in great abundance all over this locality. They are erratic rocks that have been brought here from the vicinity of Winnipesauke and Sunapee lakes, where the rock occurs in the vast ledges of those localities. They were transported here in the ice drift of the great glacial age, many of them retaining the polished or streaked appearance which they received in their transit. You will readily recognize them. In form they are usually rounded, the color of the rock mass being usually greyish, sometimes black. Interspersed in the mass you will find numerous crystals of a white or lightish feldspar. These crystals measure from a quarter to two or three inches in length. The gneissoid rocks are very abundant in all sections of the city, particularly in the neighborhood of the Manter brook, south of the city reservoir, where the rock is of a pinkish or flesh color and impregnated with streaks of biotite. Most of the rock formations around Massabesic pond are of gneiss. This rock belongs to the class of granites, but is distinguished in having the mica deposited in streaks or veins instead in a homogenous mass, like true granite.

I must not overlook the crystals of magnetite, a form of iron, occasionally found in the old wall stones in this vicinity, notably in the neighborhood of the city farm. I judge that they also came in the ice drift from the north, from the fact that I have not observed them in the bed rocks about here. Near the junction of Milton and Merrimack streets may be observed, opposite A. H. Paige's house, and directly in the street, the cropping out of a granite ledge with an extensive seam of (amphibolyte) horn blende of the variety Actinolyte having slender light green crystals. It is in massive form and easily accessible with proper tools.

Right here is also found a very fine dyke of trap carrying beautiful masses of crystals. David Perkins has secured many fine specimens here and will doubtless be pleased to direct you to the vein. Very good specimens of the red feldspar abound in the same place. Extensive veins of hornblende and chloritic schists were exposed at the recent improvements on the Boston and Maine railroad near the brewery. At the Amoskeag Falls trap veins can be seen, but the best specimens of this material I obtained in 'Squog near the old church on South Main street. The vein was struck while excavating for the city sewer. This vein was of a very dark, nearly black color, with beautiful crystals of augite in various shades of green olivine. The vein was very compact and difficult to work. Trap rock also occurs very abundantly in detached masses or boulders, probably drift rocks, all through this section. I am informed that at a ledge just north of St. Joseph's cemetery good specimens of mica crystals of the variety known as phlogopite are to be found. These crystals are very beautiful and will repay well the labor of procuring them. I hope some of you may visit the locality and report upon it later.

Our most common rock is the course feldspathic granite so much used for foundation stone for buildings. A good example may be seen at the Amoskeag Company's ledge, a little south from Rock Rimmon. The above includes most of our local varieties. But we have an endless variety of other rock occurring in kames of the river valleys and also in the numerous glacial beds of drift. I have found conglomerates that probably come from the vicinity of Lisbon, also specimens of the red porphyrytic rock from the flanks of Mt. Lafayette, also fragments of labradorite and other varieties of erratic rocks in great abundance here. In the neighboring town of Bedford good specimens of graphite have been found, generally in small detached boulders. There are no deposits there in mass. A few specimens of epidote and black tourmaline have been found there.

In the town of Amherst, adjoining Bedford, at the place called Joppa, some years ago Dr. Jackson, a distinguished geologist, while engaged in the state survey, opened a pit from which a small quantity of good lime was obtained, but the expense of

working caused it to be abandoned. I found here very fine specimens of common garnets. The locality is accessible from the highway and will repay a visit of the student. At the Francestown soapstone quarries I found besides the steatite some good specimens of serpentine, also of coarse asbestos, and hornblende and seams containing calcite.

At Hooksett, at the Pinnacle, lead ore carrying silver, also small deposits, or grains, of gold have been obtained. I have seen small beads of them in possession of the late B. P. Cilley here; also good specimens of quartz crystals are to be found. There is a vein of white quartz running out towards Allenstown. Some specimens are very interesting, being traversed with numerous veins of red. You cannot fail to observe this rock, for the old walls along the highways are full of it; many of the blocks are covered with minute crystals. At the Devil's Den in Auburn excellent specimens of folded mica schist occur, also good samples of gneiss.

Portsmouth and York, so accessible and so extensively frequented by Manchester people for their summer outings, I have found to be a geologist's or mineralogist's paradise, and if I refer briefly to the locality, I trust I may be able to furnish you with an additional pleasure in the contemplatian of the rock masses of that section. Here are to be found immense beds of shale that have been upturned and fractured in the grandest scale. Into the seams have been ejected masses of lava or trap of various colors and character, here a bed of porphyritic variety, and there a dike of the amygdaloid, and numerous other varieties, all of a most interesting character. Flanking these trap dikes are walls of metamorphic shales and slates, the striped stone that York Beach pebbles are formed from, also here are to be found fine specimens of breccia and numerous and extensive beds of syenite and numerous other interesting varieties. The student will be richly rewarded by a visit here, and with strong limbs, sharp eyes and his tool bag, may reap a rich harvest. In the vicinity of Portsmouth I find fine specimens of shale, and in the seams of the stone occur numerous veins of quartz and calcite or carbonate of lime. The series belong to one of the oldest orders, and one thought to belong to the Cambrian period.

I might refer you to numerous other localities in our immediate vicinity and throughout the state, but you will acquire a knowledge of them as you pursue your studies and investigations later on. New Hampshire, although not furnishing many rare gems or rich mineral ores, will be found to contain many valuable and interesting varieties which can engage your attention for a long time to come."

September 27th, 1899. The President in the chair. The members present gave informal reports of their summer experiences and presented the following specimens to the Institute: Miss Emma L. McLaren, porphyritic trap and several small boulders from Nova Scotia; Mr. Winch, rare specimens of mica from Alstead, and beryl from Acworth; Mr. Huse, milky quartz from Auburn and Goffstown, mica schist from Auburn and soapstone from Francestown; Mr. L. W. Colby, fossiliferous limestone from Minnesota.

October 25th, 1899. The President in the chair. The season's work was discussed by Messrs. W. E. Moore, E. J. Burnham, G. I. Hopkins and E. P. Richardson. Upon motion it was voted to take up the study of mineralogy under the direction of Mr. Hopkins. Mr. Burnham presented to the Section and the Institute a copy of Hitchcock's Geology of New Hampshire, received from Hon. H. M. Cheney of the governor's council.

The following members presented specimens: E. P. Richardson, fossiliferous limestone from a boulder, two specimens of flinty shale and trap from Ogonquit, Me.; Mr. Burnham, quartz crystals, beryl from Orange and North Groton, epidote from Plainfield, chalcedony from Hampstead, trap from Boar's Head, tremolite from Randolph, and prehnite from Windham; Mr. Huse, claystones from McIndoe's Falls on the Connecticut River; Mr. Abbott, beryl from Orange, besides a number of other specimens.

November 22d, 1899. The President in the chair. Mr. Hopkins being unable to be present the President addressed the meet-

ing upon the classification of minerals for the sake of those beginning the study of mineralogy.

Mr. Moore presented specimens of iron pyrites from Manchester and Mr. Huse gave a boulder picked up in this city containing nodules of calcite.

December 4th, 1899. The Vice President in the chair. The meeting was addressed by Mr. Hopkins, who explained the proposed work in the determination of minerals and the apparatus needed. A large number of members signified their intention to secure the necessary supplies and take up the work of the Section.

December 20th, 1899. The Vice President in the chair. The regular work in the determination of minerals was done by the members under the direction of Mr. Hopkins.

This being the annual meeting the election of officers was taken up and the following elected :

GEORGE WINCH, *President.*
MISS SUSIE C. FOGG, *Vice President.*
MISS BLANCHE E. HICKEN, *Secretary.*
MISS SARA HUNT, *Treasurer.*

EXECUTIVE COMMITTEE.

GEORGE I. HOPKINS, WILLIAM E. MOORE.

## CHANDLER LECTURE COURSE.

Through the generosity of Hon. George Byron Chandler, the following Course of Lectures has been tendered to the members of the Institute:

November 1st, 1899, "The Evolution of Power," by President T. C. MENDENHALL, of the Worcester Polytechnic Institute.

December 6th, 1899, "The Story of Evolution," by Prof. EDWARD S. MORSE, Director of the Peabody Academy of Science.

January 3d, 1900, "Birds of the Season," by Prof. FRANK M. CHAPMAN, of the American Museum of Natural History, New York city.

February 7th, 1900, "The Origin of Mountains," by Prof. GEO. H. BARTON, of the Massachusetts Institute of Technology, Boston.

March 7th, 1900, "Edible and Poisonous Mushrooms," by Mr. HOLLIS WEBSTER, Secretary of the Boston Mycological Society.

April 4th, 1900, "The Culture of the Imagination," by Prof. CHARLES ELIOT NORTON, of Harvard University.

# DONATIONS.

The following comprises the donations to the Institute during the year 1899:

## BIRDS.

Ardea virescens (Green Heron); Plectrophenax nivalis, (Snow Bunting) mounted skeleton. George E. Burnham.

Accipiter fuscus (Sharp-shinned Hawk); Cyanocitta cristata (Blue Jay.) Frank C. Twombly.

Colaptes auratus (Flicker — Hairy Wicket.) William H. Huse.

Sialia sialis (Blue Bird); Dolichonyx oryzivorus (Bobolink); Ardea herodias (Great Blue Heron); Agelaius phœniceus (Red-winged Blackbird, pair; Nyctala acadica (Saw-whet Owl); Ardea virescens (Green Heron); Botaurus lentiginosus (Least Bittern.) Adam Graf.

## ANIMALS.

Cervus Virginianus (Virginia Deer)—two specimens. Manchester St. Railway.

Procyon lotor (Raccoon); Felis catus (Wildcat or Bob-cat); Vulpes fulvus (Red Fox); Fiber zibethicus (Muskrat); Sciurus carolinensis (Gray Squirrel.) Harrie M. Young and Mrs. Mary S. Young.

Alces americana (Moose) mounted head. Frank E. Heald.

Felis catus (Wildcat or Bob-cat.) William H. Huse.

Sciurus hudsonius (Red Squirrel)—mounted skeleton. George E. Burnham.

## ENTOMOLOGICAL SPECIMENS.

Order Odonata—57 specimens; Order Orthoptera—38 specimens; Order Hemiptera—63 specimens; Order Neuroptera—12 specimens; Order Lepidoptera—56 specimens; Order Diptera—32 specimens; Order Coleoptera—272 specimens; Order Hymenoptera—98 specimens; total, 628 specimens. Edward J. and George E. Burnham.

2 Cuckoo Flies, 3 rare Moths, 1 Worker Bee, 1 Ichneumon Fly, 1 Butterfly, 1 Calosoma scrutator. Edwin A. Jones, Orlando, Florida.

Calosamia secropia, female. Miss Minnie Dustin.

Calosoma scrutator, 2 grasshoppers. Frank Davis, Orlando, Florida.

Several cases of insects, as a memorial to her son. Mrs. Hannah C. Marshall.

## MINERALS.

Fossiliferous Limestone. Lyman W. Colby.

Specimens of local minerals. George Winch, William H. Huse and Miss Emma L. McLaren.

Specimens of New Hampshire Minerals. William H. Huse, Edwin P. Richardson, Edward J. Burnham, Charles J. Abbott.

Peacock Copper Ore, from the Little Miner Mine, Butte, Montana. William E. Moore.

## BIOLOGY.

Albino Hornpout. Frederick A. Wallace.

Rattlesnake's skin (Crotalus durissus.) Edwin P. Richardson.

Biological specimens in formaline, 47 bottles. Edward J. and George E. Burnham. Contributions to above specimens made by William H. Huse and Walter S. Abbott.

Female Tarantula, from Arizona. William C. Clarke.

Double-headed Snake, Mexican Lizard. George I. Hopkins.

Shells of Anodonta fluviatilis and Unio complanatus (freshwater Clams.) William H. Huse.

A series of Skulls, being a partial list of the vertebrates of Hillsborough County. Edward J. and George E. Burnham.

## TURTLES.

Shells of all Turtles found in New Hampshire: Chelydra serpentina (Snapping Turtle); Chelopus insculptus (Wood Turtle); Aromochelys odoratus (Musk Turtle); Chrysemys picta (Painted Turtle); Chelopus guttatus (Spotted Turtle); Cistudo Carolina (Box Turtle.) William H. Huse.

Chelopus guttalus (Spotted Turtle); Aromochelys odoratus (Musk Turtle) 2; Chelopus insculptus (Wood Turtle) 2; Chrysemys picta (Painted Turtle) 4. Harrie M. Young.

## BIRDS EGGS.

57 specimens of eggs, in cabinet. William H. Huse.

Set of crows eggs. George I. Hopkins.

## BIRDS NESTS.

Cistothorus stellaris (Short-billed Marsh Wren); Compsothlypis americana (Blue Yellow-backed Warbler); Spizella socialis (Chipping Sparrow.) William H. Huse.

Dendroica vigorsii (Pine Warbler.) Mrs. John B. Varick.

## INSECTS NESTS.

White-tailed Hornets. Harrie M. Young and Mrs. Mary S. Young.

Several Mud Wasps from Florida. Edwin A. Jones, Orlando, Florida.

## WOODS.

Commercial woods of Florida. Edwin A. Jones, Orlando, Florida.
Wood peculiarly separated. Luther C. Baldwin.
Bark from Tupelo tree. William H. Huse.

## ART.

Painted panel, "Manchester Conferring the Laurel Wreath on her Dead Heroes." Miss Anna Custer.

Oil portrait of Col. John S. Kidder; oil portrait of Mrs. John S. Kidder. Mrs. Susan S. Palmer.

Medallions of Van Dyke, Emerson, Hawthorne, Longfellow, Poe, Liszt, Chopin, Dante, Handel, Haydn, Mendelssohn, Beethoven and Gluck. William H. Huse.

## BOOKS AND PAMPHLETS.

### OLD BOOKS.

Morse's Geography, published in 1814; Arts and Sciences, 1806; Manuscript of Patriotic Song, written about 1837 by Deacon Gregg, of Derry; Physician's Prescription Book in manuscript, dated 1798; Self Knowledge, John Mason, 1793; Intellectual Philosophy, Abercrombie, 1841; Education, Spurzheim, 1833; The Millennial Church, 1823. William H. Huse.

## GOVERNMENT REPORTS.

Mineral Resources of the United States, Geological Survey, 2 Vols.; Year Books, Agricultural Department, 8 Vols.; Smithsonian Report; Ku-Klux Conspiracy; Statistical Abstract of the United States Treasury Department, 1894. William H. Huse.

Year Books, Department of Agriculture, 1897-1988; Scudder's Report on Fossil Insects of North America; Mineral Resources of the United States, Geological Survey, 1897-1898. Edward H. Fogg.

Ornithological and Entomological Bulletin of the Agricultural Department. Fred W. Lamb.

Volume Describing Routes of the Explorations in Alaska, accompanied with 10 maps. Gordon Woodbury.

The Periodical Cicada. L. O. Howard, Government Entomologist.

## EDUCATIONAL.

Reports of Commissioner of Education, 12 Vols.; Proceedings of National Educational Association, 2 Vols.; Proceedings of International Congress of Education; Proceedings of American Institute of Instruction, 2 Vols.; Promotions and Examinations in Graded Schools, Emerson, E. White, LL.D.; Fourth International Prison Congress; Report on Legal Education; Short-Hand In-

struction and Practice; The Spelling Reform; Rise and Growth of the Normal School Idea in the United States; Report of Committee on Secondary School Studies; Statistics of Public Libraries in the United States and Canada; History of Education — one volume each of Tennessee, Massachusetts, Iowa, Ohio, Michigan and Rhode Island; Education, Vol. IX, Sept. 1888 to 1891. William H. Huse.

## STATE REPORTS.

First Report of the New Hampshire Association of Boards of Health; Report of State Board of Health, 1897-1898; Session Laws of New Hampshire, 1867 to 1887, 4 Vols., also 1889-1891; Constitutional Conventions of 1876 and 1889; Memorial Addresses; Biographies of New Hampshire Legislators. William H. Huse.

State Department Reports for seventeen years. Myron W. Haseltine.

## CITY DOCUMENTS.

City Reports for 1847, 1852, 1856, 1861, 1865, 1867, 1868, 1869, 1872, 1873, 1875, 1876, 1877, 1880; Manchester Directory, 1860; School reports, 1866 to 1887, 4 Vols.; Report of Trustees of City Library. William H. Huse.

City Reports for 1854, 1855, 1856, 1857, 1858, 1860, 1865, 1868, 1870, 1872, 1878, 1879, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1891, 1892, 1893, 1894, 1895, 1896, 1897; Inaugural Address of Hon. Charles H. Bartlett; Inaugural Address of Hon. Person C. Cheney; Valedictory Address of Hon. Isaac W. Smith; Valedictory Address of Hon. Person C. Cheney; Valedictory Address of Hon. Horace B. Putnam; Valedictory Address of Hon. George H. Stearns. Oscar Perkins.

City Reports for 1881, 1886, 1887, 1888, 1889, 1890. Charles J. Abbott.

## MISCELLANEOUS BOOKS.

Greeley's Arctic Expedition, 2 Vols.; Reminiscences of Class of 1886, Victor E. Stevens; The Great Cryptogram, Ignatius Donnelly; Native Trees, L. W. Russell; Lessons in Zoology, Claribel Gilman; Bee Keeper's Guide, A. J. Cook. William H. Huse.

Set of Encyclopædia Brittanica. Union Publishing Company.

Scientific American, 5 Vols. Myron W. Haseltine.

A Preliminary List of the Birds of Belknap and Merrimack Counties, Compiled by Ned Dearborn. Rev. Dr. C. S. Murkland.

Set of Hitchcock's Geology of New Hampshire, with Accompanying Charts. Hon. Harry M. Cheney.

Proceedings at the Dedication of the Soldiers Monument, September 11th, 1879. Manchester Cadets.

## FURNITURE AND FURNISHINGS.

Botanical Cabinet. Mrs. L. B. Clough.

Plate-glass Mirror; Wall Cabinet, containing a Dissecting Microscope for field work, and various articles for use of the Entomological and Botanical Sections. J. Brodie Smith.

Sash Curtains for Council-room and Library. Miss May W. Davis.

Inkstand, pens and bottle of ink; Match-holder made from fungus. William H. Huse.

Articles for toilet room. Charles J. Abbott.

## MISCELLANEOUS.

Electric Light for rooms. Manchester Electric Company.

$100—to be used in purchasing cabinets; $315—for "Chandler Lecture Course." Hon. G. Byron Chandler.

Ornithological Chart. Mrs. J. W. Fellows.

Two Charts of North America, showing Zoological Zones. Miss Uusula M. Burnham.

Frames for above. J. E. Perkins.

Map of the United States; old Spinning-wheel; old Iron Firetongs; old Pewter Pot. William H. Huse.

Indian Arrow Heads, Indian Pottery, etc.; Chinese Wooden Spoon. George E. Burnham.

Skull dug up on lot at northeast corner of Concord and Chestnut streets. Frank M. Frisselle.

Montenegrin Sword; old Newspapers; old Map of the World. Mrs. Elizabeth M. Coaker.

Music, furnished at public meeting, March 22d, Manchester Symphony Orchestra.

## LOANS.

Mounted head of Rangifer tarandus, (Caribou.) G. P. Merrifield, Derry Depot.

2 spinning-wheels, 2 clock reels, 1 ordinary reel, 1 hand reel, 1 cradle, 1 fire shovel, 1 set wooden swifts, 1 pair wooden shoes, 1 fire bucket, 1 chair, 1 iron pan. Harrie M. Young and Mrs. Mary S. Young.

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## SECTIONS ADMITTED.

Manchester Electric Club—A, Physical Science, January 12th.

Manchester Entomological Club—B, Entomology, January 17th.

Manchester Botanical Club—C, Botany, January 17th.

Manchester Ornithological Club—D, Ornithology, January 24th.

Manchester Art Association—E, Fine Arts, February 14th.

Geology and Mineralogy—F, June 10th.

# PROCEEDINGS

OF THE

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OF

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PUBLICATION COMMITTEE.

FREDERICK W. BATCHELDER, ALBERT L. CLOUGH,
WILLIAM H. HUSE.

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# MANCHESTER INSTITUTE

OF

# ARTS AND SCIENCES.

## BY-LAWS.

OFFICERS.

The officers of this corporation shall be a President, Vice Presidents, (the number of which to be determined by provisions hereinafter made) a Treasurer, a Clerk, a Corresponding Secretary, a Curator, and a Council constituted as hereinafter provided, all of whom shall be elected annually and hold their offices respectively for one year and until their successors are elected and qualified.

DUTIES.

*President.* The President shall preside at all meetings of the association and discharge the usual duties of that office. He shall be the executive officer of the corporation and also be the presiding officer of the Council.

*Vice Presidents.* In the absence of the President a Vice President shall preside in his stead and discharge all the duties of the office, excepting that he shall not be the executive officer of the corporation.

*Treasurer.* The Treasurer shall discharge all of the usual duties of that office and shall give bond for the faithful performance of his duty, in such amount with sufficient sureties as shall be determined by the Council. He shall have the custody of the

seal of the corporation and shall render a report, suitably audited, of the financial condition of the association at the time of the annual meeting.

*Clerk.* The Clerk shall perform all of the usual duties pertaining to his office and such other duties as may be required from time to time by the Council, and shall be sworn to the faithful performance of his duties. He shall also be clerk of the Council.

*Corresponding Secretary.* The Corresponding Secretary shall discharge all the duties customary to his office, shall conduct correspondence with other associations and persons alike interested, shall have the care and custody of the documents, books and papers not connected with or incident to the records and papers not properly belonging to the office of the Clerk, and he shall perform all such other duties as the Council may require.

*Curator.* The Curator shall have the care and custody of the library, cabinet, art gallery and other property of the Institute, and perform such other duties as may be required by the Council.

*Council.* The Council shall consist of not less than seven members, and the number required for such membership, in addition to President, Clerk, Corresponding Secretary, Treasurer, Curator, and Vice Presidents, as hereinafter provided, shall be elected annually by the corporation. The Council shall have power to appoint all necessary committees.

### MEMBERSHIP.

Any association, club or organization may become a member of this corporation, with the approval of the Council, by filing with the Clerk an application stating the name and purpose of such organization, with a request to be admitted as a member, and the payment of one dollar. Such membership, when obtained, shall make by the operation of this by-law all of the members of said association, club or organization members of this corporation upon subscribing to the by-laws.

Any person may be elected to membership by the Council upon being recommended by two members, paying the Treasurer the sum of one dollar and subscribing to the by-laws. All appli-

cations for membership should designate the section or sections with which the applicant will unite.

Any person may be elected a corresponding member of the Institute by a unanimous vote of the Council, and such member shall be exempt from the payment of dues and membership fee. Any person who shall pay to the Institute the sum of one hundred dollars at any one time shall, on his request, be elected a life member, and as such shall be exempt from all further dues and assessments.

SECTIONS.

Any association, club or organization, admitted to membership as hereinbefore provided, may become a section, which shall be designated alphabetically by the Council, and have authority to establish its title, to maintain its autonomy and manage its affairs, not inconsistent with these by-laws.

Each section shall have a chairman who shall discharge all of the duties pertaining to such office and ex-officio be and become a Vice President of the association and a member of its Council. Such chairman shall be elected by the section at or before the time of the annual meeting of the association and his election shall be certified by the Secretary of the section to the Clerk of the corporation.

Five or more members may organize a section, with the approval of the Council.

MEETINGS.

The annual meeting of the corporation shall be held upon the first Wednesday of January, at such hour and place as the Clerk shall deem expedient. Special meetings may be held at such time and place as the Council shall deem expedient. Notice of all meetings shall be given by publication in some newspaper in the city of Manchester by one publication at least ten days prior to said meeting or by written or printed notice by mail to the last known address of each member at least ten days prior to the meeting.

DUES.

The annual dues shall be three dollars, payable in advance.

New members shall be charged for whole months or fraction thereof to the time of the next annual meeting. Any person who fails to pay such dues for one year shall cease to be a member, and his or her name may be stricken from the roll by vote of the Council, after notice by the Clerk of the corporation setting forth such delinquency and the provision of this by-law, and any member may be removed by the Council for cause upon charges after due notice and hearing.

QUORUM.

At any meeting of the corporation ten members shall constitute a quorum.

AMENDMENTS.

These by-laws may be altered or amended at any meeting of the association, notice having been given of the proposed change.

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The following Amendment to the By-Laws was adopted June 1, 1900:

BRANCHES.

Five or more persons organizing themselves as an association, or any association previously formed, the purposes of which are harmonious with those of the Institute and which consists of five or more persons, not residents of Manchester, may apply for membership in the Institute and, upon election, shall become a branch of the same. Such branch, as a whole, shall be entitled to all privileges and subject to all rules which refer to individual members and shall, in a general way, be regarded and treated as such. It shall be incumbent upon such branch to make return to the Clerk of the Institute of the names and addresses of its members and of its officers at the time of their election, together with a report of the condition and year's work of the branch.

Any individual member of such a branch, being a non resident of Manchester, shall be entitled to the general privileges of the Institute Rooms, Library and Collections and to such other privileges as the Council may from time to time extend.

MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

# OFFICERS FOR 1900.

ALBERT L. CLOUGH, *President.*
EDWARD J. BURNHAM, *Corresponding Secretary.*
NORWIN S. BEAN, *Treasurer.*
HARRIE M. YOUNG, *Clerk.*
GEORGE I. HOPKINS, *Curator.*

## COUNCIL.

ALBERT L. CLOUGH.
EDWARD J. BURNHAM.
NORWIN S. BEAN.
HARRIE M. YOUNG.
GEORGE I. HOPKINS.
G. BYRON CHANDLER.
J. BRODIE SMITH.
WM. K. ROBBINS.
MRS. MELUSINA H. VARICK.
HENRI SCHÆFFER.
OLIVER E. BRANCH.
CHARLES J. ABBOTT.
MRS. S. C. BROWN.
MRS. ANNIE V. BATCHELDER.
WM. H. HUSE.
GEORGE WINCH.

## ROLL OF MEMBERS.

JAN. 1, 1901.

Abbott, Miss Annie F.
Abbott, Florence L.
Abbott, Mrs. Hattie S.
Abbott, Miss Maude C.
Abbott, Charles J.
Abbott, Walter S.
Adams, Charlotte R.
Africa, Walter G.
Aldrich, Dr. E. B.
Aldrich, Mrs. E. B.
Allen, Mrs. Fred L.
Andrews, Frank E.
Ansell, William H.

Bailey, Henry L.
Balch, Mrs. Charles E.
Baldwin, E. T.
Baldwin, Mrs. E. W.
Bancroft, Clarence
Barker, Miss Ella F.
Barlow, Burton
Barnes, Miss Mary F.
Barney, Hial
Bartlett, Rev. A. Eugene
Bartlett, Mrs. A. Eugene
Batchelder, Frederick W.
Batchelder, Mrs. Annie V.
Batchelder, Miss Kate E.
Bean, Norwin S.
Bickford, Charles W.
Bickford, Mrs. Emma S.
Bisco, George
Blair, Mrs. Eliza N.
Blake, Miss Annie F.
Blood, Mrs. Lavina K.
Bossi, Arnold L.
Bourne, Mrs. Harriet K.
Bourne, Henry D.
Bourne, Miss Meta
Bourne, Stephen N.
Boutwell, Mrs. Mary S.
Bower, Fred B.
Branch, Oliver E.
Branch, Mrs. Sarah C.
Brickett, Miss Mabel J.
Broderick, James A.
Brooks, Miss Gertrude H.
Brown, Mrs. Abby S.
Brown, George H.
Brown, Dr. James S.
Brown, Mrs. Marie E.
Brown, Mary E.
Brown, Mrs. S. C.
Bryant, E. M.
Buck, William E.
Bullock, Dr. Lillian G.
Burbank, William E.
Burnham, Miss Bessie I.
Burnham, Edward J.
Burnham, Mrs. Edward J.
Burnham, George E.
Burnham, Henry E.
Butman, Mrs. Jennie C.
Butterfield, Miss Annie C.
Byrne, Miss Edith N.

Call, W. R.
Carpenter, Frank P.
Carpenter, Mrs. F. P.
Carpenter, Josiah
Carpenter, Mrs. Josiah
Carter, George C.
Cass, Edgar D.
Castor, Mrs. Edgar E.
Caswell, Fred M.
Challis, Frank H.
Chandler, Mrs. Fanny M.
Chandler, George Byron

Chandler, George H.
Chandler, John M.
Chase, C. Edwin
Cheney, Miss Georgia M.
Cheney, Miss Ruth I.
Christophe, Sebastian
Christophe, Mrs. S.
Clapp, Allen N.
Clapp, Horace T.
Clarke, Mrs. Olive Rand
Clarke, William C.
Clement, Miss Mary A.
Cleworth, Harold B.
Cleworth, John
Cleworth, Mrs. John
Cleworth, Mildred W.
Clough, Albert L.
Clough, Mrs. L. B.
Clough, Miss Nora B.
Collins, Mrs. E. H.
Cooper, Miss Emma J.
Corey, William
Corson, Miss Annie R.
Cottrell, Benjamin S.
Court, Ormsby A.
Crafts, George P.
Crafts, Mrs. G. P.
Crosby, Uberto C.
Crosby, Mrs. U. C.
Cross, David
Cross, Mrs. David
Currier, Dr. Edward H.
Currier, Mrs. Emma F.
Currier, Edward S.
Currier, Mrs. Moody
Custer, Miss Anna

Dana, Miss Mary F.
Daniels, Miss Belle R.
Davis, Miss Edith H.
Davis, George M.
Davis, Mrs. G. M.
Davis, Miss May W.
Derby, Miss Lizzie M.
Dickey, Miss Esther M.
Dodge, Mrs. Helen K.
Dole, A. W.
Dow, Miss Florence
Dow, Miss Sarah E.
Dowd, Mrs. Mary H.
Downs, Mrs. Clara L.
Dowst, Miss Ella M.
Dowst, John
Drew, Mrs. Annette H.
Dustin, Charles R.
Dustin, Mrs. C. R.

Eames, William M.
Eames, Mrs. Hortense H.
Edgerly, Clarence M.
Ela, Miss Emma J.
Elliott, Mrs. Medora W.
Elliott, William H.
Elliott, Mrs. W. H.

Fairbanks, Miss Elsie D.
Farmer, Mrs. Lucinda L.
Felch, Miss Sadie C.
Fellows, Joseph W.
Fellows, Mrs. J. W.
Ferren, Miss Kittie J.
Ferrin, A. W.
Fogg, Edward H.
Fogg, Miss Susy C.
Foster, John
Foster, Mrs. John
Fracker, Miss M. Alma
Francis, Miss Florence M.
French, Charles H.
French, Mrs. Emma B.
French, Dr. L. Melville
French, Mrs. Mary E.

Gage, Miss Mary J.
Gault, John
Gay, Miss Annie M.
George, Miss Ethel L.
Gillan, Miss Jean
Gooden, Miss Kate M.
Gorrell, Mrs. M. M.

Graupner, Miss Amelia L.
Graupner, Miss Hulda C.

Hadcock, Mrs. William
Hale, Arthur H.
Hale, Fred C.
Hall, Miss E. Alfreda
Hartshorn, Fred G.
Hartshorn, Mrs Minnie L.
Hassam, R. H.
Hayes, Charles C.
Head, Miss Caroline E.
Heald, Frank E.
Heard, Arthur M.
Herrick, Henry W.
Hicken, Miss Blanche E.
Higgins, Edmund F.
Higgins, E. Safford
Higgins, Wilson F.
Hoit, Miss Carrie E.
Holt, Miss E. Blanche
Hope, Miss Ella
Hope, Miss Lucy Maud
Hopkins, George I.
Hoyt, William J.
Hubbard, Miss Martha W.
Hunt. Mrs N. P.
Hunt, Miss Sara
Hurd, Henry N.
Huse, Mrs. Isaac
Huse, William H.
Huse, Mrs. W. H.
Hyde, T. McEwen

Jackson, George R.
James, Mrs. Mary J.
Jenkins, A. A.

Kemp, Miss Bertha L.
Kendall, Mrs. John M.
Kendall, Willis B.
Kennard, Samuel C.
Kennard, Mrs. S. C.
Kew, Mrs. Ursula M.
Knowlton, Mrs. Maud Briggs.

Lamprey, Miss Alice Maud
Lane, Thomas W.
Lewis, Walter H.
Livingston, Frank C.
Lockhart, Rev. Burton W.
Lockhart, Mrs. Frances U.
Longa, Charles E.
Lord, Miss M. Eugenia

Mack, Miss Isabella G.
MacLeod, Mrs. Alberta A.
MacLeod, Donald
Mallard, Karl L.
Manning, Charles H.
Manning, Mrs. Frances Fay
Manning, Robert L.
Marr, Mrs. Frances
Marshall, MissAlice
Martin, Frank E.
Martin, Miss Winona M.
McAllister, George I.
McAllister, Mrs. Mattie H.
McDuffie, Charles H.
McDuffie, Mrs. Laura B.
McKean, Miss Ellen E.
McLaren, Miss Emma L.
McLaren, H. N.
McLaren, Miss Mary E.
Means, Mrs. Elizabeth A.
Merrill, Albert
Mitchell, Miss Mary W.
Mooar, Miss Linda Hunter
Moore, Miss Florence H.
Moore, Miss Helen M.
Moore, Miss Marcia M.
Morrill, Miss Florence M.
Morrill, Mrs. Hattie T.
Morse, Mrs. Clara H.
Morse, Henry H.
Morse, Mrs. L. L.
Morse, Miss Millicent S.
Morse, Dr. M. V. B.
Moulton, Miss Fannie D.
Moulton, Miss Mary E.
Murkland, William E.

Nelson, James M.
Nichols, William T.
Normand, Miss Eva
Nutt, Miss May F.
Nutting, Fred S.

Olzendam, Mrs. A. P.
Ormsby, R. S.
Osgood, Anson G.

Parker, Henry W.
Parker, Miss Nellie C.
Parker, Walter M.
Parker, Mrs. W. M.
Patten, Miss Annie W.
Peaslee, Mrs. Nellie D.
Peaslee, Robert J.
Perkins, David W.
Perkins, Mrs. Frederick
Phillips, Miss Grace A.
Phinney, George H.
Preston, Mrs. M. Clara
Price, Mrs. S. E.
Priest, Miss Electa M.
Priest, Mrs. Lucia Mead

Reed, Miss Helen E.
Richardson, Charles L.
Richardson, Edwin P.
Richardson, Miss Florence
Richardson, Mrs. Harriet B.
Richardson, Miss Harriet H.
Richardson, Herbert E.
Richardson, James M.
Richardson, Miss Theodora
Richardson, Miss Susan A.
Robbins, Mrs. Ellen R.
Robbins, William K.
Robinson, Ed. R.
Robinson, Dr. J. Franklin
Rowe, Miss Olive A.
Ryder, Bayard C.

Sanborn, A. H.
Sargent, Herbert G.
Sargent, F. W.
Schæffer, Henri
Shontell, Frederick W.
Simmons, Mrs. E. M.
Simmons, Walter W.
Simons, Mrs. Grace A.
Slayton, Edward M.
Smith, Mrs. A. D.
Smith, Arthur J.
Smith, Dante
Smith, Miss Emily E.
Smith, J. Brodie
Smith, Leonard G.
Smith, Miss May L.
Smith, Miss Nellie M.
Snow, Miss Nellie W.
Spaulding, F. L. V.
Squire, Miss H. L.
Stanton, Miss Theresa B.
Staples, Rev. Charles J.
Staples, Mrs. Grace D.
Stark, Augustus H.
Stark, Mrs. A. H.
Stearns, H. A.
Stevens, Victor E.
Stockbridge, Dana W.
Straw, Herman F.
Straw, Mrs. H. F.
Stuart, Miss Alice M.

Taintor, Charles W.
Taggart, Miss Alice C.
Thompson, A. W.
Tolman, Miss Mary M.
Topliff, Miss Ellen A.
Tuson, Miss Eva F.
Tuttle, Miss Hattie S.
Tynan, Miss Mary G.

Varick, John B.
Varick, Mrs. Melusina H.
Varick, Mrs. Thomas R.
Varick, Dr. W. R.
Varney, David B.
Varney, Miss Emma L.

Varney, Mrs. Harriet B.
Walker, Miss Flora M.
Waring, Miss Annie E.
Warren, Miss Marion F.
White, Louis B.
White, William L.
Whittemore, L. B.
Whitten, John H.
Whitten, Mrs. J. H.
Wiggin, Miss Ellen F.
Willand, Miss Alta C.
Willand, Miss Hattie O.
Williams, Miss Bertha M.
Williams, Miss Harriet A.
Williams, J. Arthur
Williams, Mrs. J. A.
Wilson, Miss Ida Belle
Wilson, R. W.
Winch, George
Wing, Miss Caroline E.
Woodbury, Gordon
Woodbury, Mrs. Gordon
Woodruff, Harry G.
Woodman, Miss Susie G.
Young, Harrie M.
Young, Miss Jennie

CORRESPONDING MEMBERS.

| | |
|---|---|
| Clarence M. Brooks, | Keene, N. H. |
| Alvah A. Eaton, | Seabrook, N. H. |
| Bela H. Emerson, | Hooksett, N. H. |
| Miss Sarah E. Parker, | Pembroke, N. H. |
| J. H. Prescott, | Foxboro', Mass. |
| John A. Wheeler, | Milford, N. H. |

LIFE MEMBERS.

George Byron Chandler. Mrs. Aretas Blood.

CUSTODIANS.

Miss Susy C. Fogg. Herbert G. Sargent.

Walter S. Abbott.

ZOOLOGICAL AGENT, George E. Burnham.

AGENT, Sherburne Fowler, Pembroke, N. H.

LIBRARIAN, Charles J. Abbott.

BRANCHES.

Suncook Improvement Association, Suncook Branch, No. 1.

MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

## SECTION A.

# PHYSICAL SCIENCE.

### Officers for 1900.

CHARLES J. ABBOTT, *President.*
DR. E. B. ALDRICH, *Vice President.*
EDWARD J. BURNHAM, *Treasurer.*
CHARLES R. DUSTIN, *Recording Secretary.*
FREDERICK W. SHONTELL, *Financial Secretary.*

EXECUTIVE COMMITTEE.

HENRI SCHÆFFER WILLIAM H. HUSE.
CHARLES W. TAINTOR.

## SECTION A.

# PHYSICAL SCIENCE.

### REPORTS OF MEETINGS—1900.

Monday evening, January 15. A repetition of the pendulum experiment for the determination of the value of the accelleration of gravity and for the demonstration of the earth's rotation, under the direction of E. J. Burnham, Albert L. Clough, and G. I. Hopkins.

Monday evening, February 5. An exhibition of the Ives Kromskop and explanation of the principles and practice of color photography. ALBERT L. CLOUGH.

Monday evening, February 26. A review of the life of Joseph Henry and his contributions to physical science.
EDWARD J. BURNHAM.

Monday evening, March 12. The Automobile, the Vehicle of the Future. Illustrated by lantern slides.
ALBERT L. CLOUGH.

Monday evening, March 26. The Evolution of the Horse.
WILLIAM H. HUSE.

Monday evening, April 9. The Life and Work of Moses Gerrish Farmer. WALTER S. ABBOTT.

Monday evening, April 23. The Modern Newspaper, with excursion through the plant of the Union Publishing Company.
EDWARD J. BURNHAM.

Monday evening, May 7. The Three-Color Printing Process. ALBERT L. CLOUGH.

Monday evening, May 21. Eclipses; with special reference to the approaching solar eclipse of May 28.
GEORGE I. HOPKINS.

Monday evening, June 4. Wireless Telegraphy; with demonstration by means of apparatus. H. A. STEARNS.

Monday evening, October 1. The Recently Discovered Elements Radium and Polonium. HENRI SCHÆFFER.

Monday Evening, October 15. An Excursion into the Realm of Atoms. REV. CHARLES J. STAPLES.

Monday evening, November 12. The Modern Giant and His Youthful Rival; a discussion of the steam and gas engine as prime movers. ALBERT L. CLOUGH.

Monday evening, November 26. Some Lessons from Evolution; with particular reference to the relation of environment to development. WILLIAM H. HUSE.

Monday evening, December 10. Physical Science in America; with special mention of the work of Benjamin Franklin, Benjamin Thompson and Thomas C. Mendenhall.

EDWARD J. BURNHAM.

MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

## SECTION B.

# ENTOMOLOGY.

### Officers for 1900.

EDWARD J. BURNHAM, *President.*
GEORGE E. BURNHAM, *Vice President.*
SUSY C. FOGG, *Secretary.*
WALTER S. ABBOTT, *Treasurer.*

EXECUTIVE COMMITTEE.

DR. LILLIAN G. BULLOCK, HULDA C. GRAUPNER,
MAY L. SMITH.

## SECTION B.

# ENTOMOLOGY.

### REPORTS OF MEETINGS—1900.

Monday evening, January 8. Regular meeting; fourteen members present. The President in the chair.

Lillian G. Bullock, M. D., Chairman of the Executive Committee, submitted the program for the coming six months, and the same was adopted without change.

Before opening upon the regular program, the President gave a brief introductory talk on the work of the engraver beetle, suggested by a section from a limb of the white pine, recently presented by J. J. Dearborn, M. D., of Salisbury, N. H. The specimen is one and a half inches in diameter and two feet in length, the entire surface being elaborately carved by the larvæ of this insect, which did considerable damage to the white pine in Salisbury and vicinity during the year 1899.

George E. Burnham read a paper on "Pond Life in Winter," with special reference to a pool with muddy bottom, near the Bald Hill road. Here had been found the water scorpion (Nepa apiculata), the larvæ of several species of dragon-fly, stone-fly, and caddice-fly larvæ, a species of Gyrinus in considerable numbers, also two of the Hydrophilidæ, and two species each of the Dyticidæ and Corisidæ. The larvæ of the "cob-house" building caddice-fly exceeded any other insect in numbers at this station. In a brook not far distant, the pebble building caddice-fly abounds in the vegetable covering of the submerged stones, and they are also abundant in similar situations in the brook which crosses Smyth road—in each instance the insects finding both building material and food brought to them by the swiftly flowing water.

At the conclusion of the paper and a brief discussion, the re-

mainder of the evening was devoted to a comparative study of the venation of the wings of the Nymphalidæ.

Monday evening, January 22. Regular meeting; fifteen members present. The President in the chair.

Lillian G. Bullock, M. D., presented a paper on "Some Analogies between Insect and Human Anatomy." Some time was devoted to the definition of the terms "homologue" and "analogue" and the use of the same terms for parts which present analogies rather than homologies was explained by the fact that the early scientists, who gave names to the parts of the insect structure, were in general familiar with human anatomy before they gave attention to entomology, and applied to the latter science the terminology to which they were already accustomed. The cranium, in both man and insect, contains the brain, while the heads of each present a further similarity in the tendency toward the specialization of external organs of sense. The tergum, pleura and sternum of the thorax in insects were suggestive of the spine, ribs and sternum in man; while in both forms of life the muscles act variously as rotators, elevators, depressors, adductors, abductors, flexors and extensors. The nerves of insects, as in man, are specialized as sensory and motor, and nerves of special sense; the outer layer of the brain is grayish in color, and the medullary portion is white. There is a sympathetic nervous system, which supplies the heart, œsophagus and salivary glands, and also sends off branches to join the principal nervous system. The alimentary canal of the insect is divided naturally into parts somewhat similar in form and function to the divisions of the same canal in man, and have received, in general, the same names. The insect's heart, while not resembling the human heart in shape, performs the same office. The blood in insects is composed of serum, in which float corpuscles, and the blood is aerated by coming in contact with the oxygen of the air, and the process of respiration, as in the higher animals, is carried on by muscular contraction and relaxation.

The President gave the next in his series of talks for beginners; his subject being "Coleoptera."

Monday evening, February 5. Regular meeting; fourteen members present. President in the chair.

By reason of a conflict in dates, Section A met on the same evening, and through an amicable arrangement each section in turn became guest of the other. The special feature of Section B's contribution was a paper by the Secretary, "Notes on Orthoptera."

Monday evening, February 19. Regular meeting; thirteen members present. The President in the chair.

The Diptera supplied the topic for the President's elementary talk.

Miss Amelia L. Graupner read the paper of the evening, "Bees; a Study in Venation." The paper, which was illustrated by blackboard drawings of special types, and by mounted slides of the wings of bees found about Manchester, including Andrena, Halictus, Augochlora, Ceratina, Bombus and others, led to an interesting discussion of the sub-marginal cells, and the relative position of the recurrent nervures.

Monday evening, March 5. Regular meeting; twenty members present. The President in the chair.

A plan for a summer school in connection with the Institute, which should enlarge the scope of Sections B, C, D and F, was submitted by the President.

Miss May W. Davis read a paper containing an account of personal observations made during August, 1898, upon Chionaspis furfurus, or the scurfy bark louse, found infesting a Mountain Ash (Sorbus americanus) on the west shore of Lake Winnipiseogee. This tree had previously been cut, and had grown again, in the form of several shoots from the original trunk. The older, woody stems or branches near the ground were entirely encased by these scales, forming a complete covering, so closely did they touch and overlap one another. To the casual observer it appeared as a rough, gray bark. Nearer the top and on the younger branches, the insects were not so numerous, but in the protected spots, as the axils of the branches and twigs, the scales appeared to be crowded into uneven layers. On the

smaller branches were noticed several beetles of the species Adalia bi-punctata, and on a leaf the larvæ of the same. Their presence on the infested tree was significant, although they were never observed devouring the scales.

The members of the section examined specimens of scale life under the microscope, and also made some study of the Stem-eyed Flies (Sphyracephala brevicornis) found by the President on March 4.

The President closed his series of elementary talks upon the orders with some general remarks upon the Hymenoptera and their place in the scale of insect development.

Monday evening, March 19. Regular meeting; seventeen members present. The President in the chair.

Walter S. Abbott read a paper on Anosia plexippus, which contained an interesting account of his success in rearing this common and beautiful species during the past summer. One caterpillar that he had the good fortune to observe during its change suspended itself September 1, and transformed to a chrysalis in the night of the 3d. After this the color of the chrysalis began to darken very slowly, and by the 19th there appeared a purplish tinge. On the morning of the 20th the faint outline of the wing could be seen through the transparent shell of the chrysalis. At eleven o'clock the wing was quite distinct; by three o'clock the veins and spots were plainly visible, and at five o'clock the whole chrysalis, where the wings were not plainly to be seen, had turned to a deep purple, although the butterfly did not emerge until 7:45 o'clock on the morning of the 21st. When they first emerge, the wings are very soft and flexible and cannot be held erect. In one instance the butterfly remained upon a flower in the sunshine over two hours before it became strong enough to fly away.

The remainder of the evening was devoted to a further study of venation.

Monday evening, April 2. Regular meeting; eight members present. The President in the chair.

George E. Burnham presented a paper upon Termes flavipes,

with an account of an observation made upon a considerable collection of these insects a few days previous. A large number of Termes, comprising workers, soldiers and nymphs, had been taken from a single colony found beneath a stone in the edge of woods near Derryfield Park. A box was partially filled with earth, upon which the insects were placed. At first all was confusion, but in a short time order was so far secured that the workers, divided in three groups, began excavating as many vertical shafts, about three inches apart, while the soldiers stood on guard around them. The nymphs continued in disorder, hurrying about, or endeavoring to find shelter at the corners of the box. When the workers had descended to the depth of about two inches, they began to tunnel horizontally, connecting the shafts. As this work progressed, the soldiers, one by one, followed until a few only remained about the entrances. So soon as the vertical shafts had been connected by the horizontal tunnel, several workers reappeared, and, running about in search of the nymphs, began conducting them below. In a few minutes all were in safety below ground, except one. She had found partial concealment behind a lump of earth in a remote corner. Presently two workers reascended and instituted a systematic search, finding the stray nymph and conducting her to the new habitation. The last of the soldiers then retired, and nothing above ground suggested the presence of the "white ants." Thirty-five minutes elapsed between the placing of the Termites in the box and the retirement of the last individual.

Monday evening, April 16. Regular meeting; four members present. The President in the chair.

In the absence of the Secretary, Dr. Bullock was chosen Secretary pro tem. Miss Richardson also being unable to be present, her paper was postponed. The President gave an informal talk on the relation existing between ants and aphids.

Monday evening, April 30. Regular meeting; seventeen members present. The President in the chair.

George E. Burnham gave an account of some successful experiments made by himself while securing plaster casts of the nests of Andrena vicina and the holes of Lycosa fatifera.

The President occupied the remainder of the evening with observations upon the early stages of Blatta germanica, illustrated with the microscope.

Monday evening, May 14. Regular meeting; ten members present. The President in the chair.

The evening was devoted to the study of new arrivals during the past two weeks, among them being Anax junius, brought in by Walter S. Abbott.

It was voted to hold an outing at Lake Massabesic on Memorial Day.

Monday evening, May 28. Regular meeting; nine members present. The President in the chair.

A comparative study was made of Enallagma civile, and the President gave an account of a flight of Formica pennsylvanica, which he had recently witnessed. The meeting was then open for notes from members.

Monday evening, June 11. Regular meeting; ten members present. The President in the chair.

A paper on the family Carabidæ was presented by William H. Huse. It was voted to adjourn for the summer recess.

Monday evening, October 9, Sections B and D united in a joint meeting, in accordance with an arrangement by their respective executive committees, the purpose being to make a brief review, for a few successive meetings, of the general principles of vertebrate zoology as a preparation for more advanced work later on. Nine members were present. Mrs. Annie V. Batchelder, President of Section D, was invited to preside.

E. J. Burnham, on behalf the executive committees, outlined the plan of work suggested, and then gave a succinct account of views held at various periods as to the distinction between vegetable and animal life.

It was voted to invite Dr. Lillian G. Bullock to present a demonstration of the backbone at the next meeting.

Monday evening, October 22. Joint meeting of Sections B and D; nineteen members present.

Dr. Bullock presented a study of the skull and cervical and

dorsal vertebræ in man, with comparisons with the lower forms of vertebrates.

Monday evening, November 5. Regular joint meeting of Sections B and D; seventeen members present. President Burnham outlined the structural characteristics of the Mammalia. The remainder of the evening was devoted to a comparative examination of the skulls of different types, under the direction of Dr. Bullock, with special reference to occipital condyles and facial sutures.

Monday evening, November 19. Regular meeting of Sections B and D; twelve members present. President Batchelder in the chair. By request, Mrs. Batchelder gave a report of the recent meeting of the American Ornithologists' Union at Cambridge.

The evening was then devoted to practice in the classification of the Feræ by dental and cranial characteristics.

Monday evening, December 3. Regular joint meeting of Sections B and D; nineteen members present. President Burnham in the chair.

The following officers were elected for the ensuing year:

*President*—Theodora Richardson.
*Vice President*—Walter S. Abbott.
*Secretary*—Susy C. Fogg.
*Treasurer*—Charles R. Dustin.
*Executive Committee*—Lillian G. Bullock, M. D., Hulda C. Graupner, Helen E. Reed.

The evening was devoted to a study of the foramina of the skull, under the direction of Dr. Bullock.

Monday evening, December 17. Regular joint meeting of Sections B and D; eleven members present. President Richardson in the chair. The eyes of vertebrates, with special reference to the chiasma and the crossing of the optic nerves, furnishing the subject of study for the evening.

Monday evening, December 31. Regular joint meeting of Sections B and D; eighteen members present. The evening was devoted to the external structure of fishes, under the direction of Mr. Burnham.

# A ROCK RIMMON CATCH.

## Containing Additional Species of Orthoptera Noted in the Vicinity of Manchester.

BY MISS SUSY C. FOGG.

Westward of our city lies Rock Rimmon, that bold outcropping in the chain of granitic ledges which surround our valley. The sun and shadows of passing clouds play upon it till, with the vari-tinted mists that often envelop it, all the moods of a mountain are displayed upon its rugged face, but none can know the friendliness and shelter of this great rock like the innumerable creeping and crawling things that live among its crevices and conceive of its having no other use than to afford them opportunity for basking in the sunshine.

Upon the rock, and the barren sandy plains at its base, scantily clothed with stunted oaks, pines and wiry grass, we find great numbers of the Acrididæ, which rise up, multiply and disappear, with scarcely their usual check from human source or more natural enemies. In two hours' time, on a warm day during the second week of September, I was able to locate fifteen species of Acrididæ within small area. This list may be of interest, as follows:

### Sub-Family Tryxalinæ.

1 **Chloealtis conspersa** Harris.
2 **Stenobothrus curtipennis** Harris.
3 **Orphulella speciosa** Scudder.

### Sub-Family Œdipodinæ.

4 **Arphia Xanthoptera** Burmeister.
5 **Spharagemon collare** Scudder.
6 **Spharagemon bolli** Scudder.
7 **Scirtetica marmorata** Harris.
8 **Dissosteira carolina** Scudder.
9 **Encoptolophus sordidus** Burmeister.
10 **Psinidia fenestralis** Serville.

**11 Circotettix verruculatus** Kirby.

### Sub-Family Acridinæ.

**12 Schistocera rubiginosa** Harris.
**13 Melanoplus scudderi** Uhler.
**14 Melanoplus atlanis** Riley.
**15 Melanoplus femur-rubrum** De Geer.

The unusually dry season of 1900 was most favorable to increase of the locust tribe, and from a general observation of the locality under consideration, the species appeared evenly distributed, though the Melanopli, Arphia xanthoptera, Spharagemon collare, Dissosteira carolina, Encoptolophus sordidus and Cercotettix verruculatus probably predominated.

Stenobothrus, not so noticeable to the casual observer as the bright-winged locusts, was present in good numbers, some very good examples of both long and short wings being taken.

Upon examination of a larger number of specimens and by aid of additional descriptive material, I believe Stenobothrus maculipennis should be cancelled from our list heretofore published and Orphulella speciosa inserted in its place. Individuals taken the previous year had a tendency to follow S. maculipennis in coloration and wing length, but those more recently collected have taken on all the varying hues of green, purple and brown to which they are entitled and a correspondingly wide range in length of wings.

The Arphias of Rock Rimmon are rich and finely marked in color which together with their substantial size make them most alluring to the collector.

The species that I have designated as Spharagemon collare, I take to be the New England form of Say's Gryllus æqualis or, as I previously listed, Dissosteira æqualis..

Thomas Say's original description of this species was read June 1, 1824, in the list of "new Hemipterous insects collected in the Expedition to the Rocky Mountains performed by order of Mr. Calhoun, Secretary of War, under the command of Major Long."

**Gryllus** Fabr.

1. G. æqualis.—Hemelytra spotted with brown; wings pale yellowish at base, with a black band and dusky tip.

Inhabits the United States.

Head varied with brown and light gray; thorax varied with brown and dull rufous, with a carinate line; hemelytra dark cinereous, with numerous unequal small dark brown spots; wings sulphurous at base, then a black band arcuated behind so as nearly to reach the inner angle; tip dark cinereous, darker at the angle, or with small fuscous spots on that part; feet pale cinereous, spotted with fuscous; hind thighs within with four black bands; posterior tibiæ sanguineous.

Length to the tip of the hemelytra, one inch and two-fifths.

Not an uncommon species. The thorax is not gradually raised into a carina, but the line is abrupt and of little elevation.

Our local form is constant in color and structure. It is, however, better described by later writers who have carefully separated the numerous species classed under the genus Spharagemon.

Spharagemon bolli appeared, from my collection, to be somewhat rare; but I may have been deceived in this, since it is not always easy to distinguish S. bolli from S. collare in flight, the color resemblance being quite marked.

Scirtetica marmorata is a small, clean and handsome species, and is fit companion to Psinidia fenestralis, with which it was found. Mr. A. P. Morse, in his "Notes on the Acrididæ of New England," published in *Psyche*, says of S. marmorata: "While usually recognizable by the markings of the tegmina, this species is extremely variable in color, and widely so in markings, even in the same locality, some examples being chiefly ashy, more or less maculate with black; others chiefly blackish fuscous, marked with white, yellowish or reddish brown; others, again, entirely bright rufous, sometimes of the tint of red hematite. It is one of the handsomest of our locusts, but, next to Hippiscus rugosus, is probably the least known of our Œdipodinæ, since, though widely distributed, it is extremely local. * * I have met with it in but three localities; in each of these it is common, and is found on sandy barrens but scantily clothed with vegetation. My specimens were secured between the dates of

August 2 and September 5, at Provincetown, Mass., West Chop, M. V., and North Haven, Ct."

One female in collection is bright reddish brown; the males are "chiefly blackish fuscous, marked with white."

Encoptolophus sordidus, with Dissosteira carolina, belongs to the ubiquitous type, and by the remarkable protection gained from their ability to acquire, in general color, the particular tint of soil which they inhabit, seem destined to hold fast their numbers.

Specimens of Psinidia fenestralis with orange-colored wings were plentifully distributed, but none of the rose variety were met with during the season, thus proving the latter to be the exception.

I was especially pleased to note the next named trim and cool-looking locust as a resident species, though it was certainly not rare in this locality, Circotettix verruculatus. To capture it requires all the agility and patience of the Odonate enthusiast. When at rest upon the rocks, it is so like in appearance to their weathered surface that it is not easily discovered till startled by your approach. After a short and zigzag flight, accompanied by a loud crackling noise, it often alights in the path before you, but only to dissolve once more into the general color of the rock so quickly that the eye cannot follow.

Mr. Morse so aptly describes the haunts and mannerisms of this species, that I again quote his description,—"It is found plentifully in northern and western New England, its favorite haunts being bare ledges on elevated land and low mountains. On these it delights to bask in the sunshine, crawling about over the lichen-covered and weather-beaten rocks, with whose tints its coloring harmonizes, or to hover in the air above them, sharply stridulating. Its 'song' in flight is the loudest produced by any of our locusts, and consists of a series of separate notes, clicks, or snaps, not a rattle, and is readily distinguished by this peculiar snapping quality. It is one of the wariest of our locusts, being especially shy and difficult to approach during the warmer part of the day, when it often flies away to a distance of several rods and circles about, returning to the place whence it started, or dances up and down in the air, snapping loudly."

A slight variation was noted in one specimen in collection. The usual irregular fuscous band across the middle of the wing, beyond the pale yellow disk, continued without interruption to apex. Structural characteristics were identical with other individuals.

Schistocerca rubiginosa was found usually perched upon low oak bushes, where its presence was easily detected by its loud stridulation. A fine, large species, not difficult to capture, and especially at home in this locality.

Melanoplus scudderi is the nearest approach to a wingless species yet cited within our limits. It bears marked resemblance to the Melanopli tribe, and might readily be mistaken for nymph, even in adult stage. I have five specimens in collection—three males, two females. The variation in body length is noticeable in both sexes.

New species added to our previous list are Spharagemon bolli, Scirtetica marmorata, Circotettix verruculatus, Melanoplus scudderi. The remainder of that list we allow to stand until further research.

In this connection we are pleased to acknowledge the addition of Œcanthus nigricornis, through inquiry and identification of the species by Mr. Samuel Henshaw. In his "Treatise on Insects Injurious to Vegetation," Harris writes of Œcanthus: "Of three species which inhabit the United States, one only is found in Massachusetts." From the description following, it would appear that he may have taken nigricornis, and other species, but did not consider them distinct types. Local examples of niveus occur uniformly ivory or pale yellowish white.

# ADDITIONAL NOTES
## ON THE
# ANISOPTERA
## IN THE VICINITY OF MANCHESTER, N. H.

BY EDWARD J. BURNHAM.

The drought that prevailed during July and August, 1900, was exceptionally severe in the vicinity of Manchester, and, following the unusually dry summer of 1899, exerted a marked effect upon the later Dragonflies. The individuals of the Gomphine and Corduline types, which emerge early in the season, were apparently as numerous as in other years; but there was a great decrease in the numbers of individuals of Aeschnines and Libellulines. A few species of the latter subfamily, notably Libellula exusta and Plathemis trimaculata, were abundant, appearing by the middle of June; but early in July the drought had dried up the smaller streams and nearly all the pools and bogs. Even such bodies of water as Stevens' Pond and Lake Massabesic were reduced several feet below their ordinary summer level, leaving great strips of marsh to dry and bake in the sun. The nymphs of Libellula, Sympetrum (Diplax), Leucorhinia, Aeschna and other late-appearing genera and species must have perished by thousands. A few survived, however, and when the fall rains had revived the brooks and refilled the pools, a limited number of individuals were flying about their accustomed haunts, evidently belated and hastening to complete their life-work with dispatch.

In considering how these few surviving Dragonflies came to be hovering over streams which for six weeks had shown only dry channels, we are easily tempted from the hard road of scientific investigation to the alluring bypaths of speculation; but there are a few conditions which may be accurately ascertained,

and surely an hypothesis may be permitted to stand as an hypothesis until shown to be inconsistent with known facts. The small brook, for example, that crosses Smyth Road, and beside which, in the meadows, are mud-holes formed by the removal of muck for agricultural purposes, is at least a mile and a half distant from any permanent body of water—that is, such as Dorr's or Stevens' Pond, capable of sustaining a prolonged drought. It is improbable that the few individuals of Leucorhinia intacta and Sympetrum rubicundulum found here in September had journeyed so far with the benevolent purpose of restocking this insignificant and depleted little stream. Plainly, however, if these Dragonflies were not immigrants, they were of the old stock and had survived, through special fitness, in the station of their ancestors, an unusual period of drought.

The nymphs of Dragonflies, from necessity, inhabit the margins of lakes and ponds, and the portions of streams where the water is comparatively still. Clear water, with a sandy or otherwise clean bottom, is, of course, fatal to them, since they are there exposed and must soon fall a prey to fishes and to one another. When, as during the protracted droughts of 1899 and 1900, the water in a lake or pond recedes until acres of marsh are laid bare, some of the nymphs may, and doubtless do, follow the retiring water line; but it is to find dangers increasing many fold. As the character of the bottom changes, they are more exposed, and the fish are relatively more numerous by reason of the reduced area. Few Dragonfly nymphs could expect to survive under such conditions, and in a pool or brook the situation is even worse. But there have been severe droughts in this section of the country, certainly from the time when the forests were cut away, and probably for centuries before, and yet the Dragonflies remain. It is at least plausible to assume that some species have developed the capacity to lie dormant in the dried or half-dried mud until the returning water, at the end of the drought, shall revive them.

Writers upon the Odonata have commonly attributed the distribution of these insects to their powers of flight, to favoring winds, and to the transportation of eggs and nymphs by the

currents of streams; but every careful observer knows that, with the potency of these agencies admitted, much remains to be explained; as, for example, why certain species appear to be definitely restricted to certain stations within a given area. Nannothemis bella affords a striking example for the territory about Manchester. This little Dragonfly is active, is a fairly strong flyer, and remains with us in the imago stage nearly two months —from the middle of June through July and into the beginning of August; and yet somewhat careful collecting in the vicinity of Manchester has failed to discover Nannothemis bella in more than one station. There individuals are numerous. The pools on the right of the road leading to Goff's Falls, near Pine Grove, are fed by cool springs which, it is believed, never fail. They certainly withstood the severe drought of last year. The water in this chain of pools is clear, but the bottom is entirely covered with a rich growth of sphagnum. Here Nannothemis bella has escaped the test of drought, and is it not at least possible that, lacking the capacity for survival in ponds whose margins might in any year be changed to mere mud-beds, this species long ago, after many fruitless trials at distribution hereabouts, found itself restricted to the single station where it is now found?

But if this theory of tropical hibernation during the dry season appears somewhat fanciful when applied to New England Dragonflies, we may return to the brook on Smyth Road, and to a simple statement of facts. Last July this rivulet, along which, in ordinary years, the late-flying species of Dragonflies are abundant, shrank, first to mere puddles, and at last to an empty channel, seemingly as dry as empty. But the little stream has overhanging banks, a common characteristic of New England brooks when flowing through deep meadow land, and under these banks, in several reaches of considerable extent, the mud remained moist throughout the drought. A small number of living Dragonfly nymphs were found here on the occasion of several visits, and some of them undoubtedly survived the drouth, to emerge as the imagos observed here in September, going as contentedly about their affairs as if thousands of their companions had not perished—an example of the survival of the

fittest under the stress of extreme conditions. A similar state of things was observed along the channel of the brook which, in all but extremely dry seasons, flows from Stevens' Pond, and also along the dry course of the brook that crosses the road near Massabesic. In each case the nymphs were living, not in water, but in very moist mud, and it is probable that cannibalism had quite as much to do with the reduction of their numbers as did the failure of their water supply.

The drought that prevailed in the vicinity of Manchester during the summer of 1900 interfered seriously with the work of increasing the Institute's collection. Eight additional species of Anisoptera were secured, however, and the females of two species of which the Institute already possessed the males. The additions are as follows:

## Sub-Family Gomphinæ.

### Tachopterix Selys.

**Tachopterix thoreyi** Hagen.

Calvert, p. 241.

These Dragonflies were flying in considerable numbers on the sandy pine plains near Cohas Brook, on June 5, and two specimens were secured on the River Road North June 8. Calvert had not seen the female when he compiled his Catalogue, and he repeats the description, "Vulvar laminæ reaching base of appendages." In the specimens at hand, the vulvar laminæ nearly reach the apex of the appendages. Otherwise, the description fully corresponds.

### Ophiogomphus Selys.

**Ophiogomphus rupinsulensis** Walsh.

Calvert, p. 242.

Not abundant, and seemingly restricted in this locality to Cohas Brook.

### Gomphus Leach.

**Gomphus abbreviatus** Hagen.

Calvert, p. 243.

Found in considerable numbers at Cohas Brook; also near Lake Massabesic, and on the Hooksett Road.

## Sub-Family Cordulegasterinæ.

### **Cordulegaster** Leach.

**Cordulegaster maculatus** Selys.

Calvert, p. 246.

Three specimens, all males, were taken at the brook near Smyth Road on June 17. No others have yet been recognized in this vicinity.

## Sub-Family Aeschninæ.

### **Epiæschna** Selys.

**Epiæschna heros** Fabricius.

Calvert, p. 246.

This large Dragonfly is not common about Manchester, a few specimens only being secured each year. It is abundant at Hampton, and on one day in June, 1900, hundreds of imagos, not teneral, were found entangled in seaweed at York Beach. A lunch basket was nearly filled with them by a party of excursionists from this city.

## Sub-Family Cordulinæ.

### **Didymops** Rambur.

**Didymops transversa** Say.

Calvert, p. 250.

Not abundant, but seemingly widely scattered in this vicinity. It flies early in June, frequents thickets, especially along wooded roads, and very likely falls a comparatively easy prey to the birds.

### **Tetragoneuria** Hagen.

**Tetragoneuria cynosura** Say.

Calvert, p. 252.

If this insect is cynosura, it differs from the published descriptions in that the superior appendages of the male have an acute, inferior spine at the basal third.

## Sub-Family Libellulinæ.

### **Pantala** Hagen.

**Pantala flavescens** Fabricius.

Calvert, p. 254.

As stated in Volume I. of the Proceedings of the Institute (p. 35, 1899), a male of this species was taken on an island in the Merrimack River at Amoskeag, September 6, 1898. A female was flying with the male when first observed, but escaped capture. September 17, 1900, a female, teneral, imagination evidently having but recently occurred, was taken on the same island. No other individuals have yet been recognized in this vicinity, and it is probable that Manchester is near the extreme northern limit for this species in eastern North America.

### **Plathemis** Hagen.

**Plathemis trimaculata** De Geer.

Calvert, p. 259.

Several females of this species have been added to the collection. They were quite abundant from the first to the middle of June, being fully two weeks earlier than Libellula pulchella, to the females of which species they bear so strong an apparent resemblance.

### **Nannothemis** Brauer.

**Nannothemis bella** Uhler.

Calvert, p. 260.

This dainty little Dragonfly was found in considerable numbers at the chain of pools on Goff's Falls Road, from about the middle of June to the first of August. As stated above, it has been found at no other station near Manchester.

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The list of Anisoptera in the collection of the Institute is as yet by no means complete for this vicinity, but in so far as the species have been definitely determined, it is repeated here for the convenience of members.

Diplax Charpentier has given place to Sympetrum Newman, the latter having priority and being now generally used by writers upon the Odonata.

## I. Family Aeschnidæ.

### I. Sub-Family Gomphinæ.

#### 1. Tachopteryx Selys.

1. **Tachopteryx thoreyi** Hagen.

#### 2. Hagenius Selys.

2. **Hagenius brevistylus** Selys.

#### 3. Ophiogomphus Selys.

3. **Ophiogomphus rupinsulensis** Walsh.

#### 4. Gomphus Leach.

4. **Gomphus nævius** Hagen.
5. **Gomphus abbreviatus** Hagen.
6. **Gomphus exilis** Selys.
7. **Gomphus vastus** Walsh.

#### 5. Dromogomphus Selys.

8. **Dromogomphus spinosus** Selys.

### II. Sub-Family Cordulegasterinæ.

#### 6. Cordulegaster Leach.

9. **Cordulegaster maculatus** Selys.

### III. Sub-Family Aeschninæ.

#### 7. Epiæschna Selys.

10. **Epiæschna heros** Fabricius.

#### 8. Aeschna Fabricius.

11. **Aeschna verticalis** Hagen.
12. **Aeschna clepsydra** Say.
13. **Aeschna constrictor** Say.

#### 9. Anax Leach.

14. **Anax junius** Drury.

## II. Family Libellulidæ.

### IV. Sub-Family Cordulinæ.

#### 10. **Didymops** Rambur.

15. **Didymops transversa** Say.

#### 11. **Macromia** Rambur.

16. **Macromia illinoensis** Walsh.

#### 12. **Tetragoneuria** Hagen.

17. **Tetragoneuria cynosura** Say.
18. **Tetragoneuria semiaquea** Burmeister.

#### 13. **Neurocordulia** Selys.

19. **Neurocordulia obsoleta** Say.

#### 14. **Somatochlora** Selys.

20. **Somatochlora lepida** Hagen.

### V. Sub-Family Libellulinæ.

#### 15. **Pantala** Hagen.

21. **Pantala flavescens** Fabricius.

#### 16. **Libellula** Linne.

22. **Libellula cyanea** Fabricius.
23. **Libellula exusta** Say.
24. **Libellula quadrimaculata** Linne.
25. **Libellula semifasciata** Burmeister.
26. **Libellula axillena** Westwood; form **incesta** Hagen.
27. **Libellula pulchella** Drury.

#### 17. **Plathemis** Hagen.

28. **Plathemis trimaculata** De Geer.

#### 18. **Nannothemis** Brauer.

29. **Nannothemis bella** Uhler.

#### 19. **Celithemis** Hagen.

30. **Celithemis ornata** Rambur.
31. **Celithemis elisa** Hagen.

**20. Leucorhinia** Brittinger.

32. **Leucorhinia intacta** Hagen.

**21. Sympetrum** Newman.

33. **Sympetrum rubicundulum** Say.
34. **Sympetrum semicinctum** Say.
35. **Sympetrum vicinum** Hagen.

**23. Mesothemis** Hagen.

36. **Mesothemis simplicicollis** Say.

# The Testudinata of New Hampshire.

BY WILLIAM H. HUSE.

The order Testudinata consists of reptiles with the body enclosed by two bony shields, which, in the case of all the New Hampshire turtles, are covered by hornlike plates. The carapace, or upper shield, and the plastron, or lower shield, are usually united by a bridge of bone. In two of our species they are hinged. Into the bony box composed of the two shields the extremities are withdrawn in time of danger. The carapace consists of the dorsal and sacral vertebræ, and the ribs, co-ossified with overlying bony plates. There is usually a marginal row of plates.

Turtles have no teeth. The jaws are covered with horny sheaths with sharp, cutting edges. The eye is furnished with a nictitating membrane like birds in addition to two lids. The tympanic membrane is covered by the skin. They breathe by swallowing air.

There are seven species in New Hampshire, so far as known at present. This is not a small number when the location is considered. The state is so far north that the climate is not attractive to the warmth-loving turtles. Two of the species have been found as yet in the southern part of the state only and possibly do not live beyond the northern limit of the Alleghanian province. Specimens of all the species are in the museum of the Institute.

## I. Family Chelydridæ.

The members of this family have a large head and neck. The jaws are powerful and much hooked. The body is heavier forward. The tail is long with a crest of horny projections. The plastron is small and cross shaped.

### 1. **Chelydra** Schweigger.

This is the only genus of this family represented in the state

and in turn has but a single species, C. serpentina, Linnæus. This is the largest of our turtles. It attains a length of two feet or more and specimens weighing fifty pounds have been reported. The carapace is brownish black and usually supports more or less plant life. A row of slight projections along the back, in the young, shows an attempt of the vertebræ to be visible. This disappears with age. The more prominent row on the tail has been mentioned. The plastron is yellow. This species is rarely seen on land except when the females are ready for egg-laying. The eggs are spherical and about an inch in diameter. It is variously known as Black, Mud and Snapping Turtle. The meat is highly esteemed by many.

## II. Family Kinosternidæ.

In this family the carapace is somewhat long and narrow. The highest point is back of the middle. The plastron, in our only species, is proportionally small, the anterior portion being hinged. The anterior pair of horny plates coalesce. The head is comparatively large and pointed.

### 2. Aromochelys. Gray.

This is the only genus of this family and also contains but one species, A. odoratus, Latreille. This is the smallest turtle in the state, attaining a maximum length of about six inches, including head and tail. It is called Musk Turtle because of its odor, according to all authorities, but in this vicinity it is as nearly odorless as any member of the order. The carapace is dark brown with sometimes an olive tint that shows when the shell has been cleaned of the moss that is usually found upon it. On each side of the head are two prominent yellow stripes. This species is common though not so abundant as the next three. The eggs are nearly twice as long as thick and have very heavy shells.

## III. Family Emydidæ.

The representatives of this family have an ovate carapace,

widest behind. The margin in some species is inclined to flare outward and upward. The plastron is large and covers the entire under side of the body. In two of our species it is hinged.

### 3. **Chrysemys** Gray.

This genus contains one species in New Hampshire, C. picta, Hermann. The Painted Turtle is one of our most common species. It is found everywhere in ponds, brooks and ditches. There is hardly a mudhole that does not contain at least one. The marginal plates, especially on the under side, are marked with bright red which fades away changing to yellow after death. The plastron is a rich yellow. This turtle attains a length of about eight inches. The eggs are ellipsoidal and have soft shells.

### 4. **Clemmys** Wagler.

This genus includes two species. C. insculptus, LeConte, or Wood Tortoise, is our only common turtle that lives exclusively on land in summer. It drinks water freely but the adults at least have no other use for it until cold weather approaches when they descend to the bottom of a pond or brook and burrow in the mud. It is a vegetable feeder. A specimen that I kept for a portion of two seasons ate nothing for a while but was brought to his appetite by ripe strawberries. After that he would eat almost any soft vegetable food. Placed in a pen with some rabbits, he repeated the old fable in a revised form by climbing the poultry netting that served as a fence and escaping while his long-legged companions stayed behind.

The carapace is somewhat carinated. The color is brown, sometimes merging into yellow. Each plate is embossed in such a way as to resemble a shell. The plastron is large and yellow with a black blotch on each plate. This species is about a foot in length when full grown. The eggs are ellipsoidal, with rather thin shells though not so soft as those of the previous species.

C. guttatus, Schneider, is commonly known as the Spotted Tortoise. Its black carapace with numerous yellow spots, varying

much in number, distinguishes it from other species. It is found everywhere, associated with Chrysemys picta. It is a little smaller than its companion but similar in its hablts.

### 5. **Emydoidea** Gray.

This genus contains the species E. blandingi. On June 23, 1900 a specimen of this species, Blanding's Box Turtle, was found in the southern part of Manchester near Cohas brook and brought to me. Dekay, in his Zoology of New York, published in 1842, says that the tortoise was found in Haverhill, N. H. by Dr Storer, but in the latter's report on the reptiles of Massachusetts he speaks of a specimen being sent him from "Haverhill" in such a connection that it is probable that he meant Haverhill, Mass. If this be true the specimen brought to me was the first one found in New Hanpshire of which there is any record.

The shell is seven and a half inches long and five inches wide. The carapace is black, each plate being covered with small, light yellow spots, smaller and more numerous than those of the Spotted Tortoise. These are distributed somewhat irregularly, but seem to radiate from the posterior side of the middle row of plates and the inner posterior of each lateral plate. The plastron is light yellow with a black blotch in the outer posterior corner of each plate. The head and neck are black above and yellow beneath, the yellow extending back nearly to the shell. This color is one of the most conspicuous things about the turtle. A notch in the front of the upper jaw is quite noticeable. The neck can be stretched out to the length of five inches. The skin of the neck and flanks is rough, that of the legs, imbricated. The tail is rather long. The plastron is hinged near the middle and again to the carapace so that the two shells can be shut, enclosing the extremities. In this specimen the protection is not complete, the limbs being too large to be all enclosed at once.

Since the above mentioned specimen was found two more have been brought to me. One was found in Manchester, the other in Auburn. The larger of these is of the same size as the one described and as it bears evidence of age it is probable that this is about the maximum size. The spots on the carapace are rather

indistinct. The other specimen is smaller with brighter spots. Both are better able to cover their extremities with the closed shell than the first one found.

### 6. **Terrapene** Merrem.

This genus is represented by T. carolina, Linnæus, or Box Turtle. It is nearly hemispherical in shape. The carapace is brown, nearly black, with irregular yellow markings, and is inclined to be carinated. The two shells are hinged like those of the last named species but more perfectly. They fit more tightly together, completely shutting in the unprotected parts of the body. The only New Hampshire specimen I have seen came from Pelham. It has been reported from Lee.

MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

## SECTION C.

# BOTANY.

### Officers for 1900.

MRS. ALBERT O. BROWN, *President.*
MISS CAROLINE E. WING, *Vice President.*
F. W. BATCHELDER, *Secretary.*
MISS ELLEN F. WIGGIN, *Treasurer.*

EXECUTIVE COMMITTEE.

MISS ELLEN F. WIGGIN, REV. CHAS. J. STAPLES,
MISS CAROLINE E. WING.

## SECTION C.

# BOTANY.

### REPORTS OF MEETINGS.

Tuesday evening, January 2. Regular meeting. Adjourned to January 16.

Tuesday evening, January 16. Regular meeting. Adjourned to January 30.

Tuesday evening, January 30. Regular meeting; the President in the chair. The Executive Committee reported that provision had been made for the work of the meetings of February 13 and 27, and that a plan of work for the season was under consideration. The committee recommended that the Section make a special study of the orders Filices and Orchidaceæ.

After the transaction of business the members listened to a paper on the "Ferns of New England," by Mrs. Batchelder, illustrated with mounted specimens and also the plates in "Eaton's Ferns," the latter having been kindly loaned by the City Librarian.

Tuesday evening, February 13. Regular meeting; the President in the chair. A severe storm prevailing, very few members were present and the meeting was informal. Mrs. Maria L. Clough had prepared a paper entitled "A Study in Mycology," but in the circumstances it was deemed best to postpone the reading of it till the next meeting.

Accordingly adjourned to February 27.

Tuesday evening, February 27. Regular meeting; Rev. Charles J. Staples in the chair. There being no business to transact, the members gave their attention to the reading of the paper by Mrs. Clough on "A Study in Mycology," deferred from the last meeting.

Adjourned to March 13.

Tuesday evening, March 13. Regular meeting; the Vice

President in the chair; Miss Lucy Maud Hope, Secretary pro tem. Mrs. Clough led the Section in a study of the life history of ferns, touching upon the place of these plants in the vegetable kingdom, their method of development and the "alternation of generations," which they illustrate so perfectly.

The chapter on "Fertilization, Development and Fructification," in the recently published book, "How to Know the Ferns," by Mrs. Frances Theodora Parsons, was read and discussed. Various terms used in the study of ferns were explained and illustrated by means of pressed specimens. A microscopic examination of fresh prothallia followed.

By special request Mr. Burnham gave a talk on orchids. Alluding to the interest which this class of plants has excited in recent times, he told of the perils which botanists have faced in the search for new species; also of the immense sums spent by wealthy Englishmen for rare specimens. Special attention was called to the Lady-slipper (Cypripedium), which depends upon one particular kind of insect for its fertilization. Incidentally comparison was made with the mayflower, which is now in a state of transition, some of its blossoms being self-fertilized, while others, those showing the brightest pink hue, are the products of cross-fertilization. Reference was also made to the columbine as being in danger of extermination because a certain beetle gathers the honey from the outside of the spurs without visiting the interior of the blossom.

Adjourned to March 27.

Tuesday evening, March 27. Regular meeting; Miss Susy C. Fogg in the chair. There being no business to transact, the members gave their attention to a talk by Mr. Batchelder on the "Life History of Ferns."

Ferns were first considered biologically, as aggregates of cells; then the successive steps of their development as plants, simply, were traced, the first step being the formation of a nucleus in a mass of hitherto undifferentiated matter; next, the formation of a cell wall, i. e., separation; next, division of cells and consequent multiplication, by which last process all plants, however large, are built up. The individual plant, thus start-

ed on its career, becomes further modified by differentiation, specialization, elimination, adaptation, and so on.

The polymorphism of the individual was next taken up and it was shown how, as in entomology individuals are subject to metamorphosis, as it is called, so in botany there are two or more stages in the life history of plants. These stages are usually called "alternation of generations," i. e., an alternation of non-sexual with sexual generation, in which the products of one process differ from those of the other. Then followed an account of the discovery of the process of reproduction in ferns, and credit was given to Nageli, who, in 1844, found the antheridia, and Suminski, who, in 1848, found the archegonia. The terms gametophyte and sporophyte were explained, and it was stated how closely the gametophyte in the Pteridophytes resembles the liverwort in the Bryophytes.

By means of a diagram on the blackboard, the derivation of the Pteridophytes was indicated and the probable derivation and relations of the several orders in the sub-kingdom traced. The Equisetaceæ, Lycopodiaceæ and Ophioglossaceæ were described as very ancient forms, plants allied to the Lycopodiaceæ being the probable source of the Gymnosperms, and plants allied to the Ophioglossaceæ being the probable source of the Angiosperms, while the Equisetaceæ and their allies failed to develop into higher forms. The Osmundaceæ were described as a connecting link between the Ophioglossaceæ and the more modern forms, the sporangia being derived partly from epidermal cells and partly from the interior tissue of the leaf, instead of being derived wholly from the interior tissue, as in the Ophioglossaceæ, or wholly from epidermal cells, as in the Polypodiaceæ.

Adjourned to April 10.

Tuesday evening, April 10. Regular meeting; the President in the chair. After routine business the evening was devoted to the study of Buds, Aments and Catkins, specimens being shown from various species of trees and shrubs.

Adjourned to April 24.

Tuesday evening, April 24. Regular meeting; the President

in the chair. After routine business the time was devoted to the subject of pressing and mounting specimens, and practical illustrations were given.

Adjourned to May 8.

Tuesday evening, May 8. Regular meeting; the President in the chair. After routine business the members engaged in the study of the order Ranunculaceæ. Owing to lack of fresh specimens by reason of the backwardness of the season, herbarium specimens were used. A general view of the order was presented with the help of Gray's Manual and Britton and Brown's Illustrated Flora. Known stations of local plants were named and the members of the Section were earnestly requested to make collections during the coming season, so that at its close the order may be fairly well represented in the herbarium of the Institute. Full collections of the local ferns and orchids were also strongly urged, since those plants have been designated as special objects of study during the season.

Adjourned to May 22.

Tuesday evening, May 22. Regular meeting; the President in the chair; Miss Hope, Secretary pro tem.

The Executive Committee reported that provision had been made for the work of the meetings before vacation as follows: May 22, analysis of flowers of the season; June 5, a quiz on botanical terms used at last meeting; June 19, review of work up to date.

The President gave a brief talk on the typical flower considered as a modified branch of the plant, with description of parts and explanation of technical terms. The members then proceeded to the practical analysis of *Anemone nemorosa* and *Coptis trifolia*.

Adjourned to June 5.

Tuesday evening, June 5. Regular meeting; the President in the chair; Miss Hope, Secretary pro tem. After routine business a short time was devoted to the analysis and comparison of *Viola blanda*, *cucullata*, *sagittata* and *canina*. Then the practical work with the ferns was begun, being introduced by the President with an explanation of technical terms. Microscopic

examination was made of the sori and indusia of *Dryopteris marginalis*.

Adjourned to June 19.

Tuesday evening, June 19. Regular meeting; the President in the chair; Miss Hope, Secretary pro tem. This being the last meeting before the summer vacation, members were again urged to make collections for the herbarium, the President expressing the hope that each member would donate at least one specimen collected during the summer season.

The remainder of the time was spent in the analysis of *Virburnum cassinoides* and *Asplenium Filix-femina*, and the examination of the silex skeleton of *Equisetum hyemale* prepared by Mr. Huse.

Adjourned to October 2.

Tuesday evening, October 2. Regular meeting; the President in the chair. The report of the last meeting previous to vacation, prepared by Miss Hope, Secretary pro tem., was read and approved. An exceptionally fine specimen of *Liatris scariosa* was exhibited and the flowers analyzed. Ferns and Fern-Allies having been selected as objects of study for the present, several species were shown and an informal discussion was held.

Adjourned to October 16.

Tuesday evening, October 16. Regular meeting; the President in the chair. The Executive Committee reported they had arranged a program for work during the remainder of the year on Ferns and Fern-Allies, as follows: October 16, the genus Dryopteris; October 30, the genus Asplenium; November 13, Ophioglossum and Botrychium; November 27, Equisetum; December 11, Lycopodium.

The Executive Committee further reported, concerning certain proposed lectures, that they had communicated with Professor Weed of the New Hampshire College and ascertained his terms. Further time was asked and granted for communication with Mr. Fernald of the Gray Herbarium with regard to his terms.

The genus Dryopteris was then taken up and studied with

the aid of fresh specimens of *D. acrostichoides*, *marginalis*, *spinulosa intermedia* and *Bootii*.

Adjourned to October 30.

Tuesday evening, October 30. Regular meeting; the President in the chair.

The Executive Committee having reported the result of their communication with Mr. Fernald, it was, after some discussion, voted that he be engaged to deliver two or more lectures, provided the requisite funds could be obtained. It was then voted that a committee of five be appointed by the chair to solicit subscriptions, and the chair accordingly appointed such committee.

The study of Dryopteris, begun at the last meeting, was then resumed and specimens of all the local and some other species examined. The study of the genus Asplenium was then begun, specimens of the two local species, *A. Filix-fœmina* and *A. acrostichoides* ( *thelypteroides*), being exhibited; also severa species in the herbarium, among which were *A. platyneuron* (*ebeneum*) and *A. Trichomanes*, found in adjoining towns.

Adjourned to November 13.

Tuesday evening, November 13. Regular meeting; the President in the chair.

The committee appointed at the last meeting to solicit funds to meet the expense of a course of lectures reported that a small amount had been subscribed. The amount being insufficient for more than one lecture a discussion ensued as to the advisability of giving that one. After a free expression of opinion by all the members present, it was decided that in consideration of the number of lectures already arranged for and to be given by the Institute, and also of the difficulty in raising sufficient funds for the lectures proposed, it would be wisest to drop the matter for the present. Accordingly it was voted that the project for a course of lectures to be tendered by Section C. to members of the Institute, be indefinitely postponed.

The family Ophioglossaceæ was then studied with the aid of herbarium specimens of *Ophioglossum vulgatum* and *Botrychium*

*Virginianum* and fresh specimens of *B. ternatum* of the varieties *intermedium*, *obliquum* and *dissectum*.

Adjourned to November 27.

Tuesday evening, November 27. On account of inclement weather there was not a quorum in attendance and no business was transacted. Those present studied the genus Equisetum with the help of herbarium specimens, particularly those of *E. fluviatile* (*limosum*).

Adjourned to December 11.

Tuesday evening, December 11. Annual meeting; the President in the chair; Mrs. Batchelder Secretary pro tem.

After the reading of the reports of the last two meetings and of the annual report of the Secretary, the Section proceeded to the election of officers for the coming year. It was voted that a nominating committee be appointed by the chair. Accordingly the chair appointed Mrs. Williams, Miss Wiggin, and Miss Tuttle. This committee, after consultation, brought in the following list of officers of Section C, for the year 1901:

*President*—Mrs. Albert O. Brown.

*Vice President*—Miss Caroline E. Wing.

*Secretary*—Mr. F. W. Batchelder.

*Treasurer*—Miss Ellen F. Wiggin.

*Executive Committee*—Miss Caroline E. Wing, Rev. Charles J. Staples, Miss Isabelle R. Daniels; the President and Secretary ex officio.

It was voted that the Secretary cast one ballot for the foregoing list, which having been done, the persons named were declared duly elected.

The plan of work for the coming year was then discussed. At the request of the President Mr. Burnham spoke of microscopic work in connection with botanical study, with reference to the tissues and the reproductive organs of ferns and also the development of buds. He also kindly offered his microscope and slides for use at future meetings.

Adjourned to January 8, 1901.

# INTRODUCTORY.

REPRINTED FROM VOLUME I, 1893.

The botanists of Dartmouth College in New Hampshire and of Amherst College in Massachusetts in the publication of their local floras defined their areas as circles with a radius of thirty miles from Hanover and Amherst respectively. It will be advantageous to define at the outset what shall be the working area, botanically of the Manchester Institute. Certain natural and artificial boundaries suggest themselves, within which there is plenty of room, abundance of material and the certainty of not interfering with or being crowded by workers in other areas. Broadly speaking, then, we claim as our proper area the whole of Hillsborough county, the west half of Rockingham county and the south half of Merrimack county. In other words this area may be described as bounded on the west by the Connecticut valley watershed, on the south by the state line, on the east by the Atlantic watershed and on the north by the arc of a circle drawn through Merrimack county with a radius of twenty-five miles from Manchester.

The Preliminary List is precisely what its title implies, the first step towards the goal that is set before us. The most of it is drawn from the observations and collections of the compiler, whose researches have been principally confined to the towns of Pelham and Hudson, Manchester and adjoining towns, and Concord. The intention is to extend observations as soon as may be over the whole area named, and in this work the assistance of all persons interested is solicited. Communications and specimens forwarded to E. J. Burnham, Corresponding Secretary of the Institute, Manchester, N. H., will receive due consideration.

The arrangement of families is that of Engler and Prantl, the great German systematists. The nomenclature is that of Gray's Manual, sixth edition, except in certain families where for good and sufficient reasons the use of a later nomenclature appeared to be preferable.

# ADDITIONS
## TO THE
# PRELIMINARY LIST of PLANTS.

COMPILED BY FREDERICK W. BATCHELDER.

*Note*—Circumstances prevented the anticipated enlargement of the Preliminary List of 1899 by observations and collections during the year 1900. Consequently the only additions are a single grass, two species of cruciferous plants, and the genus Lobelia, which was accidentally omitted from the original list.

### Gramineæ.

**Eragrostis Frankii** Steud. Manchester. Rare.

Growing near the track of the newly constructed electric road from Manchester to Goffstown. Probably an immigrant from the West or South.

### Cruciferæ.

**Cardamine Pennsylvanica** Muhl. In wet places.

**flexuosa** With. In swamps.

### Campanulaceæ.

**Lobelia Dortmanna** L. Sandy borders of ponds. Not rare.

**cardinalis** L. Common along stony streams.

**spicata** Lam. In dry fields. Common.

**inflata** L. Very common.

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## SUMMARY
### 1899—1900.

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| | |
|---|---|
| Number of Families represented | 115 |
| Number of Genera represented | 370 |
| Number of Species named | 811 |
| Number of Varieties named | 13 |
| Total number of names | 824 |

MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

## SECTION D.

# ORNITHOLOGY.

### Officers for 1900.

MRS. F. W. BATCHELDER, *President.*
MRS. J. C. BICKFORD. *Vice President.*
MISS MAY W. DAVIS, *Secretary.*
MISS THEODORA RICHARDSON, *Treasurer.*

EXECUTIVE COMMITTEE.

EDWARD H. FOGG, MISS THEODORA RICHARDSON.
MRS. J. C. BICKFORD.

# SECTION D---ORNITHOLOGY.

This Section was organized February 15th, 1899, and admitted to the Institute January 17, 1899.

It has for its objects the systematic study of the structure and life-history of birds in general and the observation, record and classification of the avifauna of Manchester and vicinity. Special subjects for investigation will be the distribution of species locally with relation to climatic, geologic and floral conditions, the habits of birds, their food in its relation to insect pests, and thereby to agriculture, their songs and calls, their variations—in short, anything which may increase our knowledge of their life-histories and of the links which join them to the lower and higher animals and to man.

Two important collateral branches of work will be these: First, the collection of a local museum of ornithology, in which, in the course of time, all the species incident to the region shall be represented by mounted specimens and skins prepared according to the latest and most approved methods; second, the compilation of as full a list as possible of resident, migrant, visitant and accidental species. The list will of neccessity be at first a modest one. The addition of supplements annually will render practicable at no distant date the publication of a list more nearly commensurate with our ambition and with the avian wealth of an exceptionally favored locality.

The situation of Manchester is favorable to variety in its fauna no less than in its flora. The overlapping of the Boreal and Alleghanian areas gives rise to a corresponding overlapping of the breeding ranges of various species of birds. In illustration and proof of this may be cited the fact that the breeding range of the wood thrush extends not less than twenty miles north and of the hermit thrush not less than twenty miles south of Manchester, and that the white-throated sparrow or peabody bird is a summer resident.

In order to systematize the results of observation a perpetual bird-calendar is kept by members specially appointed from time to time, who incorporate with their own observations, those of all the other members. Field-days are held at the pleasure of the section. Two were held this year and proved to be equally enjoyable and profitable.

# LECTURES.

OF A COURSE

SIX LECTURES BY MR. RALPH HOFFMANN,

OF BOSTON, MASS.

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The last three lectures in this course were delivered after the first of January, 1900.

The following were the dates and subjects:

January 12, 1900. Swallows and Sparrows.
February 9, 1900. Blackbirds, Flycatchers and Woodpeckers.
March 9, 1900. Birds of Prey, Game Birds and Water Birds.

This course of lectures proved to be even more interesting and successful than was anticipated. The constantly increasing attendance and the evident interest manifested bore sufficient testimony to their exellence.

Mr. Hoffmann's enthusiasm is reinforced by sound judgment and by the power to win at once the attention and sympathy of his audience.

## SECTION D.

# ORNITHOLOGY.

### REPORTS OF MEETINGS.

Wednesday evening, January 10. Regular meeting. The fourth lecture by Mr. Ralph Hoffman in the course tendered to the Institute by this Section having been assigned for Friday evening, the 12th, the meeting voted to adjourn without further business. Accordingly adjourned to January 24.

Wednesday evening, January 24. Regular meeting; the President in the chair. Number of members present, 23. The reading of the records of the meetings of December 27, 1899, and January 10, 1900, were read and approved.

The President offered suggestions relative to the observation and study of birds in the coming season, as follows:

1st—to record date of observation.
2d—time of day.
3d—place of observation.
4th—nature of locality.
5th—number of birds.
6th—if possible, note number of male and female and immature.
7th—compare number of males and females.
8th—note what doing, and if feeding, upon what.
9th—calls and songs.
10th—any special or unusual circumstances.

The bird calendar to date was presented by Mr. Batchelder, who remarked upon the mildness of the season and the unusual number of birds seen in this locality. Following is the list: House sparrow, crow, blue jay, goldfinch, downy woodpecker, ruffed grouse, chickadee, butcher bird, pine grosbeak. Mr. Herbert E. Richardson reported a flock of red-poll linnets seen on January 21. Mr. Fogg reported a small flock of red crossbills seen January 3, and a hairy woodpecker January 5. Mrs.

Lockhart and Mr. Batchelder were appointed to prepare the calendar for the next meeting.

Mr. Batchelder, having been appointed at the meeting of September 20, 1899, to present a comparison between the local list of birds thus far observed and Chapman's Handbook, gave his report accordingly. Following this, he gave an explanation of the names of orders and families in ornithological nomenclature.

Adjourned to February 21.

Wednesday evening, February 21. Regular meeting; number of members present, 19.

The matter of ornithological magazines and periodicals to be subscribed for was discussed and was referred to the Executive Committee. A plan for field days and a Summer School in connection with the Institute was brought before the meeting and explained by Mr. Clough, the President of the Institute, and by Mr. Burnham, the Corresponding Secretary. Saturday, March 31 was selected as the date for the first field meeting of Section D in connection with the Summer School. For reports of this and subsequent field meetings see special report of Summer School.

In the absence of Mrs. Lockhart, Mr. Batchelder reported the calendar, adding six species to the twelve hitherto reported, as follows: January 28, tree sparrow; February 2, Bohemian waxwing; February 6, junco; February 11, red-breasted and white-breasted nuthatches; February 20, white-winged crossbill. The last-named species had been reported on October 6, 1899, and occasionally during the remainder of the year. On February 20, 1900, they appeared in numerous flocks. Most of those observed were feeding upon the seeds of the Norway spruce. The pine grosbeaks have continued to be abundant, the males being to the females in about the proportion of one to six. Two of the Bohemian waxwings were observed in such favorable conditions as to leave no room for doubt in the mind of the observer. As no specimens were taken, he naturally hesitates to offer his report as absolute and final.

Mr. Herbert Richardson and Mrs. Varick were appointed to prepare the calendar for the next meeting.

The members gave their attention to a paper by Miss Amelia Graupner on "The Food Habits of Birds." The subject was considered from the economic standpoint and was illustrated by a carefully prepared chart showing the per cent of animal and vegetable food in the diet of birds. The paper was divided into the following sections: 1st. The paramount service of birds lies in their power to destroy insects. 2d. Many species perform an inestimable service by destroying the seeds of harmful plants. 3d. Birds do not naturally select the products of cultivation for food, but prefer the food supplied by wild plants. It is only when deprived of their natural food supply that they attack the fruits of garden or orchard.

Adjourned to March 21.

Wednesday evening, March 21. Regular meeting; number of members present, 14.

Miss Theodora Richardson, having been appointed by the Council as Instructor in Ornithology for the Summer School, gave notice of a field meeting to be held at Auburn on the 31st day of March.

The calendar was presented by Mr. Richardson. A paper was read by Miss Mary F. Dana on the "Theory of Migration of Birds." Following is an abstract:

Birds are divided into three classes: Those which arrive in spring and remain through the summer; those which arrive in the fall and remain through the winter; those which are with us but twice a year and are called birds of passage. Besides these are the partial migrants and the permanent residents, the latter changing their location more or less as the necessities of food supply or of incubation may decide.

Several theories of the cause of migration were considered, such as variations in temperature, scarcity of food supply, geologic and climatic changes and the selection of safe breeding places. To sum up—the mysterious phenomena and the marvelous powers of the bird world are by most students brought to rest upon the foundation of practice, habit and the survival

of the fittest. Leading ornithologists believe that birds follow landmarks known by sight, as coast lines, mountains and river valleys.

After a discussion of the theories advanced, the meeting adjourned to April 18.

Wednesday evening, April 18. Regular meeting; number of members present, 9.

The calendar of birds was read, the recent additions being these—robin, bluebird, song sparrow, American merganser (flock of 50 or more), brown creeper, red shouldered hawk, fox sparrow, meadow lark, phoebe, purple finch, flicker, redwing.

Mr. Fogg read a paper on "Bird Localities." He suggested that bird students dress as inconspicuously as possible when out for observation in wood or field. He described different kinds of localities and named the kind of birds likely to be found in each, e. g., thrushes and tanagers in woods, bluebirds and purple finches in orchards, sparrows and Maryland yellow-throats in bushy pastures and swampy clearings.

Mr. Fogg and Mrs. Lockhart were appointed to prepare the calendar for the next meeting.

Adjourned to May 2.

Wednesday evening, May 2. Regular meeting; the President in the chair. Number of members present, 9. Mrs. Lockhart presented the calendar, with these additions to the previous list, chipping sparrow, yellow-rumped warbler, yellow warbler, cowbird, vesper sparrow. Mr. Batchelder added kingfisher, blue-headed vireo, field sparrow, swift, hermit thrush, parula warbler, and Mr. Fogg added white-throated sparrow, house wren, bob-white, pine warbler, wood pewee, golden-crowned kinglet, white-eyed vireo.

The members gave their attention to an explanation by Mr. Batchelder of the derivation and meaning of the generic and specific names in ornithology.

Adjourned to May 16.

Wednesday evening, May 16. Regular meeting; the Vice President in the chair.

The calendar, reported by Miss Barnes and Miss Hope, was

of unusual interest, as will be seen from the following list of additions—brown thrasher, chebec, kingbird, yellow-throated vireo, Baltimore oriole, rose-breasted grosbeak, white-crowned sparrow, indigo bird, white-bellied swallow, catbird, Wilson's thrush, chewink, least sandpiper, spotted sandpiper, bobolink, humming bird, olive-backed thrush, black-billed cuckoo, night-hawk, Wilson's plover, wood thrush, olive-sided flycatcher, purple martin, cedar bird, gray-cheeked thrush, and these warblers: black-throated green, black-throated blue, Blackburnian, Magnolia, chestnut-sided, oven bird, water thrush, redstart, Maryland yellow-throat, black-poll, black-cap, Canadian, golden-winged, yellow-palm, palm, Nashville, Cape May; also the blue-gray gnatcatcher.

The golden-winged, palm, Nashville and Cape May warblers and the blue-gray gnatcatcher had never before been reported from this section of the state. [See Notes to Additions to Preliminary List of Birds during 1900.]

Miss Fogg and Miss Daniels were appointed to prepare the calendar for the next meeting.

The members gave their attention to a talk by Mr. Wm. H. Huse on "Ornithology in the Public Schools," with appropriate illustrations by means of lantern slides.

Adjourned to May 30.

Wednesday evening, May 30. Regular meeting.

Adjourned to June 13.

Wednesday evening, June 13. Regular meeting; Mr. Fogg in the chair.

It was voted that when the meeting adjourned it should be till the call of the President after the summer vacation.

Mr. Herbert Richardson gave a talk on "Reminiscences of Early Days in Birds' Nest Hunting and Eggs Which I Have Seen." Mr. Fogg spoke of the present year being very remarkable for the great numbers of birds recorded and especially for the number of species observed which had not been hitherto reported for this vicinity.

Mrs. McLeod, who resides in a very favorable locality a little

out of the city, reported having made observation of 84 species of birds since the first of January.

Adjourned to the call of the President.

Monday evening, October 9. At the call of the Presidents of Sections B and D a joint meeting of those Sections was held to consider the advisability of combining the work of the Sections for the remainder of the year.

It was voted that a committee of three be appointed by the chair to arrange the work of these meetings for alternate Monday evenings beginning with Monday evening, October 22. The chair accordingly appointed Mr. E. J. Burnham, Mr. Edgar D. Cass and Mr. A. L. Clough.

Mr. Burnham gave a talk leading up to the classification of animal life, beginning with the cell.

It was announced that the subject of the next meeting would be "The Backbone."

Adjourned to October 22.

Monday evening, October 22. Joint meeting of Sections B and D.

Dr. Bullock gave a talk upon "The Backbone," illustrated with specimens of human vertebræ; also with those of cats, birds and fishes. A live snake, the puffing adder, was exhibited by Mr. Huse. Mr. Burnham spoke on the new classification according to Professor Jordan's Manual, and suggested that the Section make use of that book in study.

Adjourned to November 5.

Monday evening, November 5. Joint meeting of Sections B and D.

The evening was devoted to the study of Jordan's classification and nomenclature, with special reference to the dentition of the Mammalia.

Adjourned to November 19.

Monday evening, November 19. Joint meeting of Sections B and D.

Subject of study: Dentition of Vertebrates. The Theory of Cranial Development was presented by Mr. Burnham. Follow-

ing this, various skulls and vertebræ were examined and classified.

Mrs. Batchelder, who was a delegate from the New Hampshire Audubon Society to the combined meetings of the American Ornithologists' Union and the Audubon Societies held at Cambridge November 15, gave a report of the meetings. She spoke particularly of the results already accomplished in the line of bird protection along the coast from Virginia to Maine, and of the further good results to be expected from the passage by Congress of the Lacey Bill last May.

Adjourned to December 3.

Monday evening, December 3. Joint meeting of Sections B and D.

Adjourned to December 12.

Wednesday evening, December 12. Annual meeting; the President in the chair. In the absence of the Secretary, Miss Theodora Richardson was appointed Secretary pro tem. The annual report of the Secretary was then read and approved.

It was unanimously voted that that part of the Secretary's report which referred to the death of Mr. William Ellery Moore, one of our most earnest members, be forwarded in a fitting manner to Mrs. Moore. Mr. E. H. Fogg, as Chairman of the Executive Committee, gave a report of the joint meeting of the Executive Committees of Sections B and D. In accordance with their recommendation it was unanimously voted that for the next six meetings this Section continue to work in conjunction with Section B, with Mr. Edward J. Burnham as leader, following the line of study already begun.

The chair appointed a nominating committee, consisting of Mr. Edgar D. Cass and Miss M. Eugenia Lord, to bring in a list of officers for the year 1901. The committee reported the following list of names:

*President*—Mrs. Annie V. Batchelder.

*Vice President*—Mrs. Emma L. Bickford.

*Secretary*—Miss May W. Davis.

*Executive Committee*—Mr. Edward H. Fogg, Miss Theodora Richardson, Mrs. Emma L. Bickford.

It was voted that the Secretary cast one ballot for the foregoing names, which having been done the persons named were declared elected.

The President described the "Lacey Act," passed by Congress last May, as being a measure intended to supplement existing State laws and to regulate inter-state commerce in game, and also as marking the beginning of a new era in bird protection.

Adjourned to December 17.

Monday evening, December 17. Joint meeting of Sections B and D. Continuation of study of Jordan's Manual.

Adjourned to December 31.

Monday evening, December 31. Joint meeting of Sections B and D. Continuation of study of Jordan's Manual.

Adjourned to January 14, 1901.

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# ADDITIONS
## TO THE
# PRELIMINARY LIST OF BIRDS.

**528b. Acanthis linaria rostrata** (*Coues*).
GREATER REDPOLL.

Abundant in the winter of 1899-1900. (See Note 2 below)

**642. Helminthophila chrysoptera** (*Linn.*)
GOLDEN-WINGED WARBLER.

A few observed in May, 1900. (See Note 3 below)

**645. Helminthophila ruficapilla** (*Wils.*)
NASHVILLE WARBLER.

Abundant in May, 1900. (See Note 3 below)

**650. Dendroica tigrina** (*Gmel.*)
CAPE MAY WARBLER.

Abundant in May, 1900. (See Note 3 below)

**672. Dendroica palmarum** (*Gmel.*)
PALM WARBLER.

Abundant in May, 1900. (See Note 3 below)

**751. Polioptila cærulea** (*Linn.*)

BLUE-GRAY GNATCATCHER.

Observed May 10, 1900. (See Note 4 below)

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## Notes to Bird List.

### NOTE 1.

**357. Falco columbarius** (*Linn.*) PIGEON HAWK.

Common transient visitant.

(Erroneously reported in the Preliminary List, Vol. I, 1899, as a common summer resident.)

### NOTE 2.

### Winter Visitants, 1899--1900.

The winter of 1899—1900 was remarkable for the large number of winter visitants observed, some of them being rare and some never before recorded from our area. The White-winged Crossbills, which were recorded at Manchester October 16, 1899 and frequently observed during the remainder of the year, appeared in larger numbers early in January, 1900, the maximum number occurring about February 20, after which the number rapidly diminished until their final disappearance in the spring. These Crossbills were seen oftenest feeding on seeds from the cones of the Norway spruce. The proportion of males to females was about one to four. Their call notes and flight notes were very sweet and characteristic but are not easily described.

The Pine Grosbeaks were abundant all winter. The proportion of males to females was about one to seven, and the number of birds seen together ranged from two to thirty. On one occasion they were seen to associate quite freely with a pair of butcher birds, as if not in the least troubled by the carnivorous propensities of the latter.

The Red-poll Linnets were also very abundant. In addition to the typical *Acanthis linaria* there were also numbers of the variety *A. l. rostrata*, especially toward spring. In the middle of the winter there was certainly at least one other species, probably *A. hornemannii exilipes*, and some of these were so much

larger than others as to suggest the possibility of their being *A. hornemannii* on a visit from Greenland. As no specimens were taken the compiler has not presumed to put these last two on record. Concerning *A. l. rostrata* there can be no question.

NOTE 3.

## On the Migration of Warblers Observed in May, 1900.

The month of May, 1900, was remarkable for the extraordinary incursion of warblers, including several species never before reported in our area. Soon after the first of the month the birds were observed to be unusually abundant. By the 9th the numbers, both of common and rare migrants, surpassed the record of any previous year. The first new record was that of the Palm Warbler on the 9th. On the 10th were also recorded for the first time the Nashville and Cape May Warblers, and a few days later the Golden-winged Warbler. All these species were observed in greater or less numbers for about two weeks, the maximum number occurring about the 12th. Soon after this date another extraordinary succession of events occurred. Day after day great numbers of warblers were found dead. Into one of the public schools the children brought "a basketful" of them, about three dozen, as I was afterwards informed by one of the teachers. Into another school nearly as many were brought and a number were sent to a taxidermist to be mounted. Among these birds were the following eight species: Maryland Yellow throat, Redstart, Parula, Chestnut-sided, Blackburnian, Magnolia, Canadian and Nashville. Examination of the stomachs of these birds indicated that they had not been able to procure their requisite amount of food and had starved to death. The occurrence of an unusually cold wave on the 11th and 12th and a subsequent succession of cold, rainy days may account for the facts in the case of those visitants who were off their accustomed track and whose supply of insects may have been cut off temporarily by the weather. The fatality in the cases of the ordinary residents, like the Redstart and the Maryland Yellow-throat, hardly seems as easy of explanation.

Observers in Franklin, some 40 miles further north, reported precisely similar occurrences. Not only were the warblers in great numbers but they were apparently very tame, feeding about yards and particularly the foundations of houses, and great numbers were found dead.

NOTE 4.

## A Blue-gray Gnatcatcher in New Hampshire.

On the 10th of May two observers, while watching a flock of visitant warblers, saw flying about a shrub close by, what they took at first glance to be a kinglet. A second look showed that though the bird was as small as the kinglets the color was entirely different, the upper parts being distinctly bluish gray instead of olive green. Presently the bird displayed his tail with the utmost deliberation several times, showing the outer feathers white, the others changing gradually until the middle ones were entirely black. Of course it could be nothing but the Blue-gray Gnatcatcher, never yet, so far as we know, reported from this State. The bird came finally so near that he could almost have been caught in the hand. Meanwhile Chapman's Manual had been brought from the house and every point of the bird was compared with the printed description. In the circumstances, therefore, it seems right to make the record positive, though the single specimen was allowed to escape.

MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

## SECTION E.

# FINE ARTS.

### Officers for 1900.

WILLIAM H. HUSE, *President.*
WILLIS B. KENDALL, *Treasurer.*
WILLIAM E. BUCK, *Auditor.*
EVA F. TUSON, *Clerk.*

DIRECTORS.

HENRY W. HERRICK,
NORWIN S. BEAN,
W. R. CALL,
LUTHER C. BALDWIN,
WILLIAM E. BUCK,
J. BRODIE SMITH,
WILLIAM K. ROBBINS,
CHARLES H. BARTLETT.

## SECTION E.

# FINE ARTS.

### REPORTS OF MEETINGS.

During the winter Mr. William E. Burbank and Mr. J. Warren Thyng continued their art classes that were begun in the fall of 1899. Mr. Burbank met his class on each Thursday evening and directed their work in drawing from the antique; Mr. Thyng, his class on Friday evenings, and lectured to them on perspective and the art of composition. Both classes were well attended, and to both gentlemen the Institute owes much for their interest in and efforts for the success of the organization. Both classes were discontinued in the early summer.

In the fall Mr. Burbank resumed his instruction on Thursday evenings; Mrs. Maud Briggs Knowlton began instruction to a class in wash drawing from still life, on Saturday evenings, and Mrs. Melusina H. Varick organized a class in wood carving to meet on Friday evenings. So many applied for admission to Mrs. Varick's class that a second class was formed for work on Saturday mornings. Through these classes the Section has been doing more practical work than for years before it united with the Institute.

On November 20, Rev. Charles J. Staples began a course of lectures on "Studies in Literature," under the auspices of this Section. His subject on that date was "Elements of the Best Literature," His dates and subjects for the remainder of the course were: December 18, 1900, Charlotte Bronte; January 15, 1901, William M. Thackeray; February 11, 1901, William Wordsworth; March 12, 1901, Robert Browning.

At the annual meeting of the Section, held at the rooms of

the Institute, October 9, 1900, the following officers were elected for the ensuing year :

*President*—William H. Huse.

*Treasurer*—Willis B. Kendall.

*Auditor*—William E. Buck.

*Clerk*—Eva F. Tuson.

*Directors*—Henry W. Herrick, Norwin S. Bean, W. R. Call, William E. Buck, J. Brodie Smith, William K. Robbins, William E. Burbank, Mrs. John B. Varick.

# WILLIAM MAKEPEACE THACKERAY

BY REV. CHAS. J. STAPLES.

A Lecture Delivered Before Section E. of the Manchester Institute of Arts and Sciences

January 15, 1901.

A well-worn subject is not, therefore, uninteresting. The fact that it is well worn and has been treated many times by many men of many minds only goes to prove its fascination. This writing about writing is rather poor business; and yet if we can forget what has been written about Thackeray and look at his work with our own eyes we may gain a fresh point of view that may not be without its value. It may set others to looking, too; it may bring out some unexpected lines and features. But yet our criticism will be false and futile if it represent but a personal whim, the vagary of one who strives to see something no one ever saw before. Mere personal taste counts little; we must justify our ways, at least to ourselves. What shall be our standard of what is best in literature when we think of work like Thackeray's, wide-reaching, large in amount, intensely individual? Without trying to settle such a tremendous question let us dodge it with what the scientists call a "working hypothesis." Suppose we say that all literature possesses the qualities of substance and the qualities of form. One is the thought, the other the expression; one concerns the mind and feeling put into any work, the other the way and manner in which the subject is treated, its art and language. In the best literature we find a certain quality of its substance we may call zest, earnestness, or power; the presence of a compelling

force which moves the man to speak because he must, because he has something to say. Another of these substantial qualities is breadth or range. Another is wholesomeness; in the best literature must be nothing morbid and unhealthy. Some of the qualities of form are its unity or directness, its imaginative power, and the ease or smoothness of the style. Let us look at our poor victim of an author, then, along these lines.

In the eyes of his contemporaries I suppose Thackeray seemed to be daringly unconventional. The spirit of rebellion against the usual style of the far-fetched and romantic novels common at that time showed itself in Thackeray's keen and quiet satire, in his desire to exhibit men and women as they are, even if it should be necessary to write a story without a hero. For the hero was an indispensable requisite to every well-regulated novel before Thackeray's day. Some being of transcendent excellence, man or woman, must dominate the story; at his or her appearance every knee must bow, the choicest adjectives were scattered with unsparing hand, the most unusual adventures must be devised to show off hero and heroine, their woes must be heaped mountain high, their invention and daring, their passion and pain, their valor and foresight must be superhuman, else the tale was voted by novel readers of the forties and fifties tame and insipid. Here, for example, is a short passage from Miss Jane Porter's "Scottish Chiefs," an exceedingly popular book in its time and written about 1809.

"The shriek of horror that burst from every mouth interrupted Wallace. "Vengeance! Vengeance!" was the cry of the men, while tumultuous lamentations for the "sweet Lady of Ellerslie" filled the air from the women.

Wallace sprang from the cliff into the midst of his brave countrymen: "Follow me, then, to strike the mortal blow!" * * * * *.

"Death and Lady Marion!" was echoed with shouts from mouth to mouth. Every sword was drawn; and those hardy peasants who owned none, seizing the implements of pasturage, armed themselves with wolf-spears, pickaxes, forks and scythes.

Sixty resolute men now arranged themselves around their chief. Wallace, whose widowed heart turned icy cold at the

dreadful slogan of his Marion's name, more fiercely grasped his sword, and murmured to himself, "From this hour may Scotland date her liberty, or Wallace return no more. * * * Before the moon sets, the tyrant of Lanark must fall in blood."

"Death and Lady Marion!" was the pealing answer that echoed from the hills.

Wallace again sprang on the cliff. His brave peasants followed him; and taking their rapid march by a near cut through a hitherto unexplored defile of the Cartlane craigs leaping chasms and climbing perpendicular rocks, they suffered no object to impede their steps while rushing onward like lions on their prey."

A reaction from this stilted and unnatural apotheosis of human perfection could but follow. The long bow of exaggeration was strained to breaking. Such writing began to seem hollow and false. Dickens, with all his grotesqueness, was among the first to return to common folks, and Charlotte Bronte and Mrs. Gaskell wrote out of real experiences and trials and told of real people. But Thackeray was to deal the hardest blow upon this habit of affectation and pretence in fiction, and we shall fail to do him justice or to understand his writing without bearing that in mind first of all. He set out to puncture shams, to reveal the essential wrong and wickedness of pretence in all its myriad personal and social forms. He was at heart a truth-lover, a hater of meanness and folly, and withal the gentlest, kindliest knight that ever laid lance in rest to win a joust against falseness and hypocrisy. That was the work given him to do, and he accomplished it with such exquisite delicacy, his tools were kept so sharp and bright, his skill was so perfect in its way that one is irresistably reminded of that mediæval legend about the executioner, so marvellously deft at his trade, that, having operated with noiseless and invisible swiftness, his poor victims knew not they were beheaded until, gracefully offering his snuff-box, the force of the pleasant and inevitable sneeze sent their heads rolling upon the pavement. But Thackeray never touched the springs of deepest passion or revealed the inner suffering and inner delight of souls. As a writer he held himself curiously aloof from his own creations. Sometimes it is even provoking. "Why doesn't the man show a little fire, a little enthusiasm?" we ask. "Why doesn't he hurrah a little

or groan a little? Why does'nt he get into the heart of these folks and ruffle his feathers a bit?'' No, he never does. He is ever calm. He is occupied with the outward show of life, with its pomp and pageantry, with its appearances, even in dealing with humble circumstances, and he is marvelously faithful to all the superficial details. His stories are the most vivid of panoramas; these figures live and will live, this crowded scene is fascinating, the finest illusion you or I need ever expect to witness. It is a picture of rare energy and power, delicately and finely wrought—and yet it is painted canvas, it is the surface of things and you must not approach too closely or inquire too shrewdly; the depth, the depth of life is not there, or but rarely. And none knew this better than Wm. M. Thackeray himself:

"The play is done; the curtain drops,
Slow falling to the prompter's bell;
A moment yet the actor stops,
And looks around to say farewell.
It is an irksome word and task
And, when he's laughed and had his say,
He shows, as he removes the mask,
A face that's anything but gay."

And thus we already touch, do you not see, that deep and primal test of the substance of the best literature. '' Has it the power of earnestness? Does it show zest and joy and a living energy, making men feel it is a great thing to be alive?'' I am afraid that is not true of Thackeray, and it irks me to say it. I have been twisting things in the attempt to reconcile my heart and my conscience; my heart that loves Thackeray, the man, and loves his books too, finding in them a perpetual delight—and my conscience that sees and feels more and more clearly that the man did not write because he had something of fire within, but because it was a thing he could do and do it well, partly because it was agreeable and interesting to pour out the full treasure of his observation and his thought. I have even been tempted to fit a brand-new theory to the case, just to accommodate one who never had anything but the kindest intentions and the most heart-winning boyishness of spirit in the presence of the whole human race. But on the whole I must sorrowfully stick to my standards. Somehow the great heart of

the man did not get into his stories except by implication. He was too shy, too reticent, perhaps felt too genuinely and deeply to ever unburden himself and make talk about the real things of life. Yes, I think that is true. He had the man's shyness that leaves the deepest and best things unsaid, a sensitive spirit that concealed itself behind all outward acts, knowing keenly what careless, painful and irritating comments are made by the world on what the soul holds most dear. For the real life and vital touch in Thackeray you must go to his letters, to the anecdotes about him, to his comical sketches; to his ballads and verses. It was here he bubbled over in fun, let himself loose, played the generous, hearty boy he actually was. That he couldn't do with the general public. He never quite forgets in his novels that somebody is looking on.

How far away this is from Homer or Shakespeare! *There* are two personalities that stand forever as types of that substantial quality, that primitive force in literature which shows men that take their work seriously because they are in it heart and soul. Homer, (yes, I know it has been doubted there ever was a single individual of that name, but the name represents a stage at any rate in Greek thought and Greek history) Homer plunges into his tale with the hearty unquestioning delight and unconsciousness of boyhood. He is excited by the swish of the water as the boat cuts the Ægean or he follows the precise steps of a priestly sacrifice with the serene assurance that everyone is equally interested with himself. He didn't see anything sad in life. It was all prime fun. But Thackeray is the boy without the unconsciousness of boyhood. The trail of the blase is over his work. "Let us make the best of it," he would say, "but there's not much to be proud of in this world. It is empty, it won't bear examination, it is a puppet show." Imagine Shakespeare giving that impression; you can't imagine it. Withal he gives you far crueler tragedies and shrinks not from the agonies, physical, mental and moral, the sum total is always the profound and lasting conviction that this is a great world with vast undiscovered realms in it of unmeasured potencies and excellence. One Cordelia, Portia and the rest, redeem the presence

of all the Gonerils and Shylocks. Even Hamlet and Othello and Lear by their capacity for thought and love and suffering prove the nature of man writ large.

But Thackeray belongs in his intellect to a different order. He must be ranked with Franklin, though with a far finer imagination of course. He wrote like the apostle of common sense, with shrewdness, wide and tenacious observation, not too much credulity, with piercing insight, with courteous kindliness and large toleration. Or better, he was like the writer of Ecclesiastes whose "Vanity of vanities all is vanity," he echoes at the end of his book :

"Ah! Vanitas Vanitatum! which of us is happy in this world? Which of us has our desire? Or having it, is satisfied? Come, Children, let us shut up the box and the puppets, for our play is played out."

He is like the French writers of the 18th century whom personally he did not like, because of his clearness of vision, his tendency to exhaust himself on the surface of life and his refusal to touch what lies below. Thackeray's stories always run leisurely. They seem to say, "Why so hot, friends, the world will wag on much the same no matter what happens to these men and women of mine. This boy Pendennis whom you see making such fervid blind love to the beautiful Fotheringay will soon come out of his dream. His passion is real enough, poor fellow, but see how blind it is. This little Amelia, what a pretty trusting doll it is. She will devote the fidelity of years to a self-made idol and Becky carries the while the letter which proves him mean as mud, among her secret treasures. Dear Col. Newcome will be caught in the trap of his own honesty and want of suspicion; we must not be over-hasty to conclude that he will have the good which he deserves. He is the victim of a combination which was beyond his power to change. We are puppets."

"And in the world, as in the school,
I'd say how fate may change and shift;
The prize be sometimes with the fool,
The race not always to the swift;
The strong may yield, the good may fall,
The great man be a vulgar clown,
The knave be lifted over all,
The kind cast pitilessly down."

Now on the outside of this world, fate is all powerful; but in

the substance of the best literature, you are made somehow to understand that there is that which is mightier than fate, and man is master of it.

So it is pleasanter to turn to our second test. What is the range of Thackeray's work? Certainly it is very great and deserves the highest praise. I think very few of the novelists, unless it be Dickens and Hugo have equalled or surpassed him.

Thackeray knew his world well. It was a city world and a masculine world, an upper and middle class world, these are its limitations. We may take these limitations first. He knew the country mostly as it is seen from within English country houses. There is a marked absence of landscape in his writing. His people never make remarks about the landscape, nor does he. They seem chiefly anxious to get back to the city, or at least within doors.

Perhaps this passage from Chapter XXIII of Vanity Fair will illustrate this point. Major Dobbin, you are to remember, has just landed from his last long service in India. He has heard nothing from Amelia but idle gossip. He comes on shore at Southampton. The description you will find capitally done but how brief it is, and in what general terms. Like his hero, he hurries to London.

"The chaise came up presently, and the Major would wait no longer. If he had been an English nobleman on a pleasure tour, or a newspaper courier bearing despatches (government messages are generally carried much more quietly), he could not have travelled more quickly. The post-boys wondered at the fees he flung among them. How happy and green the country looked as the chaise whirled rapidly from milestone to milestone through neat country towns where landlords came out to welcome him with smiles and bows; by pretty roadside inns, where the signs hung on the elms, and horses and wagoners were drinking under the checkered shadows of the trees; by old halls and parks rustic hamlets clustered round ancient gray churches — and through the charming English landscape. Is there any in the world like it? To a traveller returning home it looks so kind— it seems to shake hands with you as you pass through it. Well, Major Dobbin passed through all this from Southampton to London, and without noting much beyond the milestones along the road. You see he was so eager to see his parents at Camberwell."

Thackeray held not the very modern idea that character is found by the scenery it keeps. He would have been free to label such an idea another humbug. Still, this great novelist did miss the value and significance of life out-doors; he had no eye for the frame and setting which nature furnishes to man. He did not care much for the virtue of the poor, and rather disbelieved in it. He wasn't brought up in that atmosphere. Poverty irritates him. He draws a freer breath when away from it. And then, as Charlotte Bronte never could draw a satisfactory man, Thackeray certainly did not succeed with his women. It is one of the perplexities about him. "Why are all your women either knaves or fools," suddenly demanded a lady in conversation with him, and we may well believe that his reply was only a rebuke to the inquisitor, "Because, madam, I know no others." The fact remains, and it is better to think that it was due to the surroundings and history of his own life, due to misfortune and ignorance rather than to any other cause, He did not create the

> "Perfect woman, nobly planned
> To warn, to comfort and command."

He did, it is true, conceive a real live woman in Becky Sharp, one of the few great characters in fiction. Whatever her faults as a possible woman, she is actual flesh and blood in that Vanity Fair which never ceases among men. But I wonder if you feel with me at times that Becky Sharp is a little "overdone"? Don't you think the author makes her out too uniformly wicked, too unbrokenly sly and selfish? I don't believe the real Becky was without some moments of sanity, that she did care for something beside herself. I don't believe that anyone could live without that. But at any rate Thackeray doesn't leave her alone enough. He seems to be afraid we shall find something commendable in the little orphan. He pours out his sarcasms upon her. He is ever pointing the finger at her. On the last page of the novel he points the finger from away, way off, as if she was almost out of sight in the depths of degradation. He brings her near to the attainment of her schemes time and time again, only to see the careful card castle topple at a breath. He is almost vicious with her; her presence excites him as if he were a

house dog growling out of an unreasonable antipathy towards one of the neighbors. He won't let us have an atom of sympathy with the designing creature until—well, it may be very immoral for a minister to confess it, but he really creates in the virtuous breast a reactionary delight in the keen-witted scamp and a fervent though wicked wish that she might succeed in her cleverness. As for Thackeray's good women they are simply exasperating, Mrs. Pendennis and Laura, Henry Esmond's gracious lady, Amelia Sedley. Even Ethel Newcome is not much better, hardly more than a shadow, and Beatrix Esmond, who does not pretend to be exactly good, we may count the most successful of the assembly.

And yet with all these abatements it is a large and varied world he sets forth in his pages; it is the picture gallery of a wide-eyed traveler. He has seen many lands and many faces, like the much-enduring Ulysses. None have disclosed as he the life of the average modern man in certain social grades. Major Pendennis is enough to make one novelist's reputation. He knows well the men of the press and the ball-room, the camp and the court. He seems to hover on the verge of the grotesque and the caricature all the time, and yet makes you appreciate the undeniable truth of his lives and sketches. The life of the school and the college not even Kipling has given with such fidelity, and "Grey-friars" is classic ground to all English readers since the Charter-house disappeared. The life of the valet, of the returned East Indians, of British travelers abroad, of the petty German counts, the wild Bohemianism and *cameraderie* of the London inns of court and the coffee-houses down to the inimitable "Back Kitchen" of Pendennis, all is gathered up with a masterly hand. And then that wonderful power of realizing a past age in Henry Esmond, the most finished and complete work of the sort ever accomplished! I cannot praise highly enough its vivid presentation of the very atmosphere of Queen Anne's London and the very thoughts and feelings of the world as it went then. So great is this range of insight into many varieties of human nature that in the future men will go to Thackeray as the true historian of the middle 19th century in England. I

think, as I said before, he entirely misses the deep realities of that life, its undercurrents, but so far as the external appearance goes this was the half-world of the Victorian age.

That it is, after all, only a half-world Thackeray gives us in his novels is the severest criticism that can be passed upon the wholesomeness of his influence. We are compelled to admit that he fits better into the middle-age point of view. Hearty and unsophisticated youth is not apt to admire him. His view of the human lives about him is too monotonously depressing and sad, and youth does not yet feel the charm of his virile intelligence. I remember that it was years before I could get interested in Vanity Fair, though I made repeated trials, while Esmond was one of my first loves and my last. Vanity Fair is not a work to be put in any one's hand who is not ready for it. Mature life finds itself in large measure reflected there, but generous youth not at all. The greatest men in literature have and must be men of faith, not in a narrow and theologic sense, but in the sense of looking forward, of noble expectation. Life cannot be lived at its best without that, and to lose noble expectation—some love of liberty, or service, or ideal character—is the greatest possible loss. The illusions of vigorous souls are nothing to be ashamed of or scorned. As they "fade into the light of common day" they ought to strike deeper root in reason and right. Thackeray has not the wholesomeness of a large faith. But, having said this, there is a good deal on the other side. I do not think he seriously harms any one who has not already harmed himself. Many have hid their own weakness, cynicism and failure behind the name of one whose heart, I believe, was sound. It is the first plunge into Thackeray that hurts, it is the wholesome hurt of knowing some things as they are. Truths and half-truths are apt to hurt and they may be good for a man to know. It is good for a man to know the meanness of cant, hypocrisy and pretence in all its myriad forms. And so a robust nature rises from Thackeray not harmed but purified. He *has* the wholesomeness of honest intelligence, the courage to look at the meaner forms of evil in the world and not be overcome by the world. So that after the first plunge you come to

see that Thackeray is by no means a hopeless soul. He is so anxious to be truthful to the appearance that he almost falls off on the other side. But not quite. For as you come to know the people of his stories better you find they never mock at any real goodness, that to their creator the luster of even commonplace kindness and generous charity shines the fairer for the weakness, folly and frailty by which it is surrounded. Beside his intellectual clearness there is in Thackeray a great tenderness of heart towards all who are in trouble and failure, all who are betrayed either by themselves or others.

"'It is not difficult to be a country gentleman's wife,' Rebecca thought. "I think I could be a good woman if I had five thousand a year. I could dawdle about in the nursery, and count the apricots on the wall. I could water plants in a greenhouse, and pick off dead leaves from the geraniums. I could ask old women about their rheumatism, and order half a crown's worth of soup for the poor. I shouldn't miss it much out of five thousand a year. I could even drive out ten miles to dine at a neighbor's, and dress in the fashions of the year before last. I could go to sleep and keep awake in the great family pew; or go to sleep behind the curtains, with my veil down, if I only had practice. I could pay everybody if I had but the money. That is what the conjurors here pride themselves upon doing. They look down with pity upon us miserable sinners who have none. They think themselves generous if they give our children a five pound note, and us contemptible if we are without one.' And who knows but Rebecca was right in her speculations—and that it was only a question of money and fortune which made the difference between her and an honest woman? If you take temptations into account, who is to say that he is better than his neighbor? A comfortable career of prosperity, if it does not make people honest, at least keeps them so. An alderman coming from a turtle feast will not step out of his carriage to steal a leg of mutton; but put him to starve, and see if he will not purloin a loaf. Becky consoled herself by balancing the chances and equalizing the distribution of good and evil in the world."

I do not rise from "The Newcomes" or from "Vanity Fair" with any bitterness, but with a larger consideration and even love towards man. It is as though the writer of a new Ecclesiastes said, "I promise you no perfect creatures among human

folks; I find none in the world; but I will give you character in place of perfection; I will give you erring, weak and fallible humanity. I give you men you can never think of afterward without a glow around the heart, lank and faithful Major Dobbin, bearing the burdens of a host of others, Colonel Newcome, with his childlike honor and purity of soul, Esmond, a soldier of coolness, patience and magnanimity." He saw through them all. And still we love them the more, just as we do our own folks. If his is not the clarion note of faith, he has in noblest, fullest form the heart song of charity. "And the greatest of these"—it was said long ago.

When we pass from the qualities of substance to the qualities of form we simply acknowledge in Thackeray the master of our English speech. His is the well-nigh perfect power of expression in language, so that you are hardly conscious, without examination and study, how fine his skill. We forget he has a style in the mere pleasure of listening. In a far wider and truer sense than of Goldsmith it might be said, "He touched nothing he did not adorn." It seems to make little difference what his immediate subject may be, even though in itself rough and repellent, you want to have him keep on talking, and the end of the chapter always comes too soon. For with him the words are never in the way. They have the precision and deftness of a perfect machine. You like to watch the machine's smooth, swift motion whether the machine is producing anything or not. Thackeray is discursive, following one pleasant path after another, while his characters wait in awkward situations; but you do not care so long as your ears are beguiled with that pleasant and charming music. He makes long and sometimes exasperating comments on his characters, minutely describing the mechanism of his puppet show, where you would much prefer to have them speak for themselves. "Why can't he let them be!" But never mind. The talk is so beautiful in itself, the sentences flow with such simplicity and naturalness, the terms are so fit, so full of meaning, without a particle of exaggeration, that you want him to go on commenting forever, He scolds; but was there ever such admirable scolding? That is the trouble with

his scolding and his satire; it is so smooth it does not sting. Thus it is that we come to Thackeray as to a master, our critical rules all forsworn and laid aside. He dictates to us, not we to him, and for education in the art of saying things we must simply read and listen till the power of it permeates the mind. It is not so rich or so sublime a style as that possessed by two other masters of English in the Victorian age, Ruskin and Martineau, but in practical usefulness and reserve, in efficiency and good sense, it surpasses them. It never runs away with him. The engineer, you are sure, is ever sitting serene, smiling and cheerful in the place of command, master of his instrument.

See how compact and terse his way and manner is! Not a word wasted, each in its place, like well-trained servitors. You need not sift a mass of verbiage for a faint idea; the selection has been made for you; each sentence drives directly to its mark; it is luminous, almost self-luminous; there can be no mistake as to what is meant. Every paragraph is compact and finished, its subject is treated firmly and then dropped. Here is none of that oscillation, beating back and forth with hesitating step, fearful lest we have not said enough to make our meaning clear, which marks the work of those who are not sure of themselves. Here you may study the art of compression at its best, whole chapters in a verb or adjective; telling epithets without the slightest attempt at display, no redundant descriptions or fine writing for its own sake. Nor is the effect of this unity of style jerky or abrupt. All is calm and well controlled. No evidence of haste appears. Words enough are used to keep the reader's patience from suffering jolt or hurt. In short, the language is transparent, a vehicle to convey and not conceal thought. Thackeray invites you to a journey not too hurried, and, as the advertisements say, everything will be done that is possible to promote the comfort and convenience of the traveller. The attention of the tourist will be economized to the last degree. He will not even (and perhaps this has its disadvantages, as we should see in turning to Browning) he will not even be called on to do over-much thinking for himself. The imag-

ination in Thackeray's work is of a very high though quiet order. It consists in a fine felicity of phrase, in witty and unexpected turns, in capital comparisons. This imaginative excellence extends to his conception of character. A novelist's imagination must chiefly be shown in the completeness with which he puts himself in the place of his created creatures. And Thackeray does this with almost entire success. Take Henry Esmond. There are things we do not like in Henry Esmond. The whole relation between the hero and Lady Castlewood is strained. Beatrix is exasperating, indeed, was meant to be. The denouement, though powerful and thrilling, is touched a bit with theatrical tinsel. But on the whole what an amazing success! What play of light and shade upon Esmond's fortunes! How straight and manly he stands, what an air, what a figure! You cannot escape him. He will accompany you henceforth through life. He is more vivid than many an historic character. You will always associate him with the men of Queen Anne's time and the Old Pretender. The same is true of Pendennis, or of Colonel Newcome and Clive, or of the Osborne family in Vanity Fair. These are not extraordinary people or very great people. But your know them better than thousands of the great are known. You live in touch with their lives, you see them, not as they think themselves or as they are, but as their nearest saw them. You see them in the whole circle of their social and family and business relations.

The best artist is least conscious of his art, and Thackeray was an artist in literature. He could not have told you how he did it, though he did not spare toil or pains when once roused to his work. We cannot enter further into the secret than to say it was his nature, a gift born with him, almost as much in evidence in his first work as his last. He did not create a style; it was the free expression of himself. It is not an artificial, manufactured style, but one that comands the ease and reserve strength of original genius. For generations to come, his fictions will be read of English-speaking men, and his place is secure. He will hold that place by virtue of the pleasure he confers upon the mind and judgment of educated men and

women. But his audience will never be a large one. He is infected with the ennui, the restlessness, the doubt, the hesitancy of modern thought. He had no strong confidence in himself or in the world of men. That is his weakness, as it is often the weakness of the artistic temperament. But yet it was much, very much, that in the turmoil and confusion of modern cities and societies he could proclaim the old, old gospel of manhood:—

"Who misses or who wins the prize,
Go, lose or conquer as you can.
But, if you fail or if you rise,
Be each, pray God, a gentleman."

MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

## SECTION F.

# MINERALOGY AND GEOLOGY.

### Officers for 1900.

GEORGE E. WINCH, *President.*
SUSY C. FOGG, *Vice President.*
BLANCE E. HICKEN, *Secretary.*
SARA HUNT, *Treasurer.*

EXECUTIVE COMMITTEE.

GEORGE I. HOPKINS. WILLIAM E. MOORE.

## SECTION F.

# MINERALOGY AND GEOLOGY.

### REPORTS OF MEETINGS.

Wednesday evening, January 17, 1900. The President in the chair. After business, the regular work in the determination of minerals was done by the members under the direction of Mr. George I. Hopkins. Stibnite, Antimony, Prochlorite, and Natrolite were analyzed.

Tuesday evening, January 23. The Vice President in the chair. Mr. Hopkins gave a short talk on the cleavage of minerals, after which the analysis of a specimen given out at the previous meeting was read by one of the class. After this report on Celestite, the class studied and analyzed Apatite.

Tuesday evening, February 6. The President in the chair. After the business, Mr. Hopkins took charge of the work. The analyses of Siderite and Sphalerite were read. Calcite and Talc were studied in the class.

Wednesday evening, February 14. The Vice President in the chair. After business, Mr. Hopkins called for the analysis of minerals given out for home study: Dolorite and Pyrrhotite. Gypsum was then studied.

Wednesday evening, March 14. The analysis of Corundum, Chalcocite and Chalcopyrite were read, after which the class studied Magnetite and Orthoclase.

Wednesday evening, April 11. Mr. Hopkins addressed the class on the spring field work. The report on Garnet was read. Staurolite was studied.

Wednesday evening, April 25. Vice President in the chair.

The analyses of Hematite and Prehnite were read. A short talk on chemical formulas was then given by Mr. Hopkins.

Wednesday evening, May 9. Vice President in the chair. After business, the analyses of Cyanite and Obsidian were read. Mr. William E. Moore read a very interesting paper on "Some Phases of Geology."

Wednesday evening, May 23. President in the chair. After business, the analyses of Chalcedony and Hornblende were read.

Wednesday evening, June 6. The Vice President in the chair. The field trip to "The Pulpit" was discussed. Mr. J. A. Prescott and Mr. F. W. McKinley presented specimens of copper ore to the Section. The analyses of Pyroxene and Spodumene were read.

An interesting paper, "Glacial Action in the Vicinity of Manchester," was then read by Mr. E. P. Richardson. Mr. W. H. Huse then showed the Section some lantern slides, to give the members an idea of what they might see on the proposed Londonderry and Auburn trip.

Wednesday evening, June 21. The Vice President in the chair. After regular business, the attention of the Section was called to Miss Eugenia Lord's gift of pamphlets, "The Genesis of the Merrimack Valley," and "Atmospheric Phenomena." This was followed by the sad announcement of Mr. Lyman W. Colby's sudden death.

Wednesday evening, October 10. Owing to the small number present the meeting was informal.

Wednesday evening, October 24. The President in the chair. After business a general discussion of a plan of work for the coming season followed. The Section authorized Mr. Hopkins to carry the work on as he thought most profitable.

Tuesday evening, November 6. The Vice President in the chair. After business Mr. Burnham addressed the Section.

Wednesday evening, November 21. Informal meeting. Reports on minerals were given. The specimens analyzed were Cinnabar and Apatite. Aragonite was then studied.

Wednesday evening, December 5. The President in the chair. Notice of annual meeting given. The analyses of Wollastonite and Turgite were read, Wavellite was the new mineral studied.

Wednesday evening, December 19. Annual meeting of Section F. In the absence of both President and Vice President, the meeting was called to order by the Secretary. The election of officers was taken up and the following elected:

*President*—Susy C. Fogg.

*Vice President*—Walter S. Abbott.

*Secretary*—Grace A. Phillips.

*Treasurer*—Sara Hunt.

*Executive Committee*—William H. Huse, E. P. Richardson, Mrs. Fred L. Allen.

The analyses of Pectolite and Serpentine were read. Lepidolite was studied.

## CHANDLER LECTURE COURSE.

Through the continued generosity of Hon. George Byron Chandler the following course of lectures has been tendered to the members of the Institute for the season of 1900-1901.

Monday, October 8, 1900. The work of the "Roycrofters," by ELBERT HUBBARD, Editor of the "Philistine."

Wednesday, November 7, 1900. Weighing the Earth, by President T. C. MENDENHALL, of the Worcester Polytechnic Institute.

Friday, December 14, 1900. Our National Music (Illustrated), by Prof. LOUIS C. ELSON, of the New England Conservatory of Music.

Wednesday, January 2, 1901. An Entomological Hour, by L. O. Howard, U. S. Government Entomologist.

Wednesday, February 6, 1901. Art in Nature Study—The Harvest of Song (Illustrated), by Prof. Henry T. Bailey, Instructor in Art in the Schools of Massachusetts.

Wednesday, March 6, 1901. A More Beautiful Civic Life, by Mrs. Lucia Ames Mead of Boston.

# SUMMER SCHOOL.

In the winter of 1900 the idea was conceived of a department for regular and systematic out-door work by more members than would perhaps otherwise take it up. This plan was put into practical shape and a department added to the Institute, which was called, for want of a more appropriate name, a summer school. Most of its work, however, was done in the spring. The plan and scope of its work cannot be given better than in the words of the prospectus, issued before the beginning of the class work:

"A recent writer has well said that to know the lower forms of animal life is to have a better knowledge of ourselves. The thought is almost equally applicable to plant life; for the laws of development are essentially the same in all things that live and grow. Indeed, the thought may be farther extended; since it is probable that if we understood the laws by which the molecules of a mineral are selected, combined, and acted upon, we should hold the key to many of the mysteries of our own organisms.

"It is obviously desirable, therefore, that knowledge of nature and her laws should be universal. Unfortunately, profound research is practicable only for a limited number—those having wealth and leisure, as well as ability and taste. For advanced workers there must be large libraries, extensive museums, technical training, and costly apparatus. But while these toil in study and laboratory, the great book of nature lies open to all; and here, about Manchester, we are singularly fortunate. Nature has spread out two volumes for us; the Canadian and Alleghanian provinces meet at our very door. The trees and flowers, the birds and insects of two continental divisions mingle here.

"While interest in nature study is rapidly increasing, even the summer school, as commonly conducted, is inaccessible to many, partly by reason of the expense, and partly by reason of the demand upon time which cannot be spared. To meet, as far as practicable, a need that is keenly felt, a summer school has been organized under the auspices of the Manchester Insti-

tute of Arts and Sciences. For the present it will comprise four departments—Entomology, Botany, Ornithology, and Mineralogy and Geology. Competent instructors will give their services, and co-operation of able assistants is already assured. There will be practical lessons in field work for each section on alternate Saturdays, supplemented by studies and lectures at the regular evening meetings at the Institute.

The only condition is membership in the Institute, which is secured by the payment of one dollar membership fee and dues at the rate of three dollars a year. All the classes of the summer school are open to any member without extra expense, as are all the meetings and lectures of the sections and of the Institute throughout the year."

The organization consisted of the following corps of teachers:

*Principal.*

WILLIAM H. HUSE.

*Instructors.*

Section B—Entomology: EDWARD J. BURNHAM.

Section C—Botany: FREDERICK W. BATCHELDER.

Section D—Ornithology: THEODORA RICHARDSON.

Section F—Mineralogy and Geology: GEORGE I. HOPKINS.

The classes began their walks on the last day of March and continued through the spring and early summer, as will be seen by the appended calendar:

MARCH 31.—9 a. m., Ornithology; 2 p. m., Mineralogy and Geology.

APRIL 7.—9 a. m., Botany; 2 p. m., Entomology.

APRIL 14.—9 a. m., Ornithology; 2 p. m., Mineralogy and Geology.

APRIL 21.—9 a. m., Botany; 2 p. m., Entomology.

APRIL 28.—9 a. m., Ornithology; 2 p. m., Mineralogy and Geology.

MAY 5.—9 a. m., Botany; 2 p. m., Entomology.

MAY 12.—9 a. m., Ornithology; 2 p. m., Mineralogy and Geology.

MAY 19.—9 a. m., Botany; 2 p. m., Entomology.

MAY 26.—9 a. m., Ornithology; 2 p. m., Mineralogy and Geology.

JUNE 2.—9 a. m., Botany; 2 p. m., Entomology.

JUNE 9.—9 a. m., Ornithology; 2 p. m., Mineralogy and Geology.

JUNE 16.—9 a. m., Botany; 2 p. m., Entomology.
JUNE 23.—9 a. m., Ornithology; 2 p. m., Mineralogy and Geology.
JUNE 30.—9 a. m., Botany; 2 p. m., Entomology.

The course was carried on as planned, except when prevented by the weather. The entomological class, under the direction of Mr. Burnham, visited the places richest in insect life, and aroused much interest on the part of those who took this opportunity to learn of the habits of insects in their native haunts. Many valuable specimens were secured for the museum.

The botanical class, directed by Mr. Batchelder, made systematic studies of our native trees during the earlier walks, as the tenderer plants were not in leaf. Some of the trees of special interest which were studied were Quercus prinoides, which was denied us by the older botanies, but is quite abundant about Manchester; and Q. ambigua, which has not yet been located as a form, variety, species or hybrid. There are some very interesting specimens in this locality. Later, on some of the trips, the only station of Calla palustris known in Manchester was visited, also one of the few beds of Ophioglossum vulgatum in this vicinity.

The ornithological class, under the enthusiastic leadership of Miss Richardson, was the most largely attended class of the school. This, like the other classes, was the means of bringing many new members into the Institute. Some of the trips were taken about the suburbs of Manchester. On two dates the class went to Auburn, and on June 9 it united with the mineralogical class in a barge ride to Bedford, visiting many places of interest. During the term fifty-two species of birds were observed and studied. The largest number seen on any one excursion was twenty-six, counted on one of the Auburn trips.

The mineralogical division, under the instruction of Mr. Hopkins, made a detailed study of the mineralogical and geological formations in this vicintity. On March 31 the quarry opened a number of years ago by the Amoskeag company on Oak Hill was visited. Much good granite has been taken from this ledge. In some blocks of gneiss taken from the surface were seen fine

specimens of contorted strata. The second walk over Wilson Hill took the class to several ledges. In one place a large piece of trap enclosing hornblende crystals, was secured for the museum. At the City farm quarry good specimens of iron pyrites and smoky quartz with crystals of feldspar were obtained. On April 28 two ledges on North Union Street were inspected. In one was an interesting dyke of trap, which in weathering seemed to disintegrate in little nodules, instead of the angular shapes that are so common. In the other ledge biotite and muscovite were found in juxtaposition. South Manchester was next visited with its several outcroppings of granite and gneiss intersected in places by trap dykes. In one place a deposit of magnetite, considerable for Manchester, was discovered and much of it secured. In another place a small crystal of apatite was found. The fifth walk was more geological than mineralogical in its character. Rock Rimmon was visited, and from the top of this high outcropping ledge the many signs of glacial action of ice and water that are so abundant here were studied at leisure.

The last excursion was a barge ride together with the ornithological class. The combined classes numbered forty. Going over through Bedford, the first stop was made near the Center, where a cut had been made through a ledge for the new Manchester and Milford railroad. Several interesting dykes of trap were shown in the walls of granite. From this place the party proceeded to the northeast corner of Amherst, near the village known locally as Joppa. Here is a small deposit of carbonate of lime, with smaller accumulations of vesuvianite and garnet. The next stopping place was the "Pulpit," a somewhat remarkable gorge that was eroded during the glacial period, probably by water falling through a moulin in the ice-sheet and flowing away below. On the return to Manchester a stop was made at the Barr farm, where specimens of bog iron ore were obtained, also some ochre that is found with the limonite.

The inauguration of a summer school so early in the season and in the way in which this was conducted was something new and in the nature of an experiment, but its results have amply

justified its conception. New members were brought into the Institute, the interest of many was aroused, and systematic work was done in the study of nature at home. The summer school was a success.

# DONATIONS.

The following comprises the donations to the Institute during the year 1900.

## BIRDS.

Nyctala acadia (Acadian Owl) ; Mrs. Jennie Hackett Farnham.
Botaurus lentiginosus (American Bittern, young); Buteo latissimus (Broad-winged Hawk); Syrnium nebulosum (Barred Owl); Zonotrichia albicollis (White-throated Sparrow, immature); William H. Huse.
Accipiter atricapillus (Goshawk, unmounted); George Hosser.

## ANIMALS.

Lepus nuttalli mallurus (Rabbitt); Condylura cristata (Star-nosed mole);Putorius noveboracensis (Weasel, 2); Calomys americanus (Mouse) ; W. H. Thompson, Pembroke, N. H.
Lutra canadensis (Otter); Mrs. L. B. Clough.
Skull and spinal column of Felis domestica (common cat); E. J. Burnham.
Cynomis ludovicianus (Prairie Dog); George I. Hopkins.

## INSECTS.

Collection of Lepidoptera embracing 12 Sphingidæ, 7 other moths and 21 Rhopalocera ; Frank E. Heald.
Basilarchia arthemis, Basilarchia astyanax ; Miss Julia McDonough, Suncook, N. H.
Collection of insects ; Harrie M. Young.

## MINERALS.

Specimens ; Albert L. Clough.
Collection of minerals ; John R. Bruce.
Collection of minerals ; Wallace G. Stone.
Crystals of feldspar and quartz from Ossipee ; Specimens of pseudomorphs of quartz after calcite ; Bela H. Emerson, Hooksett, N. H.
Sponge Coral from the Indian Ocean ; Miss Louise E. Newell.
Collection of clay stones ; A. C. Osgood.

Heliastræa heliopora (Brain Coral), a specimen formerly owned by the late Captain C. W. Strain, Co. C, 10th N. H. Volunteers, presented as a memorial gift to the Manchester Institute of Arts and Sciences, by his sister, Mrs. Mary S. Richards.

## BIOLOGY.

Three tailed gold-fish; Harrie M. Young.

Backbone of fish, illustrating notochord; Dr. Lillian G. Bullock.

Jar containing four specimens of Squalus acanthias (Dog Fish) removed from the parent fish; William H. Huse.

Phrynosoma cornutum (Horned Toad); Henry B. Fairbanks.

### NESTS.

Cyanocitta cristata (Blue Jay); Contopus virens (Wood Peewee); Mrs. John B. Varick.

## ART.

Framed picture of General John Stark; Clarence M. Edgerly.

Medallion of James Russell Lowell; William H. Huse.

Framed portraits of Spencer, Tyndall, Darwin and Huxley; Oliver E. Branch.

Framed copy of Emancipation Proclamation, forming allegorical portrait of Abraham Lincoln; Mrs. Elizabeth M. Coaker.

## BOOKS AND PAMPHLETS.

Bookcase and books of the Derryfield Social Library as follows: Notes on the Parables, Hosea Ballou, 1812; Explicatory Catechism, 1805; Five Points of Christian Faith, 1793; Burns' Justice of the Peace, 1773; Robinson's Proofs, 1798; A View of Religions; Federal Accountant, 1827; Life of George Washington; Infantry Regulations, 1817; Library Record Book; Lectures on Female Education, 1794; Mariner's Compass, 1763; Letters from England, 1808; Christian's Life, 1795; Flowers of Modern Travel, 1797; Rollins' Ancient History, 1803; Thoughts on Divine Goodness, 1794; Watts, on the Mind, 1793; Spectator, 6 vols.; History of Vermont, 1794; Infernal Conference, 1795; Blair's Lectures, 1814; N. H. Gazetteer, 1817; Gospel News, 1794; Laws of N. H., 1789.; Heaven's Glory and Hell's Terrors, 1770; Hymn Book, 1796; William H. Huse.

Geographical Grammar. 1778 ; General History, Tytler, 1824 ; Saint's Rest, Baxter, 1805 ; History of South America, 1826; Volume of Essays, 1842 ; The Impending Crisis, H. R. Helper, 1860 ; Conquest of Kansas, Phillips, 1856 ; Willliam H. Huse.

History of New Hampshire, Vol. 3. Jeremy Belknap, 1792; Miss. M. Eugenia Lord.

## GOVERNMENT REPORTS.

Report of the Director of the U. S. Geological Survey ; Annual report of the Department of Interior, Geological Survey, 1899, Vol. 6, two parts ; Normal annual sunshine and snow-fall (weather bureau); Reports of the Commissioner of Education, Vol. 1, 1898-9; Instructions for Aerial Observers (weather bureau); Report of the Commissioner of Education, 1897–8 two volumes ; William H. Huse.

Report of the Commissioner of Education ; Compendium of the 10th census 1880, Part 1 ; Messages and Documents of the President, 1861–2 ; Edward C. Smith.

U. S. Geological Survey, J. W. Powell, 1882–3–4–5, two vols. ; Walter S. Abbott.

Annual report of the Bureau of Ethnology, 1890–91, J. W. Powell ; E. J. Burnham.

Manual of 50th Congress ; Report of the Secretary of the Interior, 1886 ; Report on commercial relations with South America ; Myron W. Hazeltine.

## STATE REPORTS.

Report of the N. H. Forestry Commission, 1885 ; Report of N. H. State Legislature, 1889–1891 ; Report of Special Legislature, 1890 ; Report of the N. H. Commissioner of Lunacy, 1891 ; Report of N. H. State Prison, 1892–93 ; Report of N. H. State Library, 1892 ; Report of N. H. Bureau of Labor, 1893 ; Report on boundary between N. H. and Mass. ; Corporation Laws of N. H. ; Public Statutes, 1890 ; Amendments to Public Statutes ; Myron W. Hazeltine.

Bank Commissioner's Report, 1887 ; Edward C. Smith.

State Board of Health Reports, Vols. 12–13 ; Back numbers of N. H. College Bulletin ; Session Laws of 1868–69–71–73–74–75–76–78–83–85 ; William H. Huse.

## CITY DOCUMENTS.

Report of City Engineer, 1899; Report of City Library, 1899; William H. Huse.

## SCIENTIFIC AND TECHNICAL.

Hydrodynamics, Emerson; Zoology of Vertebrates, MacAllister; Hydraulics and Mechanics, Ewbanks; Old Red Sandstone, Hugh Miller; Popular Geology, Hugh Miller; Glaciers of the Alps, Tyndall; Insects Injurious to Vegetation, Harris, 1852; Prehistoric Implements, W. K. Morehead; The Bird Stone Ceremonial, W. K. Morehead; Sculptured Anthropoid Ape Heads, James Ferry; A Preliminary List of the Hemiptera of Colorado, C. P. Gillette and Carl F. Baker; Monograph on the Carabidæ, George H. Horn, M. D.; Catalogue of the Odonata of the Vicinity of Philadelphia, Philip P. Calvert; Boston Society of Natural History, Guides for Science Teaching, Vol. VII, Insecta, by Alpheus Hyatt and J. M. Arms; William H. Huse.

The Genesis of the Merrimac Valley, S. D. Lord; Atmospheric Phenomena, S. D. Lord; Miss M. Eugenia Lord.

Outline papers for course of lessons on Lithology and in Mineralogy; Prof. Geo. H. Barton.

## MISCELLANEOUS BOOKS.

Gleanings in Bee Culture, 1883–4–5–6–7, 5 Vols.; American Bee Journal, 1885–6–7, 3 vols.; N. H. Register, 1884–5–8, 3 vols.; The Constitutional Convention, Jameson; North American Review Vol. CXL–CXLI; War with Mexico Reviewed; History of Candia, J. Bailey Moore; City Directory 1885; Package of pamphlets on various subjects; William H. Huse.

State Papers, Addresses and Poems of the late Hon. Moody Currier; Mrs. Moody Currier.

Transactions of the Literary and Historical Society of Quebec; Life of Joseph Francis Perrault, one of the founders of the Institution; Literary and Historical Society of Quebec.

A Trip among the Glaciers, Hon. J. W. Patterson; Influence of the Netherlands on the American Republic; Prize Essay of American Public Health Association, Mrs. Mary H. Abel; Essay on Effects of Intemperance; Address by Hon. J. W. Patterson at the College for the Deaf, Washington, D. C. 1889; Dartmouth College Catalogue 1890; Myron W. Hazeltine.

Record of the Lamb, Savory and Harriman families by Fred W. Lamb; Fred W. Lamb.
Wilderness Ways, William J. Long; Nature Study Press.
196 Books and pamphlets and 4 maps; Frank H. Challis.
American Ornithology; Bird Lore; Bryologist; Condor; Cornell Nature Study Bulletins; Fern Bulletin; Gamophyllous; Journal of Applied Microscopy; Le Naturaliste Canadien; Mineral Collector; Meehan's Monthly; Nature Study; Ohio Naturalist; Plant World; Scientific American; Torreya; "*Nature Study*" Press.

## MISCELLANEOUS.

$320.00 for "Chandler Lecture Course"; Hon. G. Byron Chandler.
100.00 for permanent improvements; Mrs. Aretas Blood.
25.00 for Journal of Proceedings; Mrs. L. M. French.
25.00 " " J. Brodie Smith.
25.00 " " Norwin S. Bean.
25.00 " " Albert L. Clough.
5.00 " " Hon. Henry E. Burnham.
15.00 for permanent improvements; Charles L. Richardson.
Electric light for rooms; Manchester Electric Co.
Bill and foot of Albatross captured on board the man-of-war Macedonia during the Mexican war by an uncle of Mr. Bruce; John R. Bruce.
Portions of two trees showing evidences of beavers' work; Frank E. Heald.
Bow, two arrows and assegai from South Africa; Miss Sarah E. Parker, Pembroke, N. H.
Date stone (1839) from Dunklee building, where Weston building now stands; James W. Wilson.
Section of hard pine tree showing bullet imbedded in wood; Harrie M. Young.
Indian stone implement; Edward W. Clough.
Boards for wood carving class; J. Hodge.
Cotton bolls; Eben Ferren.

# PROCEEDINGS

OF THE

# MANCHESTER INSTITUTE

OF

# ARTS AND SCIENCES.

VOL. III, 1901.

Manchester, N. H.

PUBLISHED BY THE INSTITUTE.

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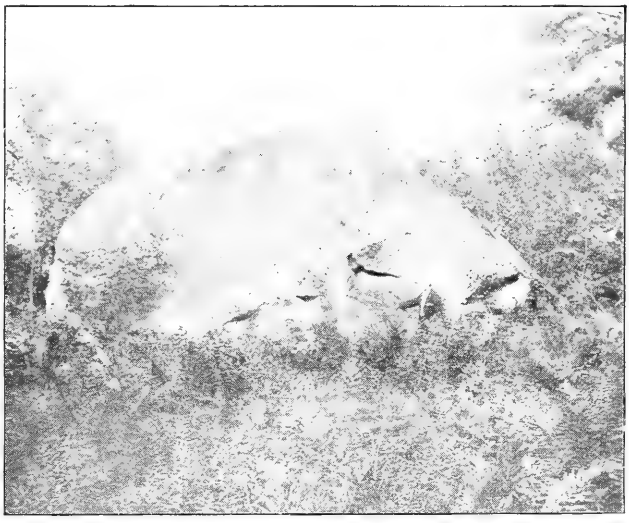
MANCHESTER, N. H.

NATURE STUDY PRESS, DEAN AVE.

1902.



BOWLDER OF PORPHYRITIC GNEISS IN DUNBARTON.

GNEISS BOWLDER ON LINE BETWEEN MANCHESTER AND LONDONDERRY.

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PUBLICATION COMMITTEE.

FREDERICK W. BATCHELDER, ALBERT L. CLOUGH,
WILLIAM H. HUSE.

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# MANCHESTER INSTITUTE

OF

# ARTS AND SCIENCES.

## BY-LAWS.

### OFFICERS.

The officers of this corporation shall be a President, Vice Presidents (the number of which to be determined by provisions hereinafter made), a Treasurer, a Clerk, a Corresponding Secretary, a Curator, a Librarian, and a Council constituted as hereinafter provided, all of whom shall be elected annually and hold their offices respectively for one year and until their successors are elected and qualified.

### DUTIES.

*President.* The President shall preside at all meetings of the association, and discharge the usual duties of that office. He shall be the executive officer of the corporation and also be the presiding officer of the Council.

*Vice Presidents.* In the absence of the President a Vice President shall preside in his stead and discharge all the duties of the office, excepting that he shall not be executive officer of the corporation.

*Treasurer.* The Treasurer shall discharge all the usual duties of that office and shall give bond for the faithful performance of his duty, in such amount with sufficient sureties as shall be

determined by the Council. He shall have the custody of the seal of the corporation and shall render a report, suitably audited, of the financial condition of the association at the time of the annual meeting.

*Clerk.* The Clerk shall perform all of the usual duties pertaining to his office and such other duties as may be required from time to time by the Council, and shall be sworn to the faithful performance of his duties. He shall also be clerk of the Council.

*Corresponding Secretary.* The Corresponding Secretary shall discharge all the duties customary to his office, shall conduct correspondence with other associations and persons alike interested, shall have the care and custody of the documents, books and papers not connected with or incident to the records and papers properly belonging to the office of Clerk, and he shall perform all such other duties as the Council may require.

*Curator.* The Curator shall have the care and custody of the cabinet, art gallery and other property of the Institute, and perform such other duties as may be required by the Council.

*Librarian.* The Librarian shall have the care and custody of all books, pamphlets, maps and charts belonging to the Institute. He may appoint an assistant, for whom he shall be held responsible.

*Council.* The Council shall consist of not less than seven members, and the number required for such membership, in addition to President, Clerk, Corresponding Secretary, Treasurer, Curator, Librarian and Vice Presidents, as hereinafter provided, shall be elected annually by the corporation. The Council shall have power to appoint all necessary committees, to act on resignations of the officers of the corporation, and to fill vacancies occurring among them.

## MEMBERSHIP.

Any association, club or organization may become a member of this corporation, with the approval of the Council, by filing with the Clerk an application stating the name and purpose of such organization, with a request to be admitted as a member, and the payment of one dollar. Such membership, when ob-

tained, shall make by the operation of this by-law, all of the members of said association, club or organization members of this corporation upon subscribing to the by-laws.

Any person may be elected to membership by the Council upon being recommended by two members, paying the Treasurer the sum of one dollar and subscribing to the by-laws. All applications for membership should designate the section or sections with which the applicant will unite.

Any person may be elected a corresponding member of the Institute by a unanimous vote of the Council, and such member shall be exempt from the payment of dues and membership fee. Any person who shall pay to the Institute the sum of one hundred dollars at any one time shall, on his request, be elected a life member, and as such shall be exempt from all further dues and assessments.

SECTIONS.

Any association, club or organization, admitted to membership as hereinbefore provided, may become a section, which shall be designated alphabetically by the Council, and have authority to establish its title, to maintain its autonomy and manage its affairs, not inconsistent with these by-laws.

Each section shall have a chairman who shall discharge all of the duties pertaining to such office and ex-officio be and become a Vice President of the association and a member of its Council. Such chairman shall be elected by the section at or before the time of the annual meeting of the association and his election shall be certified by the Secretary of the section to the Clerk of the corporation.

Five or more members may organize a section, with the approval of the Council.

BRANCHES.

Five or more persons organizing themselves as an association, or any association previously formed, the purposes of which are harmonious with those of the Institute and which consists of five or more persons, not residents of Manchester, may apply for membership in the Institute and, upon election, shall become a

branch of the same. Such branch, as a whole, shall be entitled to all privileges and subject to all rules which refer to individual members and shall, in a general way, be regarded and treated as such. It shall be incumbent upon such branch to make return to the Clerk of the Institute of the names and addresses of its members and of its officers at the time of their election, together with a report of the condition and year's work of the branch.

Any individual member of such a branch, being a non resident of Manchester, shall be entitled to the general privileges of the Institute rooms, Library and Collections, and to such other privileges as the Council may from time to time extend.

MEETINGS.

The annual meeting of the corporation shall be held upon the first Wednesday of January, at such hour and place as the Clerk shall deem expedient. Special meetings may be held at such time and place as the Council shall deem expedient. Notice of all meetings shall be given by publication in some newspaper in the city of Manchester by one publication at least ten days prior to said meeting or by written or printed notice by mail to the last known address of each member at least ten days prior to the meeting.

DUES.

The annual dues shall be three dollars, payable in advance. New members shall be charged for whole months or fraction thereof to the time of the next annual meeting. Any person who fails to pay such dues for one year shall cease to be a member, and his or her name may be stricken from the roll by vote of the Council, after notice by the Clerk of the corporation setting forth such delinquency and the provision of this by-law, and any member may be removed by the Council for cause upon charges after due notice and hearing.

QUORUM.

At any meeting of the corporation ten members shall constitute a quorum,

AMENDMENTS.

These by-laws may be altered or amended at any meeting of the association, notice having been given of the proposed change.

MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

# OFFICERS FOR 1901.

ALBERT L. CLOUGH, *President.*
EDWARD J. BURNHAM, *Corresponding Secretary.*
NORWIN S. BEAN, *Treasurer.*
HARRIE M. YOUNG, *Clerk.*
WILLIAM H. HUSE, *Curator.*
CHARLES J. ABBOTT, *Librarian.*

## COUNCIL.

ALBERT L. CLOUGH.
EDWARD J. BURNHAM.
NORWIN S. BEAN,
HARRIE M. YOUNG.
WILLIAM H. HUSE.
CHARLES J. ABBOTT.
G. BYRON CHANDLER.
J. BRODIE SMITH.
WM. K. ROBBINS.
MRS. MELUSINA H. VARICK.
MRS. LUCIA MEAD PRIEST.
HENRI SCHÆFFER.
OLIVER E. BRANCH.
MISS THEODORA RICHARDSON.
MRS. S. C. BROWN.
MRS. ANNIE V. BATCHELDER.
MISS JENNIE YOUNG.
MISS SUSY C. FOGG.
EDGAR D. CASS.

## ROLL OF MEMBERS.

Jan. 1, 1902.

| | |
|---|---|
| Abbott, Miss Annie F. | 16 Walnut. |
| Abbott, Charles J. | 18 Manchester. |
| Abbott, Florence L. | 356 Laurel. |
| Abbott, Mrs. Hattie S. | 342 Manchester. |
| Abbott, Miss Maude C. | " " |
| Abbott, Walter S. | " " |
| Adams, Charlotte R. | 362 Hanover. |
| Africa, Walter G. | 39 Hanover. |
| Aldrich, Dr. E. B. | 83 Hanover. |
| Aldrich, Mrs. E. B, | 84 Ash. |
| Allen, Miss Bertha A. | 33 Walnut. |
| Allen, Fred L. | " " |
| Allen, Mrs. Fred L. | " " |
| Ansell, William H. | 11 Parker Avenue. |
| Ayer, George W. | 51 Erie. |
| Ayer, Miss Mary L. | " " |
| | |
| Bailey, Henry L. | 308 Orange. |
| Baldwin, E. T. | 600 Beech. |
| Baldwin, Mrs. E. W. | 322 Pearl. |
| Bancroft, Clarence | 759 Pine. |
| Barker, Miss Ella F. | 998 Valley. |
| Barnes, Miss Mary F. | 331 Hanover. |
| Barney, Hial | 708 Pine. |
| Barr, Miss Florence G. | 17 Harrison. |
| Barr, Miss Mary E. | Elliot Hospital. |
| Bartlett, Rev. A. Eugene | 187 Ash. |
| Bartlett, Mrs. A. Eugene | " " |
| Batchelder, Frederick W. | 220 Myrtle. |
| Batchelder, Mrs. Annie V. | " " |
| Batchelder, Miss Kate E. | 27 Nashua. |
| Bean, Norwin S. | Second National Bank. |
| Bickford, Charles W. | 480 Maple. |
| Bickford, Mrs. Emma S. | 15 Ash. |
| Bisco, George | 593 Maple. |
| Blackstone, Mrs. Carrie S. | 639 Chestnut. |
| Blair, Mrs. Eliza N. | 67 Prospect. |
| Blake, Miss Annie F. | 609 Pine. |
| Blood, Mrs. Lavina K. | 154 Lowell. |
| Bossi, Arnold L. | 1962 Elm. |

| | |
|---|---|
| Bourne, Mrs. Grace M. | 1741 Elm. |
| Bourne, Mrs. Harriet K. | " " |
| Bourne, Henry D. | " " |
| Bourne, Miss Meta | " " |
| Bourne, Stephen N. | " " |
| Boutwell, Mrs. Mary S. | 587 Union. |
| Bradley, Rt. Rev. Denis M. | 145 Lowell. |
| Branch, Oliver E. | 229 Prospect. |
| Branch, Mrs. Sarah C. | " " |
| Brickett, Miss Mabel J. | 150 Orange. |
| Broderick, James A. | 174 Bell. |
| Brooks, Edward M. | 867 Elm. |
| Brooks. Miss Ethel C. | 541 Maple. |
| Brooks, Miss Gertrude H. | 413 Beech. |
| Brown, Mrs. Abby S. | 681 Union. |
| Brown, George H. | 18 Brook. |
| Brown, Dr. James S. | 681 Union. |
| Brown, Mrs. Marie E. | 249 Pearl. |
| Brown, Mary E. | 322 Pearl. |
| Brown, Mrs. S. C. | 395 Lowell. |
| Bryant, E. M. | 28 Hanover. |
| Bullock, Dr. Lillian G. | 295 Hanover. |
| Burbank, William E. | 357 Merrimack. |
| Burnham, Edward J. | 112 Arlington. |
| Burnham, George E. | " " |
| Burnham, Henry E. | 1911 Elm. |
| Butman, Mrs. Jennie C. | 43 Hanover. |
| Butterfield, Miss Annie C. | 6 High. |
| Call, W. R. | 913 Elm, Room 46. |
| Campbell, Miss S. Abigail | 92 Walnut. |
| Carpenter, Frank P. | Elm and West North. |
| Carpenter, Mrs. Frank P. | " " " " |
| Carpenter, Josiah | Second National Bank. |
| Carpenter, Mrs, Josiah | 1667 Elm. |
| Carter, George C. | 146 Walnut. |
| Cass, Edgar D. | 578 Beech. |
| Cass, Mrs. Edgar D. | " " |
| Castor, Mrs. Edgar E. | 560 Beech. |
| Caswell, Fred M. | River Road and West Clarke. |
| Challis, Frank H. | 6 Pleasant. |
| Chalmers, Rev Thomas | 590 Beech. |
| Chandler, Mrs. Fanny M. | Myrtle Heights. |
| Chandler, George Byron | Amoskeag Bank. |
| Chandler, George H. | " " |

| | |
|---|---|
| Chandler, Mrs. Helen M. | 152 Pearl. |
| Chandler, Mrs. Lucy R. | Bay and North. |
| Chase, C. Edwin | 384 Walnut. |
| Christophe, Sebastian | 91 Penacook. |
| Christophe, Mrs. S. | " " |
| Clarke, Mrs. Arthur E. | River Road. |
| Clarke, Mrs. Olive Rand | 18 Brook. |
| Clarke, William C. | City Hall. |
| Clement, Mrs. Clara V. | 104 Parker. |
| Clement, Miss Mary A. | " " |
| Cleworth, John | 143 Myrtle. |
| Cleworth, Mrs. John | " " |
| Cleworth, Mildred W. | " " |
| Clough, Albert L. | Box 114. |
| Clough, Mrs. L. B. | 181 Walnut. |
| Clough, Miss Nora B. | 294 Pearl. |
| Collins, Mrs. E. H. | 59 Orange. |
| Condon, Mrs. John W. | 298 Hanover. |
| Cornish, Miss Bertha K. | 253 Central. |
| Cooper, Miss Emma J. | 85 Ash. |
| Corey, William | 488 Maple. |
| Corson, Miss Annie R. | 36 Ray. |
| Crafts, George P. | 91 Bay. |
| Crafts, Mrs. George P. | " " |
| Cressey, William H. | 266 Central, |
| Crosby, Uberto C. | 1855 Elm. |
| Crosby, Mrs. U. C. | " " |
| Cross, David | 1552 Elm. |
| Cross, Mrs. David | " " |
| Currier, Mrs. Alice Blake | 673 Pine. |
| Currier, Edward H. | 488 Manchester. |
| Currier. Miss Mabel B. | 225 Bridge. |
| Currier, Mrs. Moody | Myrtle and Ash. |
| Currier, Mrs. M. R. | 42 Appleton. |
| Custer, Miss Anna | 245 Hanover. |
| Dana, Miss Mary F. | 142 Myrtle. |
| Daniels, Miss Belle R. | 586 Beech. |
| Daniels, Miss Lucia H. | " " |
| Davis, Miss Edith H. | 186 Lowell. |
| Davis, Dr. George M. | 596 Belmont. |
| Davis, Mrs. George M. | " " |
| Davis, Miss May W. | 186 Lowell. |
| Dearborn, Mrs. J. Henry | Pembroke, N. H. |
| Derby, Miss Lizzie M. | 467 Amherst. |

| | |
|---|---|
| Dickey, Miss Esther M. | 38 Avon. |
| Dodge, Mrs. Helen K. | North Elm. |
| Dole, A. W. | 727 Beech. |
| Donahue, John J. | 782 Beech. |
| Donahue, Mrs. Jessie E. | " " |
| Dow, Miss Sarah E. | 105 Ashland. |
| Dow, Perry H. | River Road and West North. |
| Downs, Mrs. Clara L. | 105 Ash. |
| Dowst, Miss Ella M. | 209 Walnut. |
| Dowst, John | " " |
| Drew, Mrs. Annette H. | 105 Ashland. |
| Dustin, Charles R. | 79 Penacook. |
| Dustin, Mrs. C. R. | " " |
| Eames, Mrs. Hortense H- | 941 Chestnut. |
| Eames, William M. | 1089 Elm. |
| Edgerly, Clarence M. | 886 Elm. |
| Ela, Miss Emma J. | 585 Beech. |
| Elliott, Mrs. Medora W. | River Road. |
| Fairbanks, Miss Elsie D. | 527 Hanover. |
| Farmer, Mrs. Lucinda L. | 145 Pearl. |
| Farnsworth, Rev. Charles H. | 962 Valley. |
| Farrington, Mrs. L. Augusta | 251 Hanover. |
| Felch, Miss Sadie C. | 10 Tilton. |
| Fellows, Joseph W. | 186 Lowell. |
| Fellows, Mrs. J. W. | " " |
| Ferren, Miss Kittie J. | 97 Ash. |
| Fiske, Herbert H. | 593 Union. |
| Fleck, Dr. C. E. | 121 Pearl. |
| Fogg, Edward H. | 302 Prospect. |
| Fogg, Mrs. John Smythe | River Road. |
| Fogg, Miss Susy C. | 302 Prospect. |
| Foster, John | 520 Beech. |
| Foster, Mrs. John | 852 Elm, Room 9. |
| Fracker, Miss M. Alma | 297 Pearl |
| Francis, Miss Florence M. | 740 Beech. |
| French, Mrs. Emma B. | 693 Beech. |
| French, Dr. L. Melville | " " |
| French, Mrs. Mary E. | 313 Belmont. |
| Gage, Miss Mary J. | 482 Granite, |
| Gault, John | 42 Brook. |
| Gay, Miss Annie M. | 184 Myrtle. |
| George, Miss Ethel L. | 19 Appleton. |
| Gill, William G. | 1061 Elm. |

| | |
|---|---|
| Gillan, Miss Jean | 757 Chestnut. |
| Gooden, Miss Kate M. | 466 Hanover. |
| Graupner, Miss Amelia L. | 215 Walnut. |
| Graupner, Miss Hulda C. | " " |
| Griffin, Mrs. Jennie G. | 729 Chestnut. |
| Hadcock, Mrs. William. | 282 Prospect. |
| Hale, Arthur H. | First National Bank. |
| Hale, Fred C. | 112 Oak. |
| Hall, Miss E. Alfreda. | 969 Valley. |
| Hall, Miss Winnifred W. | 385 Central. |
| Hammond, Miss Edith | 880 Union. |
| Hardy, Frank H. | 264 Prospect. |
| Hardy, Mrs. Margaret S. | " " |
| Hartshorn, Mrs. Minnie L. | 73 Liberty. |
| Hassam, R. H. | 559 Union. |
| Hayes, Charles C. | 15 Hazel. |
| Hazelton, Miss M. A. | 235 Hanover. |
| Head, Miss Caroline E. | 283 Mast. |
| Heald, Frank E. | 289 Concord. |
| Heard, Arthur M. | 746 Chestnut. |
| Hemminger, G. R. | 39 Hanover. |
| Hicken, Miss Blanche E. | River Road and W. Salmon. |
| Higgins, Edmund F. | 75 Bay. |
| Higgins, E. Safford | " " |
| Higgins, Wilson F. | 119 Myrtle. |
| Hoit, Miss Carrie E. | Goffstown, N. H. |
| Holt, Miss E. Blanche. | 236 Walnut. |
| Holton, Mrs. Maurice A. | 697 Union. |
| Hope, Miss Ella | 265 Myrtle. |
| Hope, Miss Lucy Maud | " " |
| Hopkins, George I. | 203 Walnut. |
| Hosmer, Miss Grace B. | 310 Myrtle. |
| How, Miss Mabel L. | 33 Walnut. |
| Hubbard, Miss Martha W. | 145 Pearl. |
| Hunt, Mrs. N. P. | 747 Union. |
| Hunt, Miss Sara | " " |
| Hurd, Henry N. | 33 Walnut. |
| Huse, Mrs. Isaac | 97 Mammoth Road. |
| Huse, Isaac Jr. | 10 Hayes Avenue. |
| Huse, William H. | 210 Young. |
| Huse, Mrs. W. H. | " " |
| Hyde, T. McEwen. | 228 Ash. |
| James, Mrs. Mary J. | 235 Hanover. |
| Jenkins, A. A. | 1037 Elm, Room 56. |

| | |
|---|---|
| Kemp, Miss Bertha L. | 40 Water. |
| Kendall, Mrs. John M. | 311 Central. |
| Kendall, Willis B. | 113 Myrtle. |
| Kennard, Samuel C. | 609 Beech. |
| Kennard, Mrs. S. C. | " " |
| Kennedy, Mrs. Martha J. | 319 Auburn. |
| Knowlton, Mrs. Maud Briggs | 639 Chestnut. |
| Lamb, Fred W. | 452 Merrimack. |
| Lamprey, Miss Alice Maud | 395 Hanover. |
| Lamson, Frank F. | 145 Pearl. |
| Lane, Thomas W. | 1937 Elm. |
| Langworthy, Willis H. | 209 Walnut. |
| Lemon, Miss Angie Mildred | 584 Beech. |
| Livingston, Frank C. | 859 Elm, Room 7. |
| Lockhart, Rev. Burton W. | 23 West Webster. |
| Lockhart, Mrs. Frances U. | " " " |
| Longa, Charles E. | 10 North Adams. |
| Lord, Miss M. Eugenia | 341 Hanover. |
| Mack, Miss Isabella G. | 128 South Main. |
| MacLeod, Mrs. Alberta A. | 897 Elm. |
| MacLeod, Donald | " " |
| Manning, Charles H. | 1838 Elm. |
| Manning, Mrs. Frances Fay | 1690 Elm. |
| Manning, Robert L. | " " |
| Many, Rev. D. J. Jr. | 116 Sagamore. |
| Marr, Mrs. Frances | 104 Appleton. |
| Martin, E. L. | 14 Market. |
| Martin, Frank E. | 313 Bridge. |
| Martin, Miss Winona M. | 435 Hanover. |
| McAllister, George I. | 20 Hanover, Room 30. |
| McAllister, Mrs. Mattie H. | 222 Massabesic. |
| McCoy, Mrs. E. Southard | 765 Union. |
| McDuffie, Charles H. | Myrtle and Ash. |
| McDuffie, Mrs. Laura B. | " " |
| McKean, Miss Ellen E. | 66 North Main. |
| McLaren, Miss Emma L. | 619 Union. |
| McLaren, H. N. | " " |
| McLaren, Miss Mary E. | " " |
| Means, Mrs. Elizabeth A. | North Elm. |
| Merrill, Albert | River Road and West North. |
| Merrill, Mrs. Alice S. | 414 Merrimack. |
| Merrill, Clarence R. | " " |
| Mitchell, Miss Mary W. | 341 Hanover. |
| Mooar, Miss Linda Hunter, | 280 Taylor. |

| | |
|---|---|
| Mooar, Miss Mary Louisa | 280 Taylor |
| Moore, Miss Florence H. | 267 South Main. |
| Moore, Miss Helen M. | 423 Hanover. |
| Moore, Miss Marcia M. | 88 Liberty. |
| Moore, Mrs. William E. | 69 Harrison. |
| Morrill, Miss Florence M. | 40 Blodget. |
| Morrill, Mrs. Hattie T. | " " |
| Morse, Mrs. Clara H. | 129 Russell. |
| Morse, Henry H. | 84 Liberty. |
| Morse, Miss Millicent S. | 107 Parker. |
| Morse, Dr. M. V. B. | 129 Russell. |
| Moulton, Miss Mary E. | 54 Mast. |
| Moulton, Miss Fannie D. | 394 Concord. |
| Murkland, William E. | 35 North Main. |
| Murphy, Miss Mary E. | 341 Hanover. |
| Nelson, James M. | 314 Lake Avenue. |
| Nichols, William T. | Union Office. |
| Nolan, Thomas F. | 70 Laurel. |
| Normand, Miss Eva | 206 Ash. |
| Nutt, Miss May F. | 604 Beech. |
| Nutting, Fred S. | 1029 Union. |
| Olmstead, Mrs. Emma P. | 726 Chestnut. |
| Olzendam, Mrs. A. P. | 42 Brook. |
| Osgood, Anson G. | 859 Elm. |
| Osgood, Clinton S. | 281 Central. |
| Page, Miss Josephine W. | 10 Adams. |
| Parker, Miss Anna A. | 269 Central. |
| Parker, Miss Emma F. | " " |
| Parker, Henry W. | 30 Granite. |
| Parker, Miss Nellie C. | 146 Pearl. |
| Parker, Walter M. | Manchester Bank. |
| Parker, Mrs. W. M. | 1883 Elm. |
| Patten, Miss Annie W. | 254 Laurel. |
| Peaslee, Mrs. Nellie D. | 568 Beech. |
| Peaslee, Robert J. | " " |
| Perkins, Miss Ada M. | Ash and Orange. |
| Perkins, David W. | 490 Lake Avenue. |
| Perkins, Mrs. Frederick | 52 Clarke. |
| Phillips, Miss Grace A. | 67 Belmont. |
| Phinney, George H. | 41 Hanover. |
| Piper, Frank S. | 273 Central. |
| Porter, Miss Olie M. | 341 Hanover. |
| Prince, Miss H. Velmer | 75 Arlington. |

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|---|---|
| Priest, Miss Electa M. | 508 Chestnut. |
| Priest, Mrs. Lucia Mead | 27 Bay. |
| Reed, Miss Helen E. | 233 Walnut |
| Richardson, Charles L. | Myrtle and Oak. |
| Richardson, Edwin P. | 318 Orange. |
| Richardson, Miss Florence | 481 Lincoln. |
| Richardson, Mrs. Harriet B. | Myrtle and Oak. |
| Richardson, Miss Harriet H. | 481 Lincoln. |
| Richardson, Herbert E. | 382 Central. |
| Richardson, James M. | " " |
| Richardson, Miss Theodora | 481 Lincoln. |
| Richardson, Miss Susan A. | 382 Central. |
| Robbins, Mrs Ellen R. | 290 Mc Gregor. |
| Robbins, William K. | Amoskeag Mfg. Co. |
| Robinson, Dr. J. Franklin | 15–16 Pickering Building. |
| Robinson, Mrs. Tillie F. | 98 Bridge. |
| Robinson, Ed. R. | " " |
| Rogers, Miss Catherine | 277 Laurel. |
| Rowe, Miss Olive A. | 118 Walnut. |
| Ryder, Bayard C. | Board of Trade. |
| Sanborn, A. H. | Amoskeag Mfg. Co. |
| Sanborn, Mrs. Chas. E. | 252 Lowell. |
| Sargent, F. W. | 741 Chestnut. |
| Sawtell, Edward B. | 286 Concord. |
| Schæffer, Henri | 170 Lowell. |
| Scott, Mrs. Lydia A. | 1949 Elm. |
| Shontell, Frederick W. | 46 Hanover. |
| Simmons, Mrs. E. M. | 142 Lowell. |
| Simmons, Walter W. | " " |
| Simons, Mrs. Grace A. | 42 Brook. |
| Slayton, Edward M. | 1602 Elm. |
| Smith, Arthur J. | 39 Hanover. |
| Smith, Miss Emily E. | 1687 Elm. |
| Smith, J. Brodie | 46 Hanover. |
| Smith, Miss Kate L. | 57 Harrison. |
| Smith, Leonard G. | First National Bank. |
| Smith, Miss May L. | 560 Beech. |
| Snell, A. E. | 37 Lowell. |
| Snow, Miss Nellie W. | Myrtle and Ash. |
| Spaulding, F. L. V. | 193 Bridge. |
| Stanton, Miss Theresa B. | 587 Union. |
| Staples, Rev. Charles J. | 70 Blodget. |
| Staples, Mrs. Grace D. | " " |
| Stark, Augustus H. | River Road. |

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| Stark, Mrs. A. H. | River Road. |
| Stearns, Miss Etta Lois, | 296 Hanover. |
| Stearns, H. A. | 464 Amherst. |
| Stevens, Victor E. | N. H. Fire Insurance Co. |
| Straw, Herman F. | 607 Chestnut. |
| Straw, Mrs. H. F. | " " |
| Stuart, Miss Alice M. | 1966 Elm. |
| Stuart, Miss Sara L. | " " |
| Sturtevant, Mrs. Ira F. | 205 Ash. |
| Taggart, Miss Alice C. | 46 Brooklyn Avenue. |
| Teeling, George A. | 165 Sagamore. |
| Thompson, A. W. | 29 Market. |
| Tolman, Miss Mary M. | 593 Union. |
| Tuson, Miss Eva F. | 36 Appleton. |
| Tuttle, Miss Hattie S. | 344 Hanover. |
| Tynan, Miss Mary G. | 72 Oak. |
| Van Dyke, Miss Emma L. | 302 Merrimack. |
| Varick, John B. | 537 Union. |
| Varick, Mrs. Melusina H. | " " |
| Varick, Mrs. Thomas R. | 136 Lowell. |
| Varick, Dr. W. R. | 537 Union. |
| Varney Miss Emma L. | 220 Myrtle. |
| Varney, Mrs. Harriet B. | " " |
| Wadleigh, Mrs. Moses | 179 Lowell. |
| Walker, Miss Flora M. | 146 Jewett. |
| Walker, Thomas Jr. | Goffs Falls. |
| Walker, Mrs. Thomas Jr. | " |
| Waring, Miss Annie E. | 247 Milford. |
| Warren, Miss Marion F. | 1687 Elm. |
| Westcott, W. R. | 40 Concord. |
| Whittemore, L. B. | 533 Beech. |
| Whitten, John H. | 2 Water. |
| Whitten, Mrs. J. H. | " " |
| White, Louis B. | 541 So. Main. |
| White, Willie L. | " " |
| Wiggin, Miss Ellen F. | 581 Union. |
| Willand, Miss Alta C. | 16 Monroe. |
| Willand, Miss Hattie O. | " " |
| Williams, Mrs. Anna M. | 471 Manchester. |
| Williams, Miss Harriet A. | 161 Laurel. |
| Williams, J. Arthur | 544 Maple. |
| Williams, Mrs. J. A. | " " |

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| Wilson, Miss Ida Belle | 304 Hanover. |
| Winch, George | 508 Manchester. |
| Wing, Miss Caroline E. | 331 Hanover. |
| Woodbury, Gordon | Union Office. |
| Woodbury, Mrs. Gordon | City. |
| Woodruff, Harry G. | Barre, Vt. |
| Woodman, Miss Susie G. | 371 Massabesic. |
| Young, Harrie M. | City Hall. |
| Young, Miss Jennie | 120 Myrtle. |

CORRESPONDING MEMBERS.

| | |
|---|---|
| Clarence M. Brooks, | Keene, N. H. |
| Alvah A. Eaton, | Seabrook, N. H. |
| Bela H. Emerson, | Hooksett, N. H. |
| Sarah E. Parker, | Pembroke, N. H. |
| J. H. Prescott, | Foxboro', Mass. |
| John A. Wheeler, | Milford, N. H. |

LIFE MEMBERS.

George Byron Chandler. Mrs. Aretas Blood.

CUSTODIAN.

Walter S. Abbott.

ZOOLOGICAL AGENT, George E. Burnham.

AGENT, Sherburne Fowler, Pembroke, N. H.

BRANCHES.

Suncook Improvement Association, Suncook Branch, No. 1.

MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

## SECTION A.

# PHYSICAL SCIENCE.

### Officers for 1901.

CHARLES J. ABBOTT, *President.*
HORACE T. CLAPP, *Vice President.*
EDWARD J. BURNHAM, *Treasurer.*
CHARLES R. DUSTIN, *Recording Secretary.*
FREDERICK W. SHONTELL, *Financial Secretary.*

EXECUTIVE COMMITTEE.

ALBERT L. CLOUGH. ARTHUR J. SMITH.
HENRY A. STEARNS.

## SECTION A.

# PHYSICAL SCIENCE.

### REPORTS OF MEETINGS—1901.

Monday evening, January 7. The "Common Battery" System of Telephony, with drawings. J. S. WADSWORTH.

Monday evening, January 21. Discussion of the names of scientists and inventors suggested as candidates for the "Roll of Honor" in Electrical Discovery and Invention.

ALBERT L. CLOUGH AND EDWARD J. BURNHAM.

Monday evening, February 4. Lantern slide exhibition.

WILLIAM H. HUSE.

Monday evening, February 18. Description of the Method of Paper Making. CHARLES R. DUSTIN.

Monday evening, March 4. The McDonough System of Color-Photography, with examples. WILLIAM H. HUSE.

Monday evening, March 18. The Radioactive Substances Radium and Polonium. (Supplementary to the address of October 1, 1900.) HENRI SCHÆFFER.

Monday evening, April 1. The Respiration Calorimeter and the Researches of Prof. W. O. Attwater in Dietetics.

WILLIAM K. ROBBINS.

Monday evening, April 15. Cameras and Photography.

FRANK FRENCH.

Monday evening, May 13. The Electric Furnace and the Chemistry of High Temperatures. Illustrated by means of an electric furnace, in which calcium carbide was produced.

DR. ARNOLD L. BOSSI, assisted by ALBERT L. CLOUGH.

Monday evening, May 27. Extremely Low Temperatures and the Liquefaction and Solidification of Gases, with experiments with liquid carbon dioxide. HENRY A. STEARNS.

Monday evening, October 14. What Science Will Do for Training the Mind. REV. CHARLES J. STAPLES.

Monday evening, October 28. The New York-Buffalo Automobile Endurance Test. ALBERT L. CLOUGH.

Monday evening, November 11. Carbon, Graphite and the Diamond. DR. ARNOLD L. BOSSI.

Monday evening, November 25. The Nernst Electrolytic Lamp illustrated by specimens of this lamp and a variety of other forms of illuminant in regard to their relative value in color discrimination.

HENRI SCHÆFFER AND ALBERT L. CLOUGH.

Monday evening, December 9. History of the Development of Photography. WILLIAM H. HUSE.

Monday evening, December 23. Excursion to the Local Telephone Exchange to inspect the "Common Battery" System, with preliminary address. W. R. WESTCOTT.

# NECROLOGY.

The following members of the Institute have died since its organization:

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|---|---|
| JOEL DANIELS, | May 18, 1899. |
| JOHN C. FRENCH, | January 8, 1900. |
| CHARLES H. BARTLETT, | January 25, 1900. |
| LYMAN W. COLBY, | June 21, 1900. |
| HENRY CHANDLER, | October 20, 1900. |
| WILLIAM E. MOORE, | October 22, 1900. |
| FRED G. HARTSHORN, | February 26, 1901. |
| DAVID B. VARNEY, | March 25, 1901. |
| ALLEN N. CLAPP, | May 18, 1901. |
| Mrs. EMELINE R. BALCH, | November 1, 1901. |
| JOHN M. CHANDLER, | December 5, 1901. |

MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

## SECTION B.

# ENTOMOLOGY.

### Officers for 1901.

THEODORA RICHARDSON, *President.*
WALTER S. ABBOTT, *Vice President.*
SUSY C. FOGG, GEORGE E. BURNHAM, *Secretaries.*
CHARLES R. DUSTIN, *Treasurer.*

EXECUTIVE COMMITTEE.

LILLIAN G. BULLOCK, M. D. HULDA C. GRAUPNER,
HELEN REED.

## SECTION B.

# ENTOMOLOGY.

### REPORTS OF MEETINGS—1901.

Monday evening, February 25. The last joint meeting for the season of Sections B and D. Mrs. F. W. Batchelder in the chair.

E. J. Burnham gave a general review of the Vertebrates with reference to the development of the brain.

Miss Susy C. Fogg having resigned as Secretary, by reason of her election to be President of Section F, George E. Burnham was selected by the Executive Committee to fill the vacancy.

Monday evening, March 11. Regular meeting; nine members present. The President in the chair.

Topic of the evening, "Wings of Diptera," illustrated with blackboard drawings by the President.

Monday evening, March 25. Regular meeting, the President in the chair.

Edward H. Fogg and Walter S. Abbott submitted the calendar for the preceding two weeks, which furnished the topic of discussion for the evening.

Monday evening, April 8. Regular meeting; eleven members present. The President in the chair.

The evening was devoted to a comparative study of the external characters of the Diptera.

Monday evening, April 22. Regular meeting; ten members present. The President in the chair.

An instructive paper by Miss Susy C. Fogg on the Orthop-

tera, with special reference to the Acrididæ and the Locustidæ.

Monday evening, May 6. Regular meeting; ten members present. The President in the chair.

E. J. Burnham discussed the Odonata with reference to differences between the Zygoptera and the Odonata.

Monday evening, October 7. Regular meeting; thirteen members present. The President in the chair.

The evening was devoted to the dissection and study of the mouth-parts of Melanoplus femur-rubrum, for the benefit and encouragement of new members.

Monday evening, October 21. Regular meeting; eleven members present. The President in the chair.

The evening was devoted to the dissection and comparative study of the mouth-parts of Coleoptera, specimens of Cicindela and Harpalus being selected.

Monday evening, November 4. Regular meeting; nine members present. The President in the chair.

The President gave a talk on Papilio polyxenes. The remainder of the evening being devoted to the study of the mouth-parts of Colias philodice.

Monday evening, November 8. Regular meeting; eleven members present. The President in the chair.

A paper was read by George E. Burnham on the Catocalas, with some account of the habits of these moths and personal experiences in collecting them.

E. J. Burnham exhibited egg masses of the White-marked Tussock-moth (Notolophus leucostigma) and reported that they were quite abundant on shade trees in the central portion of the city. The attention of the Street and Park Commissioners had been called to the matter, and a force of laborers was already engaged in collecting and burning the egg masses. The method pursued was that adopted several years ago, when this moth proved to be so costly a plague to Manchester. The laborers are equipped with ladders and poles, each of the poles having at one end an old-fashioned, three-tined steel table-fork, securely fastened and the tines bent at right angles to the handle.

The remainder of the evening was devoted to the dissection and study of the mouth-parts of the House fly, Musca domestica.

Monday evening, December 2. Date of regular meeting; no attendance by reason of the weather.

Monday evening, December 16. Regular and annual meeting; twelve members present. The President in the chair.

The annual report of the Secretary was read and approved. It showed that during the year the Section had held four joint meetings with Section D, and fourteen separate meetings. The average attendance was ten, the smallest being three and the largest thirteen.

In accordance with the vote of the section, the President named William H. Huse, Mrs. E. Southard McCoy and Miss Marcia Moore as a nominating committee. The committee reported the following list of officers, which was elected for the ensuing year:

*President*—Theodora Richardson.

*Vice President*—Walter S. Abbott.

*Secretary*—Edgar D. Cass.

*Treasurer*—Charles R. Dustin.

*Executive Committee*—Lillian G. Bullock, M. D., Herbert E. Richardson, Mrs. E. Southard McCoy.

# NOTES ON THE STUDY
## OF
# AQUATIC LIFE
## IN ITS ECONOMIC ASPECT.

BY EDWARD J. BURNHAM.

The benefits resulting from the systematic production of food from the soil are so obvious and the rude practice of the art is so simple that the fundamental principles of agriculture have been more or less clearly understood from very early times; but the possibilities in the intelligent cultivation of bodies of fresh water—of brooks, rivers, ponds and lakes—have been but dimly perceived, and the principles underlying such cultivation have scarcely been understood at all.

Few people think of fresh water fish culture as other than a means of affording amusement to the local angler or an additional attraction to the summer sojourner. With these ends in view, fish are hatched in large numbers and placed, while still young, in waters where it is blindly hoped they will thrive, but with no definite provision for their future needs. In many cases the money would be as intelligently and profitably expended for seed wheat to be cast at random to the four quarters of the earth.

The natural fecundity of fishes is so great, and their growth under favorable conditions is so rapid, that, given an adequate food supply, in suitable surroundings, the product, both in numbers and in weight, would be wellnigh incalculable; but in order that a considerable proportion of any species, whether hatched naturally or artificially, may reach maturity, all the circumstances affecting their food supply must the clearly understood, that the conditions may be, as far as possible, intelli-

gently controlled. The problem is intricate, and its factors, in the present state of knowledge, obscure; but the persistent and extended application of scientific methods of investigation cannot fail to result in its ultimate solution. A simple illustration will afford some idea of the nature of the problem and of the possibilities as well as of the difficulties involved.

A certain brook in a town near Manchester was long celebrated for its trout. Even to this day a considerable number of individuals of good size are found there, notwithstanding the almost incessant fishing for them. A brook weed grows abundantly in the rapids of this stream, clinging to the stones at the bottom. Snails in vast numbers feed upon this particular weed. The reproductive capacity of snails is great, and this brook weed is evidently a favorite food plant. It is known that the larvæ of horseflies (Tabanidæ) feed upon these snails, and, as might be expected, horsefly larvæ are abundant here. In this particular brook the singular little fishes known as "darters" (in this case some species or variety of Etheostoma as yet unidentified) are found in surprising numbers, lying half hidden among the stones. These feed upon the horsefly larvæ, and are themselves noted among anglers as a special bait for trout.

Here we have an apparently simple chain of cause and effect, from the brook weed to the trout. In most cases the inter-relations are more complicated; but even here the problem is not so simple as at first appears. If we jump at the conclusion that a stream which abounds in brook weed is therefore suitable for trout, we may fall into the error of that well-meaning person who, observing that civilized man uses the toothbrush, hastily inferred that if savages were equipped with toothbrushes, they, too, would be civilized.

In this seemingly simple chain we must know what are the conditions favorable to the growth of the brook weed, and why it is abundant in one stream but wanting in another. Of the snails we must know what other plants supply a portion of their food, and at what seasons, as well as what enemies other than the horsefly larvæ tend to check their increase; and we must learn as much or more of the horseflies themselves before we

can hope to understand the conditions of their larval stage. Finally, we must know the life history of the darter, from the egg to the moment that it is seized by the trout.

The horsefly larvæ can serve as food for the darters during only a portion of the year, and probably a relatively small portion. The trout may eat the darters all the year round, if the latter are sufficiently abundant; but the darters themselves must, at some period of the year, find other food than the larvæ of horseflies. We must know what this other food is, at what time it is found in greatest abundance and where; what conditions are favorable or hostile to its development—in a word, before we can say intelligently and confidently that a given stream or pond is properly "stocked" with the necessary food supply, and is, therefore, ready for the further "stocking" with trout or other fish, we must know all the facts relative to all the life, both animal and vegetable, in the water, on the shores, and in the air above.

Some of this work has already been done by those entomologists who have made a study of the structure and relationships of certain groups of aquatic insects, but much more remains to be accomplished before anyone can speak with certainty upon the subject of stocking even a single stream or pond. The State of New York recently took a long step in the right direction. Under the supervision of the State Entomologist, Dr. E. P. Felt, an entomologic field station was established at Saranac Inn, in the Adirondacks, in connection with the State fish hatchery at that place. The station was placed in charge of Dr. James G. Needham, Professor of Biology at Lake Forest University, whose report upon Aquatic Insects in the Adirondacks, issued as Bulletin 47 of the New York State Museum, is by far the most valuable contribution to our knowledge of this important subject which has yet appeared.

But before Professor Needham's report came to hand, an unusual opportunity for the study of the return of plant and animal life to a body of water, rendered utterly barren of both by mechanical means, was presented through the enterprise and

courtesy of Gordon Woodbury, Esq. On Mr. Woodbury's estate in Bedford there is an artificial pond, which, a century and a half ago, supplied power for a sawmill, but which for many years has been retained for pleasure only. This pond, having originally an area of about five and one-half acres, is formed by damming Cold Brook, a stream of considerable volume and great activity, which flows sinuously down a valley of its own making through an extensive forest from the sand plains and low hills beyond. This brook, in the long period since the first construction of the dam, by bringing down sand from the plains, and debris from the woodland, had filled fully two-thirds of the original area of the pond and greatly lessened the depth of the remaining portion.

Mr. Woodbury decided upon an extensive excavation, and in August of the present year the contractor began operations. The work was completed in November; silt and miscellaneous detritus of an average depth of three feet and ten inches having been removed from an area of five and one-half acres. The excavation was so thorough that, with the exception of a small island upon which shrubs and trees were left standing, there was not a vestige of plant or animal life in the entire area. The gate was closed on November 21, and three days later water began flowing over the dam.

Mr. Woodbury having previously expressed a readiness to co-operate in any investigations that might be undertaken, the Council of the Institute requested Mr. Frederick W. Batchelder to make a study of the return of aquatic plants to this area, while the present writer was similarly requested to make careful observations and report upon the progress of the natural restocking of the pond with animal life.

On December 21, one month from the closing of the gate, the first formal investigation was made, with the assistance of George E. Burnham, Secretary of the Entomological Section of the Institute. Insects had ceased flying before the excavation was completed in November, and there were but two ways open by which aquatic life could find entrance to the pond—one by the brook, and the other from a marsh of some extent, which had

been connected with the pond by four eight-inch water-mains, laid side by side at a level with the bottom. It was thought that caddis-fly larvæ and dragon-fly nymphs might have found their way through these pipes, and the first observation was accordingly made at the point in the pond where the water-mains discharge a small stream from the marsh. A hole two feet square was cut in the ice, which was found to be five and one-half inches thick. The water was three feet deep, and at a depth of two feet its temperature was 34 degrees Fahrenheit. The temperature of the atmosphere was 16 degrees at 11 o'clock A. M.

The dredging was done with a sieve net, similar to that figured and described in part O of the U. S. Nat. Mus. Bul. 39, p. 4, and used with such success by Professor Needham in his Adirondack investigations. There was no mud, the excavation having been made down to the original solid bottom of the pond. The dredge brought up large quantities of oak and maple leaves which the wind had blown into the water. Many of these bore the familiar markings of the leaf miners, and excrescences caused by various gall insects, but there was no trace of aquatic life to be found upon them. By thrusting the dredge under the ice, it was made to explore an area of fully sixteen square feet, but leaves and small twigs were the only objects brought up from the bottom; and there was no indication of life in the water.

An investigation was next made at the mouth of the brook, which had already begun the formation of a "cone" of clear sand. As the brook itself was open, and the ice of the pond was firm, it was possible, after first cutting away the thin ice along the edge, to make a thorough examination of a considerable area; but the sand yielded no indication of life of any kind. It therefore remained only to find what forms of life there might be in the brook.

A freshet, that occurred two days previously, had caused the brook to bring down an unusual quantity of clear, yellow sand, which covered the bottom evenly and completely to the foot of the first rapids, about forty rods up the stream. The dredge,

although employed diligently, revealed nothing until the rapids were reached.

At this point the brook flows with a swift current over a rocky bottom and in a curve approximating an arc of ninety degrees. At the foot of the rapids, on the inner side of the curve, a rivulet enters the brook by a ditch, evidently dug many years ago for the purpose of drainage. The area selected for examination was six feet in length and two in breadth, extending along the inner curve of the brook, including the mouth of the ditch—one foot—and five feet of the rapids. A fine wire netting, of the sort used for window screens, was arranged to enclose the area selected, but a quantitative examination was found to be physically impossible by reason of the intense cold. For the purposes of a qualitative study, however, it is believed that sufficient care was exercised to render the collection complete. This collection comprised :

10 darters (probably a variety of Etheostoma olmstedi Storer.)

3 salamanders (young of Amblyostoma ; probably A. punctatum, as the characteristic dorsal groove was very distinct.)

2 fresh-water mussels (Unio.)

8 dragon-fly nymphs (all of the same species, and of the Libelluline type.)

14 stone-fly nymphs (evidently two species, but all young and immature).

78 may-fly nymphs.

21 caddis-fly larvæ.

18 dipterous larvæ.

The caddis-fly larvæ—some bearing cases of sand, some of sticks, some of leaves, and some of the flattened needles of the hemlock—were found at the mouth of the ditch, with the exception of the sand-case-bearers, which were abundant at the foot of the rapids, but minute, with only the beginnings of cases. The clams were found in the rapids, and all the remaining forms of life included in the list were also found in in the rapids, among or beneath the stones at the bottom. The

darters, protected by their color, lay half hidden among the stones, looking more like tadpoles than fish. The dragon-fly nymphs also rested among the rocks, motionless, awaiting their prey—or, quite as likely, in that temperature, indifferent alike to food and their surroundings. The may-fly larvæ literally swarmed here; multitudes must have been hatched within a comparatively short time. The seventy-eight counted were of fair size—from one-half to three-quarters of an inch in length—but no attempt was made to secure the myriads of tiny individuals, seemingly but recently from the egg. The stone-fly nymphs were beneath the stones, and many more than those counted might have been secured had the cold not made further collecting too tedious to be endured. The salamanders were also beneath stones, but solitary. The dipterous larvæ, footless, and nearly an inch in length, appeared to roll aimlessly about in the swift current, but none was seen to be carried down the stream, although a careful watch was kept for such an accident.

It is believed that the results of the investigation tend to prove: 1) that the pond was as barren of life at the end of a month as it was when first filled with water; 2) that the nymphs and larvæ of aquatic insects, belonging to the groups mentioned in this paper, do not wander from their stations in search of food, since it was impossible for those in the marsh or in the brook to know that the pond contained no food for them; 3) that even a flood, such as prevailed two days before the examination, does not avail to carry insect and other forms of aquatic life down stream against their will; 4) that while the water of the pond has been made barren by mechanical means, Cold Brook itself, at least in its numerous rapids, teems with animal life; 5) that the restocking of the pond with insect life, when it occurs, will be accomplished chiefly by oviposition, and not by the migration or transportation of insects in the larval stage.

MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

## SECTION C.

# BOTANY.

### Officers for 1901.

MRS. ALBERT O. BROWN, *President.*
MISS CAROLINE E. WING, *Vice President.*
F. W. BATCHELDER, *Secretary.*
MISS ELLEN F. WIGGIN, *Treasurer.*

EXECUTIVE COMMITTEE.

MISS CAROLINE E. WING, REV. CHAS. J. STAPLES,
MISS ISABELLE R. DANIELS.

## SECTION C.

# BOTANY.

### REPORTS OF MEETINGS.

Tuesday evening, January 8. Regular meeting; the President in the chair.

Slides prepared by Mr. E. J. Burnham from cross sections of rose geranium leaf and petiole of strawberry, and cells of elder pith and cork, were examined by aid of the microscope.

Adjourned to January 22.

Tuesday evening, January 22. Regular meeting; the President in the chair.

An informal discussion was held relative to the advisability of purchasing a compound microscope for the section. The following herbarium specimens were studied: *Lycopodium lucidulum*, *inundatum*, *obscurum*, *clavatum* and *complanatum*.

With his microscope, Mr. Burnham showed the spore-cases and spores of *L. obscurum*.

Adjourned to February 5.

Tuesday evening, February 5. On account of the extreme cold the attendance was small and the meeting informal.

Adjourned to February 19.

Tuesday evening, February 19. Regular meeting; the President in the chair.

The President led the meeting in the study of ferns, reviewing the work of previous meetings and examining several herbarium specimens of species not hitherto studied.

Adjourned to March 5.

Tuesday evening, March 5. Regular meeting; the President in the chair.

The study of ferns was continued and special examination

was made of *Dryopteris Braunii*, *Goldieana* and *marginalis* from herbarium specimens.

Adjourned to March 19.

Tuesday evening, March 19. Regular meeting; the President in the chair.

A review of the work of the last meeting was given by Miss Lord, after which the genus Asplenium was studied with the help of herbarium specimens of the following species: *A. Platyneuron*, *Trichomanes*, *montanum* and *angustifolium*.

Adjourned to April 2.

Tuesday evening, April 2. Regular meeting; the President in the chair.

Adjourned to April 16.

Tuesday evening, April 16. Regular meeting; the President in the chair.

Adjourned to April 30.

Tuesday evening, April 30. Regular meeting.

Adjourned to May 14.

Tuesday evening, May 14. Regular meeting; the President in the chair.

Adjourned to May 28.

Tuesday evening, May 28. Regular meeting.

Adjourned to June 11.

Tuesday evening, June 11. Regular meeting; the President in the chair.

The genus Osmunda was studied from fresh specimens of *O. Claytoniana* and *cinnamomea*. Two early grasses, *Oryzopsis juncea* and *asperifolia*, were analyzed and identified. The following flowers of the season were studied: *Erigeron bellidifolius*, *Senecio aureus*, *Clintonia borealis*, *Pedicularis Canadensis*, *Sisyrinchium angustifolium* and *Myosotis verna*.

Adjourned to June 25.

Tuesday evening, June 25. Regular meeting; the President in the chair.

The time was devoted to study of the flowers of the season, especially *Habenaria fimbriata* (*grandiflora*.)

Adjourned to October 1.

Tuesday evening, October 1. In the absence of both President and Vice President, Rev. C. J. Staples was chosen chairman of the meeting.

There being no special program for the evening, the time was occupied with the discussion of plans for the work of the season.

Fresh plants of the orchid *Spiranthes cernua* were exhibited, and the incorrectness or incompleteness of the generic description in the manuals demonstrated, the specimens showing plainly both a three-ranked and a one-ranked arrangement of the flowers in the spike. It was stated by the collector that from 30 to 40 per cent of the plants in this vicinity displayed the one-ranked inflorescence.

Discussion followed concerning lectures, a microscope, a course of study and the assignment of special talks or papers. Among the subjects suggested were these: Fungi, The Spore Surface of Mushrooms, Histology, Grasses, Ecology.

The Council having recommended that the meetings of the section hereafter be arranged so as to bring them on the first and third, or the second and fourth occurrence of the accustomed week day in the month, so as to avoid complications resulting from the fifth occurrence of the day, it was voted that the meetings of Section C be held on the first and third Tuesdays in each month during the season.

It was voted to request Mrs. Maria L. Clough to give a paper or talk on "Fungi" at the next meeting.

Adjourned to October 15.

Tuesday evening, October 15. Regular meeting; the President in the chair.

After an informal talk by Mr. Burnham on apparatus for microscopic work, Mrs. Clough led the section in a study of Mushrooms, describing their place in the natural order of development, and the habits of the poisonous and edible species.

Fresh plants were used in illustration, and the spores were examined microscopically.

Adjourned to November 5.

Tuesday evening, November 5. Regular meeting; the President in the chair.

Specimens brought in were examined; among them, *Osmorrhiza longistylis*, *Geranium Robertianum* and *Chiogenes serpyllifolia*. The first named was reported as found also in Manchester. Fresh plants of *Dryopteris cristata Clintoniana* were exhibited and examined.

Adjourned to November 19.

Tuesday evening, November 19. Regular meeting.

On account of very inclement weather, the attendance was small and the meeting was informal.

Adjourned to December 3.

Tuesday evening, December 3. Annual meeting.

The lecture on "Ecology" by Prof. L. H. Bailey of Cornell University was given this evening at the vestry of the Franklin Street church. After the lecture, there being a sufficient number of members present to constitute a quorum for business, a meeting was called to order by the Secretary, in the absence of the President and Vice President, by reason of the very severe snowstorm. It was then voted to adjourn the annual meeting until the time of the next regular meeting.

Adjourned to December 17.

Tuesday evening, December 17. Annual meeting; the President in the chair.

This being the adjourned annual meeting, after the reading of the records of the last two meetings, the section proceeded to elect officers for the ensuing year. A nominating committee consisting of Miss Mack, Miss Moore and Miss Woodman was appointed by the chair to prepare a list of names to be voted upon. After consultation the committee reported the following list of names:

*President*—Miss Isabelle R. Daniels.

*Vice President*—Miss Caroline E. Wing.

*Secretary*—Mr. F. W. Batchelder.

*Treasurer*—Miss Ellen E. McKean.

*Executive Committee*—Miss Caroline E. Wing, Rev. Chas. J. Staples, Miss Mary F. Barnes, and the President and Secretary *ex officio*.

It was voted that the Secretary be authorized to cast one ballot for the above list of names. This having been done by the Secretary, the above named persons were declared duly elected as officers of Section C for the year 1902.

It was announced that at the next meeting, Mr. Batchelder would give a talk on "Plant Societies in Manchester," a local adaptation of Prof. Bailey's recent lecture on "Ecology."

Adjourned to January 7, 1902.

# INTRODUCTORY NOTE.

The total destruction of the herbarium of the Institute by fire on the evening of January 14, 1902, has placed the compiler in an embarrassing situation, since it has deprived him of the usual vouchers. He has accordingly been careful to include nothing in the following list which could not be positively identified by memory or by the notes of accurate and experienced observers.

He desires to express his indebtedness to his friend Dr. A. A. Briggs, of Andover, for invaluable assistance in the preparation of the list of Carices.

# ADDITIONS

TO THE

# PRELIMINARY LIST OF PLANTS

COMPILED BY FREDERICK W. BATCHELDER.

## Lycopodiaceæ.

**Lycopodium chamæcyparissus** R. Br. Gilford. Rare?

## Typhaceæ.

**Typha angustifolia** L. Windham. Geo. Dimmock. Rare.

## Gramineæ.

*1. **Syntherisma filiformis** (L.) Nash.
(see notes.) Rock Rimmon, Manchester. Rare.

*2. **Panicum autumnale** Bosc.
Bank of Merrimack River, Bow. Rare.

*3. **Sporobolus vaginæflorus** (Torr.) Wood.
Manchester. Concord. Not rare.

**Agrostis coarctata** Ehrh.
Chester. Rare?

**Avena striata** Michx.
Doe Mountain, Laconia. Rare?

**Phragmites Phragmites** (L.) Karst.
Hudson. Rare.

**Nardus stricta** L.
Andover. Dr. A. A. Briggs. Accidental.

**Agropyrum caninum** (L.) R. & S.
Laconia. Rare.

## Cyperaceæ.

**Carex folliculata** L. Not uncommon.
**intumescens** Rudge. Common.
**lupulina** Muhl. Common.

**utriculata** Boott. Common.
**monile** Tuckerm.
**Tuckermani** Dewey.
**retrorsa** Schwein.
**lurida** Wahl. Common.
**Baileyi** Britton. Common southward.
**Pseudo-Cyperus** L.
Laconia. Dr. A. A. Briggs.
**comosa** Boott.
Auburn.
**riparia** Curtis. Common.
**scabrata** Schwein.
Andover. Dr. A. A. Briggs.
**vestita** Willd.
Manchester. Not rare.
**filiformis** L. Common.
**stricta** Lam. Common.
**Goodenovii** J. Gay. Rather common.
**prasina** Wahl.
Manchester. Common.
**crinita** Lam. Common.
**gynandra** Schwein. Common.
**virescens** Muhl. Common.
**costellata** Britton.
Goffstown. Bristol.
**gracillima** Schwein. Common.
**formosa** Dewey.
Goffstown.
**longirostris** Torr.
Franklin.
**arctata** Boott.
**tenuis** Rudge. Common.
**grisea** Wahl. Not common.
**pallescens** L. Common.
**conoidea** Schk.
Manchester. Salisbury.
**laxiflora** Lam. Common.

**laxiflora patulifolia** (Dewey.) Carey.
Andover. Dr. A. A. Briggs.
**digitalis** Willd.
Concord. Andover.
**pedicellata** (Dewey.) Britton.
**Pennsylvanica** Lam. Common.
**Novæ-Angliæ** Schwein.
Concord. Hill.
**umbellata** Schk. Common.
**leptalea** Wahl. Common.
**stipata** Muhl. Common.
**vulpinoidea** Michx. Common.
**tenella** Schk. Common.
**Muhlenbergii** Schk.
Franklin.
**sterilis** Willd. Common.
**canescens** L. Common.
**brunnescens** (Pers.) Poir.
**bruunescens gracilior** Britton.
Andover.
**trisperma** Dewey. Not uncommon.
**Deweyana** Schwein. Not uncommon.
**siccata** Dewey. Common.
**tribuloides** Wahl.
**scoparia** Schk. Common.
**cristatella** Britton. Not uncommon.
**tenera** Dewey. Common.
**festucacea** Willd. Not uncommon.

## Juncaceæ.

**Juncus effusus** L. Common.
**bufonius** L. Common.
**tenuis** Willd. Very common.
**Greenei** Oakes & Tuckerm. Not uncommon.
**marginatus** Rostk. Not uncommon.
**pelocarpus** E Meyer. Not uncommon.
**articuiatus** L.

**Canadensis** J. Gay.
**acuminatus** Michx. Common.

### Orchidaceæ.

*4. **Pogonia pendula** Lindl.
Meredith. F. W. Batchelder. Rare.

*5. **Cypripedium aretinum** R. Br.
Laconia. F. W. Batchelder. Rare.

### Myricaceæ.

**Myrica cerifera** L.
Salem. Geo. Dimmock. Rare.

### Aristolochiaceæ.

**Asarum Canadense** L.
Salem. Geo. Dimmock. Rare.

### Portulacaceæ.

**Claytonia Virginica** L. Rare.

### Caryophyllaceæ.

**Anychia dichotoma** Michx.
Windham. Rare.

### Rosaceæ.

**Potentilla pumila** Poir.

### Papilionaceæ.

**Desmodium paniculatum** D. C.
**Dillenii** Darl.

### Vitaceæ.

**Vitis riparia** Michx.
Bank of Merrimack River, Concord.

### Umbelliferæ.

**Osmorrhiza longistylis** D. C.

### Ericaceæ,

**Rhododendron canescens** Porter.

### Solanaceæ.

**Physalis pruinosa** L.
Manchester. Rare.

### Schrophulariaceæ.

**Ilysanthes attenuata** (Muhl.) Small.
Concord.

**Castilleja coccinea** (L.) Spreng.
Pelham. Rare.

### Orobanchaceæ.

**Conopholis Americana** (L. f.) Wallr.
Meredith. Rare.

### Rubiaceæ.

**Mitchella repens** L. Common.
Accidentally omitted from list of 1899.

# NOTES.

*1. Rock Rimmon, in West Manchester, is an exposed ledge, precipitous on the east and south sides and inclined gradually on the west and north sides. It is an island of rock in a lake of gravel. Close to the eastern base is a small, boggy swamp. It follows that here, within a very limited area, are ecological conditions favorable to a great variety in the flora. The following names of rarer and unexpected species may be of interest: *Quercus Prinus* L., *Rhus venenata* D C., *Asplenium platyneuron* (L.) Oakes. (rare in this vicinity,) *Syntherisma filiformis* (L.) Nash., *Eragrostis capillaris* Nees., *Chrysopogon nutans* Benth.

*2. Dr. A. A. Briggs of Andover, while wheeling along the river road in Bow, near the Hooksett line, found several tufts of this species and kindly furnished the compiler with specimens. The latter soon after (Sept. 22) visited the locality and found the grass scattered along by the side of the road, which there runs close to the river, for about a quarter of a mile. In all there were 19 tufts, large and small. This abundance would indicate that it must have been established for some time. The land in the vicinity is subject to overflow from freshets, and is largely covered with very fine sand. Most of the grass was growing in this sand.

*3. Two forms of Sporobolus of this group are common in Manchester and Concord, one appearing to answer the description of *S. neglectus* Nash., the other that of *S. vaginæflorus* (Torr.) Wood. In the former the glumes are nearly of equal length; in the latter they are of four decidedly different lengths, increasing regularly in length from the short lower empty glume to the long-acuminate almost awned palet. Frequently the palet is so exaggerated as to strongly resemble that of *S. asper*. The two forms usually grow separately. The one which is here provisionally called *S. vaginæflorus* sometimes forms a close turf in moister situations, thus contrasting with the usual scattered

condition of both forms when growing in drier localities or in sand. Aside from the difference in the proportionate length of the glumes the plants in the two forms appear to be alike. These notes are given simply for what they may be worth in the reduction of this unsettled group.

*4. A station of this beautiful little orchid was discovered by the compiler on the shores of Lake Winnipesaukee, Aug. 12, 189–. At this time the plants were very abundant, often growing in dense clusters or colonies. In a single patch of leaf-mold, about 14 by 8 inches in extent, no less than 120 plants were found in full flower. The plants behaved badly in drying, and specimens prepared for herbaria were very unsatisfactory. The next visit to the station was on Aug. 27, 1897, when the plants were very scarce and poorly developed. The last visit was on Aug. 18, 1901. While not as abundant as when the station was discovered, the plants were then sufficiently numerous and in good condition. A number of clumps and of single plants with the leaf-mold attached were packed in tin boxes with moss and successfully transported, reaching botanical friends in Massachusetts in fine condition. The collector having suspected, from both the habitat and the habit of the plants, that they were to some extent saprophytic or symbiotic, suggested to one of the recipients of his plants a critical examination of the root system. The examination tended to prove that the plants are hemisaprophytes, deriving organic food from the humus. It also showed a particularly clear case of "mykorhiza," certain fungi having penetrated the tissues of the root and also sent hyphæ from it in all directions, so that the root looked as if clothed with root hairs.

The paleness of the parts above ground and the feeble development of chlorophyll are very noticeable. As far as observed, the plants all grow in leaf-mold and have no attachment to the soil beneath. In fact, the layer of leaf-mold is usually superposed on rock and the plants are most abundant in the little hollows between angular fragments of the rock where little or no other soil can have accumulated. The trees in the locality are

mostly hemlock, maple, oak and beech, meeting white pine on the upper part of the slope. Other interesting plants of the locality are *Aphyllon uniflorum* T. & G., *Conopholis Americana* (L. f.) Wallr, *Epiphegus Virginiana* Bart., *Monotropa uniflora* L., *M. Hypopitys* L.

*5. A small clump or rather tuft of these plants was found in Laconia near Doe Mountain, Aug. 30, 1897. The station has been visited almost every year since, but although careful search has been made there and in the vicinity, not a single plant has been found; another illustration of the evanescent habit of some of the rarer orchids.

## NEW STATIONS OF SOME RARER PLANTS.

| | | |
|---|---|---|
| **Onoclea Struthiopteris** (L.) Hoffm. | Hollis. | Deering. |
| **Woodsia obtusa** (Spreng.) Torr. | Millville, | Concord. |
| **Camptosorus rhizophyllus** (L.) Link. | | Hudson. |
| **Rhus venenata** D C. | | Concord. |
| **Ilex lævigata** Gray. | Windham. | Concord. |
| **Hudsonia ericoides** L. | | Hooksett. |
| **Rhododendron maximum** L. | | Hopkinton. |
| **Limnanthemum lacunosum** Griseb. | | Concord. |
| **Pentsemon pubescens** Solander. | | Concord. |
| **Sambucus racemosus** L. | | Concord. |

## SUMMARY.

1899—1901.

| | |
|---|---|
| Number of Families represented | 117 |
| Number of Genera represented | 381 |
| Number of Species | 899 |
| Number of Varieties | 15 |
| Total Number of Names | 914 |

MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

## SECTION D.

# ORNITHOLOGY.

### Officers for 1901.

Mrs. F. W. BATCHELDER, *President.*

MRS. J. C. BICKFORD, *Vice President.*

MISS MAY W. DAVIS, *Secretary.*

EXECUTIVE COMMITTEE.

MR. EDWARD H. FOGG, MISS THEODORA RICHARDSON, MRS. J. C. BICKFORD.

## SECTION D.

# ORNITHOLOGY.

### REPORTS OF MEETINGS.

Monday evening, February 25. Joint meeting of Sections B and D, the President of Section D in the chair; Mr. Edgar D. Cass Secretary pro tem.

This being the last joint meeting for the season of Sections B and D, a review of the biological work undertaken during the fall and winter was presented by Mr. E. J. Burnham, who traced the development of the brain from the simple notochord of the lancelets progressively upward to the extremely complex organ possessed by the highest vertebrates.

At the close of the review a vote of thanks was extended to the speaker for his able and generous assistance in maintaining the interest of the joint meetings.

Adjourned to March 20.

Wednesday evening, March 20. Regular meeting; the Vice President in the chair; Miss Mary F. Dana Secretary pro tem.

Mr. E. H. Fogg, for the Executive Committee, reported a plan of work for the ensuing season. This was to consist of lectures, papers and readings on topics of interest to the Section. The report was accepted.

By request, Miss Dana read for the second time her paper on "The Theory of the Migration of Birds." This was followed by a discussion. An article in *Bird Lore* by Mr. William Brewster, on "A Study of a Lincoln's Sparrow," was read. Members of the Section were urged to look carefully for this species, since it doubtless passes through the Merrimack valley in the migrations.

The only birds reported as seen to date were bluebirds, robins and song sparrows.

Adjourned to April 17.

Wednesday evening, April 17. Regular meeting; Miss Theodora Richardson in the chair.

An article on "Boys and Shotguns" was read by Mr. Walter Abbott, and members were urged to encourage other methods of bird study for the young people.

Mrs. M. H. Varick gave, with the help of photographs, an account of sixty species of birds seen in Florida during a recent visit there in early spring.

Birds to date were reported as follows: House sparrow, chickadee, downy woodpecker, crow, bluejay, bluebird, robin, tree sparrow, song sparrow, butcher bird, junco, purple finch, flicker, phebe, vesper sparrow, red-breasted nuthatch, pine warbler, field sparrow, rusty blackbird, bronzed grackle, dusky duck, marsh hawk, herring gull, redwing, white-breasted nuthatch, goldfinch, fox sparrow, hermit thrush, meadow lark, tree swallow, sharp-shinned hawk, fish hawk—32 species in all.

Adjourned to May 1.

Wednesday evening, May 1. Regular meeting; the Vice President in the chair; Miss Lord Secretary pro tem.

Mr. E. D. Cass gave a talk on "Bird Songs." The following additions were made to the list of birds seen to date: Redpoll linnet, golden-crowned kinglet, broad-winged hawk, chipping sparrow, kingfisher, ruby-crowned kinglet, black and white creeper, red crossbill.

Adjourned to May 15.

Wednesday evening, May 15. Regular meeting; the President in the chair.

An article was read on the planting of trees and shrubs, the fruit of which would be attractive to birds. Suggestions were made as to furnishing dishes or pools of water in gardens and lawns for birds to drink from and bathe in.

The President gave a review of the subject of Bird Legislation and Protection, from the time, about fifty years ago, when

definite laws were first passed to the recent legislative enactments in the different States and in Congress. It was stated that as long ago as in 1864 laws for the protection of birds were enforced in the District of Columbia.

The following additions were made to the bird list of the season: White-throated sparrow, 6th; least flycatcher, 8th; warbling vireo, 9th; brown thrasher, chewink, 11th; Wilson's thrush, myrtle warbler, black-throated green warbler, blue-headed vireo, swift, spotted sandpiper, 12th; catbird, rose-breasted grosbeak, Baltimore oriole, yellow warbler, Maryland yellow-throat, ovenbird, 14th; kingbird, hummingbird, 15th; white-crowned sparrow, 17th; bobolink, scarlet tanager, redstart.

Adjourned to May 29.

Wednesday evening, May 29. Regular meeting; the President in the chair.

The evening was devoted to consideration of birds of the season. Mrs. Varick gave a list of 65 species seen from May 16 to 24 inclusive. The following were the additions to the bird list: Ruffed grouse, sparrow hawk, hairy woodpecker, nighthawk. Traill's flycatcher, cowbird, indigo bird, purple martin, bank swallow, barn swallow, red-eyed vireo, Nashville warbler, parula warbler, black-throated blue warbler, magnolia warbler, chestnut-sided warbler, Blackburnian warbler, Canadian warbler, wood thrush, olive-backed thrush, whippoorwill, least sandpiper, black-cap warbler, black-poll warbler, cedar bird. Total number of species reported by members since January 1, 1901, 84.

Adjourned to June 12.

Wednesday evening, June 12. Regular meeting; the President in the chair. Study of birds of the season. This being the last meeting before the summer vacation, members were urgently requested to keep a list of birds seen during the three following months and make a full report at the first meeting in the fall.

A matter of special interest was the report by Mrs. Varick of

the discovery on Bedford plains of a colony of Prairie Warblers (*Dendroica discolor*), a species never before reported as breeding in this section or north of Massachusetts. The colony was discovered by Mrs. Varick and Dr. W. R. Varick, who had already become acquainted with the species at Martha's Vineyard. On the 11th Mr. and Mrs. Batchelder accompanied them to the locality, and entirely satisfactory observations of both plumage and song were accomplished. Since the only person licensed to shoot birds for specimens lived at a distance, his services were not available on this occasion, and shot-gun identification had to be postponed.

Adjourned to the call of the President.

Monday evening, October 7. At the call of the President, a meeting of the Executive Committee was held to arrange a program for the coming season. It was voted to place each meeting in charge of some member as leader, who should present the subject assigned him in a paper or talk, and with whatever illustrations might be available.

It was also voted that hereafter the meetings of the Section be held on the second and fourth Tuesdays in each month. It was voted to call the first meeting of the season for October 22.

Adjourned to the call of the President.

Tuesday evening, October 22. Regular meeting; the President in the chair.

An outline of the work was given by Mr. Cass, and subjects were assigned.

Adjourned to November 12.

Tuesday evening, November 12. Regular meeting; the President in the chair.

The lecture by H. T. Bailey, in the Chandler course, occurring this evening, it was voted to adjourn.

Adjourned to November 26.

Tuesday evening, November 26. Regular meeting; the President in the chair.

As leader for the evening, Mr. Cass presented the subject of

the Anatidæ, describing and defining the three groups, mergansers, river ducks and sea ducks, with reference to coloration, habits, food, flight and nests. Miss May Davis contributed notes on the sea ducks, and Mr. Fogg on the river ducks.

Adjourned to December 10.

Tuesday evening, December 10. Regular meeting; the President in the chair.

Miss Theodora Richardson, leader for the evening, read a paper on "Birds' Nests of This Locality." This was followed by a study of nests in the Institute collection, and by the exhibition of the lantern slides of nests, loaned by the Audubon Society.

Adjourned to December 11.

Wednesday evening, December 11. In accordance with the By-Laws of Section D, the annual meeting was held this evening; the President in the chair.

A nominating committee, appointed by the President to bring in a list of names for officers for the ensuing year, submitted the following list:

*President*—Mrs. F. W. Batchelder.

*Vice President*—Mrs. J. C. Bickford.

*Secretary*—Miss May W. Davis.

*Executive Committee*—Mr. Edward H. Fogg, Miss Theodora Richardson, Dr. W. R. Varick.

It was voted to adopt the report of the committee, and the Secretary was authorized to cast one ballot for the foregoing list of names. This having been done, the above-named persons were declared duly elected as officers of Section D for the year 1902.

As the date of the next meeting would fall on Christmas eve, it was voted to adjourn to the second Tuesday in January, 1902.

Adjourned to January 14, 1902.

# ADDITIONS
## TO THE
# PRELIMINARY LIST OF BIRDS.

COMPILED BY FREDERICK W. BATCHELDER.

**343. Buteo latissimus** (Wils.)

BROAD-WINGED HAWK.

Not common transient visitant.

**366. Asio wilsonianus** (Less.)

AMERICAN LONG-EARED OWL.

Not common permanent resident.

**368. Syrnium nebulosum** (Forst.)

BARRED OWL.

Not common permanent resident.

**370. Scotiaptex cinereum** (Gmel.)

GREAT GRAY OWL.

Very rare winter visitant. A specimen shot several years ago in New Boston is now in the possession of Mr. Charles L. Richardson, of Manchester.

**375. Bubo virginianus** (Gmel.)

GREAT HORNED OWL.

Not common permanent resident.

**376. Nyctea nyctea** (Linn.)

SNOWY OWL.

Rare winter visitant.

**466a. Empidonax Traillii** (Aud.)

TRAILL'S FLYCATCHER.

Rare transient visitor. Observed at Manchester May 11 and 16, 1901, by Mrs. M. H. Varick and Dr. W. R. Varick.

**673. Dendroica discolor** (Vieill.)

PRAIRIE WARBLER.

Rare summer resident. A colony of these warblers was dis-

covered on the 2nd day of June, 1901, on Bedford plains, about two miles south of Manchester, by Mrs. M. H. Varick and Dr. W. R. Varick. On the 11th, other members of the Institute visited the locality and perfectly satisfactory observations were made at short range. A few days later another colony was discovered on the plains near Rock Rimmon, in West Manchester, and observations of both colonies were had subsequently throughout the month. As several of the observers had already become acquainted with the species in southern Massachusetts the compiler feels safe in adding the name to the local list, although the absence of the only person licensed to shoot for scientific purposes caused the postponement of shot gun identification. About a dozen birds were seen at the Bedford station and nearly as many at that in Manchester. The birds were in song and in perfectly characteristic plumage.

**722. Troglodytes hiemalis** (Vieill.)

WINTER WREN.

Not common transient visitant. Observed at Manchester, Oct. 20, 1901.

**757. Hylocichla aliciæ** (Baird.)

GRAY-CHEEKED THRUSH.

Not common transient visitant, with difficulty distinguished in life from *H. ustulata swainsonii* (Cab.) Exceptionally favorable observations were made May 12, 1901, and several days following.

# NESTS.

BY THEODORA RICHARDSON.

The houses of our friends, if built by them, reflect their individuality, and though all are built of wood, stone or brick in varying proportions, a wondrous variety is produced.

Our bird neighbors, using twigs, rootlets, hair, string, bark, plant-down, mud (and in some cases unusual materials, depending upon environment), show their individuality in their selections, combinations and locations. As varied as the materials are the locations; in trees, in tree-trunks, under eaves, barns, sheds or bridges; in banks, in low shrubs, and on the ground; each family instinctively choosing that kind of site which has been the established custom of preceding generations. The characteristic nest-building of different families, and different species in a family, is no less wonderful than the selection of location.

Returning from a fall outing, two interesting bird trophies were brought home by friends, and were duly brought out for my inspection when I arrived to hear of their travels. They were the vireo's handiwork, but who shall say which, the Red-eyed, the Yellow-throated, or the White-eyed? All are made of similar material, and are pensile, being suspended from a forked branch. The Red-eyed vireo is most frequently found about here. Its nest is composed largely of strips of bark, with an interlining of finer strips, so closely resembling the pine needles as to easily deceive one; but what attracts the casual observer is the artistic outer covering of strips of bark from the white birch, and some of those tough, white spider-egg-silk-cases found on old boards. William Hamilton Gibson tells us that fragments of hornets' nests, as well as newspaper scraps, are favorite materials, and he once found a novelty, even for a vireo, "a nest entirely composed of snake-skins."

I once found the nest of a Red-eyed vireo hardly three feet from the ground, close by a path not much frequented until

July, a time later than the vireo's nesting-time. The faithful mother remained motionless upon her dainty nest, while each detail of her feathered covering was noted inch by inch; the beautiful rich olive-green of the upper parts, with the conspicuous white eye-line bordered with black, and the contrasting pure white of the breast; but the greatest delight of all was to actually see the red eye.

Drawn to the thicket by the sweet song, with which he regales you at early morn and dewy eve, you find the catbird, in the haunt long loved by the family, for generations perhaps. Here, in seclusion and safety, the nest is discovered in a large blueberry bush, whose base is submerged in the waters of the swamp. Once discovered, peace will not be restored until you withdraw and remain at a discreet distance, there to listen if you will. But an inborn curiosity "to see what birds' nests are made of," as Thoreau has said, prompts you, in time, to secure that nest. You note at once the strong contrast in construction between this nest and that of the vireo; its foundation of twigs 6 or 8 inches in length is so loose; above this are strips of grapevine bark, and the interlining is of water-washed rootlets from brook or lakeside.

But another member of the catbird family built her nest with quite an attempt at the picturesque, and who can say but that she made an attempt to initiate her fledglings in the rudiments of art? For in clear type we find the following:

HOLD THE CUBE OUT—

WHICH FACE DO YOU SEE?

PLACE THE SPHERE ON THE—

Then beside these valuable instructions we find the accompanying, "Use Robinson and Thorndike's Cough Drops." With a temple of learning and a well-known hospital within earshot of the nest's location, 'tis easy to see that this bird made good use of it's opportunities.

Frequent passing through the orchard had failed to locate the whereabouts of a kingbird's nest, until one morning three overgrown members of the family were seen perched near it. There it was, at the top of the apple-tree, in plain sight. The wonder

was that we had not seen it before. It was firmly saddled onto the branch at the forking near the end of a bough, and though composed of few materials, twine, plant-down, rootlets, with finer rootlets for interlining, it seemed made wholly for use, with no thought of beauty.

In a much-loved wood, where the veery sings its vesper from the tallest pines, their nests have been formed on the ground, but this year, in later May, we flushed a veery from her nest on a brush-pile. There it was, in full view, only shielded from the rains of heaven and the scorching sun by one immense brake. The nest was composed of leaves and bark. Upon the lining of the rootlets reposed three eggs of greenish blue. Could even an experienced eye decide whether these were the eggs of the veery, or its cousin the robin, or the wood thrush, when the bird was not seen in the nest?

May 30 was a raw, lowery, damp day, but despite the weather there were three wood thrushes calling back and forth, and at times all uniting in a chorus more uplifting than that of human voices. The hill-top woods find them there each year, and with patient search we found the nest, on which was sitting the beautiful female with clear spotted breast, quiet brown eye and long, trim tail. But the home solitude being invaded, she left her nest. It was placed about nine feet high, in a sapling pine, at the junction of the clustering branches; it was largely composed of leaves, with twigs and rootlets interwoven. Amid an enchanting woodland setting, where grew a profusion of the flowering moosewood, mingled with the hemlock and young, tender green of the tall chestnut trees, with here and there a thorn tree in full bloom, it seemed a more fitting spot to find our wood thrush located. A second nest was in this æsthetic spot, and was built in a curious fashion on the crossing of two witch-hazel boughs. Not an egg was found in either of these nests, showing that our veery had nested earlier in this instance.

Our next find was a family of five half-fledged bluebirds in the decayed trunk of an old appletree. They reposed on a soft lining of pine needles. The parent birds refused to feed the

young while we were near, but hovered around, reiterating their soft warble.

When happy chance gives one leisure in nesting time, what family secrets he is let into, in the bird world. Sitting patiently under a fragrant pine, and listening to the bird notes in all directions, and one near, that of the oven-bird, or golden-crowned thrush (as he is sometimes called), we saw his mate fly past repeatedly with food for the young. Knowing that it would be a rare thing to find the fairy oven, we made diligent search, but without success. Returning the next day, by accident we so nearly stepped on the nest that the overgrown babies made good their escape. In so doing, they revealed the nest, composed of a few chestnut leaves, but mainly of pine needles; it was at the base of a pitch pine. Having ruthlessly disturbed their peace, we tried to gather the frightened brood, but it was of no use; we desisted, and they disappeared as completely as do young partridges, when fairly grown, hidden by their protective coloring among the dry leaves.

'Twas here, in this same wood, that we were shown the leafy nest of Madam Partridge, the ruffed grouse. It held a dozen pure white eggs, and some days later we were there when two or three downy babies had just hatched and were standing without the nest. They were so tiny, and wobbly on their little yellow legs, that they cuddled in our hands, too young to be afraid. Not so the brave little mother. Fear was in her eye, so we withdrew, leaving her still sitting. One of the most difficult nests to secure and keep in shape was that of the Black-billed Cuckoo, The typical apple twig though sometimes straight, is covered with lichens and knotty protuberances. The nest was made almost entirely of such twigs, with a few mosses, and clusters of apple-blossoms for lining. Did the bird gather the latter for fragrance and decoration? The tender petals with surrounding soft, green, young leaves were at least fragrant and beautiful for a day Each year, one or more pairs of these beautiful, shy birds, have been seen near the Reservoir. It is hoped that a fresh specimen of their nest building may be added to our collection.

Many Institute observers think that the Prairie Warbler un-

doubtedly in the scrub-pine growth on the sandy Bedford Plain and in similar country just west of Rock Rimmon. Should they return this coming summer it remains for enthusiastic bird-lovers to bring to light one of their nests.

Burroughs tells us that in Georgia "the Baltimore oriole places its nest on the north side of a tree, in the middle and eastern states it fixes it on the south and east side, and makes it much thicker and warmer." He further says, "I have seen the nest from the south that had some kind of coarse reed or sedge woven in it, giving it an open-work appearance, like a basket." We are all familiar with the nest which is sometimes brought low by the winter winds. Then is revealed the wonderful weaving about the strong, supple elm twigs, for it loves the elm the best. Although the walls are thin, they are firm. Lowell gives us the following gem:

High o'er the loud and dusty road
The soft, gray cup in safety swings,
To brim, ere August with it's load
Of downy breasts and throbbing wings.
O'er which the friendly elm tree heaves
An emerald roof with sculptured eaves.

* * * * * * * * * *

Oh happy life to soar and sway
Above the life by mortals led.
Singing the merry months away
Master, not slave, of daily bread,
And when the Autumn comes to flee
Wherever sunshine beckons thee!"

While living in summer woods, I have often seen the brilliantly colored redstart and his little mate together feed their fluffy offspring, whose green coats so strongly resemble that of their maternal parent. But patient search has never yet disclosed their dainty home. It remained for a kind friend to give me the pleasure of possession of one of these nests. This one was placed in the crotch of four branches, giving it a conical shape. Its outer walls are almost entirely made of strips from plant stalks, with here and there a bit of cotton, paper, or twine; the whole becoming thoroughly matted by exposure. The inside is of soft hair.

Yet quite different in shape and combination is the nest of its cousin, the yellow warbler, or summer yellow-bird, commonly called. This is made of plant down inside and out, with strong hair and fine grass to fasten it firmly into the crotch of the blueberry bush. From its location, near the swamp, we saw the bird daily, darting in and out. William Hamilton Gibson relates an interesting account of the manner in which this tiny little warbler outwitted a cow bunting, who persistently added unlawful egg contributions to her nest. A specimen of nest which he found afforded quite a contrast to the usual size, its depth being about five inches. Examination proved the summit to be a distinct division, beneath which was a perfect nest containing an egg—a token of the cow-bird; then, the lower section seeming more bulky than the normal nest, further investigation revealed a third division, with another spotted egg within. "A three-storied nest! A nest full of stories, certainly!"

On warm days when robins dot the green southern slopes of pastures and fields, the phœbe carols its decisive, persuasive note. The proximity of this sober-colored bird to a corn-crib led us to search for bird-treasures beneath its rafters, where, unexposed to rigorous storms, reposed three mossy phœbe's nests, lined with mud, indicating as many seasons in this favored location. A robin's nest also kept them company. A recent Institute acquisition is quite as wonderful as any told of by Burroughs or others. A phœbe's nest built on a clothes-line, its mossy green cup so fulfilling the laws of physics that it must have balanced in a vertical position when the bird alighted on its rim; at other times, when she was away, it tipped slightly. If the bird had not made this wise provision, her eggs would have been easily spilled.

Accompanying this gift was the moss-covered cup of the humming-bird, capable of holding only two diminutive birds of bumble-bee size. It is said that, realizing it was being watched, the parent bird deserted the nearly completed nest.

This year, when it was time for the barn swallows to return to one of their favorite nesting places, the spot was visited, but not a vestige of last year's nests remained. Were they dis-

NEST OF PHOEBE.

Built on clothesline. Collected by J. O. Harriman. Photographed by E. H. Fogg.

See p. 80.

lodged by weather, or was it the work of those English sparrows, who come daily to the barn-yard to pilfer the hens' grain?

But soon the eaves swallows with their white foreheads, and the long forked tailed barn swallows returned and were seen gathering the little pellets of mud in the road for their homes beneath the eaves. Each day's work was shown by the addition of dark, fresh mud, that of the previous day having dried.

Long before there were so many bird-lovers in country towns, a good old farmer added a narrow strip of boards, a few inches below the eaves, on the south side of the barn, to aid the eave swallows in building. The shelf was nearly filled by their nests, of which there were nearly a hundred. Adapting the construction to the location, the space between the shelf and the eaves was entirely plastered, leaving but a round opening from which the alert bird viewed the world. The usual structure of the barn or eave swallow is a simple, pocket-shaped affair plastered to the side of the barn or onto the rafter. In childhood days the occupants of these nests were watched with wonder and admiration. How beautiful their plumage! And what power of flight! The acme of grace and poetry of motion. For many years this state of affairs existed, the birds reoccupying, each spring, the nests which needed but slight renovation.

The same man, with hospitable intentions erected a large and imposing bird house in his garden. A flock of purple martins soon took up their residence, and each succeeding year finds them there, in full numbers.

Whether there was a feud similar to that of the house of Montague, and of Capulet, I cannot say, but the belligerent martins made war on their relatives, the swallows, and demolished so many of the nests, that a greater part of the swallow colony left the premises, never to return.

You will perhaps recall "Silver Spot," so called on account of the round spot of white near his beak? He was the wise old crow of whom Thompson-Seton tells. For years in a somewhat isolated pine, a crow's nest had reposed near the summit of the tree. The gunners and passers-by had long thought it un-

used, but one day, old "Silver Spot" was discovered brooding, while his mate was away, These wise birds had apparently in no wise changed the weather-beaten structure and so it is, some birds appropriate last year's nests with or without repair, as the swallow, wren, and others. Some build new each season, but rear more than one brood, in the same nest during the season, as does the phœbe. Some rebuild each year. These include the greatest number, Often birds make no nests of their own, but use abandoned nests. Other birds build no nest, their eggs being deposited on the rock or sand.

Though denuded trees and bushes reveal many nesting sites, yet the most satisfying nest specimen is taken as soon as it is apparent that it is no longer needed. At this season untrodden and inaccessible swampy grounds may be searched for the nests of the red-winged blackbird. It was in such a spot, where thick-clustering water bushes, tall reeds and cat-tails grew, that we found a grassy nest, inside of which were the remnants of an egg-shell, plainly indicating the family.

Burroughs has said that "Though generally regular in their habits and instincts, yet the birds seem as whimsical and capricious as superior beings. One is not safe, for instance, in making any absolute assertions as to their place or mode of building. Ground builders often get up into a bush, and tree builders sometimes get upon the ground, or into a tussock of grass. The song sparrow, which is a ground-builder, has been known to build in the knot-hole of a rail fence, and a chimney swallow once got tired of soot, and fastened its nest on the rafter of a hay barn."

MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

**SECTION E.**

# FINE ARTS.

**Officers for 1901.**

WILLIAM H. HUSE, *President.*
WILLIS B. KENDALL, *Treasurer.*
WILLIAM E. BUCK, *Auditor.*
EVA F. TUSON, *Clerk.*

DIRECTORS.

HENRY W. HERRICK,
NORWIN S. BEAN,
W. R. CALL,
WILLIAM E. BUCK,
J. BRODIE SMITH,
WILLIAM K. ROBBINS,
WILLIAM E. BURBANK,
MRS. JOHN B. VARICK.

## SECTION E.

# FINE ARTS.

During the winter Mr. William E. Burbank continued his Thursday evening class in drawing from the antique. On Friday evenings and Saturday forenoons Mrs. Melusina H. Varick's classes kept up their work in wood carving with unabated interest. Mrs. Maud Briggs Knowlton's Saturday evening class in wash drawing from still life showed no diminution of zeal. To all these instructors the Institute owes much. At the close of the season, in June, an exhibition of the work done by the classes was held in the rooms, and attracted many visitors who were enthusiastic over the work of the Art Section. All the classes resumed work in the fall, although upon Mrs. Varick's inability to be present with the work of the wood carving class, the direction of the work was placed in the hands of Mr. Ed R. Robinson and Miss Annie F. Abbott.

Rev. Charles J. Staples completed his course of lectures on English Literature. His subjects were as follows: January 15, William M. Thackeray; February 11, William Wordsworth; March 12, Robert Browning.

In the fall Mr. Staples began the following course of "Readings in American Literature—Studies in Spirit and Style."

I. Benjamin Franklin. 1706-1790. December 4—Poor Richard's Almanac and the Autobiography.

II. James Fenimore Cooper. 1784–1851. December 18—Deerslayer and the Last of the Mohicans.

III. Washington Irving. 1783–1859. January 1—The Sketch Book.

IV. Edgar A. Poe. 1811–1849. January 15—Tales and Poems.

V. Nathaniel Hawthorne. 1804–1864. February 6—The Marble Faun.

VI. Theodore Winthrop. 1828–1861. March 6—Cecil Dreeme.

VII. James Russell Lowell. 1819–1891. March 10—Essays. Among My Books.

VIII. R. W. Emerson. 1803–1882. April 16—Essays. April 30—Poems.

At the annual meeting held in the rooms October 8, 1901, the following officers were elected:

*President*—Jennie Young,

*Treasurer*—Willis B. Kendall,

*Auditor*—Norwin S. Bean,

*Clerk*—Eva F. Tuson,

*Directors*—N. S. Bean, W. R. Call, J. Brodie Smith, W. K. Robbins, W. E. Burbank, Mrs. John B. Varick, Mrs. Lucinda L. Farmer, W. H. Huse.

# THE EMELINE R. BALCH BEQUEST.

On November 5, the publication of the will of the late Mrs. Emeline R. Balch, who died on November 1, announced the following provisions, of interest to all members of the Institute:

"I give, bequeath and devise, on account of the interest that my late husband entertained in the advancement of art, my lot of land with the dwelling house thereon, where I now reside, situated in said Manchester, bounded and described as follows, to wit: Westerly on Elm street, there measuring 120 feet; southerly on lot 2025, there measuring 120 feet; easterly on a twenty-foot passageway, there measuring 120 feet, and northerly on North street, there measuring 120 feet, to the Manchester Institute of Arts and Sciences, in fee, for the benefit of the Art Section of said Institute.

I also give and bequeath to said Manchester Institute of Arts and Sciences, for the benefit of the Art Section of said Institute, my portrait of my late husband, my painting of *Christ, St. John and the Lamb*, my painting of the Appian Way, my painting *Aurora* by Guido Reni, my mosaic picture of the Castle of St. Angelo, my painting *Vestal Virgin*, my painting *Tarantella*, my two Sevres banquet lamps, my pink glass toilet set, my twelve red glass plates made at Sevres, my two Napoleon plates marked with "N" and a crown, my twelve French portrait plates, my Cantonese silver tea service, my gilt sofa and chair upholstered with Lyons velvet, my bronze statue Star of the Morning, with the pedastal on which it stands, my Sedan chair cabinet and its contents, my two stationary sideboards now in my dining room and their contents, and all the chandeliers, gas and electric fixtures in said dwelling house at my decease; and I direct that the several bequests above named from my personal estate shall be appropriately placed and used in the Art Building of said Institute; and I also give and bequeath to said Manchester Institute of Arts and Sciences the sum of $50,000 for the benefit of the Art Section of said Institute."

# Edgar Allan Poe----A Study in American Literature.

BY REV. CHARLES J. STAPLES.

Delivered at a Meeting of Section E of the Manchester Institute of Arts and Sciences, January 18, 1902.

Poe's literary work never met a more intelligent and enthusiastic appreciation than it is meeting today. Interest in his writings, both here and abroad, has been steadily growing; he has challenged the attention of the best students of English literature everywhere, and like some isolated hill, which, as you recede from it, shoots up above the plain, his position in the world of letters becomes more commanding as the years spin away. To Edgar Allan Poe that indispensable, undefinable and misused word, genius, undoubtedly applies. The mark of that genius is not graciousness nor wide understanding and sympathy with human life, but power,—power to hold the reader's attention, to compel his thought, to arouse his feeling, and even at times to gripe the very soul.

In approaching works so strange, so unreal, so grotesque and yet so powerful, the ordinary methods and measures of criticism do not seem to avail. This is truer of the tales than the poems. But both are peculiarly and sharply individual. Poe stands, as a maker of literature, in a class by himself. It is, perhaps, to be hoped that he will never have an imitator or follower, for to imitate him were to spoil him. A second Edgar Poe would take away something of his fascination. There are none with

whom we may justly liken him in the whole range of English literature, though the names of Mrs. Radcliffe and of Gregory Lewis suggest themselves as distant relatives. Those who have been nearest to him in spirit may perhaps be found in Germany. In Poe at his best, one thinks of Wilhelm Hauff, Heinrich Heine, of the witches on the Brocken, or the grotesqueness, without the weird symbolism, of the Second Part of Faust.

But a better and more truly suggestive comparison, it seems to me, might be discovered in another realm of art, in that wild Hungarian music which seems to open a world of the unexpected and the fantastic, the uncanny, the weird and the mysterious.

This is not to claim for Poe a genius of the highest order or the highest success, but it is genius. Compared with Hawthorne, whose impulses lay in something of the same direction, he failed. The statement is often made that genius and insanity are akin, both being abnormally sensitive, irritable and neurotic. We find a passage in Poe's own writing which touches upon this idea. The tale of "Eleonora" opens thus:

"I am come of a race noted for vigor of fancy and ardor of passion. Men have called me mad; but the question is not yet settled whether, madness is or is not the loftiest intelligence —whether much that is glorious—whether all that is profound does not spring from disease of thought—from moods of mind exalted at the expense of the general intellect. They who dream by day are cognizant of many things which escape those who dream only by night. In their grey visions they obtain glimpses of eternity, and thrill in waking, to find they have been upon the verge of the great secret."

Fundamentally, such a statement, I believe, is false. The great genius is calm, self-poised. The depths of human passion are not unknown to him; indeed, he penetrates them more deeply than the common man. But the deepest passion has nothing in it effervescent and frothy. Genius is strongly sane and wholesome in its highest form of expression. But, since genius can only exist in conjunction with a fine and delicate nervous organization, it runs a special danger of insanity, and quickly, easily, momentarily, passes the dividing line. Men of this kind are moody, ill-balanced, undisciplined and un-

controlled. The spirit is imperfectly master of the mind, of itself. It is fretted by an inability to find full and perfect means of expression. Like high-mettled horses, genius may be swiftly ruined. Its temptations are great, its pride and poverty like whips of scorpions, its sufferings keen to the point of hysterics and of wildness. If the will is weak and circumstances untoward, if the childhood and youth have been over-stimulated and unhealthy, there will be frequent lapses into what is morbid and unmanly.

So it was with Poe; and in the literary consideration of such an author we have the strongest desire to separate the writings from the man, to judge the writings in themselves, forgetting the biography. A few of Poe's productions are almost matchless, and instinctively we feel that it would be better to leave the man out of the account. What has a man's life and fortune to do, we are tempted to say, with his writing? But it is impossible; the man, as always, belongs with his works and his works to the man. At the best, his was a pitiful and disagreeable story; it was an unworthy and unmanly life. Poe was sinned against, no doubt. He inherited an excitable and unquiet temperament, and received no adequate training or government as a child. Early in life he was left an orphan and by his adopted parents used as a plaything and spoiled. At home and in college he gained no just ideas of life, or standards of right conduct. Add to this the fact that in his later career Poe continually forced himself to spells of intense cerebral excitement in the labor of composition which were followed by an irritability and exhaustion that many fail to understand. The knowledge he acquired, or rather picked up at random, was scrappy, ill-assorted and inaccurate. Hardly a detail of his life has been spared as a subject of bitter controversy and of the most diverse interpretations, exalting him to heaven or damning him to hell. If anywhere, his actions toward his child-wife seem to show the best of which he was capable, a romantic affection, an unselfish feeling, a tender if exaggerated sympathy.

These things are to be said for him. Yet the verdict must be that he was completely and utterly self-centered, idle in youth,

dissipated, sordid, vain, unprincipled and affected. It is not unjust to say that truth never seemed to him a necessary element of character. From early life he treated truth lightly, and sometimes took extraordinary pains to avoid it. Whether in the last years this trait was not intensified by the use of opium is open to question, but throughout he was a *poseur*, assuming attitudes and convictions and virtues, with the ease and freedom of an actor. Perhaps he was hardly conscious how radically hollow and insincere it all was and how much it was the playing of a part. He became a total wreck at last.

We have no right to pass a moral judgment on these matters in a literary discussion. But they were not without influence upon his writing, and his work is not intelligible without reference to the kind of man he was. From such a character the greatest literature is impossible. In three of the requisites which such a literature requires he was wanting:

(a) His themes, the subjects he chooses are morbid and unwholesome. Of course this does not mean that they are immoral. On the contrary, both in choice and in treatment Poe is, so far as I have read, entirely free from any slightest taint of impurity. But his interest is pathological; it is attracted to what verges on disease, spiritual and mental disease in human nature. His subjects are fascinating to him because they border on the horrible; because they are extreme, rare and unusual; and this *penchant* grew upon him. Now the monstrous and the morbid are not illegitimate as subjects in literature. In fact there is a distinct fascination in them. But as we all realize it is a dangerous fascination. It is dangerous both for the author and the reader. It is an exercise of the imagination that grows by what it feeds on; which is like a narcotic, inducing the artificial necessity of larger and ever larger doses. It gradually and insidiously distorts the spiritual point of view. The healthy human being cannot, ought not to live in such an atmosphere, nor would it promote any rational end if he did. In medicine, pathology has a distinct and helpful place. The physician studies disease that he may understand it and effect a cure. In literature it can have no such end and office. Here

it exists for the sake of the sensation that it causes. It furnishes excitement, makes an impression, rouses and stirs the *blase* and sluggish mind. This may possibly be of temporary use; it may on rare occasions be justified. But it is company in which a man cannot keep his health and poise of soul or body.

Poe found that his power told best in this direction, and the temptation was great to strain it to the utmost. Hardly can you find a thoroughly healthy subject in the whole range of his poems or his tales. He took possession of the borderland between sanity and insanity, as his province, and his congenial themes are close to death and dissolution. He excels in the description of those conditions of mind and feeling in which the gruesome and grisly appear vivid and real. We seem sometimes in his writings to be watching the human spirit on the verge of attenuation and disappearance. Perhaps it does us no harm once in a while to feel the sensation of horror, the symptoms of a scare. But it must be taken in limited doses. It is increasingly difficult to make us creep in these days, but so far as the imagination can do it Poe almost and sometimes quite succeeds in doing it. The "Masque of the Red Death," the "Fall of the House of Usher" and "Ligeia" may be mentioned as typical of this success, though the illusion depends, of course, on the imagination of the reader quite as much as on the author. But this success is not vital or vitalizing. It has no power to stir and stimulate the heart of human nature and create a larger life. It is somber horror, vain supernaturalism, a mere thrill of the nerves. Or, to put the same thought in another way, Poe lived and deliberately sought to live in the night-side of nature and humanity. He tried to work that vein to the utmost it would bear. There is a night-side to nature and life, one of its mysteries surpassing knowledge. There is a peculiar spell in watching a great fire. It is the spectacle of unbridled energy, the flaming horror of destructive force; but its end is ashes. Nothing comes of it. On the part of humanity there is the parallel exhibition of passion, fierce fear, sin, crime and remorse. There is an energy of gloom, of brooding

calamity like the overhanging pall of black smoke that precedes the bursting volcano of fire. In the representation of this Poe was a master-artist. He had caught, perhaps, some of this secret from Lord Byron. He surpassed him in the creation of monstrous souls and monstrous situations, veritable "dragons of the slime," of which the tale of "William Wilson" is an instance. But from the night-side of man and nature only a paralyzing influence can ever flow. Its ultimate end is ashes.

(b)In close connection with this morbidness of theme is Poe's lack of breadth. He was nothing if not intense. He burned himself out in an exciting and nervous concentration upon a very limited field of imaginative literature. That field he has pretty clearly described in the title he gave to one of his first collections—"Tales of the Grotesque and Arabesque," and the poems are much of the same sort, together with an undeniable ear for the music of words. With characteristic perverseness he believed himself equally great in many varieties of composition, but he was utterly mistaken. His was an etching point rather than a generous broad hand. He worked with thoroughness and in miniature; all his compositions are short. His imagination was limited to very narrow and definite lines. He had no conception of character, but only of situations and conditions. This is why his humor, when he attempts it, is excruciating and far fetched. As in the "Gold Bug," for instance:

"'Stay here tonight, and I will send Jup down for it at sunrise. It is the loveliest thing in creation! What?—sunrise? Nonsense! no! the bug. It is of a brilliant gold color. * * * The antennæ are—"

"Dey ain't no tin in it, Massa Will, I keep a-tellin' on you," here interrupted Jupiter; "de bug is a goole bug, solid ebery bit of him, inside and all, sep him wing—neber feel half so hebby a bug in my life.'"

He was a master of climax, but not of the drama in the large sense. He knew the glooms and the fierceness of the human soul, its shudders and its fearsome dreams, but not its sunniness, its hopes, its radiance. He had the most superficial, ba-

byish conception of woman; he had an eye for beauty, but it was beauty of form, not of spirit and character.

(c) Still more striking, the more deeply Poe's work is examined, is his artificiality. Perhaps he was as self-conscious a great writer as ever lived. And that is saying a good deal, for most of them are abnormally self-conscious and subjective. He is the very opposite of hearty, sociable old Sir Walter Scott. This is not apparent at once. The first impression made by Poe's writings is one of power, and the power of genius is always objective; the man sinks himself in the seriousness and reality of his work. That seems true at first sight in regard to Edgar Poe. But as the original impression passes, you grow more aware of the artifice which lies behind. He studies with wonderful patience the art of producing effects, a histrionic effect. It seems to be spontaneous, to be real. There is an air of seriousness, a freedom from exaggeration, a calmness, a superb balance about his narrative which creates that illusion. But it is an illusion. Admitted behind the scenes, you discover how the wires were pulled and the plots arranged. His description, for example, of the method by which "The Raven" was deliberately manufactured—manufactured is precisely the word—is one of the most curious and disillusionizing passages in literature. It may be found in Littell's Living Age, Vol. CXLVI, p. 696. Whether this passage was written partly in jest or wholly in earnest, it throws a good deal of light upon Poe's qualities as a writer. He had extreme cleverness and great natural gifts of expression. He was a good, even an extraordinary workman. But the parts are put together by a kind of contrivance, not by an original act of creative thought. The end and result are first conceived and then all sorts of artifices are invented to attain that result. Whereas great literature rather springs from the initial impulse of an idea that demands utterance, and the form that utterance will take cannot be foreseen. It bears about the same relation to a genuine literary inspiration that the watch discovered on a Patagonian desert, in Paley's unfortunate illustration of Natural Theology, bears to the living world of divine creation. The method Poe pur-

sued gives you the uneasy sense that he is chuckling at you while he has you under his spell. He is deeply interested in his work, but never quite in earnest. Poe did not serve truth. He had no thoughts to convey. His writing represents nothing but his own skill. His art was for its own sake. He was a clever cabinet-maker in words.

Where then is the secret of his influence, his undoubted power, the spell he exercises upon the mind? We find it in a rare combination of cool intellectual analysis with a strong sensuous imagination.

This analytic power is exceedingly keen even when shrouded in the mystical vagueness which he loved. This is the element by which he made the improbable and the impossible seem actual. The construction of his tales and many of his poems is superb. It is the work of a very acute intellect arranging in advance the ingenious details of a scheme. His mind, that is, by the power of analysis foresaw and reasoned out all the elements of a problem and then fitted them together so accurately as to leave the jointures almost invisible. His mind was of the order which is required by the inventor of puzzles. His tales of mystery and of the solution of mysteries are a witness of this intense analytical power. Another evidence is found in the astonishing fact, that, in a criticism upon some of the first numbers of Dickens' Barnaby Rudge, then issuing in parts, he drew a clear outline of the plot Dickens had then in mind, and as yet unwritten. The minutest details, the values of the separate words are weighed deliberately and fitted into the structure of the composition as delicately and purposively as in the cabinet maker's art, or as in some specimen of marquetry. In this respect they bear close study. Few minds of high order have been able to stand aloof from their creations in this fashion and reason out the mechanism that produces the desired effect. But Poe cooly devised, it would seem, the joints and wires that would move his figures and display them to the best advantage in the eyes of the spectators. It was entirely in accord with this power of keen analysis that he became absorbed in the study of cryptograms and maintained in public that no cryptogram could

be invented which an attentive intellect could not solve. It is said that for a while he was flooded with secret ciphers from all parts of the country, to which he devoted so much time as to imperil his proper business. The cipher which he introduces into the story of "The Gold Bug" is not the least effective element in that famous piece of cleverness.

But united with this clear and cold intellect is a marvelous vigor and richness of imagination. Perhaps fancy is the better term, for it was not a great imagination, but, as we have seen, an imagination narrowly limited and incapable of seeing or representing life as a whole. Even this luxuriant fancy of Poe's gives, upon a second reading, the impression of a *tour de force*; it exhibits a carefully planned attempt to work up a stage effect. Poe was always aware of what he was doing. He never yielded himself wholly to a thought or an emotion. He was not spontaneous, even in his gorgeous dreams. Whether produced by the use of opium or not, his imagination was opium-drugged. It was not in any way sensual, but it was sensuous. He rioted in "color." He loved the highly decorated, though his abundance of color, is usually held in check by an artist's perception of "color values."

"Years dragged themselves along heavily, and still I dwelt in the Valley of the Many-Coloured Grass; but a second change had come upon all things. The star-shaped flowers shrank into the stems of the trees, and appeared no more. The tints of the green carpet faded; and, one by one, the ruby-red asphodels withered away; and there sprang up, in place of them, ten by ten, dark, eye-like violets, that writhed uneasily and were ever encumbered with dew. And life departed from our paths; for the tall flamingo flaunted no longer his scarlet plumage before us, but flew sadly from the vale into the hills, with all the gay, glowing birds that had arrived in his company. And the golden and silver fish swam down through the gorge at the lower end of our domain, and bedecked the sweet river never again. And the lulling melody that had been softer than the wind-harp of Æolus, and more divine than all save the voice of Eleonora, it died little by little away, in murmurs growing lower and lower, until the stream returned, at length, utterly into the solemnity of its original silence. And then, lastly, the voluminous cloud uprose, and, abandoning the tops of the mountains to the

dimness of old, fell back into the regions of Hesper, and took away all its manifold golden and gorgeous glories from the Valley of the Many-Coloured Grass."

The glow, the splendid, dreamy, simulated character of his landscapes has never been equalled or approached. The supernatural quiver, the lurid quality of his descriptions is sometimes terrific and unearthly.

The Lady Madeline of Usher has been buried alive in a vault of the castle. Her nervously diseased brother fears it, but does nothing. He speaks:

"Is she not hurrying to upbraid me for my haste? Have I not heard her footstep on the stair? Do I not distinguish that heavy and horrible beating of her heart? Madman!" Here he sprang furiously to his feet, and shrieked out his syllables, as if in the effort he were giving up his soul, "*Madman! I tell you that she now stands without the door!*"

As if in the superhuman energy of his utterance there had been found the potency of a spell, the huge, antique panels to which the speaker pointed threw slowly back, upon the instant, their ponderous and ebony jaws. It was the work of the rushing gust; but then, without those doors, there *did* stand the lofty and enshrouded figure of the lady Madeline of Usher. * * * *

From that chamber and from that mansion I fled aghast. The storm was still abroad in all its wrath as I found myself crossing the old causeway. Suddenly there shot along the path a wild light, and I turned to see whence a gleam so unusual could have issued, for the vast house and its shadows were alone behind me. The radiance was that of the full, setting, and blood-red moon, which now shone vividly through that once barely discernible fissure, of which I have before spoken as extending from the roof of the building in a zigzag direction to the base. While I gazed this fissure rapidly widened; there came a fierce breath of the whirlwind; the entire orb of the satellite burst at once upon my sight; my brain reeled as I saw the mighty walls rushing asunder; there was a long, tumultuous shouting sound like the voice of a thousand waters, and the deep and dark tarn at my feet closed sullenly and silently over the fragments of the "*House of Usher.*"

Here we may find the power of his poetry. The effect and impression wrought by this luxuriance of imagination is greater than any idea or meaning in it. The poetry of Poe, once we

pass from under the spell and glamour of it, is hollow and meretricious. It is distinctly inferior to his prose, which, I think, will far outlive his verse.

Thus the artist, not to say the artisan, is predominant in Poe. He was a literary artisan of high and strong qualities, amounting to genius in that sort. Realizing the man's nature and limitations, his skill is marvelous, his technique admirable. He was conscious of his gift and was not unnaturally impatient of those who did not recognise its value. His literary sensibilities were so fine as to become a kind of conscience. His art is the art of words. His mind revelled in sounds, in images, in sense-suggestions. His poetry shows the iridescent beauty and also the thinness of a bubble. What he most cared for was not that for which words stand, but the words themselves, their musical and emotional value, their direct and immediate impressiveness.

The positive artistic qualities of Poe's style, therefore, best repay careful study. Briefly, we may indicate them as follows: (a) The nervousness of his style. It is crisp, sharp, keen and yet quiet in the "Tales," dreamy, languorous, gem-like in the "Poems," but in both it is intense. It is the mind at high pressure, spirited and energetic. He threw himself vigorously into the work of composition. The labor was not hurried, but intense. One can realize how such nervous application must have exhausted and prostrated him. His writing is unrelieved by a filling of the ordinary and the commonplace, such as lesser men use. Even when the words are simple and calm, there is intellectual passion behind them. There is little of the nitrogen element in his manner of composition; it is almost pure oxygen. We feel that he was incapable of any extended work. The tension was too great. But he was master of the straight and simple path to a single powerful sentiment, emotion or idea. Each of his tales moves irresistibly to the concentrated energy of a true climax.

(b) The fastidiousness of his style. Contrary to a general impression, he was never slovenly. His temper was impatient,

but his ear, his sense of propriety and fitness in the use of language was inexorable. The conflict of the two was torture and wore him out with its fierceness. He cared greatly to satisfy himself, and was, in truth, unwearied in polishing and repolishing what he had written. An instinct that is not content with first suggestions, easy solutions, but alters and realters, striving toward the more perfect expression, this is the master key in all art. This distinguishes the artist. Poe does not allow the painstaking to become too apparent. He conceals the effort, but the more you read of his work the more surely it is there. His self-restraint, his literary conscienciousness compelled his fertile imagination to become his slave and servant.

(c) The third high quality in Poe's style is his sense of music and rhythm. This was very keen. No English writer has possessed it in higher degree, unless it be Swinburne. The very titles of his tales and poems are a witness. They were invented and chosen by reason of their liquid spell, their flute-like quality. "Eleonora," "Ulalume," "Lenore." Take such a phrase as "Night's Plutonian shore." It does not mean very much. It will not bear analysis, but the mere concord of syllables is undeniably pleasant; it lingers on the ear; it imprints itself on the mind. English is not in itself a musical tongue, its harmonies have to be sought for. But Poe wrought and fashioned them with skill, by a sure and native instinct. That instinct is not merely for the soft and soothing elements of language. Poe knew how to use the flashlight of vivid, piercing, nerve-tingling words. Like all true musicians, he understood the value of contrasts and discords, the crash and thunder hidden in the vocal sounds of speech. He rated, perhaps too highly, the effect of iteration on the ear, was fascinated by devices of alliteration and refrain.

Poe is not a writer to whom we turn for inspiration. He does not stir or even touch the deeper being of humanity. He has no message to the strenuous life. But he will keep his place, and it seems likely to be a permanent place in English letters.

We do not always care for, we do not always need the seer and the prophet. Sometimes the mind craves the artist's service,

one who can draw us out of ourselves and make us forget our dust and weariness by his dreams and illusions. We demand something vastly different from this too familiar work-a-day world, a world of vague mysteries and shadows, yet not unreal, a world of necromancy whose very strangeness is its power. Here is the answer to that demand. Such was the weird magic of Edgar A. Poe.

MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

## SECTION F.

# MINERALOGY AND GEOLOGY.

### Officers for 1901.

SUSY C. FOGG, *President.*
WALTER S. ABBOTT, *Vice President.*
GRACE A. PHILLIPS, *Secretary.*
SARA HUNT, *Treasurer.*

EXECUTIVE COMMITTEE.

W. H. HUSE, E. P. RICHARDSON,
MRS. FRED L. ALLEN.

## SECTION F.

# MINERALOGY AND GEOLOGY.

### REPORTS OF MEETINGS.

Tuesday evening, January 1, 1901. The President in the chair. After the business meeting, Mr. George I. Hopkins took charge of the mineralogical work for the evening.

Saturday evening, January 19. The President in the chair. The mineralogical work was conducted by Mr. Hopkins. The following resolutions were adopted :

Realizing the great loss which we have sustained during the past year in the removal by death of two of our esteemed members, Lyman W. Colby, who died June 21, and William E. Moore, who died October 22, co-laborers with us in the prosecution of nature studies in which they manifested so much pleasure and delight; the zeal and earnestness with which they always devoted themselves to the work and the interests of Section F; the cheerful and pleasant manner in which they responded so faithfully to any calls to duty; the uprightness of character which they possessed; and the many pleasant recollections we retain of their companionship; we hereby tender our heartfelt sympathy to their families and friends, with whom we sincerely mourn.

E. P. Richardson,
G. I. Hopkins,
S. C. Fogg,
} Committee.

Wednesday evening, January 30. The President in the chair. Mr. Richardson read a paper on "Some Geological Reminiscences of York Beach, Maine."

Wednesday evening, February 27. The President in the chair. At the suggestion of Mr. Hopkins it was unanimously voted to take a trip to Hooksett Pinnacle upon the advent of warm weather. Mr. Huse gave an informal talk on the geolog-

ical and topographical features in the vicinity of York Beach, Maine, illustrated by lantern slides.

Wednesday evening, March 13, The Vice President in the chair. Mr Huse gave a talk on dynamical geology, illustrated by lantern slides.

Wednesday evening, March 27. The President in the chair. Announcement was made of the opening of the summer school in the near future. Mr. Hopkins took charge of the mineralogical work, after which Mr. Huse gave an illustrated talk on aqueous and igneous agencies in the formation of the earth's crust.

Wednesday evening, April 10. The President in the chair. Announcement was made of the first walk of the geological class of the summer school. The subject of the geological talk was "Organic Agencies."

Wednesday evening, April 24. The subject of the evening was the "Cambrian System."

Wednesday evening, May 8. The President in the chair. The regular mineralogical work was done. The subject for the geological talk was the "Silurian System."

Wednesday evening, May 24. The President in the chair. Mr. James M. Nelson presented the section with a large specimen of chalcopyrite brought him from Capleton, Quebec. Mr. Nelson gave a very interesting description of the mines there and the manner of working them. The subject of the evening's illustrated talk was the "Devonian System."

Wednesday evening, June 5. Mr. Huse was chosen as President for the evening. The subject for the evening was the "Carboniferous Age."

Wednesday evening, October 23. The President in the chair. The recommendation of the Executive Committee that the section take up both mineralogical and geological work was adopted. Mr. Huse talked upon aqueous forces in the world.

Wednesday evening, November 13. The President in the chair. The evening's work consisted of mineral analysis and a talk on igneous forces. Mr. Huse then made the following statements concerning

## TWO LARGE BOWLDERS NEAR MANCHESTER.

There are two bowlders near Manchester that are of a size worthy of being recorded, although they are by no means the largest in the State. In the southern part of Dunbarton, not far from the Goffstown line, is one composed of porphyritic gneiss that is thirty-five feet long, thirty-one feet wide, and fifteen feet high above the surface of the ground. How far it extends below the surface is not known. It is located in a swamp, and doubtless rests upon the gravelly bottom of the valley.

The other bowlder is a little larger, being thirty-eight feet long, thirty-five feet wide, and nineteen feet high above the level of the ground. This is situated on the line between Manchester and Londonderry, about forty rods west of the Derry road on the west bank of Manter Brook. It was known to the early settlers as the "Great Rock," and every deed of land in the immediate vicinity named at least one bound as being such a distance in such a direction from the "Great Rock." It is composed of the gneiss that is common in Manchester and other parts of the State. A bank of fine sand, beginning at the bowlder and spreading out like a fan as it extends towards the south shows how the rock divided the current of the post-glacial stream that flowed through the valley.

Wednesday evening, December 11. The President in the chair.

This being the annual meeting, the following officers were elected:

*President*, Susy C. Fogg,
*Vice President*, Walter S. Abbott,
*Secretary*, Martha J. Kennedy,
*Treasurer*, Sara Hunt,
*Executive Committee*, W. H. Huse, Flora M. Walker, Mrs. Fred L. Allen.

The subject for the evening was "Organic Agencies." Mr. Huse made the following statements about

## SOME GEOLOGICAL FEATURES IN AUBURN.

A short distance north-east of the station of Massabesic is a rocky hill whose steep sides and rocky summit make it a noticeable feature of the landscape. On the north and east the approach to it is gradual. On the west the abruptness is such as to make ascent or descent difficult. From the summit a beautiful view can be obtained of Lake Massabesic, whose island-dotted surface stretches away to the south.

The hill is composed of the gneiss that is common in this vicinity. Upon the summit there are two dikes of light colored igneous rock. An interesting feature of this place is the bending of the strata at the sides of the dikes, which show a fault was made as the strata cracked open. After the split was made, the two edges rubbed together, slightly bending the plastic strata and leaving an interesting feature in the rock for our edification.

A few miles southeast of the above-mentioned hill, and about half a mile south of the picturesque village of Auburn, is another hill whose rounded summit carries a few bowlders left by the ice sheet. Through the middle of the gneiss which makes the hill is a stratum of mica schist, somewhat foliated and quite porous. The whole hill is impregnated with iron. Sometime in the past a rending of the earth's crust occurred at this place and the schist gave way, leaving a fissure extending into the hill. The entrance is six or seven feet high and about four feet wide. For a few feet the cave is as wide and high as the entrance. Then, on the left side, a narrow crevice, just wide enough for a man to squeeze through, extends towards the middle of the hill for a distance of sixty-nine feet, About half way in, one can climb up the perpendicular rock at the right and, by crawling through a small passage, come out on the side of the hill eighty-one feet from the entrance. The name, Devil's Den, which has clung to the hole for generations, attests the orthodoxy of the early inhabitants.

The most interesting feature of the cave is a small deposit of stalactitic limonite which coats the roof and the walls. This

shows the different layers very distinctly, and in some places is four inches or more in thickness. There is not enough to be of any commercial value, but is of interest to collectors.

MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

## SECTION G.

# ZOOLOGY.

### Officers for 1901.

EDGAR D. CASS, *President*,
CHARLES R. DUSTIN, *Vice President*,
WALTER S. ABBOTT, *Secretary*,
MILLICENT S. MORSE, *Treasurer*,

EXECUTIVE COMMITTEE.

DR. LILLIAN G. BULLOCK, DR. M. V. B. MORSE,
MARY F. BARNES.

## SECTION G.

# ZOOLOGY.

### REPORT OF MEETINGS.

Wednesday evening, October 30, 1901. A meeting was called at the Institute rooms for the purpose of forming a section in zoology. A constitution and by-laws were adopted and the following officers were elected:

*President*—Edgar D. Cass.

*Vice President*—Charles R. Dustin.

*Secretary*—Walter S. Abbott.

*Treasurer*—Millicent S. Morse.

*Executive Committee*—Dr. Lillian G. Bullock, Dr. M. V. B. Morse, Mary F. Barnes.

Thursday evening, November 14. The President in the chair. William H. Huse read the paper appended to this report upon the "Ophidia of New Hampshire." The paper was illustrated by mounted and live specimens.

Thursday evening, December 12. The President in the chair. Edward J. Burnham read the appended paper on "The Red Squirrel; a Study in Variation."

The following officers were elected for 1902:

*President*—Edgar D. Cass.

*Vice President*—Charles R. Dustin.

*Secretary*—Ellen E. McKean.

*Treasurer*—Millicent S. Morse.

*Executive Committee*—Dr. Lillian G. Bullock, Dr. M. V. B. Morse, Edward J. Burnham.

# The Ophidia of New Hampshire.

BY WILLIAM H. HUSE.

The Ophidia are distinguished from the other reptiles by a cylindrical body, tapering towards the tail, and covered with scales that are attached to the skin so as to allow considerable expansion of the latter. The bones, excepting those enclosing the brain, are attached to each other by ligaments, and can thus accommodate themselves to any expansion of the skin. This occurs whenever anything larger than the snake itself is swallowed. The mouth is usually large. The tongue, which is forked, can be protruded through a small opening in the front of the mouth. This little member is constantly used as a tactile organ to reinforce the defective vision, and has given rise to many a needless fear regarding a snake's power of stinging. The senses of smell and touch are more acute than that of sight. There are no external organs of hearing ; hence that sense cannot be very keen, The sense of taste is probably not very acute, but I do not think it is entirely wanting, as is stated by some, for I have seen a ribbon snake (*T. sauritus*) show unmistakeable signs of taste.

The body is covered with scales, which are either smooth or keeled (carinated). These are arranged in all our native species in longitudinal rows on each side of a vertebral row. The under side is covered with one row of transverse band-like scales, called ventral plates or gastrosteges, as far back as the vent. From there to the tip of the tail the plates are arranged in pairs, and are known as sub-caudal plates or urosteges. To each ventral plate a pair of ribs is attached ; hence these plates are of

value in classification. The plates upon the head are named according to their proximity to the lips, mouth, chin or eyes, and are also of use in classifying, as they vary but little in individuals of the same species. The skin is cast whenever the growing body needs a larger coat. I have seen one shed its skin three times in one season in confinement, and have read of its being done four times under the same circumstances. In nature it is probably not cast so often. As the time for shedding the old skin approaches, it becomes dull in color and the eyes assume a milky hue as that portion of the skin over the pupil becomes partially opaque and begins to separate from the eyeball. For a few days the snake is nearly blind. Finally, by rubbing against some rough substance, the skin is peeled back at the lips, and then by crawling between two sticks or stones, or under something, or even through its own coils, the skin is turned wrong side out and is worked off at the tail, when the ophidian appears in new colors, as bright as the proverbial button. This cast-off skin is stretched out considerably longer than the snake that it covered, and so should not be taken as a correct measure of its former occupant.

The progression of serpents is remarkable. The ventral plates may be used to push the animal along in a straight line ; they may be used a side at a time, when the snake moves with an undulatory movement ; or the body may be pushed along by the extension of its muscles, which movement alternates with the pulling of the hind part. No snake can jump. The so-called jumping is only the throwing of the forward portion as far as it will reach from its position when coiled.

The eggs are covered with a leathery envelope which the young snakes rupture by means of an egg-tooth similar to that of a chick. Snakes are both oviparous and viviparous. In the latter the eggs are matured in the parent but are hatched in the oviduct. One curious habit that is ascribed to our water adder (*N. Sipedon*) is that of protecting its young by opening the mouth and allowing them to run in. I was always inclined to doubt the accuracy of the observation of those who professed to

have seen this done until I was informed by the Rev. W. J. Long that he had seen the phenomenon.

A snake's manner of eating is peculiar. With no limbs to aid in seizing or holding its prey, all the work must be done with the jaws. The prey is seized wherever it can be caught, and then the mouth is slowly worked around to one end of the body. Then one side of the mouth is pushed forward and holds on while the other side is advanced. In this way the victim slowly disappears.

All snakes seem to have the power of ejecting an ill smelling fluid when frightened or angry. They do it, however, only under these circumstances. With the exception of the rattlesnake (unless the copperhead is found in the southern portions of the State) our snakes are harmless, shy, graceful, handsome little animals. Many of them do more good than harm. The smallest must live on insects, and thus be entirely beneficial. Yet they suffer more than almost any other animal from the prejudices of humanity.

The order Ophidia is represented in New Hampshire by two families, the Colubridæ and Crotalidæ. These contain the twelve species known to inhabit the State.

## I. Family Colubridæ.

In this family both jaws are provided with small, conical teeth for seizing and holding the prey. There are no poison fangs, hence all are harmless.

### 1. Storeria, Baird and Girard.

1. *S. Occipitomaculata* Storer. Red-bellied Snake. This is one of our smallest snakes, measuring about a foot in length when full grown. The color varies from a light to a dark chestnut brown or even nearly black, sometimes with a paler vertebral band bordered with black dots. There is also on some individuals a row of obscure dots on each side. The most constant features are the salmon-red belly and three light spots, sometimes confluent, just back of the head. The scales are ar-

ranged in fifteen rows. The ventral plates number from 120 to 125.

2. *S. dekayi*, Holbrook. Dekay's Snake. This little snake is about the same size as the preceding, which it somewhat resembles. Like that, it seems to be more abundant in the fall than at other seasons, though why I do not know. This species is of a grayish brown color, with a lighter dorsal stripe bordered by dark lines. The belly is of a grayish color. The scales are in 17 rows; the ventral plates 120 to 138.

### 2. **Thamnophis** Fitzinger.

This genus, the Eutainia of Baird and Girard, includes the garter snakes, which are distinguished by longitudinal stripes. Two species are found in the state. In this vicinity both go by the name of striped snake. Both have carinated scales.

3. *T. sauritus* Linnæus. Riband snake. This is long, slender and very agile. It is usually found about water or low ground, and seldom shows any inclination to fight when captured. The back is black or nearly so, with three bright yellow stripes. Below the lateral stripes the color is brown, shading down to a light yellow on the belly. The rows of scales are 19. The ventral plates number from 150 to 160. The length is about 30 inches.

4. *T. sirtalis* Linnæus. Garter Snake. This species is very variable. The general color is nearly black, varying from olivaceous to brownish. The dorsal stripe of yellow is narrow and usually not so distinct as that of *T. sauritus*. The lateral stripes usually merge more or less into the greenish or brownish yellow of the under side. The colors are generally duller than those of the preceding species, which it resembles. The dark parts are more or less mottled or spotted. In some varieties these spots are more distinct than the stripes. The scales are in 19 rows. The ventral plates number 130 to 160. The maximum length is nearly or quite four feet. This snake frequents higher ground than its relative, though it may and does go to the water for frogs. It is much more pugnacious, often biting

when captured, and occasionally facing an enemy much larger than itself and striking and biting with commendable bravery. Its bite, of course, is harmless.

### 3. **Natrix** Laurenti.

6. *N. sipedon* Linnæus. Water Snake. Water Adder. The general color is brown or black, divided into large blotches by intersecting spaces of lighter color. The belly is spotted with red and brown, often shading off into a beautiful scale of color. This species attains a length of four feet or more. The scales are in 23 rows; the ventral plates number from 130 to 150. This snake, as its name indicates, frequents water, where it feeds upon fish and frogs. It is a fierce fighter, biting at anything when first captured, but young specimens soon become tame and gentle in confinement and with their various colors make interesting pets.

### 4. **Callopeltis** Bonaparte.

6. *C. obsoletus* Say. Pilot Snake. Black Snake. This, perhaps the largest of our snakes, is dull black with a slate-colored belly. The rows of scales number twenty-seven; the ventral plates 235. The dorsal scales are obscurely keeled. It attains a length of six feet or more.

### 5. **Liopeltis** Fitzinger.

7. *L. vernalis* De Kay. Grass Snake. Green Snake. This beautiful little serpent is of a uniform green above and yellowish below. The scales are in fifteen rows; the plates number from 125 to 140. It rarely, if ever, attains a length of more than two feet.

### 6. **Bascanion** Baird and Girard.

*B. constrictor* Linnæus. Black Snake. Racer. This is a lustrous black, greenish or bluish below. The chin and throat are white. This is probably the black snake that sometimes chases timid people and is reputed to have a white ring about its neck. It is inclined to be savage when cornered or captured. The young are olive or brownish gray with black

blotches. The scales are in 17 rows, rarely 19; the ventral plates number 170 to 190.

### 7. **Diadophis** Baird and Girard.

9. *D. punctatus* Linnæus. Ring-necked Snake. This is blue-black above, pale orange below. Each plate usually has a black dot on each side. The most conspicuous feature is a yellow ring around the neck. It attains a length of a little more than a foot. The scales are in fifteen rows; the ventral plates number 140 to 160.

### 8. **Lampropeltis** Fitzinger.

10. *L. doliatus*, var. *triangulus* Boie. Spotted Adder. House Adder. Milk Snake. This variety of a species which it little resembles in color, is one of our handsomest snakes. With a reputation for venomness which is a slander, it comes about our buildings to catch mice, and is then killed because it is a snake. The color is gray, varying in shade. There are three rows of brown blotches bordered with black, on the upper side. The under side is light gray with square black spots and possesses a pearly lustre that would be admired if it were somewhere else. The extreme length is from three to four feet. The rows of scales are 21; the plates, 180 to 210.

### 9. **Heterodon** Beauvais.

10. *H. platirhinos* Latreille. Puffing Adder, Hissing Adder, Blowing Viper. The foregoing are a few of the many names that are given this snake. It is brownish, with darker blotches, but very variable. Sometimes it is nearly or quite black. The nose is pointed and slightly turned up, somewhat resembling a kernel of buckwheat. When disturbed it makes no attempt to escape but flattens its head and emits a hiss that is rather startling at first. This is another much-maligned snake that has been given a most unenviable reputation. It is, however, perfectly harmless and may be handled with impunity. Its whole appearance and habit of flattening the head and hissing is a good example of protective mimicry. It attains a

length of about 30 inches, has 23 or 25 rows of scales and 120 to 150 ventral plates.

## II. Crotalidæ.

This family includes all the poisonous snakes of the eastern states. The maxillary is furnished with long, erectile fangs, through which the poison is ejected. The body is usually stout. The head is larger than the neck and is triangular. The scales are keeled. All the species are viviparous.

### 10. **Crotalus** Linnæus.

12. *C. horridus* Linnæus. Rattlesnake. This is brown, varying much in shade and more or less blotched. Most of the specimens found in this state seem to be darker than those farther south. The most distinguishing feature is the rattle at the end of the tail. The scales number 23 to 25, the ventral plates 165 to 175. The length is about five feet. This is the only poisonous snake known to live in New Hampshire and it is now nearly extinct in all thickly settled portions.

The foregoing twelve species are all that are known at present to live in the state. There are four more that may possibly be found here. Brief descriptions taken from Jordan's Manual of the Vertebrates are appended.

*Carphophiops amoenus* Say. Ground Snake. Glossy chestnut brown; belly salmon red; head very small; scales 13. Ventral plates 112 to 131. Length 12 inches.

*Regina leberis* Linnæus. Queen Snake. Chestnut brown; a yellow lateral band and three narrow, black dorsal stripes; belly yellow with two brown bands; scales all keeled; scales 19; ventral plates 140 to 150. Length 24. Found about streams.

*Callopeltis vulpinus* Baird and Girard. Fox Snake. Light brown, with quadrate, chocolate colored blotches. Scales 25. Ventral plates 200 to 210. Length 60 inches.

*Agkistrodon contortrix* Linnæus. Copperhead. Hazel brown; top of head coppery red; back with a series of 15 to 25 V-shaped blotches; belly yellowish, with 35 to 45 dark spots on each side. Scales 53. Ventral plates 150 to 155. Length 40 inches.

# Our Two Forms of Red Squirrel.

BY EDWARD J. BURNHAM.

The typical red squirrel, *Sciurus hudsonicus* Erxleben, is about 14 inches in length, the tail being a little less than one-half of the whole. It is yellowish gray, with a median wash of bright rusty red along the back. The tail is marked by a narrow sub-terminal band of black. The under parts of the body are white, vermiculated with black, the black being most distinct in late autumn and winter.

While this is the typical *Sciurus hudsonicus*, abundant northward, it is rare in southern New Hampshire. The red squirrel which abounds along the shores of our rivers and lakes and in the woods on the hillsides is somewhat larger than the northern form; its back is more rusty; its sides are less olive; it lacks the black band near the the tip of the tail, and its under parts are pure white. It was classed as a sub-species by Bangs, the sub-specific designation, *loquax*—Latin for loquacious—being sufficiently suggestive to any one familiar with its habits.

Jordan states that the sub-species *loquax* extends north to Maine and Minnesota, being common southward; while *S. hudsonicus* is found in mountains as far south as North Carolina, and is common northward. Mr. George E. Burnham has secured one specimen of the northern form on Joe English, in New Boston (height 1100 feet), and has observed several individuals on the Uncanoonucs, in Goffstown (height 1300 feet). They have been reported from McCoy's and Fort Mountains, in

Epsom, Merrimack County (height 1590 feet), and Mr. W. D. Davis has obtained specimens in Sutton, Merrimack County, the exact locality being undetermined and the altitude in consequence unknown. At Plymouth, in Grafton County, the northern form is reported to be more abundant than the southern, even in the valleys. In Crawford's Notch, in the White Mountains, in the summer of 1900, George E. Burnham found the northern form alone.

The history and relationship of these two forms of red squirrel are of special interest as illustrating the influence of altitude upon the geographic distribution of life in North America. Naturalists were early led to attempt to divide the surface of the land into faunal and floral regions or zones. Dr. C. Hart Merriam has shown, in his paper on "The Geographic Distribution of Life in North America," (Smithsonian Report for 1901), that no fewer than fifty-six authors have proposed such divisions for this continent. The earlier writers defined their regions chiefly by lines of latitude, but it was soon perceived that some account must also be taken of elevation.

In 1863, Prof. A. E. Verrill (Proceedings Essex Institute, III, 138), basing his conclusions upon observation of the birds in the breeding season, asserted that "The Adirondack region of New York, the northern parts of Vermont and New Hampshire, including most of the higher parts of the Green Mountains and all of the White Mountains, and even the summit of the higher Alleghanies, will be included in the Canadian fauna." This was equivalent to declaring that the Canadian or Boreal zone extends, by a chain of mountain tops or islands of cold, as far south as North Carolina.

Ten years later, Samuel H. Scudder, in his paper on "The Distribution of Insects in New Hampshire" (Geology of New Hampshire, I, 333), observed that "The northernmost Alleghanian and southernmost Canadian species gradually decrease in numbers away from their metropolis, and become confined to increasingly lower or higher altitudes * * according as they are Alleghanian or Canadian forms."

Dr. Merriam, in the paper already cited, says of the Boreal

region that it "gives off three long arms or chains of islands, which reach far south along three great mountain systems of the United States—an eastern arm in the Alleghanies, a central arm in the Rocky Mountains, and a western arm in the Cascades and Sierra Nevada." It is with the first of these that we have to do in this paper.

In his study of the distribution of animals in America, Dr. Merriam found that of the 130 genera of non-pelagic mammals inhabiting North America north of Panama, there are only six genera each of which ranges over large parts of both Boreal and Sonoran regions, including, of course, the transition zone between. They are *Sciuropterus*, *Sciurus*, *Spermophilus*, *Lepus*, *Canis*, *and Lutra*. These genera—comprising the squirrels, the rabbits, the wolves, and the otters—are all of great antiquity, the remains of most of them having been found as low down as the Miocene. They were early diffused over the continent, and their peculiar habits of life, although so dissimilar, enabled them to survive the great mutations of these land areas since Miocene times.

It is well established that during the Glacial Epoch many genera formerly represented in North America perished utterly. But upon the advance of the great ice sheet and its attendant cold, the wolves, the rabbits and the otters retreated southward, and with them went the squirrels to find new homes in the tropics, somewhat over-crowded, doubtless, but able to adapt themselves to their new surroundings and bide their time.

When the ice began its final retreat, and vegetation slowly reasserted its dominion, a few of the hardier and more adventurous of the squirrels pushed their way along the sea coast and up the river valleys. Among these were they of the vermiculated bellies and the black band near the tip of the tail. They multiplied, spread over the land, and undoubtedly had things much their own way for a time—perhaps for many centuries. Then a horde of their cousins began to press on from behind. These new-comers were less showy in their rusty-red coats, but they were larger, more noisy, and more aggressive. The effect was similar to that of the Teutonic invasion upon the Celts.

The earlier inhabitants were driven farther northward, or betook themselves to the mountains, while the invaders occupied the lowlands, where they remain to this day, and where they must remain for many centuries, perhaps for many thousands of years, to come. For, with the recurrence of each season of reproduction, the cold of the higher levels and of the more northern latitudes sets a bound beyond which they cannot hope to rear their young.

# REPORT OF THE CURATOR.

There are at present in the museum of the Institute the following specimens:

| | |
|---|---|
| Minerals | 207 |
| Plants, pressed and mounted in the herbarium | 422 |
| (In addition to these there are several hundred unmounted specimens.) | |
| Insects | 1098 |
| Other Invertebrates | 192 |
| Fish | 13 |
| Batrachians | 10 |
| Reptiles | 43 |
| Birds | 157 |
| Birds' Nests | 30 |
| " Eggs, species | 77 |
| Mammals | 27 |
| Skulls of Vertebrates | 28 |
| Casts | 116 |
| Pictures and other works of art, exclusive of casts | 141 |
| Antiquities (furniture, tools, weapons, etc.) | 128 |

Of Indian relics, chiefly arrow and spear points, with some stone axes, mostly found about Manchester, there are several hundred.

In addition to these, there are a number of curios, unnumbered and unclassified.

W. H. HUSE, *Curator.*

# SUMMER SCHOOL.

The second season of the Summer School of the Institute began on April 6. The following announcement on a folder giving a calendar of the spring and summer work brought to the classes enthusiastic workers whose researches meant much for the scientific knowledge of the vicinity:

"The Summer School, inaugurated last year under the auspices of the Institute, was admittedly an experiment, made in the hope of securing to the members the advantages of systematic and united effort in certain clearly defined branches of nature study. The result was so gratifying that there was no hesitation in arranging for a Summer School for the present season on the same general plan, with the few modifications which experience suggested as desirable.

Such interest has been shown in the study of Vertebrate Zoology at the Institute during the past year, that it has been deemed best to extend the scope of the work which was last year undertaken by the class in Entomology. This class, in the broader field of Zoology, will attempt to make some study of wild animal life, in whatever form it may be found, in pond and stream, and field and forest—exclusive of the birds, which will, of course, be left as the special field of the class in Ornithology.

For the present the school will comprise three departments—Zoology, Ornithology, and Mineralogy and Geology. A class in Botany and Mycology will probably be added later, with special reference to the study of mushrooms and the late flora. There will be practical demonstration in field work, under competent instructors, for each class, on alternate Saturdays,

supplemented by studies and lectures at the regular evening meetings at the Institute rooms."

The organization was as follows:

*Principal.*

WILLIAM H. HUSE.

*Instructors.*

Zoology—EDWARD J. BURNHAM.

Ornithology—FREDERICK W. BATCHELDER.

Mineralogy and Geology—GEORGE I. HOPKINS.

Mr. Batchelder had as assistants Misses Theodora Richardson and Isabelle R. Daniels and Edgar D. Cass. Mr. Hopkins was unable to take up the work with the class in mineralogy and geology, and his place was taken by the principal.

The class in Zoology failed to make proper arrangements with the Weather Bureau and so was prevented from doing as much work as it wished in the study of outdoor animal life. On the fair days, however, much enthusiastic work was done.

The class in Ornithology was likewise hindered by poor weather, but made interesting trips to Oak Hill, Stark Park, Lake Massabesic and Hooksett Pinnacle. The largest number of species seen on any one trip was thirty-one, in the vicinity of Stark Park on May 25.

The Geological class was more fortunate than the others, for even if the day were cold and raw or the sky overspread with clouds, the specimens it sought were just as abundant and numerous as on fairer days. On April 13 the class visited the kames in West Manchester that lie on both sides and nearly parallel with the Piscataquog river. In connection with these the large, nearly circular basin just west of McGregorville was of peculiar interest.

On April 27 the class visited East Manchester and there studied a moraine that is fast being carted away for streets. Here is found till, scratched and polished bowlders and debris of all kinds, that was brought down from the north during the glacial period.

The trip on May 11 was to Auburn partly in connection with the class in ornithology. The rocky hill northeast of the railroad station at Massabesic was climbed and found to be well worth the climb. Some peculiar examples of curved strata were seen and studied for the first time.

On May 25 an invitation from Mr. Ervine E. Brock to visit and inspect his collection was accepted and a delightful afternoon was spent. Mr. Brock, who spent several years in the West, had collected a large number of minerals and entertained his visitors with descriptions of his specimens, mostly ores, and the mode of mining and smelting.

Hooksett Pinnacle was visited on June 8. Here is a rocky prominence of milky quartz, situated on one side of the Merrimack Valley. The vein of which this is a part extends from the Pinnacle in a northeasterly direction across the river, forming the rapids at that point, cropping out once in the middle of the stream and reappearing occasionally on the hills to the east. Here are found quartz crystals in abundance although the larger crystals have been taken away. In one crevice some fine pseudomorphs of quartz after calcite have been found. A good specimen of the latter was donated to the Institute museum in 1900, by Mr. Bela H. Emerson, of Hooksett. The formation of a sandy island in the river as a result of the building of the dam at Hooksett Falls is a piece of geological work of recent years.

On June 22 carriages were taken for a drive through portions of Londonderry and Auburn. The large bowlder, the largest near Manchester, situated on the line between Manchester and Londonderry, was visited and inspected. From there the class drove to a white quartz ledge near the line between Londonderry and Auburn, coming back by way of Rattlesnake Hill, seeing some good examples of glacial polishing and scratching on a ledge near the outlet of Lake Massabesic.

# CHANDLER LECTURE COURSE.

Through the continued generosity of Hon. George Byron Chandler the following course of lectures was tendered to the members of the Institute for the season of 1901–1902 :

Tuesday, November 12, 1901. THE SULTAN'S CAPITOL, (Illustrated) by PROF. HENRY TURNER BAILEY, Supervisor of Art Instruction in the Public Schools of Massachusetts.

Tuesday, December 3, 1901. THE PLANT WORLD AND ITS SOCIAL RELATIONSHIPS—A STUDY IN ECOLOGY (Illustrated), by LIBERTY H. BAILEY, Professor of General and Experimental Horticulture at Cornell University.

Friday, January 3, 1902. THE NEEDS OF A MODERN PUBLIC LIBRARY, by MR. HILLER C. WELLMAN, Librarian of the Brookline, Mass., Public Library.

Wednesday, February 5, 1902. ART AND MANUAL TRAINING IN EDUCATION, (Illustrated) by PROF. J. LIBERTY TADD, Director of the Public School of Industrial Art of Philadelphia.

Wednesday, March 5, 1902. BIRDS WITH A CAMERA, (Illustrated) by PROF. FRANK M. CHAPMAN, Curator of the Ornithological Department of the American Museum of Natural History, New York City.

Wednesday, April 2, 1902. THE EVIDENCES OF A FUTURE LIFE, by JAMES H. HYSLOP, Professor of Psychology in Columbia University.

# DONATIONS.

The following comprises the donations to the Institute during the year 1901 :

## BIRDS.

Uria lomvia (Brunnich's Murre) unmounted, found in East Manchester Dec. 21, 1900 alive but which died four days later; Fred A. Lovering.

Crophlœus pileatus (pileated Woodpecker); William E. Moore.

Merganser americanus (Merganser); C. W. Taintor, Schenectady, N. Y.

Accipiter cooperi (Cooper's Hawk); Buteo lineatus (Red Shouldered Hawk); Circus hudsonius (Marsh Hawk); Perisoreus canadensis (Canada Jay); Zonotrichia leucophyrs (White-Crowned Sparrow); John L. McQuesten.

Fulica americana (Coot); Ervine E. Brock.

Pandion haliætus carolinensis (Osprey); Harold Leavitt.

Lophodytes cucullatus (Hooded Merganser); George Hosser.

(Hawk); George V. Hill.

Charitonetta albeola (Bufflehead); William H. Huse.

Corvus americanus (Crow); Unknown.

Aix sponsa (Wood Duck) m and f; Clangula clangula americana (Golden Eye) m and f; Bonasa umbellus (Ruffed Grouse) m and f; Accipiter cooperi (Cooper's Hawk) adult f and young m; Accipiter atricapillus (Goshawk) adult and young m; Buteo borealis (Red Tailed Hawk); Buteo latissimus (Broad Winged Hawk) adult and young m; Asio wilsonianus (Long Eared Owl); Nyctala acadica (Saw-whet Owl); Megascops asio (Screech Owl); Bubo virginianus (Great Horned Owl); Chætura pelagica (Chimney Swift); Empidonax flaviventris (Yellow-bellied Flycatcher); Empidonax traillii (Traill's Flycatcher); Empi-

donax minimus (Least Flycatcher); Corvus americanus (Crow) m and f; Aglaius phœniceus (Red-winged Blackbird) m and f; Scolecophagus carolinus (Rusty Grackle) m and f; Carpodacus purpureus (Purple Finch) m and f; Loxia leucoptera (White-winged Crossbill) m and f; Loxia curvirostra minor (Red Crossbill) m and f; Acanthus linaria (Red Poll); Spinus tristis (Goldfinch) m and f; Spinus pinus (Pine Siskin); Plebtrophenax nivalis (Snow Bunting) m and f; Zonotrichia leucophrys (White-crowned Sparrow) adult and young m; Spizella monticola (Tree Sparrow); Spizella socialis (Chipping Sparrow); Spizella pusilla (Field Sparrow); Junco hyemalis (Junco); Melospiza fasciata (Song Sparrow); Melospiza georgiana (Swamp Sparrow); Melospiza lincolni (Lincoln's Sparrow); Zamelodia ludoviciana (Rose-breasted Grosbeak) m and f; Petrochelidon lunifrons (Eave Swallow); Chelidon erythrogaster (Barn Swallow); Tachicineta bicolor (Tree Swallow); Clivicola riparia (Bank Swallow); Ampelis Cedrorum (Cedar Bird) m and f; Lanius borealis (Great Northern Shrike); Vireo olivaceus (Red-eyed Vireo); Vireo solitarius (Solitary Vireo); Mniotilta varia (Black and White Creeper) m and f; Helminthophila rubricapilla (Nashville Warbler); Compsothlypis americana usneæ (Parula Warbler) Dendroica cærulescens (Black-throated) Warbler m and f; Dendroica coronata (Myrtle Warbler); Dendroica maculosa (Magnolia Warbler); Dendroica castanea (Bay-breasted Warbler) m and f; Dendroica striata (Black-poll Warbler); Dendroica blackburniæ (Blackburnian Warbler) m and f; Dendroica vigorsii (Pine Warbler); Seiurus auracapillus (Golden-crowned Thrush); Seiurus noveboracensis (Water Thrush); Geothlypis agilis (Connecticut Warbler); Geothlypis trichas (Maryland Yellow-throat) m and f; Regulus calendula (Ruby-crowned Kinglet); Regulus satrapa (Golden-crowned Kinglet); Turdus fuscescens (Veery); Turdus ustulatus swainsonii (Olive-backed Thrush); Turdus aonalaschkæ pallasii (Hermit Thrush); Merula migratoria (Robin); Sialia sialis (Bluebird) m and f. Mrs. Susan J. Olzendam, as a memorial to her daughter, Miss Sidonia C. Olzendam.

## ANIMALS.

Fibre zibethicus (Muskrat); Samuel J. Laflamme.
Putorius noveboracensis (Weasel); John K. McQuesten.
Ursus americanus (Brown Bear) Cub; Harrie M. Young.

Embryo of Bos taurus; William K. Robbins.
Phoca vitulina (Harbor Seal); Edward Weber.

## INSECTS.

Collection embracing 114 Coleoptera, 51 Hymenoptera, 11 Diptera, 23 Hemiptera and 20 miscellaneous insects; Walter S. Abbott.
Ova of Chrysopa; E. J. Burnham.
Sphinx Moths from Colorado; Harry M. Quimby.
Diapheromera femorata Walking Stick; Miss Emma J. Jeffers.

## FLOWERS.

Collection embracing the flora of Mt. Washington, collected by W. S. Jewell while in charge of the signal station at the summit; Captain David Perkins.

## MINERALS.

Specimen of amethyst; Mrs. Lyman W. Colby.
Sylvanite from Bonanza King mine, Cripple Creek, Colo.; W. B. Boardman, Colorado Springs.
Brazilian agate; George Hosser.
Rock showing contortions of strata, found in the gravel bank on Rochelle avenue; Ervine E. Brock.
Copper pyrites from Capelton, Quebec; James M. Nelson.
Collection of minerals; Frank M. Forsaith.
Sand from shore of Great Salt Lake, gravel from Garden of the Gods; Isaac Huse, Jr.
Eroded rock; George Emerson.
Collection of minerals; Dr. Lillian G. Bullock.
Roxbury pudding stone, sandstone from Niagara Falls; Miss Millicent S. Morse.
Minerals; Miss Ella M. Dowst.
Sphalerite, apatite, series showing formation of soil from rock, and series showing formation of sand from rock; specimens illustrating formation of soil from rock; series of specimens illustrating the formation of coal; William H. Huse.
Weathered and eroded rocks; Miss Linda Hunter Mooar.
Eroded bowlder; Edward Weber.

## INDIAN IMPLEMENTS.

Indian arrow chips; Clarence H. Knowles.
Case and collection of Indian relics, minerals and antiquities collected by the late Charles S. Kidder; Mrs. Emma S. Kidder.

## BIOLOGY.

Double-siphoned salt water clam ; Harrie M. Young.
Coquina, from Florida ; Mrs. Melusina H. Varick.
Millipede ; E. J. Burnham.
Clypeasta rogersi (sand plate) ; echinoid (sea urchin) natural form ; internal shell ; part of spines removed, showing shell, also bony structure of body, procured at York Beach ; E. P. Richardson.
Coral dredged at Portsmouth, probably brought over in a vessel as ballast. Supposed to be Favosites nidgarensis ; William E. Moore.
Rana sylvatica ( Wood Frog) ; Pauline Huse.
Thamnophis sauritus (Riband Snake) ; Raymond W. Huse.
Heterodon platirhinus (Puffing Adder) ; Diadophis punctatus (Ring-necked Snake) ; Storeria dekayi (DeKay's Snake) ; Rana catesbiana (Bull Frog) ; Rana clamitans (Green Frog) ; Rana palustris (Pickerel Frog) ; William H. Huse.
Alligator mississippiensis (Alligator) ; Edward Weber.
Ameiurus nebulosus (Horned Pout) ; Semotilus bullaris (Roach) ; Diemyctylus viridescens (Newt) ; Micropterus dolimieu (Small-mouthed Black Bass) Lepomis gibbosus (Bream) ; Perca flavescens (Yellow Perch) ; Liopeltis vernalis (Grass Snake) ; Thamnophis sirtalis (Garter Snake) ; one-legged frog, unclassified ; Diemyctylus viridescens miniatus (Red Eft) ; Walter S. Abbott.

## WOODS.

Wood of Xanthoxylon clava-herculis (Prickly Ash) ; George Hosser.
Petrified Wood ; Mrs. John C. Bickford.

## BIRDS' EGGS.

Eggs of 72 species of birds ; Harrie M. Young..
Eggs of Seiurus aurocapillus (Oven Bird); John K. McQuesten.

## NESTS.

Aglais phœniceus (Red-winged Blackbird) ; Zamelodia ludoviciana (Rose-breasted Grosbeak); Passerina cyanea (Indigo Bird ) William H. Huse.
Turdus fuscescens (Veery); Merula migratoria (Robin); Galeoscoptes carolinensis (Cat Bird) ; Melospiza fasciata (Song Sparrow) ; Tyrannus tyrannus (King Bird) ; Sayornis

phœbe (Phœbe); Empidonax minimus (Chebec); Ictuerus galbula (Golden Robin); Raymond W. Huse.

Merula migratoria (Robin) decorated; Miss Bertha L. Kemp.

Seiurus aurocapillus (Oven Bird); Trochilus colubris (Ruby-throated Humming Bird); Sayornis phœbe (Phœbe), built on a clothesline; James O. Harriman.

Vespa maculata (White-tailed Hornet); William Clark, Londonderry.

Various birds' nests; Miss Ella M. Dowst and Miss May W. Davis.

## TURTLES.

Mounted specimens of Chelydra serpentina (Snapping Turtle); Clemmys insculptus (Wood Turtle); shell, two skulls and mounted specimen of Emydoidea blandingi (Blandings' Box Turtle); William H. Huse.

## ART.

Bas reliefs of Bryant, Garibaldi, Whittier and Raphael; William H. Huse.

Two framed pictures and collection of small pictures, woven in silk; George Hosser.

Priming wire; fireplace, frame and fixtures; Dutch oven; flax hatchel; warming pan, sausage filler; foot stove; oven shovel; bellows; two flax beetles; candle mold; two iron pots; skillet; sickle; curd tongs; hand-made pewter platter 115 years old; hand-forged hatchet; rafting oar; flax reel; pitchfork; gridiron; two wool cards; two pairs spectacles; Colt's revolver; candlestick; auger gimlet; bread shovel; John K. McQuesten.

Up and down saw from the old Farmer mill at the mouth of Black Brook; George A. Farmer.

Loading spoon; Harrie M. Young.

Three worsted combs; two pewter platters; George Emerson.

Old documents; Ceorge Hosser.

Cook stove made in 18th century; Henry B. Fairbanks.

Collection of ancient tools; Charles D. Taffe.

Glass bottle over 100 years old; William H. Huse.

## BOOKS, PAMPHLETS AND MAGAZINES—DEPARTMENT REPORTS.

Five pamphlets on mushrooms, Department of Agriculture; Walter S. Abbott.

Report of Bureau of Education for 1898–1899, 2 volumes; William H. Huse.

Five volumes annual reports, Bureau of Ethnology; 6 circulars and 9 bulletins, Department of Agriculture; 5 pamphlets and 5 reports, U. S. Bureau of Ordnance; 3 volumes 1897–98–99, U. S. Coast and Geodetic Survey; U. S. Department Reports, pamphlets and bound volumes; Hon. Henry E. Burnham.

## STATE REPORTS.

Report of Railroad Commissioners for 1900; Railroad Commissioners.

Report of Railroad Commissioners for 1899; Report of Labor Commissioners for 1897–98; Henri Schæffer.

New Hampshire Manual of the General Court, 1901; William H. Huse.

Adjutant General's Report, 1865, Vols. 1–2; J. Brodie Smith.

## SCIENTIFIC AND TECHNICAL.

Manual of Vertebrates, Jordan; William H. Huse.

Guide to localities illustrating Geology, Marine Zoology and Botany of the vicinity of Boston, A. W. Graban and J. E. Woodman; Henri Schæffer.

Observations on the colors of flowers and leaves, E. Williams Hervey; F. W. Batchelder.

## MAGAZINES FOR ONE YEAR.

American Ornithology, The Ohio Naturalist, The Gamophyllous, Le Naturaliste Canadien, Torreya, Journal of Applied Microscopy and Laboratory Methods, The Cornell University Nature Study Quarterly; Nature Study Press.

## MISCELLANEOUS BOOKS.

Soldiers and Sailors in the Civil War, 1861–66; Col. George C. Gilmore.

Historical Collections, Vols. 1–3–7–8–9–10; Proceedings, Vol. 1–2 and part 1 of Vol. 3; New Hampshire Historical Society.

Annual register; Chicago University.

Quarterly; Vanderbilt University.

Annual Catalogue; New Hampshire State College.

Year Book; Brooklyn Institute.

Annual reports, Vols. 11–13; Bulletins 50 to 74; Massachussetts Agricultural College.

Reports of 1898–99; Canadian Bureau of Mining.

Proceedings, part 1, 1901 ; Academy of Natural Sciences.
Eight trade bulletins ; Philadelphia Commercial Museums.
Annual report, 1898–1900 ; Bulletins 65 to 69 ; Minnesota Agricultural Experiment Station.
Set of Manchester City Library Bulletins ; Miss Edith O. Simmons.
Park Commissioners report, Springfield, Mass., 1899 ; F. W. Batchelder.
Session laws, 1901 ; Report of Committee of American Institute of Instruction upon New England Education ; William H. Huse.
Webster's Dictionary, fron the law library of Daniel Webster ; 6 vols. Millman's Gibbon's Rome ; 3 vols. History of the Girondists, de Lamartine ; The Republic of God, Prentis Mulford ; 5 vols, The Native Races of the Pacific Coast, Bancroft ; Life of John C. Calhoun ; Life of Lewis Cass ; 2 vols. Life of Henry Clay ; Agreement of Science and Religion, Wythe ; Universalist's Guide ; Hector Berlioz, W. F. Apthorp ; The Catacombs of Rome, W. I. Kip ; New England Tragedies, Longfellow ; French and German Socialism, R. T. Ely ; Life of Robert Schumann von Wasielwski, Alger ; The Red Cross, Clara Barton ; 5 vols. Macaulay's Essays; Spanish and English Dictionary, Velaquez; 38 vols. Overland Monthly, bound ; Bible for Learners ; Evolution in its relation to Religious Thought, Joseph C. Conte, Report of Congress of Women at the World's Fair, Chicago, 1893 ; The Psychology of Suggestion, Sidic James ; 20 vols., North American Review, bound ; Mrs. Melusina H. Varick.

## MISCELLANEOUS.

$300 for "Chandler Lecture Course"; Hon. G. Byron Chandler.
$10 for general purposes ; Mrs. Sherman L. Whipple, Brookline, Mass.
Electric Light for rooms ; Manchester Traction, Light and Power Company.
Mounting Specimen of Crophlœus pileatus (Pileated woodpecker); Harry Thompson.
Old map of world; reward of merit dated 1811; John K. McQuesten.
Carafe, glasses and tray ; mineralogical trays ; Henri Schæffer.
Sponges and palmetto fiber from Florida ; Miss Ella Hope.
Cartridges with case, used in the German army ; George Hosser.

Cartridge used in the Civil war ; William H. Huse.

## LOANS.

Indian relics ; coins ; Indian whip made of leather wood ; Indian pipe ; spectacles used by Hazen family of Weare during latter part of 1700 ; Japanese watch chain ; jeweler's scales found in the south during the Civil war ; Palmetto wood ; button from coat of Gen. John Stark worn at Bennington ; navy revolver ; padlock found in excavating for Jefferson mill ; hand-made spike from wharf at Fort Constitution, Portsmouth ; pirates' boarding hook ; hand-made spike from old dam at Amoskeag ; sailor's money bag ; two Turkish sword bayonets ; knife captured by E. G. Bowen, 3d N. H. Regt., near Hilton Head, S. C., in 1862 ; shot pouch ; pipe carved by E. G. Bowen at Hilton Head, S. C., in 1861 ; cartridge box ; bullet pouch ; canteen ; powder horn ; sword ; barrel ; candlestick ; flintlock pistol ; sword and flintlock pistol carried by Gen. Wilkinson during Revolutionary war ; Colt's navy revolver ; pocket knife brought from Scotland by Duntley family, also lock and key ; Hammer over 100 years old ; drover's whip ; case containing the following birds : Macrorhampus griseus (Dowitcher) 2 ; Squatarola squatarola (Black-bellied plover) 2 ; Tringa alpina pacifica (Red-backed sand-piper) ; Tringa canutus (Gray Snipe); Totanus melanoleucus (Yellow-legs); Actitis macularia (Spotted Sandpiper) ; Caladris arenaria (Sanderling) ; Tringa maculata (Pectoral Sandpiper) 2 ; Branta canadensis (Canada Goose) ; Harrie M. Young and Mrs. Mary S. Young.

Dryobates villosus (Hairy woodpecker); Colaptes auratus (Flicker); Sturnella magna (Meadow lark); Molothrus ater (Cowbird); Quiscalus quiscula æneus (Crow Blackbird); Accipiter velox (Sharp shinned hawk); Cormorant ; Buteo lineatus (Red shouldered hawk); Zamelodia ludoviciana (Rose breasted grosbeak); Nyctala acadica (Saw-whet owl); Sialia sialis (Blue bird); Helminthophila peregrina (Tennessee Warbler); Carpodacus purpureus (Purple finch); Pinicola enucleator (Pine Grosbeak); Larus argentatus smithsonianus (Herring Gull); Urinator imber (Loon) young ; Edward H. Fogg.

# PROCEEDINGS

OF THE

# MANCHESTER INSTITUTE

OF

# ARTS AND SCIENCES.

VOL. IV, 1902.

PART ONE.

Manchester, N. H.

PUBLISHED BY THE INSTITUTE.

MANCHESTER, N. H,

NATURE STUDY PRESS.

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PUBLICATION COMMITTEE:

FREDERICK W. BATCHELDER, ALBERT L. CLOUGH,
WILLIAM H. HUSE.

# MANCHESTER INSTITUTE

OF

# ARTS AND SCIENCES.

## BY-LAWS.

### OFFICERS.

The officers of this corporation shall be a President, Vice Presidents (the number of which to be determined by provisions hereinafter made) a Treasurer, a Clerk, a Corresponding Secretary, a Curator, a Librarian, and a Council constituted as hereinafter provided, all of whom shall be elected annually and hold their offices respectively for one year and until their successors are elected and qualified.

### DUTIES.

*President.* The President shall preside at all meetings of the association and discharge the usual duties of that office. He shall be the executive officer of the corporation and also be the presiding officer of the Council.

*Vice Presidents.* In the absence of the President a Vice President shall preside in his stead and discharge all the duties of the office, excepting that he shall not be executive officer of the corporation.

*Treasurer.* The Treasurer shall discharge all the usual dnties of that office and shall give bond for the faithful performance of his duty, in such amount with sufficient sureties as shall be determined by the Council. He shall have the custody of the seal of the corporation and shall render a report, suitably audited, of the financial condition of the association at the time of the annual meeting.

*Clerk.* The Clerk shall perform all the usual duties pertaining to his office and such other duties as may be required from time to time by

the Council, and shall be sworn to the faithful performance of his duties. He shall also be clerk of the Council.

*Corresponding Secretary.* The Corresponding Secretary shall discharge all the duties customary to his office, shall conduct correspondence with other associations and persons alike interested, shall have the care and custody of the documents, books and papers not connected with or incident to the records and papers properly belonging to the office of the Clerk, and he shall perform all such other duties as the Council may require.

*Curator.* The Curator shall have the care and custody of the cabinet, art gallery and other property of the Institute, and perform such other duties as may be required by the Council.

*Librarian.* The Librarian shall have the care and custody of all books, pamphlets, maps and charts belonging to the Institute. He may appoint an assistant, for whom he shall be held responsible..

*Council.* The Council shall consist of not less than seven members, and the number required for such membership, in addition to President, Clerk, Corresponding Secretary, Treasurer, Curator, and Vice Presidents, as hereinafter provided, shall be elected annually by the coporation. The Council shall have power to appoint all necessary committees, to act on resignations of officers of the corporation, and to fill vacancies occurring among them.

MEMBERSHIP.

Any association, club or organization may become a member of this corporation, with the approval of the Council, by filing with the Clerk an application stating the name and purpose of such organization, with a request to be admitted as a member, and the payment of one dollar. Such membership, when obtained, shall make by the operation of this by-law all of the members of said association, club or organization members of this corporation upon subscribing to the by-laws.

Any person may be elected to membership by the Council upon being recommended by two members, paying the Treasurer the sum of one dollar and subscribing to the by-laws. All applications for membership should designate the section or sections with which the applicant will unite.

Any person may be elected a corresponding member of the Institute by a unanimous vote of the Council, and such member shall be exempt from the payment of dues and membership fee. Any person who shall pay to the Institute the sum of one hundred dollars at any one time shall, on his request, be elected a life member, and as such shall be exempt from all further dues aud assessments.

SECTIONS.

Any association, club or organization, admitted to membership as here-

inbefore provided, may become a section, which shall be designated alphabetically by the Council, and have authority to establish its title, to maintain its autonomy and manage its affairs, not inconsistent with these by-laws.

Each section shall have a chairman who shall discharge all of the duties pertaining to such office and ex-officio be and become a Vice President of the association and a member of its Council. Such chairman shall be elected by the section at or before the time of the annual meeting of the association and his election shall be certified by the Secretary of the section to the Clerk of the corporation.

Five or more members may organize a section, with the approval of the Council.

BRANCHES.

Five or more persons organizing themselves as an association, or any association previously formed, the purposes of which are harmonious with those of the Institute and which consists of five or more persons, not residents of Manchester, may apply for membership in the Institute and, upon election, shall become a branch of the same. Such branch, as a whole, shall be entitled to all privileges and subject to all rules which refer to individual members and shall, in a general way, be regarded and treated as such. It shall be incumbent upon such branch to make return to the Clerk of the Institute of the names and addresses of its members and of its officers at the time of their election, together with a report of the condition and year's work of the branch.

Any individual member of such a branch, being a non resident of Manchester, shall be entitled to the general privileges of the Institute rooms, Library and Collections, and to such other privileges as the Council may from time to time extend.

MEETINGS.

The annual meeting of the corporation shall be held upon the first Wednesday of January, at such hour and place as the Clerk shall deem expedient. Special meetings may be held at such time and place as the Council shall deem expedient. Notice of all meetings shall be given by publication in some newspaper in the city of Manchester by one publication at least ten days prior to said meeting or by written or printed notice by mail to the last known address of each member at least ten days prior to the meeting.

DUES.

The annual dues shall be three dollars, payable in advance. New members shall be charged for whole months or fraction thereof to the time of the next annual meeting. Any person who fails to pay such dues for one

year shall cease to be a member, and his or her name may be stricken from the roll by vote of the Council, after notice by the Clerk of the corporation setting forth such delinquency and the provision of this by-law, and any member may be removed by the Council for cause upon charges after due notice and hearing.

QUORUM.

At any meeting of the corporation ten members shall constitute a quorum.

AMENDMENTS.

These by-laws may be altered or amended at any meeting of the association, notice having been given of the proposed change.

# NECROLOGY.

The following members of the Institute have died since its organization:

| | |
|---|---|
| Joel Daniels, | May 18, 1899. |
| John C. French, | January 8, 1900. |
| Charles H. Bartlett, | January 25, 1900. |
| Lyman W. Colby, | June 21, 1900. |
| Henry Chandler, | October 20, 1900. |
| William E. Moore, | October 22, 1900. |
| Fred G. Hartshorn, | February 26, 1901. |
| David B. Varney, | March 25, 1901. |
| Allen N. Clapp, | May 18, 1901. |
| Mrs. Emeline R. Balch, | November 1 1901. |
| John M. Chandler, | December 5, 1901. |
| Mrs. Lavina K. Blood, | January 7, 1902. |
| John B. Varick, | February 8, 1902. |
| Augustus H. Stark. | August 8, 1902. |

MANCHESTER INSTITUTE OF ARTS AND SCIENCES.

# OFFICERS FOR 1902.

ALBERT L. CLOUGH, *President.*
EDWARD J. BURNHAM, *Corresponding Secretary.*
NORWIN S. BEAN, *Treasurer.*
HARRIE M. YOUNG, *Clerk.*
WILLIAM H. HUSE, *Curator.*
CHARLES J. ABBOTT, *Librarian.*

## COUNCIL.

ALBERT L. CLOUGH.
EDWARD J. BURNHAM.
NORWIN S. BEAN.
HARRIE M. YOUNG.
WILLIAM H. HUSE.
CHARLES J. ABBOTT.
G. BYRON CHANDLER.
J. BRODIE SMITH.
WM. K. ROBBINS.
EDGAR D. CASS.
MRS. MELUSINA H. VARICK.
MRS. LUCIA MEAD PRIEST.
HENRI SCHÆFFER.
ROBERT J. PEASLEE.
FREDERICK W. BATCHELDER.
MISS THEODORA RICHARDSON.
MISS ISABELLE R. DANIELS.
MRS. ANNIE V. BATCHELDER.
MISS JENNIE YOUNG.
MISS SUSY C. FOGG.

## ROLL OF MEMBERS.

Jan. 1, 1903.

| | |
|---|---|
| Abbott, Miss Annie F. | 16 Walnut. |
| Abbott, Charles J. | 18 Manchester. |
| Abbott, Miss Florence L. | 356 Laurel. |
| Abbott, Mrs. Hattie S. | 342 Manchester. |
| Abbott, Miss Maude C. | " " |
| Abbott, Walter S. | " " |
| Adams, Miss Charlotte R. | 362 Hanover. |
| Africa, Walter G. | 39 Hanover. |
| Aldrich, Dr. E. B. | 83 Hanover. |
| Aldrich, Mrs. E. B. | 84 Ash. |
| Allen, Miss Bertha A. | 33 Walnut. |
| Allen, Fred L. | " " |
| Allen, Mrs. Fred L. | " " |
| Ansell, William H. | 11 Parker Avenue. |
| Ayer, George W. | 51 Erie. |
| Ayer, Miss Mary L. | " " |
| Baker, Miss Maud A. | 337 Manchester. |
| Baldwin, E. T. | 600 Beech. |
| Baldwin, Mrs. E. W. | 322 Pearl. |
| Baldwin, Miss Stella | 165 Myrtle. |
| Bancroft, Clarence | 759 Pine. |
| Barker, Miss Ella F. | 998 Valley. |
| Barnes, Miss Mary F. | 331 Hanover. |
| Barney, Hial | 708 Pine. |
| Barr, Miss Florence G. | 17 Harrison. |
| Barr, Miss Mary E. | Elliot Hospital. |
| Barton, Mrs. Flora Hill | 1880 Elm. |
| Batchelder, Frederick W. | 220 Myrtle. |
| Batchelder, Mrs. Annie V. | " " |
| Bean, Mrs. Elizabeth N. | 63 Carpenter. |
| Bean, Norwin S. | Second National Bank. |
| Bickford, Charles W. | 480 Maple. |
| Bickford, Mrs. Emma S. | 15 Ash. |
| Bisco, George | 593 Maple. |
| Blackstone, Mrs. Carrie S. | 639 Chestnut. |
| Blair, Mrs. Eliza N. | 67 Prospect. |
| Blake, Miss Annie F. | 609 Pine. |
| Bolger, William H. | 341 Hanover. |
| Bourne, Mrs. Grace M. | 1741 Elm. |
| Bourne, Henry D. | " " |

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| Bourne, Miss Meta | 1741 Elm. |
| Bourne, Stephen N. | " " |
| Boutwell, Mrs. Mary S. | 587 Union. |
| Bradley, Rt. Rev. Denis M. | 145 Lowell. |
| Broderick, James A. | 174 Bell. |
| Brooks, Edward M. | 867 Elm. |
| Brooks, Miss Ethel C. | 541 Maple. |
| Brooks, Miss Gertrude H. | 413 Beech. |
| Brown, Mrs. Abby S. | 681 Union. |
| Brown, George H. | 18 Brook. |
| Brown, Dr. James S. | 681 Union. |
| Brown, Mrs. Marie E. | 249 Pearl. |
| Brown, Miss Maud E. | 18 Brook. |
| Brown, Mary E. | 322 Pearl. |
| Brown, Mrs. S. C. | 395 Lowell. |
| Bryant, E. M. | 28 Hanover. |
| Bryant, Mrs. E. M. | 294 Granite. |
| Bullock, Dr. Lillian G. | 295 Hanover. |
| Burbank, William E. | 357 Merrimack. |
| Burnham, Edward J. | 112 Arlington. |
| Burnham, George E. | " " |
| Burnham, Henry E. | 1911 Elm. |
| Butman, Mrs. Jennie C. | 43 Hanover. |
| Butterfield, Mrs. W. M. | 142 Sagamore. |
| Call, W. R. | 913 Elm, Room 46. |
| Campbell, Miss S. Abigail | 92 Walnut. |
| Carpenter. Frank P. | Elm and West North. |
| Carpenter, Mrs. Frank P. | " " " " |
| Carpenter, Miss Mary E. | " " " " |
| Carter, George C. | 146 Walnut. |
| Carter, Mrs. Kate E. | " " |
| Carvelle, Mrs. Anna S. | 2159 Elm. |
| Cass, Edgar D. | 578 Beech. |
| Cass, Mrs. Edgar D. | " " |
| Castor, Mrs. Edgar E. | 560 Beech. |
| Caswell, Fred M. | River R'd and West Clarke. |
| Chalmers, Rev. Thomas | 590 Beech. |
| Chandler, Mrs. Fanny M. | Myrtle Heights. |
| Chandler, George Byron | Amoskeag Bank. |
| Chandler, George H. | " " |
| Chandler, Mrs. Helen M. | 152 Pearl. |
| Chandler, Mrs. Lucy R. | Bay and North. |
| Chandler, Mrs, Mary Gould | North Elm. |
| Chase, Arthur W. | 332 Walnut. |

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| Chase, C. Edwin | 384 Walnut. |
| Christophe, Sebastian | 91 Penacook. |
| Christophe, Mrs. S. | " " |
| Clarke, Miss Kate I. | 74 Main. |
| Clarke, Mrs. Olive Rand | 18 Brook. |
| Clarke, William C. | City Hall. |
| Clement, Mrs. Clara V. | 104 Parker. |
| Clement, Miss Mary A. | " " |
| Cleworth, John | 143 Myrtle. |
| Cleworth, Mrs. John | " " |
| Cleworth, Mildred W. | " " |
| Clough, Albert L. | Box 114. |
| Clough, Mrs. L. B. | 181 Walnut. |
| Clough, Miss Nora B. | 294 Pearl. |
| Collins, Mrs. E. H. | 59 Orange. |
| Cornish, Miss Bertha K. | 253 Central. |
| Cooper, Miss Emma J. | 85 Ash. |
| Corey, William | 488 Maple. |
| Corson, Miss Annie R. | 36 Ray. |
| Crafts, George P. | 91 Bay. |
| Crafts, Mrs. George P. | " " |
| Craggy, Mrs. Lucy S. | 93 Myrtle. |
| Cressey, William H. | 266 Central. |
| Crosby, Uberto C. | 1855 Elm. |
| Crosby, Mrs. U. C. | " " |
| Cross, David | 1552 Elm. |
| Cross, Mrs. David | " " |
| Currier, Mrs. Alice Blake | 673 Pine. |
| Currier, Edward H. | 488 Manchester. |
| Currier, Miss Mabel B. | 225 Bridge. |
| Currier, Mrs. Moody | Myrtle and Ash. |
| Currier, Mrs. M. R. | 42 Appleton. |
| Custer, Miss Anna | 243 Hanover. |
| Dana, Miss Mary F. | 142 Myrtle. |
| Daniels, Miss Belle R. | 586 Beech. |
| Daniels, Miss Lucia H. | " " |
| Davis, Miss Edith H. | 186 Lowell. |
| Davis, Dr. George M. | 596 Belmont. |
| Davis, Mrs George M. | " " |
| Davis, Miss May W. | 186 Lowell. |
| Dearborn, Mrs. J. Henry | Pembroke, N. H. |
| Derby, Miss Lizzie M. | 467 Amherst. |
| Dickey, Miss Esther M. | 38 Avon. |
| Dodge, George B. | 279 Orange. |

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| Dodge, Mrs. Helen K. | North Elm. |
| Dodge, Mrs. Mattie M. A. | 279 Orange. |
| Donahue, John J. | 782 Beech. |
| Donahue, Mrs. Jessie E. | " " |
| Dow, Miss Sarah E. | 105 Ashland. |
| Dow, Perry H. | River Road and West North. |
| Downs, Mrs. Clara L. | 105 Ash. |
| Dowst, Miss Ella M. | 209 Walnut. |
| Dowst, John | " " |
| Drew, Mrs. Annette H. | 105 Ashland. |
| Dustin, Charles R. | 79 Penacook. |
| Dustin, Mrs. C. R. | " " |
| Eames, Mrs. Hortense H. | 941 Chestnut. |
| Eames, William M. | 1089 Elm. |
| Edgerly, Clarence M. | 886 Elm. |
| Ela, Miss Emma J. | 585 Beech, |
| Elliott, Mrs. Medora W. | River Road. |
| Fairbanks, Miss Elsie D. | 527 Hanover. |
| Farmer, Mrs. Lucinda L. | 145 Pearl. |
| Farnsworth, Rev. Charles H. | 962 Valley. |
| Farrington, Mrs. L. Augusta | 251 Hanover. |
| Felch, Miss Sadie C. | 10 Tilton. |
| Fellows, Joseph W. | 186 Lowell. |
| Fellows, Mrs. J. W. | " " |
| Ferren, Miss Kittie J. | 97 Ash. |
| Fitts, Wm. L. | 1910 Elm. |
| Fogg, Edward H. | 302 Prospect. |
| Fogg, Mrs. John Smythe | River Road. |
| Fogg, Miss Susy C. | 302 Prospect. |
| Fogg, Miss Susie G. | 133 Pearl. |
| Foster, Carl H. | 148 Sagamore. |
| Foster, H. S. | 194 Concord. |
| Foster, Mrs. John | 852 Elm, Room 9. |
| Fracker, Miss M. Alma | 297 Pearl. |
| Francis, Miss Florence M. | 740 Beech, |
| French, Mrs. Emma B. | 693 Beech. |
| French, Dr. L. Melville | " " |
| French, Mrs. Mary E. | 313 Belmont. |
| Gage, Miss Mary J. | 482 Granite, |
| Gault, John | 42 Brook. |
| Gay, Miss Annie M. | 184 Myrtle. |
| George, Miss Ethel L. | 19 Appleton. |
| Gill, William G. | 1061 Elm. |
| Gillan, Miss Jean | 757 Chestnut. |

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|---|---|
| Gooden, Miss Kate M. | 466 Hanover. |
| Graupner, Miss Amelia L. | 215 Walnut. |
| Graupner, Miss Hulda C. | " " |
| Griffin, Mrs. Jennie G. | 729 Chestnut. |
| Hadcock, Mrs. William | 282 Prospect. |
| Hale, Arthur H. | First National Bank. |
| Hale, Fred C. | 112 Oak. |
| Hall, Miss E. Alfreda | 969 Valley. |
| Hammond, Miss Edith | 880 Union. |
| Hardy, Frank H. | 264 Prospect. |
| Hardy, Mrs. Margaret S. | " " |
| Hassam, R. H. | 559 Union. |
| Hayes, Charles C. | 15 Hazel. |
| Hazelton, Miss M. A. | 235 Hanover. |
| Head, Miss Caroline E. | 283 Mast. |
| Heald, Frank E. | 289 Concord. |
| Heard, Arthur M. | 746 Chestnut. |
| Hemminger, G. R | 39 Hanover. |
| Hicken, Miss Blanche E. | River Road and W. Salmon. |
| Higgins Edmund F. | 75 Bay. |
| Higgins, E. Safford | " " |
| Higgins, Wilson F. | 119 Myrtle. |
| Hill, Mrs. Antoinette L. | 1880 Elm. |
| Hobbs, Alfred K. | 1070 Elm. |
| Hoit, Miss Carrie E. | Goffstown, N. H. |
| Holton, Edward E. | 697 Union. |
| Holton, Mrs. Maurice A. | " " |
| Hope, Miss Ella | 265 Myrtle. |
| Hope, Miss Lucy Maud | " " |
| Hosmer, Miss Grace B. | 310 Myrtle. |
| How, Miss Mabel L. | 33 Walnut. |
| Hubbard, Miss Martha W. | 145 Pearl. |
| Hunt, Mrs. N. P. | 747 Union. |
| Hunt, Miss Sara | " " |
| Hurd, Henry N. | 97 Penacook. |
| Huse, Mrs. Isaac | 97 Mammoth Road. |
| Huse, Isaac Jr. | 10 Hayes Avenue. |
| Huse, William H. | 210 Young. |
| Huse, Mrs. W. H. | " " |
| Hyde, Theodore McE. | 198 Pearl. |
| Hyde, Mrs. Theodore McE. | " " |
| James, Mrs. Mary J. | 235 Hanover. |
| Jenkins, A. A. | 1037 Elm, Room 56. |
| Kemp, Miss Bertha L. | 40 Water. |

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| Kendall, Mrs. John M. | 311 Central. |
| Kendall, Willis B. | 113 Myrtle. |
| Kendall, W. I. | 16 Monroe. |
| Kennard, Samuel C. | 609 Beech. |
| Kennard, Mrs. S. C. | " " |
| Kennedy, Miss Martha J. | 319 Auburn. |
| Kimball, Mrs. W. L. | 386 Walnut. |
| Knowlton, Edward T. | 639 Chestnut. |
| Knowlton, Mrs. Maud Briggs | " " |
| Knox, Miss Sarah T. | 757 Chestnut. |
| Lamprey, Miss Alice Maud | 395 Hanover. |
| Lamson, Frank F. | 145 Pearl. |
| Lane, Thomas W. | 1937 Elm. |
| Lemon, Miss Angie Mildred | 584 Beech. |
| Livingston, Frank C. | 859 Elm, Room 7. |
| Lockhart, Rev. Burton W. | 23 West Webster. |
| Lockhart, Mrs. Frances U. | " " " |
| Lord, Miss M. Eugenia | 341 Hanover. |
| Mack, Miss Isabella G. | 128 South Main. |
| MacDonald, Miss Victorine | 130 Concord. |
| Manning, Charles B. | 1838 Elm. |
| Manning, Charles H. | " " |
| Manning, Mrs. Frances Fay | 1690 Elm. |
| Manning, Robert L. | " " |
| Many, Rev. D. J. Jr. | 116 Sagamore. |
| Marr, Mrs. Frances | 104 Appleton. |
| Martin, Frank E. | 313 Bridge. |
| Martin, Miss Winona M. | 435 Hanover. |
| McAllaster, Mrs. Mary V. | 298 Granite. |
| McAllister, George I. | 20 Hanover, Room 30. |
| McAllister, Mrs. Mattie H. | 222 Massabesic. |
| McCoy, Mrs. E. Southard | 765 Union. |
| McKean, Miss Ellen E. | 66 North Main. |
| McLaren, Miss Emma L. | 619 Union. |
| McLaren, H. N. | " " |
| McLaren, Miss Mary E. | " " |
| Means, Mrs. Elizabeth A. | North Elm. |
| Merrill, Albert, | River Road and West North |
| Merrill, Mrs. Alice S. | 414 Merrimack. |
| Merrill, Clarence R. | " " |
| Mitchell, Miss Mary W. | 341 Hanover. |
| Mooar, Miss Linda Hunter | 280 Taylor. |
| Mooar, Miss Mary Louisa | " " |
| Moore, Miss Florence H, | 267 South Main. |

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| Moore, Miss Ellen | 16 High. |
| Moore, Miss Emily | " " |
| Moore, Miss Helen M. | 423 Hanover. |
| Moore, Miss Marcia M. | 88 Liberty. |
| Moore, Mrs. William E. | 69 Harrison. |
| Morrill, Miss Florence M. | 40 Blodget. |
| Morrill, Mrs. Hattie T. | " " |
| Morse, Mrs. Clara H. | 129 Russell. |
| Morse, Henry H. | 84 Liberty. |
| Morse, Miss Millicent S. | 107 Parker. |
| Morse, Dr. M. V. B. | 129 Russell. |
| Moulton, Miss Mary E. | 54 Mast, |
| Moulton, Miss Fannie D. | 394 Concord. |
| Murkland, William E. | 35 North Main. |
| Murphy, Miss Mary E. | 341 Hanover. |
| Nelson, James M. | 314 Lake Avenue. |
| Nichols, William T. | Union Office. |
| Nolan, Thomas F. | 70 Laurel. |
| Nutt, Miss May F. | 604 Beech. |
| Nutting, Mrs. Mary C. M. | 2195 Elm. |
| Olmstead, Mrs. Emma P. | 726 Chestnut. |
| Olzendam, Mrs. A. P. | 42 Brook. |
| Osgood, Anson G. | 859 Elm. |
| Osgood, Clinton S. | 281 Central. |
| Page, Miss Josephine W. | 10 Adams. |
| Parker, Miss Anna A. | 269 Central. |
| Parker, Miss Emma F. | " " |
| Parker, Henry W. | 30 Granite. |
| Parker, Miss Nellie C. | 146 Pearl |
| Parker, Walter M. | Manchester Bank. |
| Parker, Mrs. W. M. | 1883 Elm. |
| Patten, Miss Annie W. | 254 Laurel. |
| Patterson, Miss Emma F. | 45 School. |
| Peaslee, Mrs. Nellie D. | 568 Beech. |
| Peaslee, Robert J. | " " |
| Perkins, Miss Ada M. | Ash and Orange. |
| Perkins, David W. | 490 Lake Avenue. |
| Perkins, Mrs. Frederick | 52 Clarke. |
| Phillips, Miss Grace A. | 89 Belmont. |
| Phinney, George H. | 41 Hanover. |
| Piper, Frank S. | 273 Central. |
| Porter, Miss Olie M. | 341 Hanover. |
| Priest, Miss Electa M. | 508 Chestnut. |

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| Priest, Mrs. Lucia Mead | 27 Bay. |
| Reed. Miss Helen E. | 233 Walnut. |
| Richardson, Charles L. | Myrtle and Oak. |
| Richardson, Edwin P. | 318 Orange. |
| Richardson, Miss Florence | 481 Lincoln. |
| Richardson, Mrs. Harriet B. | Myrtle and Oak. |
| Richardson, Miss Harriet H. | 481 Lincoln. |
| Richardson, Herbert E. | 382 Central. |
| Richardson, James M. | " " |
| Richardson, Miss Theodora | 481 Lincoln. |
| Richardson, Miss Susan A. | 382 Central. |
| Robbins, Mrs. Ellen R. | 290 McGregor. |
| Robbins, William K. | Amoskeag Mfg. Co. |
| Robinson, Dr. J. Franklin | 15–16 Pickering Building. |
| Robinson, Mrs. Tillie F. | 98 Bridge. |
| Robinson, Ed R. | " " |
| Rogers, Mrs. Lissa M. | 31 W. Merrimack. |
| Rowe, Miss Olive A. | 118 Walnut. |
| Sanborn, A. H. | Amoskeag Mfg. Co. |
| Sanborn, Mrs. Charles E. | 252 Lowell. |
| Sargent, F. W. | 741 Chestnut. |
| Sawtell, Edward B. | 286 Concord. |
| Schæffer, Henri | 170 Lowell. |
| Scott, Mrs. Lydia A. | 1951 Elm. |
| Shontell, Frederick W. | 46 Hanover. |
| Simmons, Walter W. | " " |
| Simons, Mrs. Grace A. | 42 Brook. |
| Slayton, Edward M. | 1602 Elm. |
| Smith, Arthur J. | 39 Hanover. |
| Smith, Mrs. E. Blanche. | 236 Walnut. |
| Smith, Miss Emily E. | 1687 Elm. |
| Smith, J. Brodie | 46 Hanover. |
| Smith, Miss Kate L. | 57 Harrison. |
| Smith, Leonard G. | First National Bank. |
| Smith, Miss May L. | 560 Beech. |
| Snell, A. E. | 37 Lowell. |
| Snow, Miss Nellie W. | Myrtle and Ash. |
| Spaulding, F. L. V. | 193 Bridge. |
| Spence, Miss Grace E. | 80 Carroll. |
| Stanton, Miss Theresa B. | 587 Union. |
| Staples, Rev. Charles J. | 70 Blodget. |
| Staples, Mrs. Grace D. | " " |
| Stark, Mrs. A. H. | River Road. |

| | |
|---|---|
| Stearns, Miss Etta Lois | 296 Hanover. |
| Stearns, H. A. | 464 Amherst. |
| Stevens, Victor E. | N. H. Fire Insurance Co. |
| Straw, Herman F. | 607 Chestnut. |
| Straw, Mrs. H. F. | " " |
| Sturtevant, Mrs. Ira F. | 205 Ash. |
| Taggart, Miss Alice C. | 46 Brooklyn Avenue. |
| Teeling, George A. | 165 Sagamore. |
| Thompson, Miss Ruth C. | 85 Salmon. |
| Tolman. Miss Mary M. | 593 Union. |
| Tuson, Miss Eva F. | 36 Appleton. |
| Tuttle, Miss Hattie S. | 344 Hanover. |
| Tynan, Miss Mary G. | 72 Oak. |
| Van Dyke, Miss Emma L. | 302 Merrimack. |
| Varick, Mrs. Melusina H. | 283 Orange. |
| Varick, Mrs. Thomas R. | 136 Lowell. |
| Varick, Dr. W. R. | 283 Orange. |
| Varney, Miss Emma L. | 220 Myrtle. |
| Varney, Mrs. Harriet B. | " " |
| Vogel, Arthur E. | 127 Nutfield lane. |
| Vose, Miss Annie M. | 298 Granite. |
| Wadleigh, Mrs. Moses | 179 Lowell. |
| Walker, Miss Flora M. | 146 Jewett. |
| Walker, Mrs. Grace P. | 332 Hanover. |
| Walker, Thomas Jr. | Goffs Falls. |
| Walker, Mrs. Thomas Jr. | " |
| Waring, Miss Annie E. | 247 Milford |
| Warren, Miss Marion F. | 1687 Elm. |
| Westcott, Mrs. Sarah R. | 39 Prospect. |
| Westcott, W. R. | 40 Concord. |
| Wheeler, Mrs. Mary | 333 Hanover. |
| Whittemore, L. B. | 533 Beech. |
| Whitten, John H. | 2 Water. |
| Whitten, Mrs. J. H. | " " |
| White, Louis B. | 541 So. Main. |
| White, Willie L. | " " |
| Willand, Miss Alta C. | 16 Monroe. |
| Willand, Miss Hattie O. | " " |
| Williams. Mrs. Anna M. | 471 Manchester. |
| Williams, Miss Harriet A. | 161 Laurel. |
| Williams, J. Arthur | 544 Maple. |
| Williams, Mrs. J. A. | " " |

| | |
|---|---|
| Wilson, Miss Ida Belle | 304 Hanover. |
| Winch, George | 804 Beech. |
| Winchell, Miss F. Mabel | City Library. |
| Wing, Miss Caroline E. | 331 Hanover. |
| Woodbury, Gordon | Union Office. |
| Woodbury, Mrs. Gordon | City. |
| Woodman, Miss Susie G. | 371 Massabesic. |
| Young, Harrie M. | City Hall. |
| Young, Miss Jennie | 120 Myrtle. |

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# A LIST OF THE BIRDS

OF

# NEW HAMPSHIRE.

BY

Glover M. Allen.

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# THE BIRDS

OF

# NEW HAMPSHIRE.

BY GLOVER MORRILL ALLEN.

## INTRODUCTION.

In the following pages an attempt has been made to bring together a list of the species of birds known to have occurred within the State of New Hampshire during historic times, together with a general account of their distribution, faunal position, times of migration, and, in case of the rarer species, a detailed list of the known instance of occurrence. The present list can be at best only preliminary, and there remains much yet to be done in the way of obtaining more complete information as to the details of distribution and migration, and particularly so in the case of the water birds.

In addition to much that has been already recorded in many books and periodicals, a considerable body of unpublished facts relative to the birds of the State is here included, based not only on the writer's personal observations, but also on those of a number of ornithologists who have contributed most generously of their notes, and to whom due acknowledgment is made.

The sequence of names and their spelling are strictly those of the American Ornithologists' Union, instead of those used by Mr. R. H. Howe, Jr., and myself in the "Birds of Massachusetts," since it is believed that the use of the order more commonly adopted will make the list more convenient as a working basis for more complete catalogues. The distribution of the breeding

birds of the State is given so far as possible, faunally, the limits of the faunal areas being elsewhere defined. Extralimital migration dates are given in parentheses. Care has been taken to exclude from the list all doubtful records, or those resting on an unsubstantial basis, hence the frequency of the words "taken" or "captured" in connection with many of the records. A recent writer has deplored the killing of rare or uncommon birds in order to establish positively a "record" and, indeed, it is to be regretted that such a necessity exists. Accuracy, however, demands that the young ornithologist or the beginner shall substantiate in some acceptable way his often hasty identification based on a passing glimpse of a bird with which he is perhaps quite unfamiliar. To merely record one's belief that a certain rare species was observed is in most cases of no value whatsoever and should be more carefully guarded against than is at present done. The trained naturalist, who appreciates at what pains facts are determined, is content to leave unrecorded that of which he is in doubt. Of much greater value is it to establish one new fact in the life history of a common bird, than to record the accidental presence of a species far from its normal range.

It remains to express my thanks to all who have contributed to the present undertaking, and especially to Mr. William Brewster of Cambridge, Mass., who has generously contributed a number of observations on water birds; Dr. Walter Faxon of Cambridge, Mass.; Mr. W. E. Cram of Hampton Falls; Mr. G. H. Thayer of Monadnock; Mr. C. F. Goodhue of Webster; Mr. V. D. Lowe of Randolph; Mr. W. M. Buswell of Charlestown; Dr. W. H. Fox of Washington, D.C.; Mr. F. H. Allen of West Roxbury, Mass.; Mr. Ralph Hoffmann of Belmont, Mass.; Mr. R. H. Howe, Jr., of Brookline, Mass.; Mr. H. W. Wright of Boston, Mass., for their generosity in supplying many valuable notes from their observations in various parts of New Hampshire.

## LITERATURE.

The first printed reference to any New Hampshire bird appears to be that of John Josselyn, in 1672, in his "New England's Rarities Discovered In Birds, Beasts, Fishes, Serpents, and Plants of that Country." He describes "the pilhannaw, or mechquan, much like the description of the Indian ruck; a monstrous great bird; a kind of hawk,—some say an eagle; four times as big as a goshawk; white-mailed, having two or three purple feathers in her head, as long as geese's feathers they make pens of. The quills of these feathers are purple, as big as swan's quills, and transparent. Her head is as big as a child's of a year old; a very princely bird. When she soars abroad, all sort of feathered creatures hide themselves; yet she never preys upon any of them, but upon fawns and jaccals. She ayries in the woods upon the high hills of Ossapy, and is very rarely or seldom seen." It is generally supposed that this "princely bird," whose home was among the Ossipee hills, or higher peaks beyond, must have been largely fabulous. Doubtless, as suggested by Dr. Tuckerman, Josselyn's bird was but a confused conception of the golden eagle, the bald eagle, and the great blue heron. The purple feathers are supposed to indicate the heron, and the white head and tail of the bald eagle may meet the conception of a "white-mailed" bird; the habit of preying upon fawns perhaps indicates the golden eagle.

After this brief mention, I have found no further reference to the birds of New Hampshire until 1792, over one hundred years later. In this year appeared Jeremy Belknap's "History of New Hampshire," in the third volume of which is given an account of the natural products of that portion of New England.

Here is given the first list of New Hampshire birds that has appeared in print. One hundred and twenty-two species are listed by their English and Latin names as then used, and eight other names are included among the addenda, on the authority of one Mr. Peck. Considering that this list was prepared long before the days of the "A. O. U.," when there were no popular handbooks nor guides beyond Linnæus' Systema Naturæ, one cannot but be impressed by the care and accuracy shown by the compiler, here as elsewhere in the volume. Of these one hundred and thirty names, probably at least five are but repetitions, and of the rest, there are but seven or eight whose identity may not be guessed at with more or less confidence. Belknap considered no less than four of the species he listed, to be new to science, and these he distinguished by new specific names in a style of type different from that used for the specific names of the other species. These four "new" birds were:—"SPECKLED WOODPECKER, *Picus maculosus*," "LARGE SPOTTED PLOVER, *Charadrius maculatus*," "WINTER SPARROW, *Fringilla grisea*," and "BROWN FLYCATCHER, *Muscicapa fusca*."

It is of course impossible now to determine in how far Belknap's identifications were correct, and one may reasonably question the occurrence in New Hampshire, even in those days, of such birds as the "Carolina Woodpecker, *Picus carolinus*," and the "Crested Titmouse, *Parus bicolor*." It must be borne in mind, however, that great changes in the ranges and relative abundance of many birds must have taken place since Belknap's day. No other State list of New Hampshire birds has since been published, and because of its unusual interest as a scrap of early literature on the subject, it is reprinted herewith, *verbatim et literatim*, the probable identity of each name being indicated by the Latin combination in brackets following :—

"Of BIRDS we have a great variety. The following catalogue is the most full, which has been collected, but cannot boast of perfection.

BALD EAGLE, Falco leucocephalus [Haliaetus leucocephalus].

| | |
|---|---|
| BROWN EAGLE, | Falco fulvus [Haliaetus leucocephalus, juv.]. |
| LARGE BROWN HAWK, | Falco hudsonius? [Buteo sp?]. |
| HEN HAWK, | Falco sparverius? [Accipiter cooperii?]. |
| PIGEON HAWK, | Falco columbarius [Falco sparverius]. |
| WHITE OWL, | Strix nyctea [Nyctea nyctea]. |
| SPECKLED OWL, | Strix aluco [Syrnium nebulosum]. |
| BARN OWL, | Strix passerina [Megascops asio]. |
| BIRD HAWK, | Lanius canadensis [Lanius borealis]. |
| KING BIRD, | Lanius tyrannus? [Tyrannus tyrannus]. |
| CROW, | Corvus corax [Corvus americanus]. |
| BLUE JAY, | Corvus cristatus [Cyanocitta cristata]. |
| HANG BIRD, | Oriolus icterus [Icterus galbula]. |
| RED-WINGED BLACK BIRD, | Oriolus phœniceus [Agelaius phœniceus]. |
| GOLDEN ROBIN OR GOLD FINCH, | Oriolus baltimore? [Icterus galbula?]. |
| CROW BLACK BIRD, | Gracula quiscula [Quiscalus quiscula æneus]. |
| CUCKOW, | Cuculus americanus? [Coccyzus erythrophthalmus]. |
| GREAT RED CRESTED WOODPECKER, | Picus pileatus [Ceophlœus pileatus abieticola]. |
| SWALLOW WOODPECKER, | Picus hirundenaceus [?]. |
| RED HEAD WOODPECKER, | Picus erythrocephalus [Melanerpes erythrocephalus]. |
| WHITE BACK WOODPECKER, | Picus auratus [Colaptes auratus luteus]. |
| CAROLINA WOODPECKER, | Picus carolinus [?]. |
| WOOLY BACK WOODPECKER, | Picus pubescens [Dryobates pubescens medianus]. |
| WHITE TAIL WOODPECKER, | Picus villosus? [Dryobates villosus?]. |
| SPECKLED WOODPECKER, | Picus *maculosus* [?]. |
| NUT HATCH, | Sitta canadensis [Sitta canadensis]. |
| KINGFISHER, | Alcedo alcyon [Ceryle alcyon]. |
| CREEPER, | Certhia pinus? [Certhia familiaris americana]. |
| HUMMING BIRD, | Trochilus colubris [Trochilus colubris]. |
| SWAN, | Anas cygnus [Olor columbianus]. |

The SWAN is the largest of the aquatic tribe which is seen in this country. One of them has been known to weigh 36 lb. and to be six feet in length from the bill to the feet, when stretched. Naturalists have different opinions respecting the music of the swan. The tame swan of England is said to be silent; and Dr. Goldsmith seems to think the accounts of the music of the wild swan fabulous. What is deemed fabulous in Europe, is often

realized in America. It is certain that our swan is heard to make a sound resembling that of a trumpet, both when in water and on the wing.

| | |
|---|---|
| WHITE HEAD COOT, | Anas spectabilis [Oidemia perspicillata]. |
| BROWN COOT, | Anas fusca [Oidemia sp. female?]. |
| BLACK DUCK, | Anas nigra [Anas obscura?]. |
| WHITE GOOSE, | Anas erythropus [Chen hyperborea]. |
| BLUISH GOOSE, | Anas cærulescens [Chen cærulescens]. |
| BRANT or BRENT, | Anas bernicla [Branta bernicla]. |
| WILD OR BLACK GOOSE, | Anas canadensis [Branta canadensis]. |

This is the bird which Dr. HILL calls the *Swan goose*. It is a bird of passage, and gregarious; the form of the phalanx, when on the wing, is that of a wedge. By the mixture of this with the common goose, a mongrel breed is produced, which is more valuable than either of them singly. The wild goose, though it migrates from one part of the continent to the other, yet has its local attachments. One of them, which was caught in the spring, and kept in a farm yard with a flock of domestic geese, when the time of its migration arrived, took the first opportunity to join a flock in their passage to the southward; but at the return of spring, came back and alighted in the same yard with four young ones, which she had produced in her absence.

The BRANT is rare in New-Hampshire; but in the bay of Massachusetts, is found in great abundance.

| | |
|---|---|
| SEA DUCK, | Anas mollissima [Somateria dresseri]. |
| DIPPER, | Anas albeola [Charitonetta albeola]. |
| OLDWIFE, | Anas strepera? [Harelda hyemalis]. |
| QUINDAR, | Anas bucephala? [Clangula clangula americana]. |
| WHISTLER, | Anas clangula? [Clangula clangula americana]. |
| WIDGEON, | Anas penelope? [Mareca americana]. |
| MALLARD, or SPRIG-TAILED DUCK, | Anas acuta [Dafila acuta?]. |
| LORD and LADY, or SEA PIGEON, | Anas histrionica? [Histrionicus histrionicus]. |
| BLUE WINGED TEAL, | Anas discors [Querquedula discors]. |
| GREEN WINGED TEAL, | Anas —— [Nettion carolinensis]. |
| GREY WOOD DUCK, | Anas sponsa [Aix sponsa]. |
| WOOD DUCK, | Anas arborea [Aix sponsa]. |

| | |
|---|---|
| CREAM COLOURED SHELLDRAKE, | Mergus merganser? [Merganser americanus]. |
| RED BELLIED SHELLDRAKE, | Mergus serrator? [Merganser serrator]. |
| PYED SHELLDRAKE, | Mergus castor? [Lophodytes cucullatus]. |
| PENGUIN, | Alca impennis [Plautus impennis]. |
| WATER HEN, or WATER WITCH, | Alca artica? [Colymbus or Uria sp.]. |
| PELICAN, | Pelicanus onocrotalus occidentalis [Pelecanus erythrorhynchos]. |

The Pelican migrates from its native country, the Missisippi [sic], far to the northward. It has been seen in New-Hampshire. The American Pelican is not a distinct species from the Pelican of Asia and Africa but, a variety only.

| | |
|---|---|
| SHAG, | Pelecanus graculus? [Phalacrocorax sp.]. |
| GANNET, | Pelecanus cassanus? [Sula bassana]. |
| LOON, | Colymbus immer [Gavia imber]. |
| WHITE GULL, | Larus canus [Larus argentatus]. |
| GREY GULL, | Larus fuscus? [Larus argentatus juv.]. |
| MACKEREL GULL, | Larus ridibundus [Sterna hirundo?]. |
| TEE-ARR, or FISHING GULL, | Sterna minuta [Sterna antillarum?]. |
| CRANE, | Ardea canadensis [Grus mexicana]. |
| STORK, | Ardea ciconia [Nycticorax nycticorax nævius]. |
| BLUE HERON, | Ardea cærulea [Ardea herodias]. |
| SKOUK, | Ardea virescens [Ardea virescens]. |
| WHITE HERON, | Ardea alba [Ardea egretta?]. |
| WOODCOCK, | Scolopax rustica [Philohela minor]. |
| WOOD SNIPE, | Scolopax fedoa [Helodromas solitarius?]. |
| GREY CURLEW, | Scolopax totanus [Numenius borealis?]. |
| LARGE SPECKLED CURLEW, | Scolopax lapponica [Numenius hudsonicus]. |
| HUMILITY, | Tringa interpres? [?]. |
| MARSH BIRD, | Tringa morinella? [Tringa maculata?]. |
| ROCK BIRD, | Tringa maculata [Actitis macularia]. |
| OX-EYE, | Tringafulicaria? [Ereunetes pusillus?]. |
| BEACH BIRD, | Tringa arenaria [Calidris arenaria]. |
| BLACK BREASTED PLOVER, | Charadrius hiaticula [Squatarola squatarola]. |
| KILDEE, | Charadrius vociferus? [Ægialitis vocifera]. |

| | |
|---|---|
| Pyed Plover, | Charadrius apricarius [Ægialitis semipalmata?]. |
| Large Spotted Plover, | Charadrius *maculatus* [?]. |
| Peep, | Rallus carolinus [Porzana carolina?]. |
| Wild Turkey, | Meleagris gallopavo [Meleagris gallopavo fera]. |

Wild turkies were formerly very numerous. In winter they frequented the sea shore, for the sake of picking small fishes and marine insects, which the tide leaves on the flats. *Josselyn*, who resided eight years in the Province of Maine, and wrote in 1672, says, that he had eaten part of one, which, when prepared for the spit, weighed thirty pounds, and *Wood*, who visited the country earlier, and wrote in 1639, speaks of some which weighed forty pounds. They are now retired to the inland mountainous country. Dr. *Goldsmith* doubts whether any of this breed have been tamed in America. They certainly have been tamed; but they are degenerated in size by their domestication, scarcely any being more than half so heavy as those above mentioned. The turkey is a rambling bird, and runs with great speed on the ground. The tame flocks frequently wander, and cannot be fatted till the snow prevents their excursions.

| | |
|---|---|
| Growse, | Tetrao———[Canachites canadensis canace]. |

The growse is rarely seen, as there are no dry heaths in New-Hampshire, but on the tops of the largest mountains, which are seldom visited by man. This bird has a red head, is larger than the partridge, and its flesh, though red and dry, has a high flavour, and is very tender.

| | |
|---|---|
| Quail, | Tetrao virginianus [Colinus virginianus]. |
| Partridge, | Tetrao marilandicus [Bonasa umbellus togata]. |

The partridge is very common in our woods. Some of our epicurean gentry have begun to fear, that its race will be too soon extinct; but there is no danger. This bird is very prolific; it is common to find twenty of its eggs in a nest; and it has several coveys in a season [!]. Quails are equally prolific. In the southern and middle States, the quail is called a partridge, and the partridge a pheasant The true pheasant is not a native of our wilderness. The late Governor Wentworth brought several pairs of pheasants from England, and let them

fly in his woods, at Wolfborough; but they have not since been seen.

WILD PIGEON, Columba migratoria [Ectopistes migratorius].

Wild PIGEONS come in the spring, from the southward, in great flocks, and breed in our woods, during the summer months. They choose the thickest parts of the forest, for the situation of their nests. *Josselyn* says 'they join nest to nest, and tree to tree, by their nests, many miles together, on the pine trees.' In the journal of *Richard Hazzen*, who surveyed the Province line, in 1741, there is this remark; 'for three miles together, the pigeons nests were so thick, that five hundred might have been told on the beech trees at one time; and could they have been counted on the hemlocks, as well, I doubt not but five thousand, at one turn round.' This was on the western side of Connecticut river, and eastward of Deerfield river. Since the clearing of the woods, the number of pigeons is diminished.

TURTLE DOVE, Columba carolinensis [Zenaidura macroura].

SKY LARK, Alauda alpestris [Otocoris alpestris].

MARSH LARK, Alauda magna [Sturnella magna].

ROBIN, Turdus migratorius [Merula migratoria].

THRUSH, Turdus rufus [Hylocichla sp.?].

THRASHER, or MOCK BIRD, Turdus orpheus? [Toxostoma rufum.

CHERRY BIRD, Ampelis garrulus [Ampelis cedrorum].

CROSS BILL, Loxia curvirostra [Loxia curvirostra minor].

The CROSS BILL is a bird rather larger than the sparrow; it is common in the western and northern parts of the State. The upper and lower parts of its beak cross each other like a pair of shears, by which means it cuts off the stalks of wheat and rye, and then lays the side of its head to the ground to pick the kernels. The female is of a shaded olive colour. The male is of the same, but tinged with red.

SNOW BIRD, Emberiza hyemalis? [Passerina nivalis and Junco hyemalis].

The SNOW BIRD is smaller than a sparrow, and appears in little flocks, in the winter, enlivening the gloom of that dreary season. They perch on the tops of the spires of dead grass,

above the snow, or on spots of bare ground, or on the bushes and trees. They are seldom molested, as one of them is scarcely a mouthful; but they have the same delicate taste as the quail. Besides the snow bird, the crow, the blue jay, the wood pecker and the partridge, have a degree of hardiness, equal to the severity of our winters, and are then seen flying; all others avoid it, by seeking a timely retreat.

| | |
|---|---|
| BOBLINCOLN, | Emberiza oryzivora [Dolichonyx oryzivorus]. |
| RED LINNET, | Tanagra rubra [Piranga erythromelas]. |
| CHEEWEEH, | Fringilla erythrophthalma? [Pipilo erythrophthalmus]. |
| YELLOW BIRD, | Fringilla tristis? [Astragalinus tristis]. |
| WINTER SPARROW, | Fringilla *grisea* [Spizella monticola?] |
| CHIPPING BIRD, | Fringilla? [Spizella socialis]. |
| SPRING BIRD, | Fringilla [Melospiza melodia]. |
| Several species of SPARROWS, | Fringilla. |
| CRESTED FLYCATCHER, | Muscicapa crinita [Myiarchus crinitus]. |
| HEDGE BIRD, | Muscicapa canadensis [?]. |
| CAT BIRD, | Muscicapa carolinensis [Galeoscoptes carolinensis]. |
| BROWN FLYCATCHER, | Muscicapa *fusca* [Sayornis phœbe] |
| YELLOW CROWN, | Muscicapa flava [Regulus satrapa]. |
| GRAPE BIRD, | Motacilla icterocephala [?]. |
| BLUE BIRD, | Motacilla sialis [Sialia sialis]. |
| CRESTED WREN, | Motacilla regulus [Regulus calendula]. |
| COMMON WREN, | Motacilla trochilus [Troglodytes aedon]. |
| CRESTED TITMOUSE, | Parus bicolor [?]. |
| BLUE TITMOUSE, | Parus americanus [?]. |
| TOM TEET, | Parus atricapillus [Parus atricapillus]. |
| YELLOW RUMPED TOM TEET, | Parus virginianus [Dendroica coronata]. |
| LITTLE HANG-BIRD, | Parus pendulinus? [Vireo olivaceus?] |
| BANK SWALLOW, | Hirundo riparia [Riparia riparia]. |
| BLACK MARTIN, | Hirundo purpurea [Progne subis]. |
| BARN SWALLOW, | Hirundo subis [Hirundo erythrogaster]. |

The SWALLOW appears in April, and disappears in August. It was formerly supposed to migrate, but the evidences of its retiring to the water, or marshy ground, and there remaining torpid, during the winter, are so many, that this opinion is now generally received.

| | |
|---|---|
| CHIMNEY SWALLOW, | Hirundo pelasgia [Chætura pelagica]. |

| | |
|---|---|
| WHIP-POOR-WILL, | Caprimulgus europæus [Antrostomus vociferus]. |
| NIGHT HAWK, | Caprimulgus americanus [Chordeiles virginianus]. |

* * * * * * * * * * *

Additions to the zoological catalogue by MR. PECK.

| | |
|---|---|
| PIGEON HAWK, | Falco subbuteo [?] |
| FISH HAWK, | Falco haliaetus [Pandion haliaetus carolinensis]. |
| HORNED OWL, | Strix bubo [Bubo virginianus]. |
| OLD WIFE, | Anas hyemalis [Harelda hyemalis]. |
| MURR, | Alca torda [Uria lomvia]. |
| PETTERIL, | Procellaria pelagica [Oceanodroma leucorhoa?]. |
| LARGE SPOTTED LOON, | Colymbus glacialis [Gavia imber]. |
| DOBCHICK or NO TAIL, | Colymbus podiceps [Podilymbus podiceps]. |

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For nearly seventy years after Belknap's list, we find practically nothing on New Hampshire ornithology, save a few scattered notes of little importance. After this long season of quiescence, however, comes a period of considerable activity among our ornithologists. In 1869 and 1870, Mrs. Celia Thaxter contributed a series of articles to the *Atlantic Monthly*, entitled "Among the Isles of Shoals," and these contain much of interest in regard to the bird life of that locality. In 1870, also, as part of the appendix to William Little's "History of Warren," is found a mainly nominal list of 143 birds, which, however, appears not to have been the result of original observation, and is of no special importance. In 1872, appeared the first really scientific paper of note upon the birds of New Hampshire, that of Mr. C. J. Maynard on the Birds of Coos County, N. H., and Oxford County, Me. This list, with its all too brief annotations by the author, supplemented by a few notes from Mr. William Brewster, still remains the only list of birds of the northern part of the State. In Volume I of Hitchcock's Geology of New Hampshire, published in 1874, is found a list of birds then regarded as more or less characteristic of the faunal divisions of the State, but it is not clear whether these are to be considered as birds actually observed in New Hampshire. An

interesting article on the Summer Birds of the White Mountain Region, by H. D. Minot, is found in the *American Naturalist* of 1876. Herein are detailed notes on the birds observed by him at Bethlehem, constituting one of the first important papers on the avifauna of the White Mountains. At about this time, also, valuable lists of birds, with annotations, from Webster and Hollis, appeared in *Forest and Stream*, the result of observations by Mr. C. F. Goodhue and Dr. W. H. Fox respectively. During the next decade much valuable data relating to the birds of the State was contributed in the form of notes or short articles in the Bulletin of the Nuttall Ornithological Club, notably by Messrs. T. M. Brewer, William Brewster, Ruthven Deane, W. H. Fox and H. M. Spelman. In 1887 appeared Dr. A. P. Chadbourne's List of the Summer Birds of the Presidential Range, followed the next year by two short lists of summer birds seen at Holderness, Bethlehem and Franconia by Messrs. W. Faxon and J. A. Allen, and a third list, in 1889, of the summer birds at Bridgewater and Moultonborough, by Mr. F. H. Allen. These catalogues were fairly complete and added much to the knowledge of a region but little studied at that time. In these years, also, appeared a number of short articles by the lamented Frank Bolles, dealing in a popular way with the wood life of the Chocorua region. These essays were later brought together into book form in an attractive volume entitled "At the North of Bear Camp Water." Since 1884, a number of delightful essays have appeared from time to time, in the *Atlantic Monthly*, from the pen of Mr. Bradford Torrey. These deal chiefly with the life of the Franconia region, and have done much to stimulate interest as well as add to our knowledge of the flora and fauna of this part of the mountains. These articles are also to be found collected in several small volumes, such as "The Foot Path Way," "Footing it in Franconia," and others. An attempt has been made at Dartmouth College to arouse interest in the study of the local flora and fauna, and to this end there appeared, in 1891, a List of the Vertebrates Found within Thirty Miles of Hanover. This seems to have been intended only as a preliminary cata-

logue, and gives no specific records or dates, while including a number of species whose occurrence in the vicinity is much to be doubted. The plan of mapping and studying the local fauna is, however, a most commendable one and well merits further extension. Beyond the few occasional notices or short articles dealing with New Hampshire birds, published in the *Auk* and other journals or books, the most important of recent contributions to the ornithological literature of the State are mainly in the way of local lists. Chief among these are Mr. Ned Dearborn's Peliminary List of the Birds of Belknap and Merrimack Counties, in 1898, and the Preliminary List of Birds Observed in the Vicinity of Manchester, by Messrs. F. W. Batchelder and E. H. Fogg, in 1900. The former of these includes 191 species, is well annotated, and forms a most welcome contribution. A number of the less common species are included on the authority of Mr. C. F. Goodhue, of Webster, a careful and trustworthy observer. The Manchester list, though meager in its annotation, is, in the main, reliable, and evidences care in preparation. Neither list attempts to give exact dates of migration or of special records in most cases. A still more recent contribution to the knowledge of the birds of central New Hampshire is a list of birds observed about Newfound Lake, prepared by Mr. R. H. Howe, Junior, in 1901. A few other short local lists, published here and there by amateurs, attest to the increasing interest in the study of birds, though the beginner's eagerness to make a "record," or his too hasty and often erroneous identifications frequently detract much from the value of such contributions.

At the end of the present list is given a bibliography including such references only as have been found of value for the purposes of the present paper. These, however, are believed to include practically all articles of importance in this connection, though a number of minor titles are omitted. It has not been possible, however, to consult, in this connection, the "Hawks of New Hampshire" (*Manchester Union*), 1893, and the "Museum Bulletin" (Weirs), 1886, of whose existence the writer knows only at second hand.

# THE FAUNAL AREAS OF NEW HAMPSHIRE.

## TOPOGRAPHY.

The State of New Hampshire is roughly triangular in outline and stretches from the northeastern boundary of Massachusetts northward to Canada. It lies in central New England, between latitudes 42 deg., 40 min., N., and 45 deg., 18 min., 23 sec., N., and includes a great variety of country. In his account of the topography of the State, Hitchcock ('74) distinguishes six natural divisions. At the extreme southeast is what he terms the Coast Slope; here the land gradually rises westward from sea level along our limited shore-line to the slight divide of from two hundred to four hundred feet, rimming the Merrimack basin. To this area belong the Isles of Shoals, some of which are politically a part of the State of Maine. Beaches and salt marshes occur along the coast, and numerous small hills rise on the inland slope. The second division is that of the Merrimack basin, embracing much of the drainage area of that river from the White Mountains and Winnipesaukee districts southward, and broadening out towards Massachusetts. Its western rim is the long ridge which borders the Connecticut valley on the east, and which is really an extension of the White Mountain region. This ridge culminates at the south in Mt. Monadnock (3166 ft.) but a few miles from the Massachusetts line. The Connecticut valley forms the third district. The river itself is the western boundary of the State, and much of its basin lies in Vermont. Its broad, sweeping meadows, hemmed in by the ridge on the east, mark it off distinctly from the rest of the State. The source of the stream is the Connec-

ticut Lakes in Coos County. A number of side streams flow in from the east, the largest being the Ammonusuc, whose source is among the White Mountains. The fourth and smallest district is the Winnipesaukee basin. Lake Winnipesaukee is the largest sheet of water in the State, and has nearly as many authentic spellings as it has islands. Professor Hitchcock states that the district itself is normally a plain, on which are imposed four small and isolated mountain masses, viz.: the Gunstock and Belknap mountains, Red Hill, the Ossipee hills and Green Mountain in Effingham. Much of the land area is of dry, sandy plains, supporting a considerable growth of pitch pines (especially about West Ossipee) as well as thickets of gray birch and bear oak. These sandy plains stretch northward to the fifth district or White Mountain area. This embraces the highest peaks in the State, and New England as well. Professor Hitchcock distinguishes ten separate groups of mountains, of which the chief are: the Sandwich range on the south, including the peaks of Chocorua, Passaconaway, Whiteface and Sandwich Dome; the Twin and Lafayette group on the west, with Moosilauke (4811 ft.) slightly apart to the southwest; the Carter group on the east, including a number of peaks from North Kearsarge to Mt. Surprise at Gorham, and culminating in Carter Dome (4860 ft.). Finally, there is the great central mass of the Presidential range. This includes six peaks of over 5000 feet altitude, viz.: Monroe, Clay, Jefferson, Adams, Madison and the majestic Washington itself, towering up 6291 feet above sea level. Of the large rivers rising among these mountains, may be mentioned the Ammonusuc, flowing to the Connecticut, the Pemigewasset, which becomes tributary to the Merrimack, and the Saco, which flows eastward outside our boundaries, crosses Maine, and empties into the Atlantic. The sixth and last topographical district is that of the extreme northern part of the State, and includes most of Coos County. It is mountainous, though peaks of over 3000 feet are exceptional. Much of it is yet primeval forest, and it is but sparsely settled. Two depressions enter this area from the south. The first follows the Androscoggin river up to Lake Umbagog

(1256 ft.); the second follows the Connecticut up to the Connecticut Lakes at 1619 ft.

## LIFE ZONES.

From the foregoing, it is at once apparent that New Hampshire offers unusually diverse conditions of environment, from the sand dunes and salt marshes on the coast and the broad valley bottoms of the southern and central portions, to the coniferous forests of the north and the small, yet not inconsiderable, Alpine areas on the summits of its highest peaks.

There are represented by the fauna and flora of the State no less than five life zones, characterized by their peculiar species of animals and plants, as follows:—

*Upper Austral.* The slight trace of an upper austral element forms no stable part of our fauna, and may be considered as in large measure fortuitous. The White-eyed Vireo (*Vireo noveboracensis*) is stated to breed rarely at Manchester, which, perhaps, might not be surprising when we recall that this is the single location in the State, according to the chart given by Hitchcock ('74), whose mean temperature during June, July and August is 70 deg. F., the temperature which practically limits the upper austral zone to the north (Merriam, '98, p. 55). This record, however, is open to some doubt. No upper austral birds are actually known to breed in New Hampshire, though several have been recorded as stragglers. Thus, on August 7, 1880, a pair of Carolina Wrens (*Thryothorus ludovicianus*) was observed at Rye Beach by Mr. H. M. Spelman, and in the Connecticut valley, near the southwestern border, the Orchard Oriole (*Icterus spurius*) has been recorded from Brattleboro, Vt. (Howe, : 02). New Hampshire cannot be said, however, to include any considerable area of upper austral territory, and the occurrence of species characteristic of this zone is limited only to such plainly isolated cases.

*Transition.* This is an area of interdigitation and overlapping of the ranges of northern and southern species, and includes much of the open valley land along the courses of the larger rivers up to about the 600-foot level, or even locally to

1,500 feet in favorable valleys of southern exposure. In general, it embraces the low area along the coast, a large tongue of low country following the Merrimack and its side valleys, to the sand plains of Lake Winnipesaukee and the valleys which penetrate still farther to the foot of the White Mountains. The bottom lands of the Connecticut are also to be included within the Transition area so far up at least as Lancaster, and Transition species work up the side valleys even to the north side of the White Mountains. The Androscoggin valley also brings Transition forms into the low country to the northeast of these high mountains. In the northern part of the state, the Transition area is limited rather closely to the flood plains of the rivers and the cleared or settled portions of their banks near at hand, for the sub-Canadian woods here come down to a low altitude. From an examination of the map illustrating the climatology of the state in Hitchcock's Geology of New Hampshire, it is seen that this area coincides in a general way with that included by the summer isotherm of 65 deg. F. as an upper limit, thus showing close agreement with Dr. Merriam's ('98) determination that the isotherm of 64 deg. F. (summer) is the southern limit of the Canadian zone.

The effect of clearing off the heavy primeval forest by man in his progress up these same valleys has doubtless been to extend in great measure the Transition area. Thus, among the White Mountains, where, within historic times, stood lofty forests on the rich valley floors, are now broad meadows where Bobolinks, Vesper Sparrows, Savanna Sparrows, Red-winged Blackbirds, and less often, Meadowlarks find congenial surroundings, and Indigo Buntings, Song Sparrows, Field Sparrows, Catbirds, Brown Thrashers, Kingbirds, Least Flycatchers, Baltimore Orioles and even Wood Thrushes summer in the after growth of bushes, or among the open orchards and shade trees about the farms. As an instance of a species which is even now clearly to be observed thus extending its range, may be noted the Chestnut-sided Warbler (*Dendroica pensylvanica*). On several occasions I have found an isolated pair or two of

these birds inhabiting the new growth of bushes and vines far in the forest, sometimes within a year or so after the clearing of a patch of heavy timber. The complete change of the cleared territory within a short time, from a dense, damp spruce forest inhabited by a northern fauna, to a dry, sunny, and sheltered area of deciduous bushes and vines, leaves it for a time almost unoccupied, but the keen competition for the available territory of support must soon force the discovery of the new region by those organisms fitted to inhabit it. Thus it is that some birds already living close at hand, such as the Canadian Ruffed Grouse, White-throated Sparrow, Slate-colored Junco, Magnolia and Black-throated Blue Warblers, are quick to spread into a forest clearing, while a more southern species, such as the Chestnut-sided Warbler, must take much longer to discover the spot and settle there in any numbers. Among the White Mountain valleys, we sometimes see in the same grove, this meeting of northern and southern species. Thus in the Saco valley at Intervale, in a large and rather open sugar-maple grove, I have found such species as the Screech Owl and the Wood Thrush summering with the Mourning Warbler and the Hermit Thrush. Here, evidently, is not a condition of stable equilibrium. In some years, I have missed the Mourning Warblers from the grove altogether, while again I have found three pairs in an area so small that the males of all three might be in hearing at one time. The Wood Thrush appeared for two years (1899 and 1900), but a hasty search in early summer of the third year failed to reveal it again.

Of the Transition avifauna, we may distinguish a number of birds whose breeding area lies largely to the south, but extends northward into this zone in New Hampshire. Of these birds, certain ones are more or less common throughout the area, breeding well up into the valleys of the White Mountains. Such are:—Screech Owl (*Megascops asio*), Whip-poor-will (*Antrostomus vociferus*), Nighthawk (*Chordeiles virginianus*), Kingbird (*Tyrannus tyrannus*), Crested Flycatcher (*Myiarchus crinitus*), Phœbe (*Sayornis phœbe*), Least Flycatcher (*Empidonax minimus*), Red-winged Blackbird (*Agelaius phœniceus*), Balti-

more Oriole (*Icterus galbula*), Vesper Sparrow (*Pœcetes gramineus*), Chipping Sparrow (*Spizella socialis*), Field Sparrow (*Spizella pusilla*), Indigo Bunting (*Cyanospiza cyanea*), Scarlet Tanager (*Piranga erythromelas*), Loggerhead (or Migrant) Shrike (*Lanius ludovicianus*), Pine Warbler (*Dendroica vigorsii*), Catbird (*Galeoscoptes carolinensis*), Brown Thrasher (*Toxostoma rufum*), House Wren (*Troglodytes aedon*), White-breasted Nuthatch (*Sitta carolinensis*), and Bluebird (*Sialia sialis*). Others of these southern birds barely reach the valleys of the lower part of the state, or follow them up for only a short distance. Thus the Green Heron (*Ardea virescens*) follows the streams and lakes of central New Hampshire as far as Winnipesaukee, and a few occur in the lake basin beyond to Ossipee, but from the Transition valleys of the White Mountains it is absent. The range of the White Oak (*Quercus alba*) in New Hampshire nearly coincides with that of this heron. The tree is one of the more southern varieties and its distribution in the state has been mapped in a general way by W. F. Flint in Hitchcock's Report. It is not uncommon as far north as Holderness and Ossipee, and in the Connecticut valley slightly farther north at Hanover. Wild Turkeys (*Meleagris gallopavo fera*) in former times, and Bob-whites (*Colinus virginianus*) appear normally to find their breeding range to the south of Lake Winnipesaukee. The Yellow-throated Vireo (*Vireo flavifrons*) is another bird of this class. It becomes rare in the upper Merrimack valley, and in the central part of the state is not yet known to occur north of the Lake. The single bird observed by Mr. Bradford Torrey at Franconia is evidently a straggler. So, too, of the Grasshopper Sparrow (*Ammodramus savannarum passerinus*), Bartramian Sandpiper (*Bartramia longicauda*) and Cowbird (*Molothrus ater*), few seem ever to pass regularly north of Lake Winnipesaukee in the central and eastern parts of the state, although the broad Connecticut valley, in the west, carries several of these species farther northward than they occur in the eastern regions. Thus the Cowbird is common in this valley at least as far up as Lancaster, though practically absent in summer from the entire White Mountain region.

The Bronzed Grackle is also of regular occurrence well up the Connecticut and even about Lake Umbagog, yet I have no knowledge of it in central New Hampshire north of Winnipesaukee. The Yellow Warbler (*Dendroica æstiva*) is also to be added to this category of birds absent from the Transition valleys of the White Mountain area but common in southern New Hampshire and far up the Connecticut valley. The Golden-winged Warbler (*Helminthophila chrysoptera*) and the Prairie Warbler (*Dendroica discolor*) may be mentioned as two Transition species whose breeding range barely extends to the southern borders of the state in the Merrimack valley.

Of the occurrence of southern plants in the Transition zone of New Hampshire, it may be noted that the Chestnut (Castanea) and the Hickory (Carya) occur nearly as far up the valleys as does the White Oak; the Red Oak, however, ranges yet farther, entering the sub-Canadian zone. The Mountain Laurel (*Kalmia latifolia*) also occurs locally as far north as Conway. In his chapter on the Physical History of New Hampshire, Professor Hitchcock adduces evidence indicating that subsequent to the glacial epoch, and probably within the human period, there was an era when the climate of New Hampshire was milder than it now is. In support of this conclusion, is mentioned, among other things, the occurrence of a few southern plants in isolated spots far from their present range of abundance. Thus the *Rhododendron maximum* is reported from Fitzwilliam, Grantham, Hooksett, Hopkinton, Manchester, and Richmond, and its presence at these places in isolated swamps is taken as indicative of its former abundance in intermediate localities. At Manchester, also, there occur with the Rhododendron, a few Tupelo trees (*Nyssa sylvatica*) and from Winchester, in the extreme southwest corner of the state, the Climbing Fern (*Lygodium palmatum*), a southern species, has been recently recorded (Rhodora, 1902, p. 83).

An interesting bird, which seems to have become adapted to the small and scattered cold-water swamps of the Transition zone grown up to sedges, and coarse grass, steeple bushes or hellebore, is the Henslow's Sparrow (*Ammodramus henslowii*)

which may perhaps be considered as peculiar to the Transition area as any of our birds. It occurs locally in several places in the central part of the State and I found a single pair even so far up as Wonalancet, near the foot of Mt. Passaconaway in a corner of a broad meadow which was grown up to sedges, grass, and white hellebore with a sparse covering of wet Sphagnum moss.

Of other animals ranging northward into the Transition area of New Hampshire, may be mentioned, among mammals, the southern Flying Squirrel (*Sciuropterus volucella*) which occurs at least as far as Lake Winnipesaukee, the northeastern Gray Squirrel (*Sciurus carolinensis leucotis*) which even among the White Mountains, inhabits the beech woods at the lower altitudes, and the eastern Cottontail Rabbit (*Lepus floridanus transitionalis*) which is reported from as far as Webster, where it appears to have come in within recent years. Among reptiles, the Box Tortoise (*Cistudo carolina*) has been reported from Pelham and from Lee in the southeastern corner of the state by Mr. W. H. Huse (: 01). The same author finds the Yellow-spotted Tortoise (*Chelopus guttatus*) common about Manchester in the Merrimack valley, but I do not know of its occurrence north of Lake Winnipesaukee, and among the White Mountain valleys, the Painted Tortoise (*Chrysemys picta*) is the only species I have ever seen. The Ribbon Snake (*Thamnophis saurita*) follows the valley bottoms at least as far up as Intervale, where I have not infrequently found it.

A number of more northern species may also be enumerated as finding their southern breeding limit within the Transition zone. Such are the following among the birds: Loon (*Gavia imber*), Hairy Woodpecker (*Dryobates villosus*), Olive-sided Flycatcher (*Contopus borealis*), Purple Finch (*Carpodacus purpureus*), Savanna Sparrow (*Ammodramus sandwichensis savanna*), Swamp Sparrow (*Melospiza georgiana*)?, Blue-headed Vireo (*Vireo solitarius*), Nashville Warbler (*Helminthophila rubricapilla*), Black-throated Green Warbler (*Dendroica virens*), Chickadee (*Parus atricapillus*), and Hermit Thrush (*Hylocichla guttata pallasii*).

It is clear that a "line" cannot be sharply drawn between the Transition zone and the Canadian zone directly above it as some have attempted to do, but the boundaries of the two overlap and interdigitate in a most intricate manner and much yet remains to be done towards the determination in a precise way of the details of distribution of the two areas in New Hampshire.

*Canadian.* This faunal area is very well marked and embraces much of the forested area of the state. Two divisions may be distinguished, the sub-Canadian and the upper Canadian. The sub-Canadian includes the white pine woods, the mixed hemlock, beech, birch and maple forests and occasional red spruce thickets of the lower half of the state from nearly the 600 foot level up to about 3,000 feet among the White Mountains, varying more or less according to slope exposure or local condition. These woods, though in the main rather dry, are nevertheless well watered by the many little mountain brooks, which by their coldness, often carry down along their courses tongues of the damp, richer upper Canadian vegetation. Among the White Mountains, these lower woods are for the most part mixed beech, hemlock, canoe and yellow birch, poplar, together with more or less red spruce. The forest floor is damp, with an undergrowth of mountain and striped maple, cornels, and hobble bushes, especially along the little streams, and here breed Black-throated Blue Warblers (*Dendroica cærulescens*), Magnolia Warblers (*Dendroica maculosa*), Water-Thrushes (*Seiurus noveboracensis*), Mourning Warblers (*Geothlypis philadelphia*), Canadian Warblers (*Wilsonia canadensis*), Winter Wrens (*Olbiorchilus hiemalis*), Golden-crowned Kinglets (*Regulus satrapa*) and Olive-backed Thrushes (*Hylocichla ustulata swainsonii*), while among the forest trees close at hand live Hairy Woodpeckers (*Dryobates villosus*), Yellow-bellied Sapsuckers (*Sphyrapicus varius*), Northern Pileated Woodpeckers (*Ceophlœus pileatus abieticola*), Olive-sided Flycatchers (*Contopus borealis*), Blue-headed Vireos (*Vireo solitarius*), Blackburnian Warblers (*Dendroica blackburniæ*), American Brown Creepers (*Certhia familiaris americana*), and Red-breasted

Nuthatches (*Sitta canadensis*). At the lower elevations, groves of White Ppine occur, usually below 800 feet, though scattering trees are to be found, often of great size, up to 2,500 feet or slightly less. These pine groves are carpeted with needles, which make a dry and often rather barren floor. Here we find such sub-Canadian species as Slate-colored Juncos (*Junco hyemalis*), Myrtle Warblers (*Dendroica coronata*), Blackburnian Warblers (*Dendroica blackburniæ*) and Hermit Thrushes (*Hylocichla guttata pallasii*). A number of these sub-Canadian species are rather sharply limited in their breeding range by the upper Canadian zone, and occur only rarely on its lower edge. Such are the Yellow-bellied Sapsucker, Olive-sided Flycatcher, Blue-headed Vireo, Black-throated Blue Warbler, Magnolia Warbler. Bay-breasted Warbler, Blackburnian Warbler, and Oven-bird. In a general way, the 3,000 foot contour marks the lower edge of the upper Canadian zone on the higher mountains where the slope exposure is to the south. On northern, shaded slopes, this limit is some 500 to 1,000 feet lower, and on both north and south slopes the cold mountain streams serve to carry down with them strips of the upper Canadian as narrow tongues into the lower woods. In a region still covered by primeval forest, the upper Canadian area is noticeably lower on the mountains than on territory which has once been stripped of its heavy growth. Thus in the undefiled forests of the upper Pemigewasset, Canadian Spruce Grouse (*Canachites canadensis canace*) occur along the stream at least down to 2,000 feet, though on the mountains which have been burned or lumbered, only deciduous or mixed growth is found at this level, quite unsuitable for high northern species. An interesting observation I have several times made among the damper, higher woods of the sub-Canadian area on the White Mountains, is that the Lady's Slipper (*Cypripedium acaule*) growing from 1,800 to 2,500 feet or so, is prevailingly white instead of pink. In late June, 1900, almost three fourths of the numerous blossoms seen on the Carter Notch and Nineteen-mile Brook trails, were snow white or barely flushed with pink above 1,800 feet, and again in mid-June, 1902, along the same trail,

sixteen out of seventeen blossoms seen, were white. Possibly the increasing dampness of the ground and the air at these higher levels may be a factor in bringing about this change. Above 3,000 feet the plant does not occur. Unfortunately no record of temperatures for these Canadian woods is at present available for use here, but Dr. Merriam gives the limiting temperatures (summer) as about 57 deg. to 64 deg. F.

The upper Canadian area includes the thick fir and spruce forests in the northern part of the state and on the White Mountains from 3,000 to 4,500 feet. Extended observations on the temperature and humidity of this area are not at hand, but among the White Mountains it is a zone of much greater cold than the sub-Canadian. The forests are dense and are kept saturated in summer by the clouds which constantly settle over them; the ground is densely carpeted with sphagnum which acts as a huge sponge to retain water from the slowly melting snow drifts. Ice is often found under sheltered rocks into July, and even by the middle of June snow drifts are hardly gone in the woods. While on a few days' camping trip into the Carter Mountains, June 13 to 16, we found that the yellow pond lilies (*Nymphæa variegata*) in the Carter Lake at 3,360 feet, had not yet pushed their leaves to the surface of the water, though in the Transition valleys we had seen many plants in blossom along the way. Here the canoe birches were just leafing out, five weeks later than those in the valley below; here and there were violets (*Viola blanda*), and White Hellebore and ferns were just springing up from places where the snow was scarcely gone. Clintonias were only in bud, though 2,000 feet below in the sub-Canadian woods they were in full bloom. In the little lake numerous toads (*Bufo americanus*) were beginning to spawn. They are common throughout these mountain woods to the limit of timber, and numbers had repaired to this lakelet to breed. Some had not yet begun to spawn, though others had already laid considerable masses of eggs. In eastern Massachusetts, the toads spawn about the 20th of April and the young tadpoles are seen by the middle of May, or even by the first of that month. On a former occasion, I had found great

numbers of small tadpoles in Carter Lake by the 22d of July. The following sixteen breeding birds are characteristic of this upper Canadian zone in New Hampshire: Canadian Spruce Grouse (*Canachites canadensis canace*), American Goshawk (*Accipiter atricapillus*), Arctic Three-toed Woodpecker (*Picoides arcticus*), American Three-toed Woodpecker (*Picoides americanus*), Yellow-bellied Flycatcher (*Empidonax flaviventris*), Canada Jay (*Perisoreus canadensis*), Rusty Blackbird (*Scolecophagus carolinus*), Canadian Pine Grosbeak (*Pinicola enucleator leucura*), White-winged Crossbill (*Loxia leucoptera*), Pine Siskin (*Spinus pinus*), Tennessee Warbler (*Helminthophila peregrina*), Cape May Warbler (*Dendroica tigrina*), Black-poll Warbler (*Dendroica striata*), Wilson's Warbler (*Wilsonia pusilla*), Hudsonian Chickadee (*Parus hudsonicus*), and Bicknell's Thrush *Hylocichla aliciæ bicknelli*).

Of mammals characteristic of this area are the Rock Vole (*Microtus chrotorrhinus*), (?), Canada White-footed Mouse (*Peromyscus canadensis*), Woodland Jumping Mouse (*Napæozapus insignis*), Canadian Red Squirrel (*Sciurus hudsonicus gymnicus*), Smoky Shrew (*Sorex fumeus*), Water Shrew (*Sorex albibarbis*), Canada Lynx (*Lynx canadensis*), Sable (*Mustela americana*), Pennant's Marten (*Mustela pennanti*).

In addition to the species more or less strictly confined to each of these two subdivisions of the Canadian zone, may be mentioned a few which are common to the area as a whole. Such are Saw-whet Owl (*Nyctala acadica*), Hairy Woodpecker (*Dryobates villosus*), White-throated Sparrow (*Zonotrichia albicollis*), Slate-colored Junco (*Junco hyemalis*), Nashville Warbler (*Helminthophila rubricapilla*), Myrtle Warbler (*Dendroica coronata*), Winter Wren (*Olbiorchilus hiemalis*), Red-breasted Nuthatch (*Sitta canadensis*), Golden-crowned Kinglet (*Regulus satrapa*), and Olive-backed Thrush (*Hylocichla ustulata swainsonii*); also the following mammals: Northern Virginia Deer (*Odocoileus virginianus borealis*), Canada Porcupine (*Erithizon dorsatum*), Eastern Varying Hare (*Lepus americanus virginianus*), Mink (*Putorius vison*), Black Bear (*Ursus americanus*), Masked Shrew (*Sorex personatus*).

In passing, a word may be added with regard to the change wrought among these rich mountain woods, by fire. Many of the lower peaks and ranges, such as Kearsarge, the Moats, the Rattlesnake range, and others, have been more or less completely burned over by forest fires during the last century. Fires once started in these old forests are not readily stamped out, a damp substratum offering but little hindrance to their progress. The trees are usually killed by the heat and partially charred, but most of them remain standing and soon become withered and exceedingly hard and dry. The soil beneath is quite denuded of covering, and along the ridges it soon washes away, leaving bare rocks and ledges. It is long before such an area is again clothed with verdure. Small blueberry bushes are among the first plants to spring up, and sparse grass and fireweed (Epilobium) follow. Eventually the old fire-killed timber falls from the washing away of the soil and decaying of the roots, and a new growth of birch and poplar slowly takes its place. These trees, well adapted to a thin soil, serve to keep the substratum from washing completely away, and in time a new forest is formed, though different from the original one, while the many exposed ledges and bare, rounded ridges testify to the extreme difficulty of creating a new soil in place of that worn away by the exposure.

*Hudsonian.* This life zone is not well defined in New Hampshire. In the extreme northern part of the state, it is possible that well marked tongues or islands of this area occur, as at the Connecticut Lakes, where Woodland Caribou (*Rangifer caribou*) occur about the cold bogs, and Pine Grosbeaks summer in numbers. On the White Mountains the Hudsonian zone may be considered as including the belt of stunted fir balsam and spruce from about 4,500 feet up to 5,000 feet on southern slopes, the lower limit dipping to perhaps 4,000 feet on some northern exposures. This is the "scrub" of the mountaineer, and forms an exceedingly dense and stubborn barrier to him who tries to force a passage through. Its avifauna is not characterized by the presence of any strictly Hudsonian species, so far as present observations go, a fact which is doubtless due to its limited

extent. The few species of birds found in it are those common to both the upper Canadian and the Hudsonian zone. Doubtless the upper Canadian species readily spread into it from below and true Hudsonian species, if not crowded out, would at least find its area too limited for regular occupation. The following birds are found to occupy this area regularly, and doubtless breed in it: Canadian Spruce Grouse (*Canachites canadensis canace*), White-throated Sparrow (*Zonotrichia albicollis*), Slate-colored Junco (*Junco hyemalis*), Myrtle Warbler (*Dendroica coronata*), Black-poll Warbler (*Dendroica striata*), Hudsonian Chickadee (*Parus hudsonicus*), and Bicknell's Thrush (*Hylocichla aliciæ bicknelli*). A few other species wander up to this height more or less frequently, but probably do not breed above the upper Canadian; such are Canadian Ruffed Grouse (*Bonasa umbellus togata*), White-winged Crossbill (*Loxia leucoptera*), Nashville Warbler (*Helminthophila rubricapilla*) and Golden-crowned Kinglet (*Regulus satrapa*).

Mr. Samuel H. Scudder, in his report on the Distribution of Insects in New Hampshire (Hitchcock, '74), refers to this zone under the name of "sub-Alpine." He finds that certain insects whose habits render them more or less local, are quite characteristic of this division, and gives, as two species which seem peculiar to this region in New Hampshire, a butterfly (*Brenthis montinus*) and a grasshopper (*Podisma glacialis*).

*Arctic-Alpine.* This is the treeless, "barren ground" area, limited in New Hampshire to the summits of certain of the highest mountains. In general, it includes the peaks of the Presidential range above the level of 5,000 feet, having thus a vertical extent of about 1,000 feet to the top of Mt. Washington (6,291 feet). Much of it is a region of boulder-strewn slopes, though the more level parts, or "lawns," support a matted turf of wiry sedges, together with a number of alpine flowering plants. Though a small area, comparatively speaking, it is, nevertheless, doubly interesting because of its peculiar character and the rigorous conditions of environment which it affords. From the observations made at the summit station on Mt. Washington by officials of the U. S. Weather Bureau, a great

amount of valuable data has been obtained. In the chapter on Climatology in Hitchcock's Geology of New Hampshire ('74), it appears that for the years 1853–59, the mean annual temperature at the summit was 28 deg. F. The mean temperature for the months of October to March, which there are practically winter, was 12.4 deg. F., that for the months of April to September being 39.7 deg. F. The months of June, July and August, which may be taken as the breeding period for birds at this height, averaged for the six years, 44.5 deg., 47.9 deg., 50.7 deg. F. respectively. These are the three hottest months of the year at the summit, so that the mean temperature for this period is 47.3 deg. F., with 50.7 deg. F. for the hottest single month. This corresponds closely with Dr. Merriam's statement ('98, p. 54) that the limiting temperature for the lower boundary of the Arctic zone is probably 50 deg. F. for the six hottest consecutive weeks of summer. The local conditions of this mountain summit, however, are doubtless somewhat different from those of the circumpolar arctic region. The report on the Climatology of the state previously referred to, includes an interesting account of certain phenomena of the rigorous winters at the summit of Mt. Washington, describing among others, the remarkable frost feathers which build out into the wind from any stationary object. In summer, cumulus clouds from the heated valleys below often rise so as to envelop the mountain top, or more often Mt. Washington's head alone is shrouded by a stationary cloud. It is stated that at times, the whole country westward is covered with clouds, but that when they have passed the ridge running directly south from Mt. Washington, they are instantly dissolved, never passing beyond a certain point, though moving at the rate of from fifty to sixty miles an hour. The wind at this altitude is frequently terrific. During periods of storm, the wind at the summit is said to increase steadily in velocity till it reaches its culmination, then come lulls, at first only for an instant, and these continually lengthen until the storm ceases. A wind velocity of 140 miles an hour has been measured, and during one night, the mean of four observations is given as 128 miles. Moreover, it is found

that often a gale is blowing at the summit, while below, the air is quite still. Thus at one observation, a wind of 96 miles an hour was blowing at the summit of Washington, while 3,000 feet below, at the depot of the Mt. Washington Railroad, there was not sufficient air stirring to move the anemometer. The winds of extreme velocity, however, are usually limited to the winter season or to periods of storm in summer. The prevailing winds for the entire year are west and northwest, a fact which may have some bearing on the occurrence at these summits of certain wind-blown insects, for a large number of species straggle up from the surrounding country. Mrs. A. T. Slosson has collected considerably over a thousand species here during a period of years, and has not infrequently obtained forms belonging to distant parts of the country. The tendency of insects to work their way up a mountain is well known. The air currents constantly rise up the mountain sides, for which reason the woodsman faces his camp up hill to avoid the smoke of his camp fire. Aided by these currents, multitudes of small insects may sometimes be seen streaming up from below, and converging at the summits in great numbers. Thus, on one occasion, while on the crest of the Carter range in mid-June, I have seen the flying *Aphides* coming up from the forest-clad country below in countless numbers, wafted by the gentle upward current of air.

Observations of rainfall for a single year on Mt. Washington's summit gave 55 inches, of which 47 inches were in summer and autumn. Other local conditions of this small area incident on altitude and latitude make it a most interesting spot for careful œcological study.

The bird fauna of this arctic-alpine region is small, and includes no species typical of the zone. The White-throated Sparrow (*Zonôtrichia albicollis*) and the Slate-colored Junco (*Junco hyemalis*) are the only two birds which breed here regularly, and the former occurs only in a few sheltered places on the lower edge of the zone, as at the Lakes of the Clouds. The Junco is the only bird one may feel confident of finding even to the summit of Washington in summer. A number of lowland species wander up to these altitudes irregularly, however, dur-

ing the summer or on migrations. Thus Goldfinches and Pine Siskins are often seen flying over, and small hawks, Red-breasted Nuthatches and Robins sometimes alight in passing. On one occasion, in mid-July, I even observed on two consecutive days, a Savanna Sparrow (*Ammodramus sandwichensis savanna*) singing from a stone among the sedges, only a short distance from the summit buildings. The bird seemed perfectly at home here, and was probably breeding.

Of mammals, several species occur on these arctic summits, but these are chiefly Canadian forms. The Varying Hares (*Lepus americanus virginianus*) seem even to visit the tip-top buildings on Mt. Washington, and Mr. Thaddeus Lowe, of Randolph, tells me of seeing their tracks in the snow about these structures in the late spring. Striped Squirrels (*Tamias striatus lysteri*), Red-backed Mice (*Evotomys gapperi ochraceus*) and even an occasional Canada Porcupine (*Erithizon dorsatum*) or Woodchuck (*Arctomys monax*) have been known to wander up from below, and the last is sometimes seen in Tuckerman's Ravine, at over 4,000 feet on Mt. Washington. The Little Brown Weasels (*Putorius cicognani*) and Sables (*Mustela americana*) are great travelers and go all over these high levels, even traversing the ranges from one forest to another, as I am informed by Mr. V. D. Lowe.

For characteristic arctic animals of this region, we must look to the insects, of which a number of high northern species are known to occur. The most conspicuous of these, at its season, is doubtless the Barren-ground Butterfly (*Chionobas semidea*), which is very closely confined to this treeless alpine area. Its caterpillar feeds on the *Carex rigida bigelovii* which grows abundantly at these heights.

Of typical arctic plants may be mentioned in addition to two or three carices and dwarf willows, the *Diapensia lapponica*, alpine azalea (*Loiseleuria procumbens*), *Rhododendron lapponicum*, *Cassiope hypnoides*, all blossoming in June; also the handsome Peck's Geum (*Geum radiatum peckii*), found plentifully in July, and the Greenland Sandwort (*Arenaria grœnlandica*). A number of other flowering plants occur on these summits, of which

nearly fifty are stated to be strictly alpine, and many of these are found also on alpine summits in Europe. Extended lists of the plants occurring in the arctic-alpine zone of the White Mountains are to be found as indicated by the following references :—

1874. Hitchcock's Geology of New Hampshire, vol. 1, p. 392, 394, 568, 572.
1895. Miller, G. S. Proc. Boston Society of Natural History, vol. 26, p. 178–179.
1900. Among the Clouds, vol. 24, no. 13, p. 3.

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*Summary.* From the foregoing it is seen that the principal faunal areas of New Hampshire are the Transition and the Canadian, the former including most of the valley land of the southern part of the state up to about 600 feet, as well as long tongues of country in the Connecticut and the White Mountain valleys; the Canadian comprising much of the wooded area of the state from about 600 feet up to about 4,500 feet on the mountains. A mere trace of an Upper Austral fauna is sometimes observed in the lower valleys, and on the coast at our southeast border, but forms no stable element of the fauna. The Hudsonian zone is limited to a narrow belt of stunted fir and spruce growth on the White Mountains from about 4,500 feet to 5,000 feet, and may also include a few small areas in the extreme northern part of the state. Its avifauna, so far as known, consists only of such species as are common also to the upper Canadian zone. Finally on the extreme summits of the higher White Mountains, above 5,000 feet, is a "barren ground" arctic-alpine zone, possessing no large characteristic animals, but yet supporting a number of small arctic plants as well as high northern insects.

## MIGRATION.

Certain phases of bird migration in New Hampshire are perhaps of sufficient interest to warrant a few remarks in addition to the notes given under the several species in the following list.

The coastwise migration of many of the smaller land birds is worthy of much further study. Mrs. Celia Thaxter ('70, p. 581, et seq.) has given a short account, written in her charming way, of the land birds occurring during the migrations, at the Isles of Shoals. Here, at some six or seven miles off the coast of Rye, she writes that about the 27th of March "the islands are alive with song sparrows. . . . . Robins and blackbirds *Agelaius phœniceus*] appear with the sparrows; a few blackbirds build and remain; the robins, finding no trees, flit across to the mainland. Yellow-birds [*Dendroica æstiva*] and kingbirds occasionally build here, but very rarely. . . . . By the 23rd of April come the first swallows, and flocks of martins [*Progne subis*], golden-winged and downy woodpeckers, the tiny ruby-crowned wren [*Regulus calendula*], and troops of many other kinds of birds; kingfishers that perch on stranded kellocks, little nuthatches that peck among the shingles for hidden spiders. . . . . All these tarry only awhile in their passage to the mainland. . . . . Now and then a bobolink pays us a flying visit, and, tilting on a blackberry spray, pours out his intoxicating song; some morning is heard the fairy bugling of an oriole; a scarlet tanager honors the place with half a day's sojourn." These migrants may very likely be cutting across the curve of the coast to strike the Maine shores farther north, and in fall there seems to be a somewhat similar movement in

the reverse direction. Mr. A. A. Eaton, of Seabrook, writes me that one day in October, a few years since, as he lay off shore in a boat, great numbers of small birds, mostly Myrtle Warblers, were noted coming in from the northeast, as if crossing from the Maine coast, and the beach itself was swarming with them. This day was clear, but a storm arose during the following night. Capt. H. L. Spinney ('98) in an interesting account of the migrations at Seguin Island, off the mouth of the Kennebec River, Maine, states his belief that many of these small birds are actually blown out to sea, and struggle back to land as opportunity allows. He says, "I have been out many mornings in a boat some half a mile or more from the island, waiting for the ducks to come to my decoys, when the day before and during the night the wind had blown very strong from the north or northwest, and about sunrise the small birds would begin to fly in from sea in numbers, from one to three or four in sight at one time. This they would continue to do until noon. Many of them would be seen to drop in the water so exhausted that even when within a few yards of the island they would have to succumb; others would just reach the shore at the edge of the water. . . . . Although I have seen many of them drop in the water, I have seen but one rise out of it. This was a sparrow, which, rising three times in succession, finally reached the island."

At the Isles of Shoals, Mrs. Thaxter observes that "the lighthouse . . . . . is the destroyer of birds. . . . . The keeper living at the island three years ago told me that he picked up three hundred and seventy-five in one morning at the foot of the lighthouse, all dead. They fly with such force against the glass that their beaks are often splintered. The keeper said he found the destruction greatest in hazy weather and he thought 'they struck a ray at a great distance and followed it up.' Many a May morning have I wandered about the rock at the foot of the tower, mourning over a little apron brimful of sparrows, swallows, thrushes, robins, fire-winged blackbirds, many-colored warblers and flycatchers, beautifully

clothed yellow birds, nuthatches, catbirds, even the purple finch and scarlet tanager and golden [Baltimore] oriole and many more beside.'' Captain Spinney finds ''warm, cloudy nights, very dark with little wind if any'' the most favorable for a large flight of birds at his lighthouse, or when the atmosphere has become smoky from forest fires and there is a clear night with light southwest wind; but ''should rain or strong winds come suddenly, all but a few individuals will leave at once, or settle down on the ground.'' In foggy weather, he has rarely noted birds about the light.

Away from the coast, the main routes of migration are naturally the north and south trending valleys. One has only to spend a few weeks of late August and early September in a locality not in such a valley to realize how few birds are moving through his territory in comparison with the hosts along the large rivers. In the White Mountain valleys most of the small birds, as warblers, kinglets, vireos and sparrows of various species, sooner or later collect in the valley bottoms; the robins and cedar birds gather in large numbers about the wild cherry trees by the river, and the bobolinks swarm over the weed-grown fields. The main flight of swallows and nighthawks is confined in great measure to the river basins, notwithstanding the far roving habits of the birds, and apart from such localities one sees but few of the migrants. A number of waterfowl seem to pass down the Connecticut valley with more or less regularity, even such salt-water species as Scoters of three sorts, Old-squaw and American Golden-eye Ducks, Red-throated Loons, Horned Grebes, and even an occasional cormorant (*P. dilophus*). Bonaparte's Gulls often stray across the state in late summer, and several species of sandpipers, as the Least and Semipalmated, migrate in numbers down the larger water courses. Mr. William Brewster (:02) states his belief that many of the Red-legged Black Ducks, such as occur in early October at Lake Umbagog, after leaving their breeding grounds in the interior about Hudson's Bay, strike for the Atlantic coast by the shortest possible route, thus crossing northern New England in their passage. It would seem not improbable that other

waterfowl and shore birds pursue a somewhat similar course, and on reaching our large lakes and rivers often stop to feed or rest.

A number of special cases might be mentioned as of interest. Thus, as stated elsewhere, there seems to be a more or less well defined migration of Brunnich's Murres across the lower part of the state in late fall, many birds seeming to make a cross cut from the Maine coast to the Connecticut valley. Certain northern warblers, as the Tennessee, Cape May, Bay-breasted and Mourning Warblers, seem to pass over the southern part of the state in their spring flight, and are rarely seen there though common in the White Mountains or to the north of them in summer. The fall migration of the Black-poll Warblers (*Dendroica striata*) is of more than usual interest as observed among the White Mountains. These birds breed commonly in the balsam forests of the upper Canadian zone mainly above 3,000 feet on southern exposures, and down to 2,000 feet on the northern slopes. During September they swarm, in migration, over the low country of the southern part of the state and beyond, but in the valley bottoms among the mountains are usually uncommon, if not rather rare. Here they migrate mainly at the upper levels and along the mountain tops. Thus at Intervale, a careful search in the lower valleys and woods from the Saco up to some 1,500 feet on the neighboring mountains will frequently fail to discover more than a scattered individual or two among the flocks of other small warblers and chickadees, but higher up along the tops of the lower mountains they are fairly common. Thus, on September 10, 1900, I went up Mts. Bartlett and Kearsarge (northern), the latter 3,260 feet, and on reaching the more open ledges of the former, at about 2,200 feet, at once noticed the numbers of Blackpolls that were passing. Many single birds flew by overhead at short intervals and at no great distance above the mountain; most of them were going northward in the face of a light wind, but a number stopped among the clumps of small spruces, balsams and birch which grew among the ledges. A few also were seen in company with small flocks of chickadees and on all sides was heard their fine

insect-like note. On my descent again into the valley, they were practically left behind after I had passed below the 2,000 foot level. A few days later, on September 13th, among the deeper forests of the Carter mountains, they were found to be common in small flocks. We had noticed a few scattered individuals along the valley road, but on entering the upland woods at about 2,000 feet, they became at once numerous. The following day we found them in numbers among the higher forests on Carter Dome and the mountains beyond. They seemed to be merely roving through the trees in loose flocks, or flying about from one place to another in a restless, aimless way. We camped that evening at the Carter Lakes, and arose early on the morning of the 15th of September after a clear, cold night. The altitude at the lakes is 3,360 feet, and on either side tower the walls of the Carter Notch, a great rift in the mountain with a valley opening out towards the north and another to the south. Shortly after the sun had begun to creep down the farther wall of the Notch, there commenced a large flight of Black-poll and Myrtle Warblers. By singles, pairs, threes, or in small flocks of from four to six birds, these warblers came flying in from the south, high in the air, making straight for the Notch. Many, on reaching this point, kept on over the divide to the northward. Others wavered at the height of land (3,460 feet) but still kept on till out of sight, while yet others, and these mainly the Myrtle Warblers, turned to alight among the trees on the mountain side, or about the lakes. This flight continued from 4:30 or 5 o'clock a. m., for over two hours, during which time several hundred birds passed, by actual count. Of these, about one quarter were Myrtle Warblers, the rest Black-polls. By 9 a. m., only an occasional bird or two was observed, and the flight was practically over. It seemed as if the Black-poll Warblers from all the forests immediately to the south were moving north in a concerted manner to the pass through the Notch and off beyond. Possibly they were heading for the Ammonoosuc Valley to continue thence down the Connecticut; this would be a natural course, and one cannot suppose that their northward flight at this season could have been more than some such local movement.

The periodical abundance of certain northern birds, such as Pine Grosbeaks, Redpolls, Pine Siskins, and Crossbills, is a phenomenon of no small interest. Such incursions we look upon as irregular and of haphazard occurrence, for no other reason, perhaps, than because we are quite ignorant of the conditions which bring them about. During the fall and winter of 1899-1900 a notable incursion of Red and of White-winged Crossbills took place not only over New Hampshire, but over most of New England, and the coast regions farther south. The Red Crossbills appeared first, and were already quite common among the hills of New Hampshire during June and July, 1899. During the two months following they passed through Massachusetts and made their way to Washington and even to Virginia. The White-wings followed closely in their wake and during the last of October were common in eastern Massachusetts, passing through during November and December to the states farther south, reaching New Jersey, Pennsylvania and Ohio. It may be of value to place on record a few facts relative to this flight as observed among the White Mountains during the summer of 1899. On June 18, 1899, when I reached Intervale, in the Saco Valley, the Red Crossbills were at once noticed as abundant. Usually they are present here in small numbers during summer, but on this occasion their numbers were abnormally large. During the remainder of June and early July, flocks of from seven to twenty were often observed, usually flying southward down the river valley in loose order. After the first week or so of July, although they were still present in about the same numbers, no large flocks were noticed, but at the most little companies of from four to six birds, groups of three, and many pairs and singles. In most cases which could be determined, the paired birds seemed to be adult males and females; the former were in bright red plumage and frequently were observed singing as they flew about on fluttering wing or perched among the tree tops. They seemed to feed to a considerable extent on the seeds of the paper birch, and many were also found feeding among elm trees or upon hemlock seeds in the hemlocks. On two trips into the nearby mountains from

July 20 to 25, it was plain that most of the Red Crossbills were in the valleys, below 1,500 or 2,000 feet. In course of a trip from Intervale over the Presidential Range from August 2 to 5, the same fact was again observed, that practically all the Red Crossbills were left below us when the woods at 2,000 feet were reached, though numerous pairs and a few single birds were found along the Glen road nearly to this altitude. At about this same time, Red Crossbills were common in the lowlands just north of the great range, which they must have passed by following through the various notches and valleys. The first White-winged Crossbills were noted on the 20th of July, when a small flock of six birds was found feeding among the spruces at some 2,400 feet on Mt. Bartlett, and on the following day several were heard as they flew past overhead while we were going through mixed woods at over 2,000 feet on the Carter Notch trail. A single bird was seen on July 22d at Carter Notch (3,360 feet), but there seemed to be only a few scattering birds on the upper levels at this date. About the middle of August the number of Red Crossbills seemed to be falling off in the valleys, and at the same time small flocks began to gather in the lower woods to feed on the ripening seeds of the red spruce and hemlock. This gathering into flocks continued during August, and by the first of September numbers of small bands of from 3 to a dozen birds were found, with sometimes a White-winged Crossbill or two among them. One or two small flocks of the latter had already appeared in the valley also. From September 4 to 6 was again spent in the higher woods of the Carter mountains, the greatest elevation being the summit of Carter Dome (4,860 feet). Throughout the lower country, a fair number of Red Crossbills was seen on our trip in, but after getting above 2,000 feet or so, White-winged Crossbills became common in flocks of from seven to fifty birds, to the complete exclusion of the Red species. It will be remembered that on the previous trips to these upper levels in late July and early August, only a very few White-wings were seen, while now they were abundant. They were extremely restless, and flocks were constantly in sight or hearing, now pitching down into a spruce or

birch tree to feed on the seeds, then whirling away over the mountain. From early September on, the White-wings were present in the river valley in small numbers, but not in the abundance seen on the higher parts of the mountains, above 2,500 feet. During the rest of September, both Red and White-winged species were daily seen flying southward down the river valley, but after the 20th I was unable to make further observations on them there. The cause of such an unusual incursion is doubtless more or less complex. One factor may be the food supply, of which there was that year an abundance, since spruce, hemlock and birch trees bore heavily, and apparently with unusual luxuriance. The exceedingly dry spring and summer may have had an indirect influence in producing the large crops of seeds in the case of these trees, for the pollen would have escaped being wetted down, and thus a greater number of the fruiting parts may have been fertilized.

## ANNOTATED LIST OF THE BIRDS OF NEW HAMPSHIRE.

**1. Colymbus holbœllii** (Reinh.). HOLBŒLL'S GREBE.

Inland, a rare spring and fall migrant; on the coast, it doubtless occurs also as an uncommon winter resident. In the spring of 1876, several were taken at Webster, and one so late as June, of that year (Goodhue, '77a, p. 146). Mr. Ned Dearborn ('98, p. 3) records one in breeding plumage taken at Alton where it was picked up in a field exhausted; and another shot in the fall at Lake Winnisquam.

**2. Colymbus auritus** Linn. HORNED GREBE.

A regular autumnal migrant to the larger water courses and ponds.

**Dates:** October to November 20 (Winter on coast?).

**3. Podilymbus podiceps** (Linn.). PIED-BILLED GREBE.

An uncommon spring and fall migrant, and a rare local summer resident. At Webster, Mr. C. F. Goodhue ('77, p. 146) used to find it in summer and it doubtless still occurs in the breeding season on some of the lakes in the southern part of the state. In the fall migration, it is not infrequently found in the Connecticut valley, and Mr. William Brewster has formerly found it in small numbers at Rye Beach in fall.

**Dates:** March to October 4.

**4. Gavia imber** (Gunn.). LOON.

A common spring and fall migrant and winter resident along the coast, and common inland in migrations on the larger bodies of water; a few still breed about the lakes in the southern

part of the state, and in the less disturbed regions to the north they are yet fairly common summer residents. "Twenty years ago," writes Mr. Dearborn ('98, p. 3), "they bred every summer at one or more of the headwaters of the Suncook river." They still breed at Winnipesaukee and Asquam Lakes. Mr. G. H. Thayer writes me that a pair nests annually at Breed's pond near Chesham, and Dr. W. H. Fox states that a pair bred in 1899 at Lake Sunapee. They were known to breed also at Bow pond, Strafford, some 15 years ago (W. E. Jenkins, '84, p. 23). Off the coast, at Rye Beach, Mr. William Brewster tells me that barren birds were observed to pass the entire summer on the ocean, while the flight from the north began soon after September 1st. During September and October they are common as migrants on the wind-swept lakes and along the coast.

**5. Gavia lumme** (Gunn.). RED-THROATED LOON.

Inland, a rare fall migrant; along the coast, it should occur as a winter resident. Mr. C. F. Goodhue ('77a, p. 146) records one taken at Webster, in the fall of 1876, and there is also a specimen in the Acworth Public Library taken at Alstead, November 4, 1886. Mr. G. H. Thayer has noted it as a rare autumn visitant to Dublin Pond.

**6. Fratercula arctica** (Linn.). PUFFIN.

A winter visitant off the coast. Mrs. Celia Thaxter (370, p. 210) records the "sea parrots" as found in winter about the Isles of Shoals.

**7. Cepphus grylle** (Linn.). BLACK GUILLEMOT.

A winter visitant off the coast. Mr. A. A. Eaton of Seabrook writes me of one taken near there in December, 1888. Mrs. Celia Thaxter ('70, p. 210) also mentions it as a winter bird at the Isles of Shoals.

**8. Uria lomvia** (Linn.). BRUNNICH'S MURRE.

A common winter resident along the coast, and of occasional occurrence inland, whither it is sometimes blown by easterly winds. Thus Prof. William Patten writes me of one captured in an exhausted condition by a farmer within two or three miles

of Hanover in February or March of 1894. A second bird was said to have been taken there at the same time. An interesting and apparently unusual incursion of these birds into the southern part of the state, took place during the last week of November, 1899, when more than two dozen were taken, as follows: *Antrim*, one sent in to Mr. J. P. Melzer, Nov. 25; *Charlestown*, one shot Nov. 30, and a second Dec. 1, on the Connecticut river; *Francestown*, one sent in to Mr. Melzer on Nov. 27; *Franklin Falls*, one captured in a brush heap, about the last of November, according to Mrs. Ellen E. Webster; *Lake Winnisquam*, several specimens were taken, reports from Laconia, Winnisquam and Tilton probably referring to the same birds. *Meredith Neck*, Mrs. Ellen E. Webster (:00a) writes that three were shot on Winnipesaukee, the locality being as above; *Nashua*, one found "near a pond," and sent to Mr. J. P. Melzer on Nov. 27; *Northfield*, one taken alive on Bean Hill according to Mrs. Webster (*in literis*); *Tilton*, two sent to Mr. C. F. Goodhue, were shot here. In addition to these captures, Mr. A. A. Eaton writes me of two taken at Seabrook, on the coast, at about the same time. Outside of New Hampshire, Messrs. Faxon and Hoffmann (:00, p. 53) record a specimen killed Nov. 30, 1899, on Onota Lake, Berkshire Co., Massachusetts, and also give two other records for the bird in the county for previous years; Mr. R. O. Morris (:02, p. 6) took one at Springfield, Mass.. Nov. 30, 1899, and states that during the last five or six years the bird has occurred at that place a number of times; one was also taken in 1901. Mr. H. S. Hathaway (:00) records a specimen taken at Point Judith, R. I., Nov. 26, 1899, and adds that he had seen "six recently" (i. e., before Dec. 19, '99) taken off the Rhode Island coast. Finally, Mr. H. B. Bigelow tells me that he shot a single bird of this species on Nov. 29, 1899, at Broad Water Bay, Virginia. Evidently there was a large migration of Brunnich's Murres about the last of November, 1899, extending so far southward as Virginia, and in the course of this migration a number of the birds on an overland flight seem to have become exhausted and constrained to seek the ground, alighting wherever they might, at various

points over southern New Hampshire and western Massachusetts. Apparently there was no meteorological disturbance at this time of sufficient severity to have forced the birds inland, and we are obliged to look for another explanation of this phenomenal flight. May it not be that a general migration of the Murres along the Nova Scotia shores had taken place at this time, and in their southward flight the birds had followed the trend of the coast of Maine, and on reaching southern Maine, a number of them, instead of turning to skirt about the out-jutting coast of Cape Ann and eastern Massachusetts, had continued straight on in their southwesterly course, and so have crossed southern New Hampshire and reached the Connecticut Valley, down which some may have continued, and so reached the ocean waters off New York? A glance at the map shows that if a straight course parallel to the Maine coast were thus followed, it would lead necessarily over the route indicated. We may suppose that those birds which were found to have come to earth at the various localities mentioned, were either exhausted or bewildered, or had reached the end of a first stage of migratory flight. Mr. R. H. Howe, Junior, further contributes the interesting fact that on November 30, 1901, Mr. H. T. Winchester observed numbers of small flocks of Murres on Newfound Lake, about 100 birds in all. At sundown they began "peeping," each flock to flock, and gradually gathered on some rocks along the south shore of the lake. They were very wary, and with some difficulty Mr. Winchester shot two, one of which is in the mounted collection of Camp Pasquaney at Bridgewater, Future observations may show that this cross-cut is not seldom taken by these birds on their southward flight.

**9. Plautus impennis** (Linn.). Great Auk.

In former times this bird doubtless occurred on our shores, and is mentioned by Belknap in 1792 as the "Penguin."

**10. Alle alle** (Linn.). Dovekie.

A not uncommon winter visitant off the coast; inland, it is of casual occurrence, being driven in by storms. Thus, specimens have been obtained at *Concord*, where after a severe storm, one

was shot late in the year, some time since; *Milford*, where, as Mr. J. P. Melzer writes me, five or six which had been blown inland, were obtained some twenty years ago; *Warren*, a specimen is recorded by Mr. Ned Dearborn ('98, p. 5) as having been taken at this place.

**11. Stercorarius parasiticus** (Linn.). PARASITIC JAEGER.

A visitant off the coast in [spring], late summer and fall. Mr. A. A. Eaton has a specimen taken at Seabrook, September 2, 1897, and writes that it is "quite common during September."

**12. Rissa tridactyla** (Linn.). KITTIWAKE.

A common winter resident off the coast.

**13. Larus glaucus** Brunn. GLAUCOUS GULL.

A rare winter visitant. Mr. William Brewster kindly contributes a record of a bird shot at Hampton, and which came into the possession of Mr. N. Vickary, the late taxidermist, about Feb. 20, 1886.

**14. Larus marinus** Linn. GREAT BLACK-BACKED GULL.

A common winter resident on the coast.

**15. Larus argentatus** Brunn. HERRING GULL.

A common spring and fall migrant and winter resident along the coast, and occasional inland, where after a hard blow, stray birds are seen on the large lakes, as at *Chocorua Lake* (Bolles, '93b, p. 129); *Concord*, one seen April 7, 1889, after a southerly gale ("P. C.", '89, p. 275); *Dublin Lake*, noted in small flocks in the fall, by Mr. G. H. Thayer (*in literis*); *East Tilton*, one seen at Little Bay in October, 1896, and another recorded from Webster Lake by Mr. Ned Dearborn ('98, p. 5); *Newfound Lake*, two seen on September 3, 1901, and another at *Squam Lake* on Sept. 6, 1902, by Mr. R. H. Howe, Junior. These birds often follow up the larger rivers to a considerable distance inland. Thus on Feb. 10, 1900, I saw two so far up the Merrimack as Nashua Junction, soaring about over the river, which

was frozen except in places where the current was rapid. Mrs. Celia Thaxter ('70, p. 211) in writing of the sea birds in summer at the Isles of Shoals, mentions that "the little yellow gulls, just out of the egg, ran tumbling about among the stones," and it is not unlikely that they formerly bred there.

**Note: Larus delawarensis** Ord. RING-BILLED GULL.

Mrs. E. E. Webster (1900) has recorded as of this species a bird captured at Campton Village in November, 1898. I am informed, however, that the identification is in doubt, and the species is therefore without a positive record for the state, though it should unquestionably occur on the coast.

**16. Larus philadelphia** (Ord). BONAPARTE'S GULL.

A spring and fall migrant and rare winter resident on the coast, where it is probably more common than the few observations might seem to indicate; occasional inland on the larger bodies of water. Records are at hand from the following localities: *Charlestown*, where an immature bird was taken on the Connecticut by Mr. W. M. Buswell, August 3, 1897; *Milford*, single birds several times taken, as Mr. J. P. Melzer writes me; *Plymouth*, a flock of about 100 birds noted in May, 1877, by "H. B. E." ('77, p. 345); *Portsmouth*, a male is in the Bryant collection, Mus. Comp. Zool., taken Oct. 20, 1885; *Rye Beach*, Mr. William Brewster tells me that he found it common during migration in late summer; *Seabrook*, Mr. A. A. Eaton writes me of a specimen which he mounted Feb. 15, 1890; *Sunapee Lake*, Dr. W. H. Fox writes me that an immature bird was shot in August, 1880; *Webster*, Mr. C. F. Goodhue writes me of two taken on a pond, one about 1890, the other during the last of August, 1897.

**Dates:** May; August 3 to October 20. Winter.

**17. Sterna hirundo** Linn. COMMOM TERN.

A spring and fall migrant, and formerly a summer resident on the coast, where Mrs. Celia Thaxter ('70, p. 211) records that they used to breed on Duck Island among the Isles of Shoals. She mentions that the natives called them "medrakes." The "tee-arr or fishing gull, **Sterna minuta**," mentioned by Belknap (1792, III, p. 169) may also have been

this species. Individuals are of occasional occurence inland, on the larger lakes ; thus at *Winnepesaukee*, Mr. C. F. Goodhue saw a pair on June 10, 1878, at Forty Islands, and at *Ossipee Lake*, Frank Bolles ('93b, p. 129) records one shot Aug. 30, 1890.

**18. Sterna dougalli** Montag. ROSEATE TERN.

Formerly a summer resident at the Isles of Shoals (Baird, Brewer and Ridgway, '84, vol. 2, p. 305).

**19. Sterna fuliginosa** Gmel. SOOTY TERN.

An accidental visitant from the south. There is but one valid record, that of Dearborn ('98, p. 5) really referring to the Black Tern, viz.: at *Newmarket*, where "a fine adult male, taken . . . . about September 14, 1878, by Mr. D. C. Wiggin," is recorded by Mr. Ruthven Deane ('78b, p. 195).

**20. Hydrochelidon nigra surinamensis** (Gmel.). BLACK TERN.

An occasional summer and fall migrant to the coast; casual inland. The following are the only actual records for the state which have come to my notice: *Chocorua*, one remained half a day on a small lake, September 30, 1889, according to Frank Bolles ('93b, p. 129). This was probably the bird mentioned in the same work (p. 36) as seen on "one bright October morning"; *Lake Winnepesaukee*, one was seen June 10, 1878, by Mr. C. F. Goodhue. Mr. Goodhue writes me that through a *lapsus* on his part, this bird was given as **Sterna fuliginosa** in Dearborn's list ('98, p. 5). *Newfound Lake*, an immature bird was shot by Mr. H. T. Winchester, on September 9, 1902, and is now in the collection of Camp Pasquaney, as I am informed by Mr. R. H. Howe, Junior. *Rye Beach*, Mr. William Brewster records ('81b) that a flock of about forty of these birds was seen August 24, 1880, by Mr. H. M. Spelman. The birds stayed several days about a small pond of brackish water, and four were collected. Mr. Brewster also examined a specimen shot here on Sept. 1, 1868.

**21. Æstrelata hasitata** (Kuhl). BLACK-CAPPED PETREL.

An accidental straggler from the south Atlantic. A single specimen was captured at Pittsfield, in Merrimack County, in August, 1893, and beyond an anonymous paragraph in the Boston Sunday Herald ('93), appears not to have been recorded. The bird is now in the mounted collection of Mr. William Brewster, No. 46,076, catalogued under date of August 30, 1893. Doubtless the bird was blown up the coast by the tropical hurricane of the last week of August in that year. A second specimen was taken on the same date, and "two days after the storm," at Blacksburg, Montgomery County, Va., about 200 miles from the coast, as recorded on p. 361 of volume X of the Auk.

**22. Oceanodroma leucorhoa** (Vieill.). LEACH'S PETREL.

A common summer and autumn visitant off the coast, and of casual occurrence inland, where it has been captured at *Alstead*, a single specimen, September 29, 1897, now in the mounted collection at the Acworth Public Library; *Lancaster*, two seen and one of them shot, October 1, 1897, on a small pond, by Mr. F. B. Spaulding ('98a, p. 50); *Manchester*, one shot near the milldam at Lake Massabesic, October 4, 1899, according to Mr. F. W. Batchelder (:00, p. 123).

**23. Oceanites oceanicus** (Kuhl). WILSON'S PETREL.

A common summer visitant off the coast. Mr. William Brewster ('83b, p. 402) has recorded them as being numerous offshore between Cape Ann and Cape Sable in June, 1881, and also informs me that he found them in great abundance between Portsmouth and the Isles of Shoals on July 11, 1874.

**24. Sula bassana** (Linn.). GANNET.

A spring and fall migrant off the coast.

**25. Phalacrocorax dilophus** (Swains.). DOUBLE-CRESTED CORMORANT.

A spring and fall migrant on the coast. Casual inland, where

it has been taken on the Connecticut at Hartland, Vt., in October, 1897, as recorded by Mr. R. H. Howe, Junior (:02, errata).

**P. carbo** doubtless occurs on the coast, but no definite records are at hand.

**26. Pelecanus erythrorhynchos** Gmel. AMERICAN WHITE PELICAN.

The only record for this species in the state is that of Belknap (1792, III, p. 168) who affirms that it has been seen in New Hampshire. Doubtless in his time the bird was more likely to wander to New England than now, when it is but of accidental occurrence.

**27. Merganser americanus** (Cass.). AMERICAN MERGANSER.

A rather common spring and fall migrant and less common winter resident in our inland waters; a not uncommon summer resident about the ponds and streams from the White Mountain region northward. At Intervale, in the Saco valley, I have observed partly grown young swimming in the river so early as June 23d. They appeared unable or at least unwilling to fly, and when suddenly frightened, would skim rapidly over the surface, the swiftly moving wings serving only to partially lift the body from the water. Later in the summer, during August and September, flocks of as many as a dozen are occasionally seen. In feeding they delight to work their way *up stream* along the shores of some rock-strewn river, half swimming, half wading, now splashing frantically to one side in pursuit of an escaping minnow, or, with head and neck submerged, ploughing straight ahead, exploring as they go. Ever alert, however, on the intimation of danger they stop, and swim slowly away, but if actually alarmed, all turn about and, half flying, half paddling, beat a precipitate retreat down stream often not stopping until they have gone half a mile or more. Both Mr. C. J. Maynard ('72) and Mr. William Brewster (:00) note it as breeding at Lake Umbagog. In November, as observed by Mr. Ned Dearborn ('98, p. 5) they appear in numbers on the lakes

in the southern part of the state, and many winter on the rivers where open water is to be found. Mr. R. H. Howe, Junior, ('99, p. 40) has recorded a single bird at Shelburne, on the Androscoggin River, so late as December 20, 1897, but I do not know of the birds wintering north of Lake Winnepesaukee. Mr. Dearborn finds them wintering on the Winnepesaukee and Merrimack Rivers. Dr. W. H. Fox writes me of a pair noted at Hollis, on our southern border, in July, 1876, and it is not impossible that they may have bred in the neighboring region.

**Dates:** (Southern N. H.) November 1 to April 15 (July); (Northern N. H.) April to November (December).

**28. Merganser serrator** (Linn.). Red-breasted Merganser.

A common spring and fall migrant and winter resident on the coast; occasional inland. Mr. G. H. Thayer writes me that it is an irregular fall visitant to Dublin Pond.

**Dates:** November to April.

**29. Lophodytes cucullatus** (Linn.). Hooded Merganser.

An uncommon spring and fall migrant, and in the northern parts of the state, a summer resident. Thirty years ago, according to Mr. C. J. Maynard ('72) it bred "not uncommonly" at Lake Umbagog, and Mr. William Brewster (:00, p. 208) states that it still breeds there in hollow trees.

**Dates:** March to November.

**30. Anas boschas** Linn. Mallard.

A rare spring and fall migrant. Mr. F. B. Spaulding writes me that one was shot on a pond near Lancaster in the spring of 1888 or '89. Mr. Ned Dearborn ('98, p. 6) states that he knew of but three to have been shot in fifteen years on the Winnipesaukee River, the last one being in October, 1895. In November, 1900, there seems to have been a flight of Mallards in southern New England, and Mr. W. E. Cram writes me that on the 8th of that month he observed a flock of eight at Hampton Falls, two or three birds on the 9th, and five on the 11th, of which two, an old drake and a duck, were shot. Mr. H. C. Sargent

also obtained a male and a female at Elliot Pond near Chocorua on November 9, 1900, from a flock of about 10, and states that the bird seemed to be unknown to the residents there.

**31. Anas obscura** Gmel. BLACK DUCK.

A common spring and fall migrant and in the southern part of the state a rare summer resident, though breeding not uncommonly in the more northern areas. According to Mr. William Brewster (: 02) it still breeds plentifully at Lake Umbagog. In the country about Intervale, although a few birds are to be found here and there throughout the summer, it is not until the last of August that they appear in any numbers. Near Monadnock, Mr. G. H. Thayer has found it a rare summer resident. During September and October flocks of from six to thirty are found about the rivers and large ponds, and on the wind-swept lakes until early November.

**Dates:** March to December.

**32. Anas obscura rubripes** Brewster. RED-LEGGED BLACK DUCK.

A spring (?) and late fall migrant. This newly described duck is stated by Mr. Brewster ( : 02) to be common in migration at Lake Umbagog from the second week of October until the waters are closed by ice, the earliest date of its capture there in fall being September 28, 1899. Mr. C. F. Goodhue has in his mounted collection a specimen of this duck taken late in the fall, years ago, at Webster. It doubtless occurs also in spring, but I know of no records.

**Dates:** (Spring? ); (September 28) October 8 to December.

**33. Mareca americana** (Gmel). AMERICAN WIDGEON.

An uncommon spring and fall migrant on the coast.

**Dates:** April; September to October,

**34. Nettion carolinensis** (Gmel.). GREEN-WINGED TEAL.

An uncommon spring and fall migrant. In the Connecticut valley, both Mr. F. B. Spaulding at Lancaster and Mr. W. M. Buswell at Charlestown note its occurrence. In the central

part of the state it appears to be rare. Mr. W. E. Cram reports it on the coast at Hampton Falls.

**35. Querquedula discors** (Linn.). BLUE-WINGED TEAL.

An uncommon spring and fall migrant. I have records of this bird from the Connecticut valley and from the rivers and lakes of the southern and central parts of the state as well as from the coast, but in the White Mountain region it appears to be rare, and I have never seen specimens from there.

**Dates:** May; August 22 to November.

**36. Spatula clypeata** (Linn.). SHOVELLER.

A very rare migrant. The only record is of two "shot at *Rye Beach* in August, 1872" (Baird, Brewer & Ridgway, '84, p. 528).

**37. Aix sponsa** (Linn.). WOOD DUCK.

A not uncommon spring and fall migrant and occasional summer resident. Formerly it bred rather commonly throughout the well watered portions of the state. Thus, Mr. C. J. Maynard records it in 1872 as breeding about Lake Umbagog, and Mr. C. F. Goodhue found it a common summer resident at Webster at about the same time. At present it still breeds in small numbers at suitable localities; thus Mr. Dearborn ('98) instances a pair which bred near Tilton in 1892 and in 1893; Mr. G. H. Thayer writes that it is a regular summer resident at one spot near Dublin. Frank Bolles ('93b) found it to breed about Chocorua, and to the north of the White Mountains it must still be found in small numbers in summer. At Intervale, I have usually seen only single birds in fall, on the small meadow brooks, but on the lakes and ponds of this region flocks of six to a dozen are not infrequent during migrations, remaining into the first week of November.

**Dates:** March to December.

**38. Aythya marila** (Linn.). AMERICAN SCAUP DUCK.

An uncommon migrant in fall along the coast, and occasional inland. A few must occur on the coast in spring, but I have

no records. Mr. C. F. Goodhue writes me that he has once taken it at Webster, and has mounted a specimen shot at Concord about Dec. 13, 1899

**39. Aythya affinis** (Eyt.). LESSER SCAUP DUCK.

A rare migrant. Mr. C. F. Goodhue has obtained it near Webster and Mr. G. H. Thayer writes that he has observed it in fall at Dublin Pond.

**40. Aythya collaris** (Donov.). RING-NECKED DUCK.

A very rare migrant. The only record at present available is that of a specimen obtained at Concord, during the last of November, a number of years ago, by Mr. C. F. Goodhue in whose mounted collection the specimen now is.

**41. Clangula clangula americana** (Bonap.). AMERICAN GOLDEN-EYE.

A common spring and fall migrant and winter resident along the coast and on certain of the larger lakes and streams inland in the southern part of the state; a summer resident at Lake Umbagog. Mr. William Brewster (:00) has given an interesting and valuable account of the breeding habits of this bird as observed by him at Umbagog, where, he states, it still nests abundantly "especially about the outlet and throughout the bottom lands of the lower Megalloway River, where the forests were killed half a century ago by the back water from the dam at Errol." The birds remain on the lake into November, during which month, according to Mr. Ned Dearborn ('98, p. 7) they first appear as migrants on the lakes in the southern part of the state "finally descending into the rivers when the larger bodies of water are frozen over." Many of these birds, he states, winter on the Winnipesaukee and Merrimack rivers. Mr. G. H. Thayer writes that it is an irregular fall visitant to Dublin Pond. There is a single male specimen in the collection of the Acworth Public Library labeled as taken at Charlestown on the Connecticut River, June 13, 1885.

**Dates:** Summer; October to April 15 (June 13).

**42. Charitonetta albeola** (Linn.). BUFFLE-HEAD.

An uncommon spring and fall migrant on the coast; occasion-

al inland, as at Webster where Mr. C. F. Goodhue has obtained it.

**Dates:** March and April; October and November.

**43. Harelda hyemalis** (Linn.). OLD-SQUAW.

A common spring and fall migrant and winter resident along the coast, and occasional also inland. In the Connecticut valley, this duck appears to be of not infrequent occurrence in migrations. Mr. W. M. Buswell includes it in a list of birds seen about Charlestown, probably on the strength of two specimens, a male and a female, taken in Marlow, an adjoining town, on April 24, 1883, and now in the collection of the Acworth Public Library. Mr. G. H. Thayer also writes me that it is an irregular fall visitant to Dublin Pond, sometimes occurring in large flocks. Mr. R. H. Howe, Junior, (:02) also instances two birds obtained at Windsor, Vt., farther up the Connecticut. Mr. C. F. Goodhue writes of two taken late in November, about 1891, on the Winnipesaukee River, between Franklin Falls and Tilton. Mrs. Celia Thaxter ('70) states that the fishermen at Isles of Shoals call these birds "Scoldenores."

**Dates:** October to April 24.

**44. Histrionicus histrionicus** (Linn.). HARLEQUIN DUCK.

A rare visitor to the coast in late fall and early winter. Belknap (1792, III, p. 168) mentions it without comment among other New Hampshire birds, and it may have been of more frequent occurrence in his time. Mrs. Celia Thaxter ('70, p. 210) also mentions it among the winter sea fowl at the Isles of Shoals. The only definite record, however, is that given by Mr. H. A. Purdie ('73) of a bird taken at *Hampton*, in November, 1872.

**45. Somateria dresseri** Sharpe. AMERICAN EIDER.

A not uncommon spring and fall migrant and winter resident off the coast. This is the bird commonly known as "Sea Duck."

**46. Oidemia americana** Swains. AMERICAN SCOTER.

An uncommon spring and fall migrant and winter resident

along the coast, and not rare as a migrant in the Connecticut river basin. Mr. William Brewster tells me that off the coast at Rye Beach, scattering birds, no doubt barren, are seen occasionally in summer. In the collection of the Acworth Public Library there are three specimens taken at Alstead, one a male, Oct. 8, 1883, and two females on the 26th of the same month. At Lancaster, farther up the valley, Mr. F. B. Spaulding writes me that on Oct. 12, 1894, two gunners brought in four, 3 males and 1 female, shot from a flock of 8 on Martin Meadow Pond. Mr. R. H. Howe, Junior, ( : 02, p. 10) also adduces a specimen from the Connecticut at Windsor, Vt. Mr. G. H. Thayer finds the bird a rather regular migrant in fall at Dublin Pond, and notes that the greater proportion of the birds are males.

**Dates:** October 8 to April; summer (barren birds).

**47. Oidemia deglandi** Bonap. WHITE-WINGED SCOTER.

A common spring and fall migrant and winter resident on the coast; occasional inland on migrations as at Webster, where it has been noted by Mr. C. F. Goodhue, and Dublin Pond, where Mr. G. H. Thayer assures me it occurs in the fall with the other Scoters. Scattering birds occur off the coast in summer, as noted under the preceding species.

**48. Oidemia perspicillata** (Linn.). SURF SCOTER.

An uncommon spring and fall migrant and winter resident on the coast; rare inland. Occasional specimens are also observed off the coast in summer, these being doubtless barren birds. There is a female in the Acworth Public Library collection, without date, taken at Lempster in the Connecticut valley. Mr. G. H. Thayer states that it occurs in fall on Dublin Pond, but is less often seen than the other two species.

**49. Erismatura jamaicensis** (Gmel.). RUDDY DUCK.

An uncommon spring and fall migrant, and occasional also in summer, though its breeding in the state is yet to be established. There are two summer records for the southern part of the state: *Newfound Lake*, where on July 11, 1901, a fine adult male was shot by Mr. R. H. Howe, Junior, ('01, p. 27) and is now in

the collection of Camp Pasquaney, Bridgewater; *Rye Beach*, where, as recorded by Mr. G. S. Miller, Jr., ('91, p. 118), an adult female in worn breeding plumage was taken on August 22, 1879. The bird is in the collection of Mr. William Brewster. Although the latter specimen may have been an early migrant, Mr. Miller is inclined to think that it had not come from any great distance, as he had found an adult female still accompanied by young in Massachusetts on Aug. 11, 1890.

**Dates:** Spring. July 11; August 22 to October 28.

**50. Chen hyperborea** (Pall.). Lesser Snow Goose.

A rare and irregular fall migrant. In Belknap's time it may have been more common and his "White Goose, **Anas erythropus,**" (1792, III, p. 167) was probably this species. Mr. A. A. Eaton writes me that a flock of six was seen at Seabrook in 1895 or '96, but the only actual capture of the bird that I can instance is of a young male taken October 2, 1896, at *Lake Umbagog*, as recorded by Mr. William Brewster ('97) in whose possession the bird was stated to be.

**51. Chen cærulescens** (Linn.). Blue Goose.

A casual visitant from the interior. Belknap (1792, III, p. 167) mentions the "Bluish Goose, **Anas cærulescens,**" without comment in his list, but it is of course a question as to what this record may refer. The only authentic record is at *Lake Umbagog*, where Mr. William Brewster ('97) states that an immature bird was taken on October 2, 1896, the specimen coming into his possession less than an hour after its death.

**52. Branta canadensis** (Linn.). Canada Goose.

A common spring and fall migrant. According to a writer in the Forest and Stream (vol. 22, p. 386) a pair was killed in the Merrimack river at Concord, on June 2, 1884, which, barring the possibility of these having been tame birds, is an unusually late date. During migrations flocks of these birds not infrequently alight on ponds and lakes, in both spring and fall.

**Dates:** March 11 to April; October to December 7.

**53. Branta bernicla** (Linn.). Brant.

Although probably a not uncommon spring and fall migrant

on the coast, it is only casual inland, the single record being that given by Mr. Ned Dearborn ('98, p. 8) on the authority of Mr. C. F. Goodhue, who writes me that a bird was shot late in November about 1891, on the *Winnipesaukee River* between Franklin Falls and Tilton. The specimen is still in Mr. Goodhue's mounted collection.

**54. Olor columbianus** (Ord). WHISTLING SWAN.

Years ago this bird was doubtless of regular and not uncommon occurrence, but it is now only accidental in migrations. There is but a single definite record: at *Seabrook*, where according to Mr. William Brewster ('79a) a male in immature plumage was shot on October 18, 1878, by a gunner while lying off shore in a dory. Regarding the Trumpeter Swan, *Olor buccinator*, which is also believed to have formerly occurred in New England, it is interesting to recall the quaintly phrased statement of Belknap (1792, III, p. 166) that "naturalists have different opinions respecting the music of the swan. The tame swan of England is said to be silent; and Dr. Goldsmith seems to think the accounts of the music of the wild swan fabulous. What is deemed fabulous in Europe, is often realized in America. It is certain that our swan is heard to make a sound resembling that of a trumpet, both when in the water and on the wing." These remarks may very likely have had reference to *Olor buccinator*.

**55. Plegadis autumnalis** (Hasselq.). GLOSSY IBIS.

An accidental visitant from the south. There is but a single record: *Alton*, near Lake Winnepesaukee, "an old bird, in full plumage" taken in October, 1858, by Dr. Charles Palmer, in whose collection it was said to have been in 1872. The bird was first recorded by Dr. J. A. Allen ('69–'70, p. 637) and this record was later supplemented by Dr. Palmer ('71, p. 120). Many writers on New England ornithology have mentioned this specimen and it figures also in Mr. Dearborn's list ('98, p. 8). This specimen was incorrectly recorded as "Wood Ibis (*Tantalus loculator*)" in Forest and Stream (vol. 7, p. 325).

**56. Botaurus lentiginosus** (Montag.). AMERICAN BITTERN.

A not uncommon summer resident of the fresh-water marshes throughout the state. Its habit of breeding on the floating islands of grass at Lake Umbagog was described by Mr. C. J. Maynard ('72). In the Saco valley at Intervale, the bird is present in small numbers during late summer, keeping to the grass grown marshes and little brooks on the meadows. Mr. S. A. Shaw ('85) records a specimen obtained at Hampton, on December 11, 1881, and states that one wing had been broken, but was entirely healed.

**Dates**: March to November (December 11).

**57. Ardetta exilis** (Gmel.). LEAST BITTERN.

A rare summer resident in the extreme southern part of the state. This bird barely reaches our southern border, and finds the northern limit of its range well within the Transition zone. Mr. C. F. Goodhue is quoted in Mr. Ned Dearborn's '98 list as saying that he is quite sure it has been taken at or near Bradford, and Mr. Dearborn also states that it has been reported from the vicinity of Hanover. This report is presumably that given in "A List of the Vertebrates found within thirty miles of Hanover, N. H.," 1891, a list which, though admirable in concept, must unfortunately be used with some caution, and its statement that the Least Bittern is a "not rare summer resident" certainly should be carefully confirmed. The only trustworthy records that I have obtained for the bird in this state are: *Hampton Beach*, a specimen taken in 1869, is in the mounted collection of the Boston Society of Natural History; *Seabrook*, where Mr. A. A. Eaton assures me he has seen a specimen killed in town, and in the possession of Mr. Isaac George. Samuels ('67, p. 404) says that it has been found to breed in all the New England states, but I have found no actual breeding record for New Hampshire.

**58. Ardea herodias** Linn. GREAT BLUE HERON.

A rather common spring and fall migrant and summer resident. Doubtless many of the individuals now seen in summer

are not breeding birds, but formerly there were rookeries known in a number of places in the state. Thus Mr. C. F. Goodhue ('77, p. 146) records the bird as having bred at Webster prior to 1877, and Samuels ('67, p. 402) tells of a heronry in a hemlock swamp at Errol, on a small branch of the Androscoggin, where nests with partly grown young were found about June 25th. Still more recently Mr. Edward A. Preble writes me of a small colony which bred 15 years ago at a spot among the Ossipee Hills, two miles northwest of Dan Hole Pond. "Upwards of 100 nests were occupied within an area of about an acre. These were placed mostly in large beeches, one of which held 6 or 8 nests." The birds fished at Dan Hole Pond, where they obtained pickerel. A gang of sawmill hands broke up the colony in 1888. Mr. Ned Dearborn ('98, p. 9) adduces a recent instance from Belknap and Merrimack Cos., where a pair nested "in an old growth of pine situated in a large swamp. The young ones were supplied with food from a pond nearly two miles away." My friend, Mr. H. C. Sargent, also writes me that on May 26, 1901, he discovered a small rookery about a mile and a half east of Chocorua, on a slope near two ponds. The young birds were apparently hatched, and about a dozen nests were observed. In the White mountains a few of these birds usually appear in the Saco valley, singly or rarely in pairs, about the first of August, and often the same birds seem to stay about in one locality for a number of days, feeding along the brooks and ponds. Doubtless there are secluded spots where they yet breed among the White mountains, and after the young are off they seek the valleys for a season, where food is easily accessible. Individuals are apt to be seen in suitable localities throughout the state during all the summer months. Occasionally one or two birds seem to linger late in the season as long as there is food and open water to be found. Thus Mr. H. C. Sargent writes me of a bird which was shot by a resident near Chocorua on December 21, 1900. The man found the bird in his yard, standing in eighteen inches of snow, when he first went out in the morning. Mr. V. D. Lowe observed one at Randolph on December 31, 1901.

**Dates:** April 5 to November 6 (December 31).

**Note: Ardea egretta** Gmel. AMERICAN EGRET.

Belknap (1792, III, p. 169) mentions a White Heron among the birds of the state, and Mrs. E. E. Webster recently writes me of a bird observed on May 18, 1901, at Franklin Falls, "feeding on a wet meadow bordering the Merrimack River," which must have been an Egret. It was seen by several persons and remained in the vicinity two or three days. An unequivocal instance of its occurrence in the state is yet to be cited, however.

**59. Ardea cærulea** Linn. LITTLE BLUE HERON.

An accidental visitant from the south. The only record is of a bird killed in *Amherst*, April 28, 1897. It was brought to Mr. James P. Melzer, who states ('97) that it was "in perfect plumage, with maroon neck."

**60. Ardea virescens** Linn. GREEN HERON.

A not uncommon summer resident about the lakes and water courses of the southern part of the state, becoming rarer in the central regions. It is a bird of the Transition zone, and seems to occur regularly about as far northward in New Hampshire as do the white oaks. Mr. E. A. Preble informs me that he has observed it occasionally in summer at Ossipee along the Beech River, but it appears not to occur farther up in the region, as Frank Bolles did not mention it from Chocorua, nor have I any knowledge of its presence at Intervale, in the Saco valley. The bird is also apparently quite absent from the Franconia region, though doubtless a few do work up the Connecticut valley to about this latitude. Mr. F. B. Spaulding of Lancaster writes me that on June 6, 1897, while near the Connecticut at that place, in company with Judge J. N. Clark, a bird flew over which the latter gentleman pronounced to be "unmistakably a green heron." Mr. Spaulding had never met with the bird there previously. Farther south, along the Connecticut in the vicinity of Walpole, I have found the bird not uncommon, and it is rather common at Newfound Lake (Howe, :01, p. 27).

**Dates:** Last of April to October,

**61. Nycticorax nycticorax nævius** (Bodd.). BLACK-CROWNED NIGHT HERON.

A not uncommon summer resident near the coast, but less

common inland. It appears to penetrate the interior of the state by following up the water ways even to the foot of the White Mountains. At Dublin Lake, Mr. G. H. Thayer writes me that it is an irregular visitant, not known to breed. In the Merrimack valley, Mr. C. F. Goodhue has found it rarely near Webster, and still farther up, it has been recorded from Newfound Lake in summer (Howe, :01, p. 27). A number appear to work up the Saco valley through Maine, and thus reach the White Mountain region. At Chocorua, Frank Bolles ('93a, pp. 36 & 128) states that a few are found late in summer and instances a flock of ten which remained for two or three days in the neighborhood, one August. At Intervale, I have seen and heard occasional birds on the Saco meadows in the months of June, July and August and have attributed to these birds the two or three large stick nests which I have found nearly every year high up in some large white maples by the water's edge, though doubtless the young, if such there had been, were already grown by the time I arrived (late June). In the Connecticut valley, neither Mr. W. M. Buswell of Charlestown, nor Mr. F. B. Spaulding, of Lancaster, have met with the bird, though doubtless a few do penetrate so far up perhaps as the latter station, and Mr. R. H. Howe, Junior (:02, p. 11) gives it as occurring in the Connecticut valley at Windsor, Vt., and at St. Johnsbury farther north in that state. Certain it is, however, that over the greater part of central, western, and northern New Hampshire it is absent.

**Dates:** April to October.

### 62. **Grus mexicana** (Mull.). Sandhill Crane.

This bird is supposed to have occurred as a migrant in New England at the time of the first settlement of the country. Several of the early writers on this region mention what seem to have been cranes, and among them Belknap (1792, III, p. 169) lists the "Crane, *Ardea canadensis*," as of the birds occurring in New Hampshire. The only actual record for the state appears to be *Wakefield* at Lovell's Pond, where Mr. William Brewster (:01) states that he is informed by Mr. Ned Dearborn, a specimen was obtained in 1896 or 1897. Mr. Dearborn first

saw the specimen at the shop of Mr. J. S. Turner, a taxidermist at Portsmouth, to whom it had been sent in the flesh in a fresh condition. Mr. Dearborn has purchased the specimen and it is now preserved at the State Agricultural College at Durham. The presence of the bird in the state is of course quite fortuitous at this time.

### 63. **Rallus virginianus** Linn. Virginia Rail.

A local summer resident of the Transition regions, and perhaps not so rare as the few records might seem to show. The following are the only instances which have come to my notice: *Hampton*, a bird seen and its nest, containing eight eggs, found May 28, 1887, and another bird found dead under some telegraph wires by Mr. S. Albert Shaw ('87); *Hampton Falls*, Mr. W. E. Cram gives it as a summer resident; *Hollis*, Dr. W. H. Fox writes that it is a rare summer resident; *Marlow*, there is a specimen in the Acworth Public Library, taken October 1, 1881; *Lancaster*, Mr. F. B. Spaulding writes me that several years ago a boy found a nest containing about ten eggs on a low meadow near the Connecticut, and that Capt. B. F. Goss identified the eggs as of this species. This is the only record I have obtained for the northern part of the state. *Webster*, Mr. C. F. Goodhue has found it rarely and does not know of its breeding.

**Dates:** April to October 1.

### 64. **Porzana carolina** (Linn.). Sora.

An uncommon and local summer resident in the Transition area. I have found it in summer in a certain sedgy bog at North Conway, and on July 13, 1897, at Intervale, I several times started a single bird from the short grass of a flooded hayfield on the Saco meadows during a sudden and extensive freshet. Doubtless the birds breed in the vicinity. What may have been an early migrant was seen at Intervale by a brook on the meadows, August 26, 1898. Mr. W. E. Cram finds it in summer at Hampton Falls. In migration Mr. William Brewster has found it not uncommon in fall at Rye Beach.

**Dates:** May to October.

**65. Fulica americana** Gmel. AMERICAN COOT.

A rather rare autumnal migrant, occurring in the Connecticut valley and in the lake region of the south-central part of the state.

**Dates**: September to October 8.

**66. Crymophilus fulicarius** (Linn.). RED PHALAROPE.

This species, like the next, is found in migration off the coast well out to sea, but occasionally inland, whither it is probably driven by storm. In May, 1892, great numbers of Red and Northern Phalaropes were observed at various points along the New England coast, and among others at the Isles of Shoals, where, according to Mr. Bradford Torrey ('97, p. 392) thousands were observed by Mrs. Celia Thaxter, "in great flocks that wheel and turn, and, flying in long masses over the water, show now dark, now dazzling silver as they careen". These flocks probably included the two species, as was the case elsewhere. Mrs. Thaxter had noted the birds the year before at the Isles of Shoals. Mr. F. B. Osgood records ('91, p. 9) having "put up a flock of a dozen or so in the middle of Lake Umbagog."

**67. Phalaropus lobatus** (Linn.). NORTHERN PHALAROPE.

An abundant spring and fall migrant offshore, casual inland. Mr. R. I. Brasher ('94) records meeting with "numerous flocks" some twenty miles off the New Hampshire coast, on August 9, 1893; they disappeared as land was sighted. Mr. W. C. Prime ('89) has twice observed the bird in the Franconia Mountains. In the first instance, the single individual was not captured, but was observed at very close range in September, about 1884, as it swam on the waters of Profile Lake, feeding on the multitudes of winged ants drowned on the surface. The second instance was on September 22, 1888, when a single bird was knocked over with a short stick on Lonesome Lake (about 3,000 feet altitude). It was quite fearless, and was feeding on the seeds of sedges which grew at the margin of the lake.

The great abundance of Phalaropes at the Isles of Shoals in May, 1892, has been mentioned under the preceding species.

**Dates:** May; August 9 to September 22.

**68. Steganopus tricolor** Vieill. WILSON'S PHALAROPE.

A rare migrant to the coast. Baird, Brewer and Ridgway ('84, p. 339) record the bird as "shot by Mr. William Brewster at Rye Beach in the summer of 1872." I am informed by Mr. Brewster that the specimen in question was obtained on Aug. 15, 1872.

**69. Philohela minor** (Gmel.). AMERICAN WOODCOCK.

A not uncommon spring and fall migrant and a less common summer resident throughout the lowlands of the more remote parts of the state. "W. H. B." ('96) records an old bird with a brood of young seen by a Mr. Oliver Dodge "on the south slope of a hill in the town of Brookline, N. H.," on the 13th of March, several years previous, after a rather open winter. Such early breeding seems rather improbable, however. Mr. C. J. Maynard ('72) records that they were found to breed, though not commonly, at Lake Umbagog, where a nest with four eggs was found May 10, 1870. At Intervale, I have observed them not infrequently in summer among the alder swales about the brooks in the valley, and in September, a few are to be found in damp woods up to 1,500 feet.

**Dates:** Last of March to October 17.

**70. Gallinago delicata** (Ord). WILSON'S SNIPE.

A migrant, uncommon in spring and more common in fall near the coast; inland it is generally found only in small numbers, in marshy spots about ponds. At Intervale, in the Saco valley, I have never seen but a single bird, this on Sept. 18, 1897, in a small marsh. A writer in the Forest and Stream, signing himself "W. H. B." ('96) says he has known the bird to winter at Nashua, an occurrence which, though not improbable, must be quite unusual. Mr. William Brewster has observed it at Rye Beach on July 22.

**Dates:** March to May; July 22 to November (Winter?).

**71. Macrorhamphus griseus** (Gmel.). DOWITCHER.

A rather common fall migrant coastwise; a few probably occur in spring, but I have no records.

**Dates:** July 20 to August 25.

**72. Micropalama himantopus** (Bonap.). STILT SANDPIPER.

A rare fall migrant. The single classic record still remains the only published instance of the occurrence of the bird in this state: *Rye Beach*, "no less than ten specimens" were secured by Mr. William Brewster ('72, p. 309) in the Augusts of 1868, 1869. These birds were first recorded in the American Naturalist, Vol. III, p. 639, and have been mentioned by many writers since that time. Mr. Brewster has kindly given me the dates of capture of eight specimens at Rye Beach, as follows: Aug. 20, 1868, one shot; Aug. 24, 1869, one shot; July 31, 1871, one shot; Aug. 9, 1871, one shot; Aug. 11, 1871, two shot; Aug. 24, 1871, one shot; Aug. 25, 1871, one shot.

**Dates:** July 31 to August 25.

**73. Tringa maculata** Vieill.. PECTORAL SANDPIPER.

A rather uncommon fall migrant inland about the marshes and larger bodies of water; common also as a coastwise migrant.

**Dates:** July to October 10.

**74. Tringa fuscicollis** Vieill. WHITE-RUMPED SANDPIPER.

An uncommon migrant. Mr. William Brewster tells me that he found it not uncommon at Rye Beach in July and August in former years, while inland it has been taken at Lake Umbagog, according to Mr. H. Merrill ('82) who records a specimen "shot about Oct. 2," and "two others upon Oct. 14," 1876, by Mr. N. C. Brown.

**75. Tringa bairdii** (Coues). BAIRD'S SANDPIPER.

A rare fall migrant on the coast and at Lake Umbagog. The records are: *Lake Umbagog*, one obtained "on a mudflat at the foot" of the lake, Sept. 1, 1875, by Mr. William Brewster

('76a, p. 19), and one shot on the mudflats at the mouth of Cambridge river, Sept. 4, 1880, and two others, a male and a female, at the same place on the following day (Brewster, '81a, p. 60); *Rye Beach*, two were shot on August 26, 1880, by Mr. H. M. Spelman ('81 b). One of these birds was in company with "a large flock of peeps."

**Dates**: August 26 to September 5.

**76. Tringa minutilla** Vieill. LEAST SANDPIPER.

A very common migrant in spring, late summer and fall, on the coast, and to a less extent inland, where it occurs about the larger bodies of water. Mr. F. W. Batchelder (:00, p. 125) records this bird at Manchester, June 3 and July 10, and asks thus if it may not be a summer resident; on the contrary, these dates probably represent the end of the spring migration and the beginning of the fall migration respectively.

**Dates**: Last week of May to June 3; July 10 to September.

**77. Tringa alpina pacifica** (Coues). RED-BACKED SANDPIPER.

An uncommon migrant on the coast. A few should occur in spring, but my only records are in fall, when the bird is commoner.

**78. Ereunetes pusillus** (Linn.). SEMIPALMATED SANDPIPER.

A very common spring and fall migrant coastwise, and also not uncommon in fall as a migrant along the shores of the larger bodies of water, as at Lake Umbagog (Brewster, 81a, p. 61), Dublin Lake (Thayer, *in litt.*) and Ossipee Lake (Preble, *in lit.*)

**Dates**: May; July to September.

**79. Calidris arenaria** (Linn.). SANDERLING.

A common spring and fall migrant on the coast. Mr. William Brewster noted it as common at Rye Beach after August 2.

**80. Limosa fedoa** (Linn.). MARBLED GODWIT.

An accidental visitant. Mr. William Brewster permits me to

record a specimen shot at Rye Beach, Aug. 27, 1868, by a local gunner. Mr. Brewster examined the specimen shortly after its death.

**81. Totanus melanoleucus** (Gmel.). GREATER YELLOW-LEGS.

A common spring and fall migrant on the coast, but uncommon inland, where it is of occasional occurrence about the larger bodies of water and in the Connecticut valley. Mr. R. H. Howe, Junior ( : 01, p. 27) records an early specimen at the head of Newfound Lake, July 17, 1901. Both Mr. F. B. Spaulding at Lancaster and Mr. W. M. Buswell at Charlestown in the Connecticut river valley, find the bird occasionally on migrations, and Mr. G. H. Thayer writes me that it is not infrequent at Dublin Lake in fall.

**Dates:** May; July 17 to October 7.

**82. Totanus flavipes** (Gmel.). YELLOW-LEGS.

An uncommon spring, and common fall migrant on the coast. Rather rare inland; Mr. C. J. Maynard ('72) gives it as "not a common summer visitor" at Lake Umbagog, 30 years ago, and Mr. Ned Dearborn ('98, p. 10) records a single bird observed Aug. 20, 1889, at Alton.

**83. Helodromas solitarius** (Wils.). SOLITARY SANDPIPER.

A common spring and fall migrant, and possibly a rare summer resident. No conclusive proof has yet appeared to show that the bird nests in the state, though Baird, in Baird, Brewer and Ridgway's "Water Birds" ('84, p. 282), says, "Early in August, 1878, I noticed a pair of this species with a brood of four young hardly able to fly, near an open reservoir of rain water, on Appledore, Isles of Shoals. These were too young to have come to that island over the water, the distance being nine miles; and that this brood could have been hatched on that rocky and treeless island seems very improbable. They were in company with, yet holding aloof from, several pairs of *Tringoides macularius* [*Actitis macularia*]." Doubtless occasional barren birds remain about ponds throughout the breeding season in favored

localities. Thus Mr. C. F. Goodhue writes me of one which he observed in June, feeding about a small pond near the summit of South Kearsarge Mountain, and Mr. G. H. Thayer writes that he has repeatedly observed them in the breeding season on a small wood pond at an elevation of about 1,580 feet at the northeastern end of Mt. Monadnock. About the last of July the migrating birds appear rather commonly along the waterways and ponds, and usually spend the day quietly feeding. During the last week of August, 1897, I several times found as many as 13 or 14 birds congregated about a small drain at Intervale, to feed, but when closely approached, they would fly off one or two at a time in different directions. In early September, I have occasionally seen single individuals about the little lakes in Carter Notch, at 3,360 feet. Here they would remain all day, feeding along the shore, and pass on southward after dark, sometimes calling loudly as they departed. Occasionally, too, I have seen single birds in the latter part of a summer afternoon, with steady graceful flight, passing southward down the Saco valley. Mr. C. J. Maynard ('72) has noted a single bird at Errol, in the northern part of the state, so late as "November 1st, 1869, when the ground was covered with snow and the ponds were partly frozen."

**Dates**: May 9 to June; July 17 to November 1.

**84. Pavoncella pugnax** (Linn.). RUFF.

An accidental visitant from the old world. The bird is included here on the strength of a female obtained by Mr. William Brewster ('76a) on September 8, 1874, while it was "flying on the marshes at the mouth of the Cambridge river," which is nearly on the boundary line between New Hampshire and Maine, at the southern end of Lake Umbagog.

**85. Bartramia longicauda** (Bechst.). BARTRAMIAN SANDPIPER.

Formerly a common summer resident of the upland fields and pastures in the southern and central parts of the state, and a common spring and fall migrant. Of late years, however, it has become scarce or has entirely disappeared from its old lo-

calities. Mr. Ralph Hoffmann informs me that a few still summer at Alstead, and Mr. G. H. Thayer writes that it breeds regularly but in small numbers in the northwestern corner of Cheshire County. Mr. C. F. Goodhue has also found it breeding at Webster. North of Lake Winnipesaukee, I have no record of its occurrence as a breeding bird. In the Howe-Shattuck collection there is a male (No. 1753) taken on its breeding grounds, July 13, 1891, by Mr. W. H. Phelps at New London.

**Dates**: May to September.

**86. Tryngites subruficollis** (Vieill.). BUFF-BREASTED SANDPIPER.

A rare fall migrant on the coast. Baird, Brewer and Ridgway ('84, vol. I, p. 306) record its capture at Rye Beach by Mr. William Brewster, who tells me that he shot one on each of the dates Aug. 25 and Aug. 28, 1871.

**87. Actitis macularia** (Linn.). SPOTTED SANDPIPER.

A rather common summer resident, of general distribution along the larger water courses and about the lakes and large ponds. Dr. A. P. Chadbourne ('87, p. 103) records seeing a single bird on July 8, 1886, in the Great Gulf, Mt. Washington, on the west branch of the Peabody river, at about 3,100 feet altitude. It must be only exceptionally that this bird ever penetrates the forest brooks to this height. Mr. F. B. Spaulding records ('98b) a nest containing the unusual number of five eggs, at Lancaster.

**Dates**: May 1 to October.

**88. Numenius longirostris** Wils. LONG-BILLED CURLEW.

A rare fall migrant until recent years; now accidental. Mr. William Brewster observed single birds at Rye Beach on Aug. 25, 1871, Aug. 12 and 17, 1872.

**89. Numenius hudsonicus** Lath. HUDSONIAN CURLEW.

An uncommon migrant. Mr. William Brewster noted it at Rye Beach in former years between August 6 and September 2.

**90. Squatarola squatarola** (Linn.). BLACK-BELLIED PLOVER.

A [spring] and fall migrant on the coast. Mr. William Brewster noted it as rather common in August, at Rye Beach, some years ago.

**91. Charadrius dominicus** Mull. AMERICAN GOLDEN PLOVER.

A rare fall migrant. According to "Samourai" ('76, p. 102) they appeared at Rye Beach in 1876 on September 14. Mr. William Brewster tells me of four specimens noted at Rye Beach as follows: Aug. 26, 1868, two seen, one of which was shot; Aug. 29, 1868, one seen; Aug. 27, 1871, one shot.

**92. Ægialitis vocifera** (Linn.). KILDEER.

Formerly a rare migrant. Mr. William Brewster observed one at Rye Beach on Aug. 31, 1868, and two at the same place on Aug. 4, 1871. Though probably still of occasional occurrence as a migrant on the coast, the only other records which I have, are of its casual appearance. Thus in the midst of the great storm of November 25, 1888, as writes Dr. A. P. Chadbourne ('89, p. 258), quoting a letter from Mrs. Celia Thaxter, they appeared at the *Isles of Shoals* (as elsewhere along the New England coast) in great numbers. "After the storm the birds gradually disappeared, except a few that remained at favorable points for a long time." Mr. Bradford Torrey writes ('89, p. 275) that he was assured by Mrs. Thaxter that some of these birds remained at the Isles of Shoals until the last week of February, 1889. A second accidental record is of a bird shot at *Jefferson*, to the north of the White Mountains, in December, 1893. Mr. F. B. Spaulding, to whom I am indebted for this record, states that the bird was in a very emaciated condition and evidently unable to proceed farther.

**93. Ægialitis semipalmata** Bonap. SEMIPALMATED PLOVER.

A spring and fall migrant, common coastwise, but less common in fall on the shores of the larger lakes and ponds.

**94. Colinus virginianus** (Linn.). Bob-white.

A rather rare permanent resident of the Transition valleys of southern New Hampshire. Owing to the great numbers of these birds which have been introduced into New England from the south in recent years, it is now impossible to say what proportion, if any, of those at present found, are native bred. That southern New Hampshire is a part of the bird's natural range, is evident, however, as that careful chronicler, Belknap (1792, vol. III, p. 170) mentions it over a century ago, as a bird of New Hampshire. Mr. C. F. Goodhue ('77a, p. 146) also gives it as a rare resident at Webster in the '70's. Our severe winters appear to keep the birds in check, notwithstanding the frequent restocking. The repeated failure of southern birds to survive the cold seasons is hardly to be wondered at, when even the native birds, inured by long years of natural selection to the northern climate, can barely hold their own on our southern border. During the summer of 1899, I thrice observed a single bird in the Saco valley at Intervale, though it is highly improbable that it was other than an introduced specimen which had been loosed in the neighboring region. I know of none having been observed in the locality before or since.

**95. Canachites canadensis canace** (Linn.). Canadian Spruce Grouse.

A not uncommon permanent resident of the spruce and balsam forests of the upper Canadian region, in the northern part of the state, and along the higher peaks of the White Mountains. It occurs on the Presidential Range in small numbers and seems less common there than on the Carter-Moriah Range, where at least one or two are almost sure to be seen in a few hours' walk. On these mountains, it inhabits the rich, damp belt of balsams and spruces from about 3,000 feet (on the southern exposures) to the upper limit of the tree growth, at 4,800 to 5,000 feet. It also occurs in small numbers on the Twin Mountains, on Moosilauke (4,810 ft.) and on the higher peaks of the outlying Sandwich Range, as on Passaconaway (4,116 ft.) where it was recorded by Bolles ('93b, p. 155) "in the autumn,"

and on Tripyramid (4,184 ft.) where Mr. F. H. Allen saw two in June, 1894, and Mr. R. W. Gray one on Aug. 6, 1899; one was also seen by Mr. Allen on Mt. Osceola (4,352 ft.) in the early part of the summer of 1898. In the primeval forest of the East Branch of the Pemigewasset, on August 4, 1902, I observed a single bird in a thick balsam swamp so low as 2,000 feet, and another was seen the day previous at about 4,000 feet on a spur of Mt. Hancock. There seems to be no movement of these birds toward the valleys even in severe winter weather. Mr. C. J. Maynard ('72) speaks of the bird as common thirty years ago at Lake Umbagog, where eggs were taken in the latter part of May, and young seen on June 15. On the Carter Range, I saw, on July 24, 1899, an adult female, in company with a young bird, hardly larger than a Bob-white, but able to fly readily. Two full grown young were seen together on the same range, Sept. 14, 1900. The crop of a fine male shot on this range in 1901, was found to contain a quantity of balsam needles.

**96. Bonasa umbellus togata** (Linn.). CANADIAN RUFFED GROUSE.

A rather common permanent resident of general distribution, being found throughout all the wooded country from the Transition valleys to the upper limit of scrub growth on the White Mountains.

Typical examples of *B. umbellus umbellus* apparently do not occur in New Hampshire. Birds from the southeastern portions of the state are usually more or less intermediate, but nearer *togata*. Specimens which I have seen from the White Mountains seem quite typical of the northern bird, and as stated by Mr. William Brewster ('95, p. 406, foot-note) "the dark gray birds which inhabit the primitive coniferous forests of northern Maine and New Hampshire and western Massachusetts are all nearly, or quite typical representatives of *togata*."

From year to year, their numbers are subject to more or less variation according as the season is favorable or not. Entire broods remain together throughout the breeding season, and until well into the fall, wandering about in the woods, and becoming quite fat on a diet of various berries, leaves, and buds.

In the crops of different birds I have found, in early fall, bits of leaves of *Aspidium spinulosum*, *Populus grandidentata*, and fruit of the snowberry (*Chiogenes*), blueberry (*Vaccinium*) and white baneberry (*Actæa*). The birds delight to wallow in fine, dry dust in sunny spots in the woods, and hence are often met with along trails, where the sun can reach and dry the ground. Mr. Vyron D. Lowe, of Randolph, writes me that while crossing the Presidential Range in the latter part of winter, in 1900, he found two of these birds frozen to death, away up among the scrub, where, on account of the thick crust, they were unable to burrow into the snow at night. This fact is of interest as showing that they migrate but little from these upper levels, even in the winter season.

**97. Meleagris gallopavo fera** (Vieill.). WILD TURKEY.

Formerly a common permament resident in the southern part of the state, but long since extirpated. Dr. Jeremy Belknap (1792, vol. III, p. 170) writing of the birds of this state, says they "were formerly very numerous. In winter they frequented the sea shore, for the sake of picking small fishes and marine insects, which the tide leaves on the flats. * * * They are now retired to the inland mountainous country." Evidently the birds were nearly extirpated by the early part of the nineteenth century, though Dr. Samuel Cabot ('44, p. 80) states that he "purchased one in the Boston Market, brought from New Hampshire," so late as 1841 or '42.

**98. Ectopistes migratorius** (Linn.). PASSENGER PIGEON.

Formerly a summer resident of great local abundance, but now practically extirpated.

Arriving within our borders during the first week of April in tremendous flocks, they nested in large colonies, at least as far north as the White Mountains proper. E. D. Sanborn, in his History of New Hampshire ('75, p. 159) states that at about 1780, in northern New Hampshire, the air was "black with flocks of pigeons, which were caught in immense numbers, and their meat dried for winter use. The feathers were used

for bedding." Mr. C. F. Goodhue, of Webster, tells me that as a boy, some forty years ago, he remembers seeing great flocks of these birds flying northward in early spring, forming a solid phalanx, with a front of a rod or so broad, and extending to either horizon. They still bred at Webster according to Mr. Goodhue ('77a, p. 113) in the '70's, and I am informed by an old inhabitant of the town of Conway that some forty years ago great numbers nested on the Rattlesnake Range of hills in that township. Dr. W. H. Fox, writes me that they were formerly very common at Hollis in the southern part of the state, and used to be netted extensively in the '70's; one nest was found, and the last flock seen was in 1880. There is a mounted specimen in the Public Library at Acworth, taken at that town, October 10, 1881, and is the most recent specimen from the state that I know of, though Mr. W. W. Flint, of Concord, writes me that the last Passenger Pigeon of which he has any recollection was shot near his house in the summer of 1885, when the birds were already rare.

**Dates:** April 2 to October 10.

**99. Zenaidura macroura** (Linn.). MOURNING DOVE.

A not uncommon summer resident of the Transition country in the southeastern part of the state, along the seacoast and especially in the bottom lands of the Merrimack valley where it is fairly common about Concord and farther up at Franklin. On the coast, Mr. A. A. Eaton writes that it is quite common at Seabrook, nesting in slender pines, and Mr. W. E. Cram notes it as a summer bird at Hampton Falls. Dr. W. H. Fox says it was formerly rare at Hollis, but has since become commoner. In the western part of the state, the bird is only of occasional occurrence in the southern Connecticut valley, where a few probably work up from the south. Thus Mr. W. M. Buswell writes me of having several times seen a bird or two in the spring and early summer of 1898, and again in April, 1899, at Charlestown. Beyond this, I have no information of its presence in the Connecticut valley. Mr. F. H. Allen informs me of a single female seen about the last of June, 1894, so far to the northward as Waterville, on the outskirts of the White Mountains. The bird

was evidently a straggler, as the species appears not to occur regularly north of Lake Winnepesaukee.

**Dates:** Last of March to October.

**100. Carthartes aura** (Linn.). TURKEY VULTURE.

An accidental visitant from the south. It has twice been captured in the state, as follows: at *Hampton Falls*, on the coast, where on the 6th or 7th of April, 1882, a female was shot by Frank Percell. This specimen, which is preserved in the mounted collection of the Boston Society of Natural History, was recorded by Mr. C. B. Cory ('82). Mr. William E. Cram, of Hampton Falls, also writes me that on the 15th of May, 1898, he saw a bird of this species at that town, and that, although he did not shoot it, he had sufficient opportunity to make the identification unquestionable. The second capture of the Turkey Vulture in the state was at *North Weare*, near Concord, where, as I am informed by Mr. C. M. Stark, a bird was found one spring morning, about 1887, by a Mr. Felch, in the latter's hen yard. It appeared unable to fly, and when thrown into the air would only flutter to the ground. It was kept for some time by Mr. Stark, and would often wander off to a considerable distance in the fields. Later the bird was given away to a butcher, about whose slaughter house it remained for some time and then suddenly disappeared.

**Note: Elanoides forficatus** (Linn.). SWALLOW-TAILED KITE.

Mr. Ned Dearborn ('98, p. 13) includes this species in his list of birds of Belknap and Merrimack Counties on the testimony of one Geo. Stolworthy, "who states that he saw one in Franklin in 1875. It picked up a snake within one hundred feet from him, where he had a good chance to see it." Dr. W. H. Fox also writes me that on July 4, 1887, a farmer, whom he considered reliable and who was a sportsman, reported to him "a large bird, thought to be a hawk, having a forked tail like a barn swallow. It was seen quite closely as it lit on some alders near the road and remained while he drove by." Though both these cases suggest the bird in question, the evidence does not seem to warrant its inclusion as a bird of the state.

**101. Circus hudsonius** (Linn.). MARSH HAWK.

An uncommon local summer resident, breeding in marshy places. I have never observed it in the breeding season among

the White Mountains, though it is rather common on the meadows of the Saco valley during the migration in August and September. At such times, a single bird will remain in the same neighborhood for several days at a time, evidently finding food plenty, and being in no haste to move southward.

**Dates:** March 16 to November 12.

**102. Accipiter velox** (Wils.). SHARP-SHINNED HAWK

A common spring and fall migrant, and a less common summer resident; in the southern half of the state, a winter resident. Throughout the heavily-wooded parts of New Hampshire, this hawk is of general distribution during the breeding season, occurring well up onto the mountains. In the winter, a few are to be found in the lower part of the state, and Mr. C. F. Goodhue ('77a, p. 113) has recorded them in this season, about Webster. A northerly winter record for this bird is that of one obtained at Tamworth, on December 27, 1898, by Mr. R. W. Gray and now in the Howe-Shattuck collection. Throughout the White Mountain region this is by far the commonest hawk during the fall migration and especially in the months of August and September, when it is to be found, usually singly, from the fertile valley bottoms, through the woods, even to the summits of the mountains, and I have seen a single bird on the rocks near the summit of Mt. Washington, on the 28th of August, 1901. I have not infrequently heard from this bird, a sharp "chip," much like a Phœbe's "chip," and usually given when alarmed or as it starts to fly from the perch on which it may have just alighted.

**103. Accipiter cooperii** (Bonap.). COOPER'S HAWK.

A not uncommon spring and fall migrant and summer resident. It breeds regularly over the greater part of the state, and throughout the lower Canadian region, up to about 3,000 feet on the higher mountains.

**Dates:** March 26 to October.

**104. Accipiter atricapillus** (Wils.). AMERICAN GOSHAWK.

An irregular, though sometimes common visitant in late fall

and winter; rare summer resident. From the White Mountains northward the bird is probably a regular breeder, and Mr. F. B. Spaulding writes that he has found its nest and eggs on the banks of the Connecticut river on the Vermont side opposite Lancaster. South of the White Mountain region, it has been recorded by Mr. Ned Dearborn ('98, p. 14) as having bred at Dunbarton, where, in 1897, a female was shot on her nest, and sent to Mr. Thomas R. Payson, of Northfield, in whose possession the skin now is. Mr. Ralph Hoffmann (:03) writes that on July 21, 1902, he discovered a nest of this species at Alstead, in the southwestern part of the state. It contained two young, nearly full grown, which were already taking short flights by the 29th of July. One of these young birds was shot, and is now in the collection of Mr. William Brewster, of Cambridge, Mass. The nest was placed in a small pine, at a height of thirty-five or forty feet. The migrating birds appear in fall in the lower part of the state about the last of October, and Mr. W. E. Cram, of Hampton Falls, writes me of having seen it there so late in the spring as March 10.

**Dates:** October 25 to March 10; Summer.

**105. Buteo borealis** (Gmel.). RED-TAILED HAWK.

An uncommon, though generally distributed permanent resident of the lower Canadian region, breeding in the well wooded upland and mountainous districts. There is a slight migratory movement on the part of many of these birds, so that they are resident in winter in the southern parts of the state at localities from which they are generally absent in summer. They winter so far north at least as the southern valleys of the White Mountains.

**106. Buteo lineatus** (Gmel.). RED-SHOULDERED HAWK.

An uncommon permanent resident of general distribution at the lower altitudes throughout the wooded areas of the southern and central parts of the state. The bird is apparently rare so far up as the White Mountains. Mr. F. B. Spaulding omits it from a list of birds seen by him at Lancaster, and I have never positively identified it but once at Intervale, where on

August 25, 1898, an immature bird was shot in the Saco valley. On one or two other occasions, however, I am confident that I have observed it there in the month of August. At Chocorua, Frank Bolles ('93b p. 100) records it in August, and it doubtless breeds in that vicinity.

**107. Buteo platypterus** (Vieill.). BROAD-WINGED HAWK.

A fairly common summer resident of the dense mixed woods of the sub-Canadian area. In the White Mountain region and northward, it is the commonest breeding hawk, but in central and southern New Hampshire it is less common except along the ridge of the western part of the state. Dr. W. H. Fox writes me that years ago he found a nest and young at Hollis on the southeastern border. Mr. G. H. Thayer finds it not uncommon about Monadnock, and I have seen it in summer along the range of hills west of Newfound Lake, where, however, it is rare. In the White Mountains it breeds in the woods up to the limit of large tree growth, about 2,500 feet. Like many of the hawks, it shows attachment for a chosen locality, and I have known of a pair at Intervale which nested for several seasons in a large beech tree in the forest. The nest was a huge pile of sticks in a crotch of the tree, and evidently the accumulation of years. Portions of two or three dead garter snakes were found in the nest, which at the time of my visit on July 22, 1898, contained two young birds ready to fly.

**Dates:** April to September 15.

**108. Archibuteo lagopus sancti-johannis** (Gmel.). AMERICAN ROUGH-LEGGED HAWK.

An uncommon fall and winter visitant, sometimes occurring in flights of considerable numbers. Mr. C. F. Goodhue ('85) mentions it in a list of birds observed in winter at Webster, and states that one specimen in black plumage was taken. Mr. Ned Dearborn ('98, p. 15) says that he is informed by a Mr. Henry Osgood of Pittsfield, of a large number that "passed in loose flocks over Catamount Mountain in this town one day late in November, a few years ago. He also has a mounted speci-

men in melanistic plumage that was killed in his vicinity." On the coast, it also occurs in small numbers, and Mr. W. E. Cram of Hampton Falls, who has observed the bird frequently, writes me that he had a good opportunity to watch a pair at his town so late as the 5th and 6th of May, 1895. He adds that they were evidently male and female, both in rather dark plumage, and that he might readily have killed both, but preferred not to.

**Dates:** October to (May 6).

**109. Aquila chrysaetos** (Linn.). GOLDEN EAGLE.

A permanent resident, now become extremely rare and irregular. There appear to be no recent records of the breeding of this bird in New Hampshire, though formerly a few nested regularly in inaccessible localities among the White Mountains. As recorded by Baird, Brewer and Ridgway ('74, vol. III, p. 316) a pair nested for years on the inaccessible Eagle cliff, at Profile Lake among the Franconia Mountains. Repeated efforts were made to reach this nest, but in vain. "In the summer of 1855 a renewed attempt was made to scale the precipice over which the shelving rock, on which the nest stands, projects. A party was formed, and although they succeeded in ascending the mountain, which was never achieved before, they could reach only a point beyond and above, not the nest itself. * * * The party reported a large collection of bones in its immediate vicinity, with other evidences of the accumulated plunder of many years, as well as a plentiful supply of fresh food at the time visited." Nuttall ('32, vol. I, p. 64) mentions that he saw a young bird which had been brought from the White Mountains, where it had been taken from its nest in the month of August. The last breeding record for the state appears to be that of C. A. Hawes ('78) who states that on July 6, 1876, he observed at White Horse Ledge, North Conway, a nest containing two young, partly fledged. He made an unsuccessful attempt to reach the shelf of rock on which the nest was placed, but managed to get sufficiently near to see that the nest itself was about four feet across, and built of large sticks, while all about were scattered feathers, fur and bones. On visiting the locality the following year, he found that the birds were no longer there.

Both H. D. Minot ('77) and Mr. Wm. Brewster ('95) mention having seen the bird soaring high over the summit of Mt. Lafayette. The only recent captures of this eagle in the state are: *Bartlett*, one caught in a fox trap on Feb. 19, 1893, recorded by "Jagare" ('93); *Hollis*, Dr. W. H. Fox informs me that one was shot eight miles west of this town on Sept. 16, 1881; *New Hampshire*, Mr. Ralph Hoffmann writes me that he examined a mounted specimen in the shop of W. E. Balch, a taxidermist at Lunenburg, Vt., and which was said to have been taken in the state. Mr. Balch, on my inquiry, tells me that it was sent to him on Oct. 9, 1899, from New Hampshire.

**110. Haliæetus leucocephalus** (Linn.). Bald Eagle.

An uncommon summer resident in the central and northern parts of the state, and occasional at all seasons in the southeastern section. It is generally to be found during the summer in small numbers about the larger lakes, as at Umbagog, where, however, Mr. Wm. Brewster ('95, p. 386) does not believe it now nests. Mr. Ned Dearborn ('98, p. 15) finds the bird also along the shores of Lake Winnipesaukee and the river that drains it, and makes the interesting observation that "they usually roost in the same place as long as they remain in a single locality, and if there are several in the neighborhood, they generally assemble at nightfall to spend the night together." Doubtless these are not breeding birds. At Newfound Lake, however, is a fine pair of old birds, which probably nests on the mountains near, and returns yearly to the lake to summer; indeed, the residents say that there has not been a summer for generations, that has not seen a pair of the big birds sailing over these waters. Mr. Vyron D. Lowe, of Randolph, a keen woodsman, tells me that a pair of Bald Eagles has summered for perhaps 25 years on the Presidential Range of the White Mountains, and that until seven years ago, or thereabouts, the nest was nearly at timber line on Mt. Adams, but that some one robbed it, and the birds have left the site, though he still sees them on the range at intervals during the summer; in 1902, Mr. Lowe first saw the birds on March 23d. On the coast, a few birds winter, and a specimen is recorded in the Or-

nithologist and Oologist ('82) captured at Portsmouth, Jan. 27, 1882; Mr. F. H. Allen also saw one on Feb. 2, 1900, from the cars while passing through the southeastern part of the state. Mr. W. E. Cram has observed it the year round at Hampton Falls. Inland, the first migrants appear early in March, and I am informed of a fine adult bird seen by Mrs. E. E. Webster at Franklin Falls, not far south of Lake Winnipesaukee on March 3, 1900, there being still two feet of snow on the ground.

**Note**: **Falco islandus** Brunn. WHITE GYRFALCON.

Mr. C. J. Maynard ('72) states that he saw what he is certain was a bird of this species, flying high above him as he was crossing a mountain pass in Errol, on Nov. 5th, 1868. While the chances are in favor of the bird having been a Gyrfalcon, the identification cannot be considered sufficiently positive to warrant inclusion in this list.

**111. Falco rusticolus obsoletus** (Gmel.). BLACK GYRFALCON.

A very rare winter visitant. There is but a single record, near *Milford*, one shot in January, 1891. The bird was originally recorded by Mr. J. P. Melzer ('91) as from Milford, Vt., which, as he informs me, was a mistake. It was taken on Lyndeboro Mountain, a range of hills which runs through the towns adjoining Milford, N. H. Mr. Wm. Brewster ('95, p. 480) records the locality correctly.

**112. Falco peregrinus anatum** (Bonap.). DUCK HAWK.

An uncommon local summer resident. A number of places are known to which a pair of these birds has returned year after year to nest on the same cliff, a notable instance being the pair at Eagle Cliff in the Franconia Mountains which appears to have held possession for a number of years succeeding the desertion of the site by the Golden Eagles. Mr. Ned Dearborn ('98, p. 16) mentions a place near Alexandria where the birds were reported to be seen, and young in the latter part of the summer. At Humphrey's Ledge, a high cliff rising from the Saco valley at Intervale, a pair has bred for several years. The old birds are noisy during the early part of the summer, and

often are seen soaring high over the river, more like a Buteo than a Falco, and uttering their loud, squealing cries. After the young leave the nest, gravity brings them down to the valley bottom, but they are soon able to fly sufficiently well to keep out of gunshot. The whole family usually disappears soon after the young are strong on the wing, and I have not observed them about their ledge after Aug. 15th. Mr. G. H. Thayer writes me that he usually finds one or two every summer on the higher ridges of Mt. Monadnock, but does not know of their breeding. On the coast, Mr. W. E. Cram notes the bird at Hampton Falls as a migrant in the months of March and April, September and October.

**113. Falco columbarius** Linn. PIGEON HAWK.

A rather rare spring and fall migrant. Dr. A. P. Chadbourne ('87, p. 103) records that one was "seen" in the Great Gulf, Mt. Washington, at about 3,000 feet, on July 8, 1886. The bird was not secured, however, so that the record does not certainly establish the bird's presence in New Hampshire during the breeding season. I have never found it in the fall migrations among the White Mountains, when other hawks are common, and all the many specimens seen or shot have been of other species. Mr. C. F. Goodhue has taken the bird at Webster, however. Amateur local lists of birds usually include this species as a summer resident, where doubtless the Sharp-shinned Hawk is the bird in question.

**114. Falco sparverius** Linn. AMERICAN SPARROW HAWK.

An uncommon spring and fall migrant and a rather rare summer resident of the Transition areas of the state, breeding sparingly in the valley bottoms well up towards the bases of the White Mountains. At Intervale, I have known of but a single pair to nest in the vicinity during ten years' observation; this pair bred for one or two seasons in a large dead tree on the Saco valley meadows, about eight years since. A few appear also in late summer in the migration down the valley. I have seen

there on August 25, 1897, a small family group of three birds, which may have come from no great distance. The fall migrants appear at Intervale during the last week of August and occasional birds are seen through the first half of September. They cross the mountain ranges in migration and two have been noted by Dr. A. P. Chadbourne ('87, p. 104) flying low over the summit of Mt. Clay, of the Presidential Range, on Sept. 2, 1884, and "the next day another came sailing down from above and disappeared in Tuckerman's Ravine." Mr. Bradford Torrey also saw one fly close by the summit of Mt. Washington (6,290 feet) about the 28th of August, 1901.

**Dates:** March 15 to October.

**115. Pandion haliaetus carolinensis** (Gmel.). AMERICAN OSPREY.

A rather common spring and fall migrant along the coast and on the larger streams and lakes; also a rare summer resident. According to Mr. C. J. Maynard ('72), they used to breed at Lake Umbagog. In the fall migration, they appear with more or less regularity during the last week of August about the lakes and streams. Dr. A. P. Chadbourne ('87, p. 104) has recorded one which flew a few yards over his head on Mt. Jefferson, Sept. 2, 1884, elevation about 5,500 ft. As with other hawks, they appear often to cross these high ranges, instead of keeping altogether to the valleys.

**Dates:** April; Summer; August 25 to November 1.

**116. Asio wilsonianus** (Less.). AMERICAN LONG-EARED OWL.

A rather rare resident. All the records which I have for this species are from localities in the southern and central part of the state. I have never seen it in the White Mountains.

**117. Asio accipitrinus** (Pall.). SHORT-EARED OWL.

Rare, occurring only as a migrant so far as known. Mr. C. F. Goodhue has found it very rarely at Webster, and Mr. J. P. Melzer writes me that he has mounted perhaps twenty specimens killed in recent years about Milford.

**Dates:** April; November.

**118. Syrnium nebulosum** (Forst.). BARRED OWL.

A permanent resident throughout the wooded region of the state, and without doubt our commonest owl. In the White Mountains, where other species of owls seem generally rare, it is fairly common and of general distribution throughout the sub-Canadian woodlands up to about 3,000 feet. Frank Bolles' account ('90) of his pet Barred Owls taken from the nest at Chocorua, on June 1, 1888, contains much of value and interest. He found these Owls much given to sunning themselves sleepily during the morning hours, and often, while in the woods, could call up a bird by imitating its notes. Although doubtless this is a strictly resident species, one always is more apt to see them in fall than at other times. There is probably some slight migratory movement, as the young birds move off, or the older birds change station occasionally.

**119. Scotiaptex cinerea** (Gmel.). GREAT GRAY OWL.

A rare winter visitant. Mr. G. H. Thayer writes me that there is a mounted specimen in the possession of a farmer at *Chesham*, which was taken some years ago in late autumn, in the heavy woods to the northwest of Mt. Monadnock. Mr. James P. Melzer writes that he has had two or three brought in for mounting in years past, from about *Milford*. My friend, Mr. V. D. Lowe, of Randolph, has also described to me an owl taken in late September, 1892, on the Dead Diamond River, a branch of the Megalloway, in Wentworth's Location, which can hardly be other than this species. Mr. Lowe is acquainted with the common owls, and I have no reason to doubt that the bird in question was a Great Gray Owl.

**120. Nyctala tengmalmi richardsoni** (Bonap.). RICHARDSON'S OWL.

A rare winter visitant from the north. The definite records for the state appear to be the following: *Chocorua*, my friend, Mr. H. C. Sargent, permits me to record a specimen which he shot there March 1, 1900, just after an unusually heavy snow storm; *Cornish*, Mr. R. H. Howe, Junior (:02, "Errata") records a specimen taken "in the autumn or early winter about

1890," and in the collection of Mrs. Russell Brewster, of Windsor, Vt.; *Hollis*, Dr. W. H. Fox ('83) records a female shot on Dec. 15, 1879. The weather was mild at the time, and there were about three inches of snow on the ground; *Milford*, Mr. J. P. Melzer writes that he has mounted two or three killed in the vicinity during the last twenty-five years; *Webster*, Mr. C. F. Goodhue has mounted a specimen taken here, a number of years ago.

**Dates:** December 15 to March 1.

**121. Nyctala acadica** (Gmel.). SAW-WHET OWL.

A resident throughout the state, of general distribution, but apparently nowhere common. At Hampton Falls, on the coast, Mr. W. E. Cram finds it the year round; at Hollis, Dr. W. H. Fox saw one in June, 1875, and states that it is rather common there in autumn. Mr. C. F. Goodhue has found it to breed rarely at Webster, and Mr. Ned Dearborn ('98) considers that in point of numbers it comes next to the Barred Owl in Belknap and Merrimack Counties. In the White Mountain region, it is occasional in summer; Frank Bolles ('90, p. 113) records a single bird at Chocorua on July 18, 1889 (?); and Mr. F. H. Allen observed one late in June, 1888, at Campton. Mr. V. D. Lowe, of Randolph, tells me also that he has sometimes heard it in summer on Mt. Adams, about "Perch Camp," 4,400 feet, slightly below the tree limit. At Lancaster, in the upper Connecticut valley, Mr. F. B. Spaulding ('93) has found it nesting on several occasions.

**122. Megascops asio** (Linn.). SCREECH OWL.

An uncommon permanent resident of the Transition regions of the state, following the valley bottoms well up into the White Mountains, where, however, it becomes rather rare. Mr. C. F. Goodhue finds it at Webster, and it is occasional throughout the south-central parts of the state, as at Acworth, Charlestown, Hollis, Keene, Newfound Lake and Peterborough. Farther north, in the central part of New Hampshire, Mr. E. A. Preble writes me that it is fairly common about Ossipee, and yet farther, a pair or two are found nearly every summer at Intervale.

Here they are confined to the river valley, and I know of a pair which nests annually in a large grove of sugar maples by the Saco River, and one or more of the family are often to be found here throughout the summer. On June 18, 1900, I found the brood of four young hardly out of the nest, all sitting erect and motionless side by side on a maple branch, while one of the old birds, in great excitement, flew from tree to tree with weird cries of protest. Mr. F. B. Spaulding writes me that at Lancaster, in the upper Connecticut valley, he has seen it but a few times, and never found it to breed.

**123. Bubo virginianus** (Gmel.). GREAT HORNED OWL.

A rather common resident throughout the well watered forest areas of the state, but apparently rare in the White Mountains themselves. Mr. G. H. Thayer writes me that it is present in small numbers about Mt. Monadnock; Mr. C. F. Goodhue has often had specimens from about Webster, and north of the White Mountains it is not uncommon about the larger lakes and streams.

**124. Nyctea nyctea** (Linn.). SNOWY OWL.

An irregular late fall and winter visitant, sometimes occurring in considerable numbers along the sea coast; accidental in summer. Mr. L. J. Rundlett ('97) has recorded a "full-grown, adult Snowy Owl," shot on the intervale near Concord, July 15, 1897. The previous week had been extremely hot, and the bird is conjectured to have lived in a large ice-house near by, upon the cupola of which it was shot. The sex of the specimen was not determined. Mr. Rundlett informs me that it had been seen a few days previous by some workmen, and that just before it was killed, it had been started from the tall grass, where it may have been searching for mice. This occurrence is, of course, purely accidental. Mr. C. F. Goodhue ('77b) has recorded a specimen killed at Webster so early in the fall as just previous to Oct. 10, 1877. Mr. Ned Dearborn ('98, p. 17) adduces three records for Belknap and Merrimack Counties, and Mr. H. L. Piper informs me of having taken the bird in winter near Rindge; it is not infrequent throughout the Con-

necticut valley in winter, and at Colebrook, a Mr. Norton ('83) records three secured in the flight of 1883–84. There was a considerable flight along the coast during the winter of 1901–02, and several were killed near Portsmouth. In the White Mountains, I have only very rarely known of their presence in winter. Mrs. Celia Thaxter ('70, p. 209) speaks of this owl as a frequent winter visitant to the Isles of Shoals, where it feeds largely upon the numerous rats on the islands. "Several snowy owls," she writes, "haunt the islands the whole winter long. I have never heard them cry like other owls; when disturbed or angry, they make a sound like a watchman's rattle, very loud and harsh, or they whistle with intense shrillness, like a human being."

**Dates**: (October 10) November 3 to March 4; (July 15).

**125. Surnia ulula caparoch** (Mull.). American Hawk Owl.

A rare and irregular visitant in late fall and winter. During the late fall of 1884, an unusual flight of these birds occurred over northern New England, of which Mr. William Brewster ('85) has given an account. During this flight, the birds were noted commonly at Colebrook, and four were shot at Lake Umbagog. The records for the state, so far as known to me, are as follows: *Colebrook*, during the flight mentioned above, Mr. Ned Norton found them common here, and writes ('84b) under date of December 1: "Less than one inch of snow now. Hawk Owls came three weeks ago in greater numbers than ever before. Farmers' sons have been killing them all over the country." The same observer states that on April 20, 1884 ('84a), he observed a Hawk Owl near *Colebrook* with a mouse in its claws. *Lake Umbagog*, four were secured by Mr. William Brewster ('85) during the 1884 flight, on the dates October 25, October 31, November 15 and November 16 respectively. *Meriden*, a specimen in the mounted collection of the Boston Society of Natural History is labeled as having come from near this town. *Milford*, two specimens from this vicinity have been mounted by Mr. J. P. Melzer in years past. *Nashua*, one was taken by a Mr. O. H. Phillips, formerly a taxidermist, near this

place in the late '70's or early '80's, as I am informed by Dr. W. H. Fox, who examined the specimen. *Penacook*, Mr. C. F. Goodhue has mounted one shot here some years ago, and has a mounted specimen shot by him about thirty years ago at *Webster*, where he also shot another bird at about the same time. Mr. Ned Dearborn ('98, p. 18) states that a Mr. George Stolworthy asserts that he mounted one taken in Sanbornton during the breeding season, an occurrence which, if true, is surely quite accidental.

**Dates:** October 25 to April 20.

**126. Coccyzus americanus** (Linn.). YELLOW-BILLED CUCKOO.

A very rare summer resident, barely reaching the south-central parts of the state in the Transition areas of the valley bottoms and the coast. A few of these birds appear to follow up the Merrimack valley for some distance, and perhaps with more regularity than the few records might seem to indicate. Thus Mr. W. W. Flint writes me of one killed a few years ago at Concord, and seen by him, and Mr. Ned Dearborn ('98, p. 18) records a pair seen in a piece of inundated woods at Northfield, farther up the valley, on June 24, 1897, and adds that another was brought in which was found dead, that same season. It is stated by Mr. F. W. Batchelder (:00, p. 127) to be a "rare summer resident" at Manchester, though no definite instances of its occurrence are cited. The most northern record for the state is that given by Mr. R. H. Howe, Junior, (:01, p. 35) of an adult female shot on July 4, 1900, at the head of Newfound Lake. The bird may very well have followed up the Merrimack and Pemigewasset valleys to this point. The same author (:02) records its presence in the Connecticut basin of Vermont, and I am assured by Mr. W. M. Buswell that it occurs at Charlestown, N. H., in the Connecticut valley. On the coast, Mr. A. A. Eaton writes me that he has positively identified it at Seabrook, and Mr. W. E. Cram has noted it thrice at Hampton Falls, September, 1897, September, 1899, and August, 1900, respectively.

**127. Coccyzus erythrophthalmus** (Wils.). BLACK-BILLED CUCKOO.

A common summer resident of the Transition regions of the state, penetrating the valleys and foot hills of both sides of the White Mountains, where it is found not infrequently in the sub-Canadian woods up to at least 1,000 feet. Mr. F. H. Allen has found it quite common at Jefferson and Randolph and it doubtless occurs throughout the open valley lands of the region to the north of these mountains.

**Dates:** May 12 to August 29.

**128. Ceryle alcyon** (Linn.). BELTED KINGFISHER.

A summer resident, of general distribution about the larger streams, lakes, and ponds; rarely it winters in the southern and central parts of the state. Baird, Brewer and Ridgway ('74, vol. 2, p. 395) record a single pair which had a nest in a bank by the side of the carriage road on Mount Washington, "more than a mile from any water. It was a shallow excavation, made that season, and contained fresh eggs the latter part of May. The food of the pair was taken near the dam of a sawmill on Peabody River." The altitude at which this pair bred must have been about 2,500 to 3,000 feet. After the breeding season the birds often make considerable wanderings into the region about their nesting site. At such times they will often follow the trout brooks through the woods, and in mid-September, I have found them occasionally to reach so high an altitude as 3,360 feet, at the lakelets in Carter Notch. Mr. Ned Dearborn ('98, p. 18) states that one wintered on the Suncook river in 1889–90, and that he has seen at least one at Tilton in mid-winter.

**Dates:** March to November 24; (Winter).

**129. Dryobates villosus** (Linn.). HAIRY WOODPECKER.

A not uncommon permanent resident, confined during the breeding season to the Canadian areas. It breeds on the higher land from the southwestern portions of the state northward, and in central New Hampshire is rather common. In the White Mountains I have found it commonest on the larger ranges from 3,000 to 4,500 feet where there is an abundance of birch, fir, and

spruce. In winter, there is a slight movement southward, and into the valleys from these upper regions.

**130. Dryobates pubescens medianus** (Swains.). DOWNY WOODPECKER.

A common permanent resident throughout the Transition and sub-Canadian life zones, up to about 3,000 feet on the mountains, though occasional birds go still higher into the small tree growth, and on Aug. 1, 1899, I observed one in Tuckerman's Ravine, Mt. Washington, at over 4,000 feet among the balsams. In winter there seem to be nearly as many of these birds on the mountains as in summer, but those which I have observed at this season have all been below 3,000 feet.

**131. Picoides arcticus** (Swains.). ARCTIC THREE-TOED WOODPECKER.

A rather rare permanent resident of the upper Canadian regions of the White Mountains and the northern part of the state; occasional also in fall and winter in the southern part of the state. In summer, its range is practically that of the following species in the White Mountains, but it seems less common. Dr. A. P. Chadbourne did not observe it during his White Mountain trips and I have seen it only on two occasions, these while on a trip over the Carter-Moriah range, in early September, 1901. Frank Bolles ('93b, p. 155) attests its presence on Mt. Passaconaway in summer, and H. D. Minot ('77) records that he has found the nest in the White Mountains. F. A. Bates ('91) records two nests with young in late June from the mountain forests at the head waters of the Pemigewasset. Dr. Walter Faxon also tells me that he saw a bird of this species on Mount Moosilauke on October 4, several years ago. Farther south, Dr. A. L. Reagh has observed two birds at Newfound Lake, on August 18, 1899. W. B. O. Peabody ('41 p. 338) states that he is informed by Dr. Brewer that it breeds at Keene, but while an outlying pair may have bred on the northern slope of Mt. Monadnock, it certainly has not since been found to breed so far south, though Mr. G. H. Thayer (:02) records a female observed on May 18, 1899, at Chesham,

six miles north of that peak. To the north of the White Mountains, the bird is a resident of the coniferous forests. In fall and winter there is often a fairly well defined movement of the birds into the White Mountain valleys and over the southern part of the state. Thus Mr. G. C. Shattuck saw 3 or 4 during the last week of December, 1899, at the Albany Intervales, and another at the same place on Feb. 18, 1901. Mr. Ned Dearborn ('98, p. 19) records a female seen at Alton on Dec. 20, 1890, and implies that he has known of others taken in winter in the southern part of the state; Mr. C. F. Goodhue ('77, p. 96) has found it a very rare fall and winter visitant at Webster; Dr. Charles Palmer ('71) has recorded a specimen taken late in fall at Strafford; at Hampton Falls, the bird has been observed in fall by Mr. W. E. Cram, and Mr. A. A. Eaton writes me of one shot at Seabrook in November, 1888, and a second specimen killed at the same place on Nov. 26, 1899.

**132. Picoides americanus** Brehm. AMERICAN THREE-TOED WOODPECKER.

An uncommon permanent resident of the upper Canadian zone in the White Mountains and in the upper part of the state. In winter, there is a slight movement into the valleys, and rarely into the southern part of the state. Thus Mr. G. C. Shattuck has seen a single bird on each of the dates Dec. 31, 1900, and Feb. 14, 1901, at the Albany Intervales, the valley west of the Moat Mountains and north of the Sandwich range, and on Bear Mountain of the latter range, Frank Bolles ('93b, p. 247) has recorded seeing a pair on Dec. 21, 1891, apparently about half way up the mountain. Mr. C. F. Goodhue ('85, p. 14) has taken a single bird at Webster in January, 1875. On the White Mountains themselves, whether by chance or otherwise, I have found this the commoner of the two three-toed woodpeckers. It occurs in summer in the rich, damp, balsam forests from 3,000 feet (or slightly less where cold streams flow off on the northern slopes) to 4,000 feet. Mr. William Brewster has taken two adult males at Gorham, July 30, 1870, and Mr. C. J. Maynard has seen one in August by the road not far from the Glen House (Brewster, ed., '95, p. 333). Dr. A. P. Chad-

bourne ('87, p. 104) has recorded an adult female and a young bird below Hermit Lake in Tuckerman's Ravine (3,960 feet) and another in the Great Gulf on Mt. Washington, July 5, 1886. On the Carter Range, in the latter part of summer I have a few times met with the bird, and on December 27, 1900, one was seen among the large trees in Carter Notch just above the lakes, at about 3,400 feet, on the southern slope of Carter Dome. There were about 18 inches of snow on the ground at that time, but evidently the bird was as much at home at this high level in winter as in summer. Frank Bolles ('93b, p. 155) notes having observed both kinds of three-toed woodpeckers in summer, among the dense spruce forests which clothe the top of Mt. Passaconaway (4,116 ft.), which appears to be the southernmost New Hampshire record for this species in summer. To the north of the White Mountains in the dense evergreen forests, it is a rare resident, and Mr. William Brewster ('98a) has given an excellent account of a pair at Lake Umbagog, whose nest, containing a partial complement of two eggs, was found on June 2, 1897.

**133. Sphyrapicus varius** (Linn.). YELLOW-BELLIED SAPSUCKER.

A fairly common spring and fall migrant, and a less common summer resident. To the north of the White Mountains, about Lake Umbagog and in the saturated forests of the northern regions of the state, it is a common summer bird; in the White Mountains, too, it is not infrequent in the damp, sub-Canadian woods of paper and yellow birch, spruce, balsam, and hemlock below 3,000 feet, but seems rather local, and becomes still more local south of the mountains, being confined more or less to cold swamps during May and June. Thus at Intervale, it is rare; and on only a few occasions have I observed it in the woods on the immediately surrounding low mountains. Frank Bolles found it common at Chocorua, and I have also noted several birds in a favorable swamp near his cottage. In the central parts of the state it is also found here and there in summer, as at Bridgewater, Wonalancet, Ossipee, Webster. Mr. Ralph Hoffmann has observed a few in a swamp at Alstead in the

southwestern part of the state, and Mr. G. H. Thayer writes me that about Mt. Monadnock it is a regular summer resident in the heavy timber about the base of the mountain. At Charlestown, Mr. W. M. Buswell writes me that he saw a female Sapsucker on Nov. 10, 1898, and that it was seen there every few days until Jan. 5, 1899, when he shot it to make sure of its identity. Its wintering so far north is probably quite accidental. It is now believed that the specimen recorded by Baird, Brewer and Ridgway ('74, vol. II, p. 543) as *S. v. nuchalis*, taken by Mr. William Brewster near Lake Umbagog in New Hampshire, was merely an individual variation of the eastern bird.

**Dates:** April to October 29 (winter).

**134. Ceophlœus pileatus abieticola** Bangs. NORTHERN PILEATED WOODPECKER.

A rather rare permanent resident of the sub-Canadian mixed forests, up to about 3,000 feet on the mountains. In the southern part of the state, the bird is now very rare, but along the ridge of land bordering the Connecticut from Monadnock to the White Mountains it is rather frequently seen, nor is it usually very shy. I have seen three birds, a pair and a single, in one forenoon (July 9, 1894) at Walpole on the hills just east of the Connecticut River, and know of other birds observed there. Mr. G. H. Thayer has also found it nesting in the big timber on Monadnock. About Lancaster, Whitefield and Jefferson on the west and north of the White Mountains, it is not uncommon, and Mr. E. A. Preble notes it occasionally in the heavy forests of Ossipee. To the north of the White Mountains it inhabits the coniferous forests and has been observed by various persons about Lake Umbagog, where among the water-killed trees, it is said to be common. On the White Mountains it appears to be rare, though traces of its work are often met with, especially in the denser primeval forests. In one large swamp on Mt. Bartlett, I found a dead tree of a foot or more in diameter through whose trunk these birds had drilled a hole large enough to admit one's arm.

**135. Melanerpes erythrocephalus** (Linn.). RED-HEADED WOODPECKER.

A rare and irregular visitant in the southern and western lowlands of the state, appearing in summer and fall. The following are the records which I have been able to gather: *Alton*, two have been seen by Mr. Ned Dearborn ('98, p. 19); *Charlestown*, on May 25, 1899, Mr. W. M. Buswell writes that he observed one; *Dublin*, Mr. G. H. Thayer writes that it has been seen once or twice; *Hampton Falls*, noted in June, 1886, and September, 1897, by Mr. W. E. Cram; *Hanover*, about 1881, a bird was seen almost daily during the breeding season near the Dartmouth College grounds, as I am informed by Prof. Edwin B. Frost, who supposes that there was a pair breeding there; *Hollis*, adults noted by Dr. W. H. Fox, Aug. 1, 1880, Sept. 8, 1884, and in August, 1886; *Jefferson*, recorded in September, 1900, by Mr. H. W. Wright (:02); *Manchester*, recorded on May 28, 1899, by Mr. F. W. Batchelder (:00, p. 127) who adds that it has been reported from Londonderry; *Milford*, Mr. J. P. Melzer writes that immature birds are sometimes brought in during the fall; *Seabrook*, Mr. A. A. Eaton writes me of three immature birds seen previous to 1890; an adult male was shot in the spring about 1896, and another adult male in July of the same year, while an immature bird was sent in for mounting in the fall of 1899; *Webster*, about June, 1869, Mr. C. F. Goodhue ('77a, p. 96) records having taken two birds, "when they were around several days."

**136. Colaptes auratus luteus** Bangs. NORTHERN FLICKER.

A not uncommon summer resident of the Transition areas, wintering in small numbers on the coast, but only occasionally inland in the southern part of the state. In summer a few are found well up into the valleys of the White Mountains and after the breeding season is over, are prone to wander up into the lower mountains to 3,000 feet or thereabouts. Thus in August and September, I have sometimes come upon a pair or a single bird on the ridges of Mt. Bartlett and Kearsarge, and on at

least two occasions I have noted a bird or two at Carter Notch (3,360 feet), in the latter month. This deep notch or cleft in the mountain wall, with a valley opening out to the north and another to the south, seems to serve as a passageway for a number of birds in migration, and I doubt not that these flickers had paused here to rest on their southward flight, for during the breeding season I have never observed them above 2,000 feet on these mountains. Mr. Ned Dearborn ('98, p. 19) has recorded that he has twice seen a flicker in Alton in January. At Hampton Falls, on the coast, Mr. W. E. Cram ('99) finds the bird a regular winter resident.

**137. Antrostomus vociferus** (Wils.). WHIP-POOR-WILL.

A common summer resident of the Transition regions of the southern part of the state, but becoming rarer and local farther north. In some parts of central New Hampshire it is very common, as at Newfound Lake. On the outskirts of the White Mountains it is local in the southern valleys, being found about ponds in dry sandy woods where there is an undergrowth of Bear Oak (*Quercus ilicifolia*), brake and blueberry bushes. In such a locality, a few are to be found every summer at North Conway, two miles south of Intervale, in the Saco valley. Frank Bolles ('95b) found them about his "Lonely Lake" at Chocorua, and at Lancaster, Mr. F. B. Spaulding has observed the bird also. Although their nightly serenades gradually cease as the summer wanes, the birds nevertheless remain upon their breeding grounds until well into September, and Frank Bolles notes them about his lake, so late as September 25.

**Dates**: May 6 to September 25.

**138. Chordeiles virginianus** (Gmel.). NIGHTHAWK.

A common spring and fall migrant, and a rather common summer resident of the Transition regions in the lower part of the state, following the valleys up well into the lowlands of the White Mountains. In summer it is usually found in dry open woods, where there is more or less scrubby undergrowth. In

the Saco valley, I have found a few each year during the breeding season at North Conway, among the scrubby Bear Oaks that grow on a certain sandy tract at an altitude only a few feet above the valley (500 ft.). During the month of August flocks of these birds, sometimes numbering two or three hundred, I have frequently seen at Intervale, in late afternoon, moving leisurely down the Saco valley. The larger flocks often take a considerable time to pass a given point, as the individual birds fly quartering up and down, back and forth, so that the flock as a whole swings down the valley, completely past the observer, then back again, then down the valley once more, with each returning swing coming back a less distance until all are passed. Evidently the birds are feeding at such times. On August 19, 1897, I observed a large flock of over 200 birds thus passing down the Saco valley, when it finally broke into two divisions, one of which moved off northward up the valley, while the other continued on southward. At other times the flocks do not seem to be actively engaged in feeding, but each bird, usually separated by a considerable space from the next, flies swiftly on towards the south, as if with a distinct goal in view; and frequently such flocks are so scattered that barely a half dozen birds are in sight at once, now a little group of two or three winging its way past, to be followed shortly by a single straggler or a pair. By the end of August, their migration is practically over in the White Mountains, though an occasional belated migrant may be seen hurrying south during the first week or two of September.

**Dates**: (April 17, Hollis) May 11 to September 15.

**139. Chætura pelagica** (Linn.). CHIMNEY SWIFT.

A common summer resident of the Transition area, especially about the larger centers in the southern and central parts of the state. In the White Mountains, a few are usually to be observed during the summer about almost every small cluster of houses, or less commonly a pair or two will be found inhabiting a chimney of some isolated farmhouse. At Intervale, there appear rarely to be more than a few pairs in any season, notwithstanding the abundance of chimneys. Dr. A. P. Chadbourne

('87, p. 104) records that on July 3, 1886, he was given a specimen which had been caught alive in an unused chimney of the Halfway House on Mount Washington (3,840 feet) but that no others were seen during his short stay there, nor had the men at the house ever before observed the bird. Mr. Bradford Torrey ('84, p. 57) also states that on June 17 he found a company of these birds "flying criss-cross over the summit" of Mt. Washington, but there is nothing to prove that they ever nest in any of the buildings there. Mr. Owen Durfee also tells me of a single bird seen flying about the summit on July 6, 1889. In their daily flights the birds often travel far from their nesting-chimney, over the woods, so that it is not uncommon, while on a trip through the mountains, to hear them chattering far overhead when the nearest building must have been two or three miles distant. During late August, I have not infrequently seen them at Intervale, migrating southward, often in large flocks numbering upwards of one hundred birds, and at so great a height that they appeared but specks in the sky, though their distant chattering could be faintly heard. On such occasions, a few Eave Swallows, distinguished by their flight, have sometimes been observed in company with the Swifts. The fall migration is practically over by the first week of September, though Mr. Bradford Torrey ('96, p. 200) has once observed one flying swiftly southward near the Profile House so late as October 1.

**Dates**: April 29 to September 7 (October 1.)

**140. Trochilus colubris** Linn. RUBY-THROATED HUMMINGBIRD.

A not uncommon summer resident, and a common fall migrant. Though usually observed in the more open regions and about settlements, it is also occasionally found to nest in the woods at the lower altitudes, and I once saw a single bird at about 3,000 feet near Carter Notch, toward which it was flying. During the month of August while the Jewelweed (Impatiens) blooms in luxuriant beds in the lowlands, the hummingbirds are constantly to be found about them. Often from four to six are in view at once, some dipping daintily into the flowers,

others with squeaks and twitters engaged in mock combat, while yet others rest momentarily on some dead twigs near by. After these flowers are through blossoming, by about September 10, most of the hummingbirds depart, though I have seen a few belated individuals at Intervale so late as the 19th of the month, hovering over the nasturtiums.

**Dates:** May 13 to September 19.

### 141. Tyrannus tyrannus (Linn.). Kingbird..

A fairly common summer resident of the Transition valleys and up to about 1,500 feet in the White Mountains. It is a characteristic orchard bird and is seldom found at any distance from the apple trees during the breeding season. After the young leave the nest the entire family is usually found to remain about their nesting ground in a small flock for the remainder of the season. By the last of August these family parties migrate southward, and joining one to another, soon form a flock of 20 to 30 birds. The attachment of these flycatchers to a chosen site is strong, and I know of a pair at Intervale which has nested for five consecutive summers in the same apple tree which projects out over a small pond on the Saco meadows. I have seen on these meadows what I presume to be birds which had summered close by, so late as September 8, 1898, but most of them have left by the first of that month.

**Dates:** May 3 to September 8.

### 142. Myiarchus crinitus (Linn.). Crested Flycatcher.

An uncommon summer resident of the Transition and sub-Canadian woodlands, occurring in the White Mountains as high up at least as 1,500 feet. About Intervale, I have found it in fair numbers through June, but after that month the birds become retiring and their noisy calls infrequent, so that a careful search is necessary to discover them at all. They remain in these northern valleys until September.

**Dates:** May 13 to September.

**143. Sayornis phœbe** (Lath.). PHŒBE.

A rather common summer resident, especially in the southern and central portions of the state. It is generally found near bodies of water, or about barns and outbuildings, following the settlements up to 1,500 feet or so. In numerous cases, what appears to have been the same pair of birds has returned year after year to build on the same spot. The males arrive ten days or a fortnight in advance of their mates, and occasionally one may see the joyful meeting of the two on some early April morning, the male launching himself into the air, alternately sailing and flying as he pours forth a succession of "*chips*" and "*phœbes*," and finally flutters down to a perch near his mate, who appears to take it all as a matter of course. At least two broods are usually reared, and the first brood may sometimes be seen lingering about the nesting site long after they are old enough to be independent of parental care.

**Dates:** March 26 to October 10.

**144. Contopus borealis** (Swains.). OLIVE-SIDED FLYCATCHER.

An uncommon summer resident, of general distribution in the breeding season throughout the sub-Canadian region, up to about 2,500 feet. It is most frequently found on dry hillsides where there is a scattering growth of spruce or pine, with dead trunks here and there; or it is found about open spaces in the denser woods. Mr. R. Hoffmann observed four males at Alstead in the summer of 1900, and Mr. G. H. Thayer finds it about Mt. Monadnock in the heavier growth. Mr. William Brewster ('78, p. 177) has recorded a specimen taken at Rye Beach on July 24, 1872, and Mr. W. E. Cram writes that it is found during the summer at Hampton Falls. About Lake Umbagog it is said to be common in summer.

**Dates:** May to September 3.

**145. Contopus virens** (Linn.). WOOD PEWEE.

A rather common summer resident of the Transition and sub-Canadian regions, showing no decided preference for deciduous, evergreen, or mixed growth, and often, as I have observed at Walpole and elsewhere, dwelling among the large elms of the

village street. Among the White Mountains, I have not observed them above 2,000 feet. Often I have noticed that after sunset or in the dusk of early morning, instead of the simple "*pe-a-wee*," the last two syllables are repeated as a sort of refrain, thus: "*pe-a-wee, a-wee*," given again and again in the twilight. I have also heard this variation on cloudy days, but only occasionally. In the White Mountains a few birds remain until well into September.

**Dates:** May 17 to September 17.

**146. Empidonax flaviventris** Baird. YELLOW-BELLIED FLYCATCHER.

A common summer resident of the upper Canadian life area. On the White Mountains it is a characteristic bird of the moss-grown, saturated forest of balsam and spruce, breeding in the from about 3,000 to 4,500 feet. It is also occasionally seen at lower altitudes in suitable outlying localities, and I have observed a pair on July 20, 1899, at about 1,500 feet on Mt. Bartlett among some hemlocks. The birds may have bred not far away, and acted as if young were near by. Both were heard to utter the "*pu-ee*" note. At Lancaster, Mr. F. B. Spaulding has found the nest of this bird, and records ('87) one with five fresh eggs found on June 14, 1886, "near a low, swampy piece of woods." North of the White Mountains, it is found in the dense swampy woods, and was recorded about Lake Umbagog by Mr. C. J. Maynard ('72). There are no recorded instances of its breeding south of the White Mountains, but I am assured by Mr. G. H. Thayer that he has found the bird in summer in a certain forest swamp on Mt. Monadnock at an elevation of about 1,400 feet. On June 15, 1902, on Imp Mt. of the Carter range, I heard one of these birds give a peculiar flight song, just after sunset. It flew slantingly upward for some twenty feet and repeated a number of times alternately its ordinary "*pu-ee*" and "*killick*."

**Dates:** May 26 (Franconia) to August (September?).

**147. Empidonax traillii alnorum** Brewst. ALDER FLYCATCHER.

A rather common summer resident throughout the Transition

valleys of the upper part of the state but less common in the southern quarters. It is confined almost exclusively to the alder swales along meadow brooks or about swamps and ponds. Mr. Ned Dearborn ('98) has recorded it from Belknap and Merrimack counties; Mr. R. Hoffmann tells me that it is rare about Alstead; and Mr. G. H. Thayer finds it inhabiting the alder swamps at Dublin; I have found it rare at Bridgewater. In the White Mountain valleys it is locally common, and follows the alder growth up to about 1,500 feet. Farther north, it occurs at Umbagog, and along the alder-bordered streams in the open country. Mr. Bradford Torrey (:00, p. 634) notes it at Franconia on the 23d of May, and it was "abundant" by the 26th of that month. On the Saco meadows at Intervale, I found a freshly built nest on June 21, 1899. Four eggs were subsequently laid, one egg being deposited each day. In fourteen days the eggs had hatched. This nest was only about a foot from the ground and the date seems slightly late. The birds remain in the alder swamps until the last of August, and I have not certainly identified them after that month.

**Dates:** May 23 to August 31.

**148. Empidonax minimus** Baird. LEAST FLYCATCHER.

A common summer resident, usually found during the breeding season in the vicinity of dwellings, and nesting in the orchard trees. It seems to follow civilization almost as closely as the Alder Flycatcher does the alder swamps, and extends its range up the valleys with the settlements, going as high at least as 1,500 feet. It is evident that the general introduction of apple trees throughout the eastern states must have had an effect on the habits of this species, as it is rarely found far from orchards, and shows everywhere a decided preference for the apple trees. After the young are off, the birds become more retiring, and often withdraw into the edge of nearby woods, deserting in part the vicinity of houses.

**Dates:** May 4 to September 21.

**149. Otocoris alpestris** (Linn.). HORNED LARK.

A common spring and fall migrant and less common winter resident along the coast, but uncommon, if not rare, inland.

Owing to the frequent confusion of this species with the Prairie Horned Lark, it is impossible now to say what proportion of the inland records for *alpestris* are really referable to that form. Probably, however, many or most of the single and paired birds taken inland during the spring are of the subspecies *praticola*, true *alpestris* being more strictly confined to the coast. Mr. A. A. Eaton writes me that *alpestris* is common during winter on the beach at Seabrook, and I have also seen it there in small flocks flying northward on March 26, 1900.

**Dates :** November to March 26.

**150. Otocoris alpestris praticola** Hensh. PRAIRIE HORNED LARK.

An uncommon spring and fall migrant and local summer resident. This bird was first recorded as summering in the state by Dr. Walter Faxon ('92) who says that on the 4th of June, 1891, his brother observed two birds haunting an old field in the town of *Franconia* and that their number was afterwards augmented by "what were doubtless the second-brood young." These birds were seen in the same spot as late as July 21st. Mr. Bradford Torrey (:01) gives an account of the habits of these birds as observed by him at Franconia during May, 1901, when at one spot no less than five birds were found, and a half mile up the valley were two more pairs. Two years previous, no horned larks had been observed here by Mr. Torrey, who admits, however, that he may have overlooked them. At *Lancaster*, Mr. F. B. Spaulding writes me that he is confident it breeds, as he has seen pairs there in midsummer, and "once in June saw a young bird just able to fly following its parent and begging for food." He also states that it arrives even in February in pairs and small flocks. Mr. H. W. Wright informs me that on Aug. 7, 1899, he observed two perched on a fence bordering meadows by the Connecticut River in Lancaster. Furthermore, Miss Mary V. Blandy tells me that a small flock was observed at *Jefferson* (not far to the east of Lancaster) about a piece of ploughed land during the summer of 1900, and that one of the birds was killed and identified as of this race. More recently, Mr. Ralph Hoffmann kindly permits me to record that

on June 22, 1903, at *Errol*, he flushed a female from her nest, containing two newly hatched young and one egg. He says that at least two pairs were breeding here. The only other summer record is that of a single bird seen by Mr. C. F. Goodhue at *Boscawen* on June 25, 1901. As far as at present known, therefore, the Prairie Horned Lark summers in New Hampshire in small numbers on the fallow and pasture lands to the west and north of the White Mountain region. A migrant bird was also recently sent me from Randolph, where it was taken on March 6, 1902, by Mr. V. D. Lowe.

**Dates:** (Last of February?) March 6 to August (September and October?).

**151. Cyanocitta cristata** (Linn.). BLUE JAY.

A permanent resident, of general distribution throughout the Transition and sub-Canadian areas of the state, apparently not breeding above 3,000 feet in the White Mountains. After the breeding season, small flocks, apparently composed of the individuals of a single family, are often noted wandering through the woods. In the White Mountains during August and September, these flocks reach the valley bottoms, and may then unite to form companies of from six to frequently 20 or 30 birds. They appear to be migrating in a leisurely way, and at Intervale I have frequently seen them moving down the Saco valley, in early forenoon or late afternoon. At such times, I have seen them, one by one, fly from one large tree to another farther down the river valley, where the first arrivals wait for the rest to come up, and then move on again as before; or the entire flock may keep well together and go trooping down across the meadows from tree to tree. It is possible that these migrations are not very extensive, but in the White Mountain valleys they are certainly well marked. In the northern woods, these Jays appear to be unusually quiet, and one may pass an entire day where they are not uncommon, without hearing their loud screams, though by imitating their alarm cry, it is possible to get an immediate reply, and bring the inquisitive birds to the trees above one's head. The wandering flocks in summer occasionally reach considera-

ble altitudes in their search for food; and Dr. A. P. Chadbourne has recorded ('87, p. 104) a small flock seen on Mt. Washington opposite the Halfway House (3,840 ft.) on July 26, 1884. I have once seen a flock in the Carter Notch (3,360 ft.) where, on Sept. 15, 1900, at a sudden alarm call from one of the birds, an entire flock of eight flew up from among the scrubby growth. They seemed to have worked their way up one side of the divide, and continued through the walls of the notch down the other side, southward. Occasionally on late summer afternoons, I have seen small flocks of Blue Jays busily catching flying insects with all the ease and grace of a flycatcher. An old orchard tree is a favorite vantage point from which they fly out at the passing insects and with easy, graceful flight, snap up their prey, and then with set wings sail to a branch of another tree. I have watched small flocks engaged at this occupation for a half an hour or more at a time, the birds maintaining almost perfect silence throughout, save for an occasional low, rattling note.

**152. Perisoreus canadensis** (Linn.). CANADA JAY.

A permanent resident of the upper Canadian zone of the White Mountains and the northern parts of the state. North of the White Mountains the bird is not uncommon in the dense coniferous forests, and Mr. C. J. Maynard ('72) mentions two specimens taken at Umbagog early in June. On the higher mountains of the Presidential and neighboring ranges the birds are rather common in the dense balsam and spruce growth from 3,000 to 4,000 feet. Dr. A. P. Chadbourne ('87) notes having observed small flocks of half a dozen on the Presidential range on three or four occasions, and Mr. Bradford Torrey, in his "Footpath Way," mentions having seen it once on Clinton and again on the side of Mt. Washington, where a small "family party" was observed. Mr. H. W. Wright has seen the bird several times on Mt. Adams, and once also on May 26, 1899, at Bowman's, a station on the north side of Adams, and at an elevation of only 1,500 feet. On the Carter-Moriah range I have found the bird usually in pairs during late summer, above 3,000 feet, and am told of nests having been found on

these mountains. A few birds occur in summer on the outlying peaks of over 3,500 feet as on Tripyramid and on Black Mountain of the Sandwich range (F. H. Allen *in literis*) and also on Osceola. In the fall and winter there is a slight movement of the birds from the higher levels into the valleys, and occasional birds wander even into the southern part of the state. Thus Mr. C. J. Maynard ('72) found it "common at Errol, November 3d, 1879," and at Shelburne, Mr. R. H. Howe, Junior, ('99) reports that a bird had visited the lumber camps in December. At Passaconaway, Frank Bolles ('93a, p. 95) notes also that it is said to visit the camps there sometimes in winter. At Lancaster, in the upper Connecticut valley, Mr. F. B. Spaulding writes that he took a bird on November 30, 1899, and finds it uncommon there. Farther south, there are several records for fall or winter, as at *Bedford*, a specimen from this locality is said to have been taken several years ago, and until recently was preserved in the collection of the Manchester Institute of Arts and Sciences ("Pinfeather Ornithologist," :02, p. 173); *Pittsfield*, where Mr. Ned Dearborn ('98, p. 22) is assured of its occurrence by local authority; *Penacook*, where Mr. C. F. Goodhue writes me one was killed about 1890; *Raymond*, one closely observed, as I am told by my friend Mr. F. H. Allen, on November 28, 1901, by a Mr. F. A. Lovejoy; *Strafford*, one recorded by Dr. Charles Palmer ('71) as in his possession, shot in winter.

**153. Corvus corax principalis** Ridgw. NORTHERN RAVEN.

At present this species is an accidental visitant, for which the more recent records are: *Canterbury*, a specimen was trapped in early spring "a few years since," according to Mr. Ned Dearborn ('98, p. 22); *Greenville*, a specimen was killed at this town some years ago, as I am informed by Mr. J. P. Melzer, of Milford, who mounted the bird, but can give me no definite data; *Sutton*, Mr. C. F. Goodhue records ('85) one taken and another seen here on December 20, 1878; *Warner*, a bird secured about February 18, 1879, according to M. C. Harriman ('79). Many writers have presumed that the raven breeds in the

White Mountains, but no evidence has ever been cited as a basis for such a belief. I have had occasional reports of the bird from this region, but none that I considered trustworthy.

**154. Corvus americanus** Aud. AMERICAN CROW.

A common summer resident throughout the Transition and sub-Canadian regions; it is abundant as a spring and fall migrant, but as a winter resident it is rare in all but the southern portions of the state. Among the White Mountains, crows nest up to 3,000 feet or so, but are not to be found in the deeper woods at a distance from open farm lands. Dr. A. P. Chadbourne records ('87, p. 104) two birds seen in July on the bare rocks at 5,350 feet on Mt. Washington, whither they had evidently flown from below. Late in the summer, they gather in small flocks, to feed by day on the meadows and lowlands; at sunset they may often be seen flying toward the mountains at a considerable height, to roost. These smaller flocks unite, by September, to form larger, which migrate southward in late September or early October. A few birds winter with some regularity as far north as the White Mountain valleys. At Intervale, I saw a bird on Dec. 26, 1900, and farther up the valley, at Jackson, they occasionally winter. They have been recorded by J. W. Nash ('88) as having wintered at North Conway. To the north of the White Mountains, they are rarer in winter; Mr. R. H. Howe, Junior, ('99) has recorded seeing the bird at Shelburne the last of December, 1897. In the Connecticut valley, "E. C." ('86) states that crows passed the winter of 1886 at Hanover, "a rare incident." In the southern parts of the state, they are sometimes common in winter, and in a journey by train up the Merrimack valley on Feb. 10, 1900, occasional birds were seen along the river, and at Manchester a flock of from 30 to 40 was observed from the car window feeding on a large pile of refuse. About Webster, that same winter, Mr. C. F. Goodhue had observed crows to be wintering in larger numbers than usual, for the season was comparatively mild. On March 26, 1900, on the coast at Seabrook, during the entire forenoon, I observed Crows flying northward in small groups of from 3 to 30, at varying intervals apart. At least three or four hun-

dred birds were counted in about two and one-half hours. They flew low and with the light southeast wind, and appeared to be following the coast line in their flight.

**155. Dolichonyx oryzivorus** (Linn.). BOBOLINK.

A common summer resident and abundant fall migrant throughout the broad meadows of the Transition valleys. In suitable localities it is common even up to the foot of the White Mountains and in the Connecticut valley at least as far up as Lancaster. North of these mountains, however, it is much less common. Mr. H. W. Wright writes me that four or five pairs breed every season at Jefferson Highlands, and Mr. F. H. Allen has also observed it in this region. At Intervale where the bird is plentiful, the young are hatched and have left the nest by the last of June, and the adult birds of one meadow or of one circumscribed area sometimes flock as early as July 4th, keeping rather closely together, while yet feeding their well grown young in the grass. These latter remain concealed until closely approached before they take wing and fly straight away to drop into the grass farther off. As the young grow stronger on the wing, they join the flock of old birds, and by the last of July, flock joins flock, until large companies are formed which wander about to some extent before moving southward. Often I have noticed, during August, flocks of Bobolinks flying northward up the Saco valley towards evening, the movement appearing to be a general one, though of its purpose I am ignorant. Others again are to be noted passing southward down the valley, sometimes at a considerable height in the air.

**Dates:** May 5 to September 9.

**156. Molothrus ater** (Bodd.). COWBIRD.

An uncommon summer resident of the Transition valleys in the southern and western part of the state; rarely wintering. The distribution of this bird in New Hampshire is of interest; it is not uncommon in the extreme southeastern portions of the state, and numbers work up the Merrimack valley, where in certain localities it is said to be common, as at Hollis (Fox, '76), Manchester (F. W. Batchelder, :00), Webster (Goodhue,

'77a) and Tilton (Dearborn, '98). Mr. Dearborn (l. c.) has also observed it rarely at Alton near the southeastern end of Lake Winnepesauke. North of this lake, save in the Connecticut valley basin, the bird is practically wanting, and appears not to occur at all in the White Mountain valleys in summer, though Mr. H. C. Sargent tells me that in the fall of 1902 he saw it at Chocorua. In the western part of the state, it is of regular occurrence in the Connecticut valley region. At Alstead, Mr. R. Hoffmann has found it rare in summer; Mr. G. H. Thayer writes me that it is common at Keene, and on one or two occasions stragglers have appeared at Dublin; at Charlestown it is common, according to Mr. W. M. Buswell, and still farther up, at Hanover, Mr. E. B. Frost has found it in numbers. The most northern breeding locality in the Connecticut valley known to me is Lancaster, where Mr. F. B. Spaulding has not infrequently seen the bird and found its eggs. These Connecticut valley birds seem to keep close to the river, and rarely get into the mountain valleys on either side; indeed, the only record I have for the Franconia region is of a bird seen October 2, 1887, at Franconia by Dr. Walter Faxon. Mr. F. B. Spaulding has twice noted a single cowbird wintering at Lancaster; one was shot there on Jan. 18, 1895, which had been noticed throughout the winter feeding on the streets with the English sparrows (Spaulding, '95), and a second was seen into December, 1899, staying about with the sparrows.

**Dates:** March 25 to October 2; (winter).

**157. Agelaius phœniceus** (Linn.). RED-WINGED BLACKBIRD.

A rather common, but local summer resident, breeding in marshes and open swamp land throughout the Transition areas; accidental in winter. It is found rather commonly about the rivers and lakes of the southern parts of the state, and a few colonies are found even among the White Mountain valleys and at Umbagog. The young are on the wing by July, and at Intervale I have never seen the birds later than August 21st, as they leave their breeding grounds during the first part of that month. Mr. C. F. Goodhue ('85) records that a fine specimen

was taken at Warren by Mr. M. C. Harriman, on January 7, 1878.

**Dates?** March 3 to September; (winter).

### 158. Sturnella magna (Lin.). Meadowlark.

A summer resident of the Transition valleys, uncommon in the southern parts of the state, and rare so far north as the White Mountains; rarely or perhaps accidentally wintering. On the coast, at Hampton Falls, Mr. W. E. Cram writes me that it has been observed at all seasons. It occurs in fair numbers in the Merrimack River basin, as at Hollis, and Manchester, and farther up at Webster, Tilton and Gilmanton (Dearborn, '98). In the Connecticut valley basin, the bird is not uncommon as far up at least as Charlestown, as observed by Mr. W. M. Buswell and myself among others. Mr. E. B. Frost writes me that two or three pairs breed yearly about Hanover. Mr. Bradford Torrey (:00, p. 638) records a single bird singing at Franconia, May 22, 1899, which may have straggled up the Connecticut valley; the bird was unknown to the Franconia people. Still farther up, Mr. F. B. Spaulding of Lancaster found a single pair nesting on his father's meadows at that town in 1901, the first he had ever noted there. At Intervale, in the early '90's, a pair of these birds bred for a few seasons on the Saco meadows, but were finally shot, and none have since appeared until 1902, when a pair was noted during the summer months, with four of the full-grown young, and again in the early summer of 1903. Mr. C. F. Goodhue ('85) records that a single bird remained at Webster through the winter of 1874–75.

**Dates:** March 26 to October 12; (winter).

### 159. Icterus galbula (Linn.). Baltimore Oriole.

A summer resident of the Transition portions of the state, rather common in the valleys and lowland towns of the southern part, but becoming rare in the White Mountain region. About the larger southern towns, it delights to nest in the elms of the village street. In the valleys on both sides of the White Mountains one or two pairs are found about nearly every hamlet, though apparently fewer occur on the northern side of the range.

At Intervale, a pair is usually found nesting each season, and the birds, after the breeding period is over, remain about the village, often roaming over the lowlands a mile or more from the nesting site. I have seen what were apparently these summering birds, up to the first of September, at Intervale.

**Dates:** May 6 to September 1.

**160. Scolecophagus carolinus** (Mull.). RUSTY BLACKBIRD.

A common spring and fall migrant and in the northern part of the state, a rare summer resident. Mr. C. J. Maynard ('72) records seeing a few at Lake Umbagog in June, and Samuels ('67, p. 551) states that he found several in June, 1864, in the valley of the Megalloway River in Maine. Doubtless a few breed regularly in the swamps of this wooded region. In the White Mountain valleys they appear in small flocks about the first week in September, and Mr. Bradford Torrey has observed them in Franconia up to October 2.

**Dates:** March 8 to April 19; summer (northern N. H.); September 9 to October 2.

**161. Quiscalus quiscula æneus** (Ridgw.) BRONZED GRACKLE.

An uncommon summer resident of local distribution, mainly within the Transition zone. Colonies are not infrequently found in the southern part of the state, along the coast and in the Merrimack and Connecticut valleys. At Manchester, according to Mr. F. W. Batchelder (:00, p. 19) it is a "rare transient visitant." Mr. C. F. Goodhue has found a small breeding colony near Webster, and Mr. Ned Dearborn ('98) considers it a common summer resident in Belknap and Merrimack counties. Dr. Walter Faxon has also observed a flock at Plymouth, May 26, 1895. Mr. G. H. Thayer assures me of its presence at Keene and Marlboro. In the Connecticut valley at Charlestown, Mr. W. M. Buswell finds it uncommon, and I have seen a few individuals at Walpole in early July, 1894. In the upper Connecticut valley, Mr. F. B. Spaulding writes me that at Lancaster a dozen or more pairs nest in some evergreens at the head of the main street, and that there were formerly more, but their

numbers have decreased since the removal of some of the trees. At Lake Umbagog, Mr. William Brewster ('76b) records that numbers breed in the old woodpeckers' holes or natural cavities of the standing, water-killed trees by the mouth of the Androscoggin. Throughout the White Mountain valleys, and most of central New Hampshire north of Lake Winnepesaukee, the bird seems to be entirely absent. Frank Bolles ('93b, p. 126) states, however, that at Chocorua, according to the old residents, this species and the meadowlark were formerly common, when flax was cultivated there, and grain fields were broader.

**Dates:** March 12 to November.

### 162. **Coccothraustes vespertinus** (Coop.). Evening Grosbeak.

An accidental visitant from the northwest, known to have occurred only during the famous 1890 flight, when so many were recorded from New England. During this incursion, the last recorded specimen was taken in New Hampshire. Following are the separate records for the state: *Francestown*, a fine male was captured by Mr. T. Edward Bishop on March 27, 1890. A female accompanied this bird, but was not captured (Colburn, '90); *Henniker*, a single bird. the last recorded of this remarkable flight, in New England, was shot by Mr. Aubrey B. Call ('90) on May 1, 1890; *Milford*, several were secured by Mr. J. P. Melzer ('90), who records that on January 6, 1890, five were obtained, and four others on January 9th, from a flock of 8 or 10 birds of both sexes. These were among the first specimens to be obtained in New England. *Seabrook*, a male was shot about Jan. 9, 1890, by a Mr. Boyd, according to Mr. William Brewster ('96). A female accompanied this bird. Mr. A. A. Eaton of Seabrook writes me of what must have been this same specimen, that it was one of a flock of six which appeared early in January, and that it was presented to him on the 9th, after having been several days dead. Later it was given to Mr. William Brewster. The fact that there are no records for the northern part of the state is probably due to lack of observation, for Mr. O. W.

Knight ('97) records one captured so near the White Mountains as Fryeburg, over the border in Maine.

Mr. E. H. Forbush ('90, p. 210) suggests as a possible cause of this remarkable flight, the prevalence of strong west winds, following some of the cyclonic storms of the early winter.

**Dates:** January 6 to May 1, 1890.

**163. Pinicola enucleator leucura** (Mull.). CANADIAN PINE GROSBEAK.

A permanent resident, breeding in small numbers throughout the saturated forests of the upper Canadian area of northern New Hampshire and on the White Mountains; as a winter resident it is of regular occurrence over the whole state, though in varying abundance. In the wet balsam forests above 3,000 feet on the White Mountains, this bird is an uncommon summer resident. The first published record of its presence here in summer seems to be that of J. E. Cabot ('57) who mentions having seen them "at the White Mountains in August," nearly a half century ago. Dr. A. P. Chadbourne ('87) next records two specimens seen, both of them in the low spruce and fir timber opposite the Halfway House on Mt. Washington, (altitude, 3,800 feet). One was a fine adult male in full song, seen July 12, 1884; the other an immature bird, seen July 13, 1886. Mr. Bradford Torrey ('90) notes two bright males and a third bird in dull plumage at Eagle Lakes (4,000 ft.) among the Franconias on June 19, 1889, and again at the same place on June 28th, three were seen and one heard singing. I had never observed the bird on numerous camping trips on the higher mountains until June, 1902, when on the 14th of that month a finely plumaged male was seen at 3,500 feet in Carter's Notch, singing gaily. He soon flew on higher up the mountain side. The following day a second male was observed about seven miles farther along on the same range. He sang persistently, notwithstanding the drizzling rain, and appeared to be established among the firs at an elevation of about 4,500 feet near the top of North Carter. I have no doubt that a few birds regularly breed at these upper levels. In the northern part of the state a few breed at the

Connecticut Lakes. Mr. H. A. Purdy states that in 1876 he observed young birds the last of July, being fed by their parents at these lakes. A writer in Forest and Stream, signing himself "N. U." ('83) records finding them in pairs at Second Connecticut Lake on May 24th, 1883. Mr. C. J. Maynard ('72) did not record this species in summer at Umbagog, though from the nature of the country, it may well occur during that season. About the first of November, these birds begin to appear in small numbers in the lowlands and throughout the more southern parts of the state, and Mr. C. F. Goodhue has observed them at Webster so early as October 25. After a late winter, they linger as long as the snow remains on the ground, and I have seen them still in flocks at Chocorua up to April 20, while the melting drifts yet lay deep in the woods. Perhaps these lingering flocks are mainly composed of birds which summer on the higher peaks near by, or at no great distance northward. The great abundance of Pine Grosbeaks during some winters, and their scarcity in others is an interesting fact, the determining causes of which remain to be worked out.

**164. Carpodacus purpureus** (Gmel.). PURPLE FINCH.

A rather common summer resident throughout the sub-Canadian and Transition areas of the state. Among the White Mountains, it is fairly common in the valleys, arriving about the middle of April, and scattering birds may be found in the woods up to 3,000 feet. It is said to occur commonly at Lake Umbagog. Doubtless a few winter irregularly in the southern part of the state; Frank Bolles ('93b) records seeing a number at Chocorua on December 22d; Mr. C. F. Goodhue ('85) includes it among the winter birds of Webster; and a Mr. J. H. Johnson ('92) records it from "central New Hampshire" as having been "very scarce during the winter of 1891–92.

**165. Loxia curvirostra minor** (Brehm). AMERICAN CROSSBILL.

A permanent resident, of notorious irregularity in its numbers and movements. At times the bird is common all summer in the sub-Canadian woods of the state below 3,000 feet and in

the White Mountain valleys, and later in the season invades the lower parts of the state; again one sees but few even in the most favorable localities. The Red Crossbill is mainly a bird of the sub-Canadian areas, whose appearance at any season of the year may be looked for, while the White-winged species seems more definitely restricted, during summer at least, to the upper Canadian forests, and rarely appears in the lowlands till fall or winter. Mr. C. F. Goodhue ('77a, p. 49) has recorded that a few have been known to breed near Webster. They doubtless breed regularly also among the White Mountains, whence I have had occasional reports of nests. The great crossbill flight of 1899–1900, when this and the following species were so abundant, is mentioned under *Migration*.

**166. Loxia leucoptera** Gmel. WHITE-WINGED CROSSBILL.

A permanent resident of the upper Canadian spruce and fir forests in the northern part of the state and above 3,000 feet on the White Mountains; elsewhere it is of uncertain and irregular occurrence, sometimes appearing in numbers during the cold months. Among the White Mountains small flocks or single birds are almost always to be found in summer in the damp forests at the higher levels. Mr. Bradford Torrey has recorded them in June at Eagle Lake, among the Franconias, and Mr. C. J. Maynard ('72) quotes Mr. William Brewster as having found them at Franconia in summer, and adds that they were common in June, 1870, at Lake Umbagog. On numerous camping trips on the higher White Mountains, the Presidential and Carter ranges, I have usually found a few in summer; and among the wilder forests of the Carters, not infrequently I have observed flocks of a dozen or twenty birds above 3,000 feet, in June, July, and September. In the summer and fall of 1899, and during the following winter there was an unusual incursion of these birds over the southern part of the state and beyond, which has been considered at length in the chapter on *Migration*. I am informed by guides that Crossbills of this or the pre-

ceding species have been found breeding on the White Mountains in late winter, and they doubtless do so likewise at Umbagog and northward. The song, which I have sometimes heard, in July, is a series of trills, alternately high and low.

**167. Acanthis linaria** (Linn.). REDPOLL.

A winter visitant, of irregular abundance, from the north. Probably but few winters pass when none of these birds visit the state, and though rare in some seasons, in others they come in great swarms, frequenting largely the birches on whose seeds they feed. Specimens from these flocks show a considerable range of variation in size and markings, but all which I have seen from the state were referable to typical *linaria* rather than to any of the several other species and subspecies. Doubtless *A. l. rostrata* occurs at times along the coast, and indeed it has been reported from Manchester (Proc. Manchester inst. arts and sci., Vol. II, 1901, p. 80, 81) but the record is not properly substantiated.

**Dates:** November 1 to April.

**168. Astragalinus tristis** (Linn.). AMERICAN GOLDFINCH.

A common permanent resident over most of the state save the deeply wooded portions above 3,000 feet, and usually occurring in flocks except for the short period in late summer when the birds pair off to breed. Though commonest in the open valley lands, they are also to be found on the forested mountain slopes, and not infrequently they may be seen crossing the higher ranges, or even passing by the summit of Mt. Washington itself, though rarely, if ever, stopping at these heights. In winter they may be found in small flocks at least as far north as the White Mountain valleys, and I have seen small flocks at Jackson and near Glen Ellis Falls in Pinkham Notch during the last days of December after extremely cold weather and much snow. Mr. C. J. Maynard ('72) states, however, that he did not find them wintering about Lake Umbagog.

**169. Spinus pinus** (Wils.). PINE SISKIN.

A common permanent resident of the Canadian region, and

occurring also throughout the lower parts of the state as a fall and winter visitant. Over the lower part of the state they are sometimes rare for an entire season, and again appear in great numbers. After a winter in which they have been plenty, stray birds seem to drop out as the main flight recedes northward, and these may sometimes breed at the lower altitudes. Among the White Mountains, a few are almost always to be found in the lowland valleys, but they seem usually to be crossing from one mountain to another. In the upper Canadian zone above 3,000 feet, on the mountains, they are common in the spruce and balsam forests and young fully grown may be found so early as June 23d, flying about with their parents. At the same time, also, large flocks may be encountered. Thus on June 15, 1902, I came upon a flock of over 40 individuals in the woods on Carter Dome at 4,500 feet, and again during the latter part of June, 1900, numerous flocks up to as many as 50 birds in a single one, were observed in the valley about Intervale, as well as pairs here and there. These flocks were wandering about the lowlands, and may later have broken up in part to breed. It is evident, however, that in this respect, the birds are somewhat irregular. These are restless, active little creatures, and when observed among the mountains are usually in flight overhead. I have rarely failed, on trips over the main ranges of the White Mountains, to hear a few single ones or an occasional pair, and to observe them passing swiftly by from one range of mountains to another, or dropping down into the forests below. Prof. Edwin B. Frost writes me that at Hanover, he and his brother found three or four nests in two different years, with eggs about the middle of April. Mr. C. F. Goodhue also observed a pair building a nest in a large pine at Webster during the last of April, 1900, but they later deserted it.

**170. Passerina nivalis** (Linn.). SNOWFLAKE.

A rather common spring and fall migrant and winter visitant throughout the open lands of the state, but of more regular occurrence on the coast than inland. Mr. C. J. Maynard ('72) records that they appeared in Coos County in the latter part of October, 1869, and occasional individuals are known to appear

in the southeastern parts of the state by the very last of the same month. A late spring specimen is preserved in the collection at the Acworth Public Library, taken at Acworth on April 6, 1883. Mr. C. F. Goodhue also has in his collection a male in summer plumage, taken near his house at Webster in June, a few years since. One of the bird's wings had been injured, though Mr. Goodhue says it could fly quite well. Doubtless, however, it was unable to continue its migration. It is now generally conceded that the nest, described to Audubon ('60, III, p. 56) by Wright Boott, as seen "on a declivity of the White Mountains of New Hampshire," and stated by Audubon to have been of this species, must have been that of the Slate-colored Junco, also called Snowbird.

**Dates:** October 25 to April 6.

**171. Poœcætes gramineus** (Gmel.). VESPER SPARROW.

A fairly common summer resident of the grassy bottom lands and dry hillside pastures throughout the Transition valleys of the state. Among the White Mountains, they follow the valley clearings up to about 1,500 feet. During September they gather in small flocks in the fields preparatory to migrating, and at such times are often accompanied by a few Savanna Sparrows. At Intervale, I have occasionally heard individuals singing with uncertain voice, so late as September 15. Here too, as elsewhere, a decided falling off in point of numbers was observed in case of this species during 1899 as an effect of a late freeze which proved so disastrous to many birds. At Chocorua in 1900 I found a pair to have arrived by April 15, while the melting snow still lay in places nearly a foot deep on the ground. In the southern part of the state the birds appear a few days earlier.

**Dates:** April 7 to October.

**Note: Ammodramus princeps** (Mayn.). IPSWICH SPARROW.

Although doubtless occurring among the sand dunes on the coast, this bird has yet no definite claim to a place on the New Hampshire list. The record by Mr. N. C. Brown ('77) of one seen by him at Lake Umbagog has since been expunged (Brown, '96).

**172. Ammodramus sandwichensis savanna** (Wils.) SAVANNA SPARROW.

A common summer resident, especially of the broad Transition valleys, where it frequents the meadows with the Bobolinks. Occasional pairs follow the cleared land well up onto the hillsides, where, as at Jackson, among the White Mountains, I have observed them up to 1,600 feet or so. Mr. G. H. Thayer also reports that a few breed at Dublin, on a high, grassy, pasture hill, at 1,600 feet. On July 7th, 1898, and on the following day, while on a trip over the Presidential range, I observed a single Savanna Sparrow singing, as if quite at home, from a rock on the northeast side of the summit of Mt. Washington, but a few yards from the buildings, and it is not impossible that a pair was breeding there among the sedges.

**Dates:** April 20 to October.

**173. Ammodramus savannarum passerinus** (Wils.). GRASSHOPPER SPARROW.

A rare summer resident in certain localities among the Transition valleys of southern New Hampshire. A few follow the Connecticut valley meadows up so far at least as Walpole, where Mr. R. Hoffmann observed a single bird in 1899, and another in 1900. Others push up the Merrimack valley, apparently with some regularity. Dr. W. H. Fox writes me of one noted at Hollis on May 13, 1876. Mr. C. F. Goodhue ('77a, 49) has recorded its occurrence in summer at Webster; Mr. Ned Dearborn ('98, p. 25) also states that he has usually found one or two each season in the neighborhood of Tilton, still farther up the valley. Beyond Lake Winnepesaukee the bird seems not to occur.

**Dates:** May 13 to Summer.

**174. Ammodramus henslowii** (Aud.). HENSLOW'S SPARROW.

A local summer resident, breeding in small numbers in cool, open swamps of the Transition area grown up to sedges, grasses, small bushes and the rank hellebore. Apparently this bird is a species characteristic of these peculiar "islands" of the

Transition zone. Mr. C. F. Goodhue was the first to make known the fact that Henslow's Sparrow is a regular summer resident of New Hampshire (see R. Deane, '78a). He found it in small numbers in certain meadows about Webster, and the adjacent towns of Boscawen and Salisbury, over 25 years ago, and observed a nest of four young birds on August 16, 1877, at the last named place. This record has remained the only published instance of the bird's presence in the state, though H. D. Minot, in his "Land and Game Birds of New England," ('77) states that he had "suspicions * * * * that they occur in at least one spot among the White Mountains." More recently, however, Mr. G. H. Thayer writes me that "on the 1st of August, several years ago," his father "shot a Henslow's Sparrow, and saw two others high up in the Walpole hills some ten miles" northwest of Keene, in a small isolated wet place, grown with rank grass and small bushes, in the midst of a wide expanse of open hill pasture, at about 1,000 feet altitude; he has also noted the bird at Dublin in June, 1902, and at Hancock and Bennington. Mr. R. Hoffmann has also observed the bird on one or two occasions near the same locality, at Alstead. Elsewhere in the state, I know of its presence only at Wonalancet, on the intervale at the foot of Mt. Passaconaway. Here, on July 14 and 15, 1899, I observed a pair evidently settled, in a small cold marsh, partly carpeted with sphagnum, and grown up with sedges and white hellebore. On the tops of the hellebores the male would sit and sing incessantly, but only once did I observe what must have been his mate. I have been unable to visit this spot since to discover if it is regularly inhabited by the birds.

**Dates:** April 17 to August.

**175. Ammodramus caudacutus** (Gmel.). SHARP-TAILED SPARROW.

A summer resident of the salt marshes on the limited coastal strip of the southeastern part of the state. Dr. Jonathan Dwight, Jr., ('87) states that true *caudacutus* breeds as far north as Portsmouth. Mr. William Brewster ('78) also mentions a specimen in his collection taken at Rye Beach, on August 20,

1869. Doubtless the subspecies *subvirgatus* occurs in migrations, but records are not available.

**Note: Ammodramus maritimus** (Wils.). SEASIDE SPARROW.

The statement of Dr. Elliot Coues in his "Birds of New England" (Proc. Essex Inst., Vol. V, p. 282) that this species occurred at Rye Beach, was an error, the Sharp-tailed Sparrow having been the bird intended (Brewster, '77b).

**176. Zonotrichia leucophrys** (Forst.). WHITE-CROWNED SPARROW.

A spring and fall migrant, uncommon in the lower parts of the state, but seemingly more plentiful in the higher country. More birds are seen also in fall than in spring. Mr. Bradford Torrey and Mr. H. W. Wright have found the bird regularly among the White Mountains from September 25 into October, and Mr. G. H. Thayer reports it as sometimes common at Monadnock in *Migrations*. I have observed it on one occasion on the Saco meadows at Intervale so early as September 21, 1900. During the spring of 1900 this species was seen at many localities in unusual numbers, and Mrs. E. E. Webster informs me that at Franklin Falls it seemed more plentiful than the White-throated species during May of that year.

**Dates:** May 6 to 25; September 21 to October 11.

**177. Zonotrichia albicollis** (Gmel.). WHITE-THROATED SPARROW.

A common spring and fall migrant, and as a summer resident, common throughout the Canadian portions of the state and even up into the sub-alpine zone on the White Mountains. South of Lake Winnepesaukee, it breeds on Mt. Monadnock and the surrounding hills, on South Kearsarge, and elsewhere locally along the higher land in the western part of the state. Among the foot hills of the White Mountains, scattering pairs breed even at low elevations in the valleys in bushy open spots, but it is not very common until the deeper sub-Canadian woods are reached. On the mountains it is common up to the limit of scrub growth at 4,800 to 5,000 feet, and a few push still higher up to avail themselves of outlying clumps of stunted growth. I

have observed a few in summer about the Lakes of the Clouds on Mt. Washington at some 5,000 feet, and Dr. A. P. Chadbourne ('87) notes them as high as 5,300 feet.

**Dates:** April 23 to May 14; Summer; September and October.

**178. Spizella monticola** (Gmel.). TREE SPARROW.

A common spring and fall migrant and less common winter resident. In fall the main flight passes through during late October and November, and a few are left to winter at least as far north as at the White Mountain valleys, as at Ossipee, where Mr. E. A. Preble has noted them in winter. Frank Bolles (93b) records two seen on December 21st, at Chocorua, but it must be rarely that the birds winter there. Mr. F. B. Spaulding also writes of seeing two on Dec. 9, 1899, at Lancaster, the latest he had ever noticed them there in winter. During March and April the northward flight takes place, a few birds lingering nearly to the last of the latter month.

**Dates:** October 8 to April 24.

**179. Spizella socialis** (Wils.). CHIPPING SPARROW.

A common summer resident of the Transition area, found mainly about orchards and door-yards, and one of the most familiar and confiding of our native birds. Like the Least Flycatcher, it follows closely the path of civilization and has doubtless greatly extended its range within historic times as the forests have disappeared before the advance of the white man. Already by August family flocks of old and young are seen, and by the latter part of that month these join one to another, until large companies are formed. At such times the birds fairly swarm over weedy fields or stubble land, and often are accompanied by Bluebirds and Myrtle Warblers. These flocks move leisurely southward during September, though a few individuals remain among the White Mountains until well into October. Prof. C. M. Weed ('98) has given a good account of the feeding habits of this bird, as observed by him at Durham.

**Dates:** April 16 to October 11.

**180. Spizella pusilla** (Wils.) FIELD SARROW.

A summer resident, common in the southern part of the state

on bushy hillside pastures, but becoming local and uncommon among the White Mountains. About the Winnepesaukee region the bird is very common in suitable places, and follows the valleys well up among the mountains on both sides of the great range. On the south side of the range, I have found small colonies in the Saco valley at North Conway and Intervale, and a few pairs still farther up at Jackson, on the western slope of Spruce Mountain, facing the Glen road, and at an elevation of about 1,500 feet. On the north side of the range, Mr. F. H. Allen has found them not uncommon at Jefferson and Randolph, these birds very likely reaching this district by way of the Connecticut valley. It is noticeable that a large part of the nests found in southern New Hampshire are built in low bushes. After the young are on the wing, the birds continue on their breeding grounds in small family flocks, into September, and Dr. Walter Faxon has observed them at Franconia so late as October 7.

**Dates:** April 19 to October 7.

**181. Junco hyemalis** (Linn.). SLATE-COLORED JUNCO.

An abundant spring and fall migrant, and throughout the Canadian area, a common summer resident of coniferous woods or open, dry pastures grown up to small pines or spruces; also a winter resident in the southern part of the state. South of Lake Winnepesaukee the bird is local in summer, breeding in suitable localities, as at Northfield on Bean Hill, South Kearsarge (Dearborn, '98), on Mt. Monadnock above 1,500 feet in the spruce growth (Thayer, *in lit.*), and along the ridge of land in the western part of the state northward to the White Mountains. At Intervale, a few pairs breed even in the valley bottom of the Saco at 520 feet, and thence up to the limit of scrub growth on the higher mountains, at 4,800 to 5,000 feet. Above this level a few scattering pairs are to be found here and there where an outlying clump of dwarfed firs provides shelter, and a few birds are usually to be found feeding about the buildings on the extreme summit of Mt. Washington (6,291 feet). I have no doubt these birds nest on the summit, and they must surely find an abundance of insect food. In the southern part of the state, the bird is known to winter in small numbers; Mr. W. E.

Cram writes me that it occurs through the winter months at Hampton Falls, and Mr. C. F. Goodhue ('85) records it as a winter bird at Webster. I do not know of its wintering farther north, though Frank Bolles ('93b) records a flock seen on Bear Mountain on Dec. 21, 1891. The birds arrive on their breeding grounds among the White Mountains before the snow is off, and I have observed the males in mid-April singing among the stunted growth on the summit of Mt. Chocorua as though completely at home and settled for the season. Young, just hatched, were observed at Jackson on June 16, 1902.

**182. Melospiza melodia** (Wils.). Song Sparrow.

A common summer resident throughout the Transition regions, breeding as high up at least as 2,000 feet among the White Mountains, in more or less cleared areas. Dr. A. P. Chadbourne ('87) records having seen a single bird "on the bare rocks at an altitude of 5,340 feet on Mt. Washington" on July 6, 1886, and he suggests that it may have nested somewhere near. Mr. C. J. Maynard ('72) records its breeding at Lake Umbagog the last of May, and adds that he has seen the bird in Coos County "the first week in November, when the snow was on the ground." During September large flocks often gather about the weed patches in the lowlands, or swarm in the swampy thickets preparatory to migrating southward. Doubtless a few winter in the southeastern portions of the state, but actual records are unavailable.

**Dates:** March 9 to December.

**183. Melospiza lincolnii** (Aud.). Lincoln's Sparrow.

A migrant, apparently rare in spring, but rather common in fall. Owing to its inconspicuous dress and retiring habits it is very frequently overlooked. On the Saco meadows at Intervale, I have observed it in the fall migration as early as September 7, on which date, in 1899, two birds were seen by Mr. R. H. Howe, Junior, and myself, one bird being taken. After this date, from one to as many as five were seen almost daily throughout the month. Often one or two individuals are found in company with the large flocks of Song Sparrows which at

this season frequent the weed-grown potato patches, or an occasional bird is found among the tall grass and bushy tangle on the edge of a swamp or wood. One soon learns to recognize the neat, graceful form, the uneasy movement and inquisitive way of the bird, as it hops restlessly about, now appearing on the edge of a thicket or tangle of grass to peer curiously at the observer, or again vanishing utterly in situations where the cover seems too slight to conceal it at all. I have sometimes heard from this bird in the fall, a sharp and distinctive "chip" much like a note of the Vesper Sparrow; also on a few occasions a short, low "tzz," similar to a note of the Song Sparrow and given as the bird skulks among the shrubbery. Mr. Torrey has on several occasions noted this bird among the Franconia valleys in fall, and other observers have reported it from localities in the southern part of the state. Its possible breeding in the northern part of the state may be suggested, as it is well known to breed among the Adirondacks; and Mr. G. H. Thayer (:02) has even recorded what he believes to have been a Lincoln's Finch seen by him on July 28, 1900, at Lake Nubanusit in Southwestern New Hampshire.

**Dates:** May 15 to 26; September 7 to October 4.

**184. Melospiza georgiana** (Lath.). Swamp Sparrow.

A rather common spring and fall migrant and a less common and local summer resident. During the summer it is confined to grassy swamps along streams and lakes. It is common as a breeding bird in many places in southern New Hampshire, but among the White Mountain valleys it seems rare at this season. Mr. F. H. Allen ('89, p. 78) has recorded it from Moultonboro in the summer, but I know of no other locality where it breeds, in the immediately adjacent country to the north though several apparently favorable places have been investigated. Mr. C. J. Maynard ('72) states that it breeds at Lake Umbagog. In the Saco valley at Intervale, it appears in some numbers during September with flocks of other migrating sparrows.

**Dates:** April to October 10.

**185. Passerella iliaca** (Merr.). Fox Sparrow.

A rather common migrant in early spring and late fall. The

last of the spring migrants pass through the White Mountains by April 23 or thereabouts, and appear again on their southward flight in early October.

**Dates:** March 16 to April 23; October 5 to November 7.

**186. Pipilo erythrophthalmus** (Linn.). TOWHEE.

A not uncommon summer resident of the Transition valleys in the southern parts of the state becoming rarer and local towards the White Mountains, to the north of which it appears not to occur. In the lower Connecticut valley this bird is fairly common, and is found also in some numbers throughout the central and southern regions of the state in open bushy lands. North of Lake Winnepesaukee it occurs in bushy, sandy areas in the lowlands. Mr. E. A. Preble finds it about Ossipee among the sandy "barrens" grown up to bear oak and pitch pine, and I have found it in small numbers in a few similar localites in that vicinity and as far up as North Conway in the Saco valley. Dr. Walter Faxon tells me also of a bird seen by him on June 17, 1894, near Moosilauke. At Intervale, I have seen the bird but once, when on Sept. 19, 1899, a migrant appeared on the edge of the Saco meadows in the early morning.

**Dates:** May 1 to October.

**187. Zamelodia ludoviciana** (Linn.). ROSE-BREASTED GROSBEAK.

An uncommon summer resident of the Transition area, entering also to a less extent the sub-Canadian region. A few summer regularly in the White Mountain valleys at least as far up as Intervale, though I have found them more common there in August or September during migration. Mr. G. H. Thayer notes their fondness for potato beetles at Dublin.

**Dates:** May 12 to September 18.

**Note: Guiraca cærulea** (Linn.). BLUE GROSBEAK.

Miss Mabel C. Berry ('96) records having observed at close range, on May 26, 1894, an adult male of this species at East Derry. The bird was not secured, though the observer felt certain of the identity. It seems safer, however, to await a more positive record before according the bird a place in the list of New Hampshire birds.

**188. Cyanospiza cyanea** (Linn.) INDIGO BUNTING.

A rather common summer resident of the Transition region. In the southern part of the state it is very common in certain localities, and follows the lower valleys well up among the White Mountains. It is also recorded as not common about Lake Umbagog. During September considerable flocks of old birds and fully grown young gather around the weed-grown fields and standing corn, and at Intervale, in the Saco valley, remain until the first of October when the frosts are heavy. Mr. G. H. Thayer writes me that at Dublin, but few occur so high up as 1,400 feet.

**Dates:** May 9 to October 1.

**189. Piranga erythromelas** Vieill. SCARLET TANAGER.

A not uncommon summer resident of the Transition and sub-Canadian woods. In the White Mountains, I have found it in small numbers on the mountain sides as far as the upper limit of the beech woods, some 2,000 feet. According to Mr. C. J. Maynard, it is rare at Umbagog, and is doubtless wanting in the coniferous forests of the northern part of the state. The males cease singing about the second week in July, and owing to their habit of keeping to the upper regions of the forest trees, are not very frequently observed in late summer. At Intervale, I have noted occasional birds in the beech woods up to September 13th, and Frank Bolles ('93b) records one seen at Chocorua so late as the 25th of that month, 1891.

**Dates:** May 13 to September 25.

**Note: Piranga rubra** (Linn.). SUMMET TANAGER.

Although this bird has twice been recorded from New Hampshire, once by Mr. C. F. Goodhue, who believed he saw one at Webster ('77a, p. 49), and once by Mr. Ned Dearborn ('98, p. 27), who adduces the testimony of Mr. George Stolworthy of Franklin to the effect that he saw a number of males at that place in the early summer of 1875, neither of the records seems to stand on a sufficiently definite basis to warrant according the species a place in the present list.

**190. Progne subis** (Linn.). PURPLE MARTIN.

A not uncommon, though local summer resident of the Transition valleys throughout the southern and central parts of the

state. It breeds in the Connecticut valley at least as far up as Colebrook, where Dr. Walter Faxon ('97) has recorded that Mr. William Brewster found a pair in 1896, nesting under the hood of an electric arc light. I have never found it breeding at Intervale, though two miles farther down the valley at North Conway a small colony annually inhabits a large bird house. Apparently the birds are slowly falling off in point of numbers.

**Dates:** April 19 to September.

**191. Petrochelidon lunifrons** (Say). CLIFF SWALLOW.

A common spring and fall migrant and common local summer resident throughout the lowland districts of the state up to at least 1,500 feet. The birds breed in colonies under the eaves of barns and outbuildings, and the young after leaving the nest are often to be seen in little squads on the roof, where they are fed by their parents. Even after the young are strong on the wing they are still fed occasionally by the old ones, and not infrequently have I observed the parent perform this duty in mid-air, both birds hovering for a second to effect the transfer. Concerning the supposed immigration of this species from the west in the early part of the century, there seems to be no conclusive evidence. Peabody ('41) states that the earliest information he had of its appearance in New England was from Chief Justice Shaw, who "found it at the White Mountains in the summer of 1816." Belknap, writing in 1792, does not mention it as a bird of New Hampshire.

**Dates:** April 28 to September 1.

**192. Hirundo erythrogaster** (Bodd.). BARN SWALLOW.

A common spring, and abundant fall migrant, and fairly common summer resident, nesting throughout the farming districts in the large open barns, up to about 1,500 feet in the White Mountain valleys. It is said to be abundant at Lake Umbagog. In August, the birds gather in large flocks and move southward. At Intervale, one may see them during this month flying leisurely down the valley at all hours of the day, and several times I have seen an entire flock of some 25 birds pause in

their flight to chase a passing hawk. Only a few are seen among the White Mountains after August, though I have noted single stragglers at Intervale so late as September 12, 1900, and in 1898, a single bird on September 21, the day being cold, and Mt. Washington's summit white with snow.

**Dates:** April 24 to September 21.

**193. Tachycineta bicolor** (Vieill.). TREE SWALLOW.

A common spring and fall migrant and less common summer resident. These birds arrive in central New Hampshire in early April before the snow is off the ground and from one to three or more pairs are generally found about the smaller towns and villages in summer. At Intervale, I have rarely found more than one pair nesting in the village. In the forest of water-killed trees at the mouth of the Androscoggin River, Lake Umbagog, Mr. William Brewster ('76b) has recorded that "multitudes" were found "occupying deserted nests of the smaller Woodpeckers."

**Dates:** March 23 (Hampton Falls) to September.

**194. Riparia riparia** (Linn.). BANK SWALLOW.

A common spring and fall migrant and a locally abundant summer resident, nesting in colonies where steep banks of sand occur along the rivers. The breeding birds often go far afield in search of food, and I have frequently seen individuals flying over the Saco valley at least a mile and a half from the nesting colony. It is interesting, in watching a large colony, to observe the apparent precision with which each bird enters its proper burrow, and only on rare occasions have I seen a bird hesitate for a second before picking out its own burrow. This is the first of our swallows to leave, and among the White Mountain valleys the breeding colonies break up and disappear by the middle of July, and except on one occasion (a single bird seen Aug. 11, 1899) I have never observed the birds at Intervale after July. Mr. William Brewster, however, ('98b) notes them with flocks of other swallows at the lower end of Lake Umbagog on Aug. 22, 1896. As pointed out by Mr. Ned Dearborn, ('98) these swallows will often dig their burrows in a newly-ex-

cavated sand pit, but after a single season desert the locality altogether. I have often observed the same thing in various places and attribute it to a change in the texture of the sand near the face of the cut due to the drying out of the water on the newly-exposed front, so that it would cave in more readily if a burrow were dug.

**Dates:** May to August 24.

**195. Ampelis garrulus** Linn. Bohemian Waxwing.

An extremely rare winter visitant. This bird is frequently reported by amateur observers, who, as their judgment grows with later experience, are led to expunge their record. There appears at present to be no valid published record for the occurrence of this species in the state, but Dr. W. H. Fox informs me that in the early part of 1880, O. H. Phillips, a taxidermist, took specimens near *Nashua*. Mr. W. E. Cram writes me he has observed it at *Hampton Falls* on February 17 and 21, 1897,

**196. Ampelis cedrorum** (Vieill.). Cedar Waxwing.

A common spring and fall migrant and summer resident; rarely wintering in the southeastern portion of the state. Although these birds breed mainly in the open Transition and sub-Canadian regions, they are great wanderers, and small flocks of from 3 to 6 birds are not infrequently observed during summer crossing the Presidential range, or stopping for a few moments at the higher levels, as at Carter Lakes (3,360 feet), and Halfway House (3,840 feet), to pass on again shortly. In the White Mountain valleys they nest about the middle of July, and the young are soon on the wing. During September they quickly gather into large flocks about the wild cherry trees, preparatory to migrating southward. Mr. Ned Dearborn (: 00) records that a flock of ten birds wintered at Durham during the season of 1899–1900, a circumstance which appears to be quite unusual. In eastern Massschusetts there is regularly a wave of northbound migrants about the end of January, this movement lasting into March, after which there comes a second wave in late May. Apparently this first wave has spent its energy by the time it reaches central New Hampshire. Rarely this first

flight reaches the central part of the state in January; thus Mr. C. F. Goodhue ('85) notes a flock of 20 or more at Webster in January, 1878. By February or March, the birds appear irregularly in the lower portions of the state, though often observers in the central counties do not see them till late May, i. e., during the second wave. The limits and dates of these peculiar movements will bear a much more thorough working out. The fall migrants have usually left by October.

**197. Lanius borealis** Vieill. NORTHERN SHRIKE.

A rather common late fall migrant and winter resident throughout the state, occurring as high at least as 2,000 feet in the White Mountains during winter.

**Dates**: November 12 to April.

**198. Lanius ludovicianus** Linn. LOGGERHEAD SHRIKE.

A rather rare and local summer resident in the Transition valleys at least as far north as the White Mountains, and the upper Connecticut valley; accidental in winter. In view of the general lack of definite published breeding data for this species, it may be well to detail the records for New Hanpshire as far as possible. The bird has been observed at the following localities in the state: *Charlestown*, Mr. W. M. Buswell has observed a pair for at least two seasons in the same yard, and on April 26, 1898, took their nest and six eggs. This nest was nearly completed by April 8, and contained two eggs on the 21st. The earliest date at which he has observed the bird in spring is March 20. *Concord*, near this town a specimen was obtained by Mr. C. F. Goodhue, on January 20, 1879, and identified and recorded by Mr. Ruthven Deane ('79). *Hampton Falls*, one was observed by Mr. W. E. Cram on August 20, 1899. *Hanover*, a pair is recorded by Mr. E. B. Frost ('85) to have nested in a fir tree in a person's yard during the season of 1885. The birds were first seen on April 16, and by May 4th, the nest had been built and six eggs laid. Both birds were shot for identification. Mr. Frost, in a letter to the writer, adds that a nest with six young was found at Hanover on May 30, 1884, and that he

knew of another at about the same time. Also on May 17, 1897, on the Vermont side of the Connecticut river, a nest containing one egg and four young birds was found by Mrs. Frost, and in 1898, the birds were noticed near the same place. *Hollis*, one seen by Dr. W. H. Fox on September 1, 1885. *Intervale*, I have twice observed the bird in the Saco valley here; once on August 25, 1897, when a single bird was seen for a short time on the meadows, and again on August 9, 1899, when I watched one for part of an afternoon as it stayed about an old apple orchard near the river valley. Possibly a pair may have nested here earlier in the season. *Jefferson*, in an interesting letter on birds observed in this vicinity, Mr. H. W. Wright tells me that "it has been breeding for several years within town limits. A friend living on the road to Jefferson Hill, when I discovered a family of shrikes about his pasture, told me they had nested in the same elm tree in that pasture for 4 or 5 years. In 1899, we observed them whenever we drove by throughout the season. This year (1900) they nested farther back and were seen only occasionally on the roadside. I have observed a pair or family at three or four other points, in driving, in this vicinity." *Lancaster*, Mr. F. B. Spaulding finds it a regular summer resident here, where it arrives early and breeds about the first of May. *Northfield*, in September, 1897, Mr. Ned Dearborn ('98, p. 218) observed one at this town. *Tamworth*, a single bird was observed on August 16, 1898, by Dr. A. L. Reagh (see Howe, :01, p. 44). *Tilton*, according to Mr. Ned Dearborn ('98, p. 28) a nest with eggs was discovered here by Mr. G. H. Davis, in May, 1897.

From the foregoing, it is plain that this shrike is most common in the valleys of the Connecticut and its larger tributaries, by which it reaches the country slightly north of the White Mountains.

**Dates:** (January 20, '79) March 20 to September.

### 199. **Vireo olivaceus** (Linn.). Red-eyed Vireo.

A common summer resident throughout the Transition and sub-Canadian areas, being found from the shade trees of the vil-

lage streets up to about 3,000 feet in the mixed forests on the White Mountains. It is also common to the north of these mountains, as at Lake Umbagog. At Intervale, I have on one or two occasions seen single birds on the wire fences, which cross the Saco meadows, feeding on crickets which they obtained on the edge of a farm-road, and carried to the fence to eat. Most of them leave the latitude of the White Mountains by the middle of September, though Dr. Walter Faxon informs me that he saw three on September 30, 1895, at Warren.

**Dates :** May 8 to September 30.

**200. Vireo philadelphicus** (Cass.). PHILADELPHIA VIREO.

A rare spring and fall migrant, and in the northern part of the state a rather rare summer resident. To Mr. William Brewster, we are chiefly indebted for our knowledge of this species as a summer bird of New Hampshire. About Lake Umbagog, this gentleman and Mr. Ruthven Deane ('76) secured in all, three specimens, on the 3d and 4th of June, 1872. Near the same spot, Mr. Brewster ('80) secured on August 29, 1874, three more specimens and a fourth on August 31st, these being all "young birds in freshly assumed but quite perfect fall dress." On May 29, 1876, another was taken at Umbagog, and two more on May 31st, and three years later, on May 27, 1879, a mated pair was shot. From Umbagog, Mr. Brewster ('80) states that he traced them westward to Dixville Notch in northwestern New Hampshire, where "they were noted in greater numbers than elsewhere, and on June 10th several pairs were found in the open birch groves about the 'Dix House,' just beyond the Notch." He further notes that although these birds arrive at Umbagog during the last of May or first week of June, they remain silent until the breeding season has fairly begun, when they are quite as indefatigable singers as the Red-eyed Vireos, and are then found generally distributed throughout the less heavily wooded areas. Mr. Ralph Hoffmann has also noted the bird in the Dixville Notch in the breeding season, in 1903. The only White Mountain record of this bird in

the breeding season is that of Mr. Bradford Torrey ('90, p. 251) who, in company with Dr. Walter Faxon, observed one singing "by the roadside in the valley," at Franconia, on June 16, 1889, and repeatedly in the same place on subsequent days. The bird acted as if settled there, but no nest was found. The following instances of its occurrence as a migrant elsewhere in the state are detailed as of interest: *Chocorua*, where Mr. F. H. Allen informs me he observed a pair on June 5, 1900, probably late migrants; Frank Bolles ('93b, p. 39) also records having once observed it there in migration. *Dublin*, one taken September 29, 1899, and a second at the same season in 1900 by Mr. G. H. Thayer (:02) who records seeing others at Dublin on several occasions in fall; near *Fitzwilliam*, one obtained on May 27, 1897, as I am informed by Mr. G. H. Thayer. *Franconia*, one bird seen September 23d and another September 26, 1900, by Mr. Bradford Torrey; *Hollis*, one recorded by Dr. W. H. Fox ('77) as shot on May 26, 1876, by a Mr. A. F. Eaton, while it was "feeding in company with two other birds of the same kind, in some low oak bushes;" *Intervale*, I observed a single bird among some small elms in the Saco valley on Aug. 26, 1899, an early fall migrant doubtless.

**Dates:** May 26 to September 29.

**201. Vireo gilvus** (Vieill.). WARBLING VIREO.

An uncommon summer resident within the Transition areas of the state, and during the nesting season is usually confined to the big elm trees of the village streets. In the White Mountain valleys, the bird is rare so far up as Intervale, and for several years I have never known more than one or two pairs to summer in the big elms of the village. What I presume to be the same pair of birds has for at least three successive seasons lived among a group of elms near our house, and although after the young were off, I have several times seen the birds in the open valley at a considerable distance from their nesting site, nevertheless the male is now and then to be heard singing in the early morning from the same elms even into the second week of September. Apparently this species is rare or generally absent to the north of the White Mountains, though Mr.

F. B. Spaulding reports it from Lancaster, in the Connecticut valley. Dr. Walter Faxon has found it also breeding at Franconia.

**Dates:** May 3 to September 17.

**202. Vireo flavifrons** Vieill. YELLOW-THROATED VIREO.

An uncommon summer resident in the Transition valleys of the lower part of the state. At Hollis, Dr. W. H. Fox writes that it is common in summer, and it also occurs regularly on the coast in small numbers. About Manchester it is said to be common, and usually found about towns. Farther north in central New Hampshire it becomes rarer; at Bridgewater, Mr. F. H. Allen ('89) has observed it, and Mrs. E. E. Webster writes me of one seen at Franklin Falls in May, 1899, while Mr. C. F. Goodhue notes it as breeding about Webster. I have no record of it north of Lake Winnepesaukee in the central part of the state, where, however, it may be of casual occurrence. Mr. Bradford Torrey (:00, p. 638) records a single bird singing on June 3, 1899, in a sugar maple grove at Franconia, which is the first time, in all his observations in that region, that he has seen the bird there. This straggler may have reached Franconia by way of the Pemigewasset valley, but more probably by the Connecticut basin, where the bird is a regular summer resident as far up at least as the vicinity of Hanover, and according to Mr. R. H. Howe, Junior, (:02, p. 19) it has even been recorded from St. Johnsbury, Vt., on a northern tributary of the Connecticut.

**Dates**: May 8 to September.

**203. Vireo solitarius** (Wils.). BLUE-HEADED VIREO.

An uncommon, though generally distributed summer resident, throughout the sub-Canadian areas of the state. On our extreme southeast, Dr. W. H. Fox finds it a rare breeding bird at Hollis, but on the higher land farther west, about Mt. Monadnock, and northward along the eastern rim of the Connecticut valley and throughout the mixed woods of the central and northern parts of the state it is fairly common, nesting up to about

3,000 feet in the White Mountains. Apparently the great freeze of 1899 killed numbers of the early migrants, and in the White Mountains especially, I have noticed an apparent diminution in their numbers in the two following seasons.

**Dates:** April 29 to October 7.

**Note: Vireo noveboracensis** (Gmel.). WHITE-EYED VIREO.

This species probably reaches the extreme southwestern part of the state at times, and has been recorded by Mr. F. W. Batchelder ( : 00, p. 133) to have bred near Lake Massabesic, Manchester, in 1899, and previously on the Hooksett Road in the same town. Mr. Ned Dearborn ('98, p. 29) includes it among the birds of Belknap and Merrimack Counties on the authority of a Mr. George Stolworthy but this record is perhaps to be questioned. Mr. W. E. Cram of Hampton Falls also writes me that he is confident he has once observed it at that place. At present, however, it seems safer to exclude the bird from the New Hampshire list awaiting an undoubted record.

**204. Vireo bellii** Aud. BELL'S VIREO.

An accidental visitant from the interior. Mr. William Brewster ( : 01) records that Mr. Ned Dearborn, while driving along a country road in *Durham*, on November 19, 1897, observed a small bird hopping about some poison-ivy vines which had overrun a stone wall. Mr. Dearborn shot the bird and submitted it to Mr. Brewster for examination, and the latter states that it proves to be a perfectly typical example of this species.

**205. Mniotilta varia** (Linn.). BLACK AND WHITE WARBLER.

A common spring and fall migrant and less common summer resident throughout the Transition and sub-Canadian woods. Among the White Mountains it appears to be quite absent in the breeding season above the 3,000 foot level, and is also rare or wanting in the balsam and spruce forests of the northern part of the state. About Intervale, I have found it common all summer in the lowland woods of mixed or deciduous growth.

**Dates:** April 30 to September 29.

**Note: Helmitherus vermivorus** (Gmel.). WORM-EATING WARBLER.

A specimen is recorded as seen at Manchester on Oct. 1, 1900, by a Mrs. A. A. Macleod ( : 00, p. 102) but the record is not properly substantiated.

**206. Helminthophila chrysoptera** (Linn.). GOLDEN-WINGED WARBLER.

A rare migrant, and probable summer resident in the extreme southeastern part of the state. Although no actual instance of its breeding in the state is known to me, Mr. W. E. Cram writes that he took a specimen at Hampton Falls in May, 1887; Mr. G. H. Thayer writes that he has observed it once in early summer near Jaffrey; and local observers report (Proc. Manchester Inst. Arts & Sci., Vol. II, p. 80) that a few were observed in May, 1900, at Manchester. Mr. Ralph Hoffmann also informs me that a fine male was noticed in late May and early June, 1902, by Dr. W. R. Varick at Concord, where there may have been a breeding pair.

**207. Helminthophila rubricapilla** (Wils.). NASHVILLE WARBLER.

A common spring and fall migrant and rather common summer resident. It is of general distribution in damp bushy localities throughout most of the state and is common in certain portions of southwestern New Hampshire. Among the White Mountains it is scattered all over the higher peaks in the Canadian zone, and is fairly common up to the limit of small tree growth, or nearly 4,500 feet, and I have repeatedly noted birds at the head of Tuckerman's Ravine on Mt. Washington, in King's Ravine and elsewhere on the great range. During a trip over the Carter range, June 13 to 16, 1902, a large number of these birds was observed. They seemed to be very evenly distributed above 3,000 feet, and showed a preference for the birches, then just in bud, scattered through the balsam forest.

**Dates:** May 4 to September 13.

**208. Helminthophila celata** (Say). ORANGE-CROWNED WARBLER.

An accidental visitant, for which there is but a single valid record:—*Hollis*, a single bird taken May 16, 1876, by Dr. W. H. Fox ('76). Dr. Fox informs me that the specimen has been examined and thoroughly identified by competent authorities. The record by Mr. John Murdoch ('78) of a bird taken at Isles of Shoals has been shown to be a misidentification.

**209. Helminthophila peregrina** (Wils.). TENNESSEE WARBLER.

A rare spring and fall migrant and in the upper Canadian regions of the northern part of the state an uncommon summer resident. About Lake Umbagog the bird was stated by Mr. C. J. Maynard ('72) to be common, and more recently, Mr. William Brewster is quoted as saying that it is there found during the breeding season, generally in larch swamps, but sometimes among coniferous growths on the mountain sides. Among the White Mountains it is a rare and local summer resident. Dr. Walter Faxon ('89) records that in 1887 he and Mr. Bradford Torrey found two males in full song throughout the breeding season, "in some pasture land largely grown up to black spruce in Franconia, * * * * at a high level (some distance above the Profile House Farm)." In late May, 1888, the bird was detected in the same place, and "also in an extensive larch swamp in the lower part of the same town, where Mr. Torrey found it again in the latter part of the following month." Mr. Torrey has several times since recorded the bird from this locality. Elsewhere among the White Mountains it has not been detected in the breeding season so far as I am aware. In migrations the bird has been observed once in late May, 1897, at *Dublin*, by Mr. G. H. Thayer; one was captured on the *Isles of Shoals* Sept. 9, 1877, and recorded by Mr. John Murdoch ('78) on supposedly good authority as *H. celata*, but Mr. William Brewster ('82) who later examined the specimen pronounced it to be *peregrina*; one was noted at 4,000 feet on *Mt. Adams* on Sept. 2, 1884, by Dr. A. P. Chadbourne ('87); and Mr. C. F. Goodhue has taken it at *Webster*. According to Mr. F. W. Batchelder (:00, p. 133) it is a "rare transient visitant" at *Manchester*.

**Dates:** May 20 to September 9.

**210. Compsothlypis americana usneæ** Brewst. NORTHERN PARULA WARBLER.

A common spring and fall migrant, and a not uncommon summer resident of the thick, sub-Canadian forests, though found usually in spruce and hemlock woods where there is more

or less Usnea; it occurs frequently, however, in growths where there seems to be little of this moss, and delights to feed among red oaks. I have not observed it above 2,500 feet in the White Mountains, and it is hardly a common bird in the coniferous woods of that region.

**Dates:** May 3 to October 1.

**211. Dendroica tigrina** (Gmel.). CAPE MAY WARBLER.

A rare spring and fall migrant in the central and southern parts of the state, and an irregular summer resident of the Canadian forests to the north of the White Mountains. Mr. C. J. Maynard ('72) records it as formerly common at Umbagog, breeding in the thick evergreen woods, and according to Mr. Wm. Brewster ('95) it was a really abundant summer resident there from 1871–'75, but before 1879, had quite deserted the region. I do not know of its occurrence in summer among the White Mountains, though Mr. Bradford Torrey (:00) records that he observed a male in full song at the "Landaff Larch Swamp" among the Franconias, almost daily from the 22d of May to the 3d of June, 1899, after which date he was called away. Mr. G. H. Thayer writes of having twice observed the bird in fall at Dublin. Local observers record in the Proceedings of the Manchester Institute of Arts and Sciences, Vol. II, p. 82, that it was observed in some numbers at Manchester during the phenomenal warbler migration of May, 1900.

**Dates:** May 10 to September.

**212. Dendroica æstiva** (Gmel.). YELLOW WARBLER.

A not uncommon summer resident in the Transition valleys of the southern and western parts of the state, but rare or absent in the White Mountain valleys and northward. In the Merrimack valley the bird is common at least as far up as Concord, and elsewhere in the southern valleys it is of general occurrence. North of Lake Winnepesaukee it is very local. About Newfound Lake a small number annually breed, and at Ossipee, Mr. E. A. Preble has once found it nesting. Dr. Walter Faxon found a single pair in the willows on Gale river

among the Franconias about the summer of 1886, and Dr. J. A. Allen (Faxon & Allen, '88) records them at Bethleham and Franconia in 1874, though apparently the bird is now very rare or wholly absent from these regions in summer. I have never seen it about Intervale save in fall, although there seems to be suitable country for it. On September 11, 1899, I noted two in some bushes on the Saco meadows at Intervale, but have never seen others there. In the Connecticut valley the bird is fairly common at least as far up as Lancaster, where both Mr. F. B. Spaulding and Mr. H. W. Wright have found it in summer, and the latter gentleman observed a single bird singing in the western part of Jefferson on Aug. 12, 1901. A few also work up the side valleys farther south to some distance; thus Mr. G. H. Thayer has found it in Marlboro commonly, while farther up at Dublin it is rare.

**Dates:** May 9 to September 11.

**213. Dendroica cærulescens** (Gmel.). BLACK-THROATED BLUE WARBLER.

A fairly common summer resident of the rich, sub-Canadian woods, inhabiting the denser undergrowth along the forest brooks. Dr. W. H. Fox writes me that it breeds rarely at Hollis on our southeastern border, and Mr. G. H. Thayer finds it about Monadnock rather commonly. In central New Hampshire it is fairly common locally. Among the White Mountains it occurs commonly up to the 3,000 foot limit, above which I have rarely found it. On June 21, 1900, I observed a single male singing by the lake in Carter Notch at the altitude of 3,360 feet. The males continue to sing at intervals long after the breeding season, and I have heard their song in the woods at Intervale until the 17th of September.

**Dates:** May 10 to October 10.

**214. Dendroica coronata** (Linn.). MYRTLE WARBLER.

A very common spring and fall migrant, and a common summer resident of the Canadian fauna. It breeds rather sparingly in coniferous growth on the hills of the southwestern part of the state and along the height of land which bounds the Con-

necticut river basin on the east. I have no certain evidence of its breeding in the southeastern section of the state, though it may do so locally, and Dr. W. H. Fox has recorded ('84) taking an adult male at Hollis on June 25, 1883. Among the White Mountains, it is found to breed sparingly among the white pines in the river valleys so low as 520 feet at Intervale, while higher on the mountains it is fairly common up to 3,000 feet above which it is practically the only Dendroica, except *D. striata*, to occnr in any numbers. To the limit of scrub growth, at 4,800 or 5,000 feet, it is generally distributed, and I have noted it on numerous occasions at these upper levels on the Presidential and Carter ranges. In September, this species is often found in the valleys in considerable numbers, accompanying the little flocks of Bluebirds and Chipping Sparrows, and frequently is observed feeding with them on the ground, instead of frequenting the woods with the hordes of other migrating warblers.

**Dates:** Spring migration, April 23 to May 28; Summer; fall migration, September to October 23.

### 215. **Dendroica maculosa** (Gmel.). MAGNOLIA WARBLER.

A common spring and fall migrant, and a rather common summer resident of the sub-Canadian fauna. It breeds in small numbers among the spruce woods of Mt. Monadnock and locally elsewhere in southern and western New Hampshire, being here very strictly confined to the spruce growth. Among the White Mountains, it is common along the streams and in the damp thickets of spruce, hemlock, and fir, with an undergrowth of deciduous bushes, and reaches the altitude of 3,000 feet on the mountain sides, above which, however, it is very rare or entirely wanting. Mr. William Brewster ('77a) gives an account of the habits of this bird as observed by him in New England, wherein he states that he has found it generally distributed over high and low country alike, to the north of the White Mountains, and notes its arrival at Umbagog already by the 25th of May, 1876, while yet "not a leaf had unfolded, even in the most

sheltered places, and snow lay in large masses everywhere in the hollows and on northern exposures."

**Dates:** May 9 to Octocer 3.

**216. Dendroica pensylvanica** (Linn.). CHESTNUT-SIDED WARBLER.

A summer resident of the Transition area, common in the southern parts of the state, but becoming somewhat less plentiful among the White Mountain valleys. Mr. Maynard ('72) reports it as "not very abundant" at Umbagog, where also it breeds. It is generally confined to open bushy fields, or clearings grown up with sprouts and bushes. Among the White Mountains it is found mostly in the valley bottoms, but is quick to take advantage of sprout growth in newly-made clearings even far in the woods. Thus during the winter of 1898–99, a considerable area of beech woods was cut on the west slope of Mt. Bartlett at about 1,000 feet, and during the following year there sprang up a considerable growth of sprouts. The next spring a pair of Chestnut-sided Warblers was found to have ensconced themselves there. In another case, a pair was found at slightly over 2,000 feet on the Carter Notch trail, where a bushy growth had arisen in a clearing made in the depth of the forest about a lumber camp. Mr. E. A. Preble has also observed about Ossipee the same readiness of these birds to quickly occupy the young growth following the clearing off of woodland, a fact which shows that in the keen struggle for existence, this species is not slow to take advantage of an increase in the available living area.

**Dates:** May 6 to September 25.

**217. Dendroica castanea** (Wils.). BAY-BREASTED WARBLER.

A rather rare spring and fall migrant in the southern parts of the state, but sometimes common, as in May, 1901. In the White Mountains and northward it is a fairly common summer resident mainly of the upper Canadian zone. The range of this species in summer overlaps that of the Black-poll Warbler for about 1,000 feet, and extends below it to nearly an equal

amount. Thus one finds breeding birds at an altitude of from 1,800 feet in rich, damp coniferous woods on southern exposures, up to about 4,000 feet among the small balsam timber. The two birds in respect to their ranges are perhaps somewhat comparable to the Olive-backed and the Bicknell's Thrushes, the former inhabiting the lower altitudes and ranging upward into the stronghold of the latter. Mr. C. J. Maynard found this a common breeding bird at Lake Umbagog thirty years ago, though apparently he did not observe *D. striata* breeding there. Mr. F. H. Allen tells me that on the Sandwich range he has found the bird common in the breeding season in the vicinity of Waterville. Mr. M. Chamberlain ('91, Vol. I, p. 238) has also recorded that a nest was found on Mt. Chocorua by Frank Bolles, but the identification appears not to have been certain. South of this range, I have no actual evidence of the breeding of this species, but Mr. C. F. Goodhue ('77a, p. 33) has recorded that young birds hardly able to fly and still fed by their parents, were observed at Webster in the latter part of July about 1875. Mr. G. H. Thayer also writes me that he observed a pair in late May, 1897, in a deep hemlock and deciduous wood on Monadnock, with nesting material in their bills, and states that they showed great anxiety when their vicinity was approached. Whether or no the birds did nest was not ascertained. In fall, owing to the difficulty of distinguishing this species from the Black-poll Warbler, observations are less easy to make, but I am inclined to think they migrate more or less with the latter, and I have taken specimens in the woods at 2,000 feet from mixed flocks of warblers. In the month of May, 1900, owing to the occurrence of cold waves, these and other northbound migrants lingered in unusual numbers throughout southern New England instead of passing by to their breeding grounds.

**Dates:** May 14 to 28; Summer to September.

**218. Dendroica striata** (Forst.). BLACK-POLL WARBLER.

A very common spring and fall migrant over the southern parts of the state, and a common summer resident of the upper Canadian zone on the White Mountains and northward. On

the higher mountains of the outlying Sandwich range, which includes several peaks of 4,000 feet or over, Mr. F. H. Allen has found this species in summer and in this same region has noted it in the Mad River Notch at Greeley's Ponds (2,000 feet) and in small numbers as low as 1,500 feet near Waterville. Frank Bolles ('93b) also mentions having come upon a pair of these birds on July 14, on a high ridge of Chocorua. Among the White Mountains, the birds are found throughout the damp balsam forest above 3,000 feet on southern slopes, though on the north sides of the mountains they breed at a much lower altitude, following down the cool mountain streamlets. This influence of slope exposure on distribution was well seen in a walk through the Pinkham Notch on June 23, 1900. Starting at a point below the Glen House on the north side of the divide, the road gradually rises until the height of 2,000 feet is reached and it then decends on the southern slope of the divide, towards the Saco valley. On the north side of the divide, I noted a number of Black-poll Warblers on this walk from an altitude of 1,500 feet to the top of the water shed, 2,000 feet at the highway. They were among the fir balsams and spruces by the roadside in the valley of the West Branch of the Peabody river which flows out from the Great Gulf. Not a Black-poll was heard or seen on the south side of the divide, nor was the vegetation so well suited to their requirements, being mostly of mixed and deciduous growth. The 3,000 foot limit is about as far down on the south slopes of the mountains as the bird breeds, except of course where peculiar local conditions obtain; and from that height up to the limit of scrub growth, at from 4,800 to 5,000 feet, it is one of the most characteristic birds of the mountain-top fauna. Most of the Black-polls cease singing by August, though on trips into their country during the last week of that month, I have heard a few still in song. On September 14, 1900, while in camp at Carter Notch (3,360 feet) where the birds are common all summer, I observed an individual in the fall plumage as it sang again and again among the stunted fir trees; and during a long walk over the range on the same day two or three others were heard singing. On the following morning, September 15th, what may have been the same bird as

previously noted, was again singing with all its springtime vigor about the camp. I also heard a few singing in early September, 1901, while on a trip over this range. These I take to be the resident birds still on their breeding grounds, as I have never observed the migrants at low altitudes singing in fall. Under the head of *Migration*, I have detailed some observations on the interesting movements of the Black-poll Warblers, and it may be again remarked that they appear to migrate along the mountain tops in fall, keeping generally above 2,000 feet or so, and uncommonly appearing in the valley bottoms at this season among the White Mountains, though after the central parts of the state are reached, they flood the low country as we are accustomed to see in Massachusetts. In the lower part of the state, the spring migration is over by early June, and the fall migrants again appear in late August or early September.

**Dates:** May 8 to October 10.

**219. Dendroica blackburniæ** (Gmel.). BLACKBURNIAN WARBLER.

A rather common summer resident of the sub-Canadian woods, especially those of mixed hemlock and deciduous growth. In the southern part of the state, Dr. W. H. Fox writes that it breeds at Hollis, and it is well known to nest about Mt. Monadnock and northward along the ridge forming the eastern rim of the Connecticut valley basin. In the White Mountain region, it is common in the white pine and spruce woods up to about 3,000 feet, but above this level only a few scattering pairs occur. Dr. A. P. Chadbourne ('87) records seeing a single bird at 3,800 feet on Mt. Washington on July 8, 1886.

**Dates:** May 4 to September 10.

**220. Dendroica virens** (Gmel.). BLACK-THROATED GREEN WARBLER.

A very common spring and fall migrant and a common summer resident, breeding most plentifully in the pine and spruce woods of the sub-Canadian area. In such growths, it is very common in the White Mountains up to about 2,000 feet. A few pairs penetrate still farther up the mountain sides into the

lower edge of the upper-Canadian fir growth. Thus I have observed a bird singing by the lakes in the Carter Notch (3,360 feet) on June 20, 1900, and another by Hermit Lake (3,800 feet) on Mt. Washington on the same day.

**Dates:** (April 26) May 1 to October 5.

**221. Dendroica vigorsii** (Aud.). PINE WARBLER.

A rather common spring and fall migrant in the southern part of the state, and as a summer resident not uncommon locally in the Transition valleys and lowlands as far north as the White Mountains. It is largely confined during the breeding season to groves of pitch pine (*Pinus rigida*) though where these trees are not to be had, it will occasionally take to the white pines (*Pinus strobus*). In the Connecticut valley, Mr. R. Hoffmann has found this bird in small numbers as far up at least as Cornish, during the summer. In central and southern New Hampshire, it is not rare in the breeding season, but farther north, especially in the lowlands about Ossipee, where, on a large tract of dry sandy soil there is an extensive growth of pitch pines, the bird is fairly common. Here, on April 21, 1900, before the snow was off the ground, I found a few of these Warblers singing, they having evidently just arrived. Still farther up the state, a few are found every year in the dry pine woods at North Conway and Intervale in the Saco valley. At Intervale three or four pairs summer annually in the white pine woods at about 500 feet, there being no growth of pitch pine of any size. In the fall migration I have never found the bird here in any numbers, though single ones are of occasional occurrence with the flocks of Chickadees and other small birds in the woods, or even with the Chipping Sparrows and Bluebirds on the open meadow lands till late September, and I have heard occasional birds singing up to the 22d of that month.

**Dates:** April 21 to September 25.

**221. Dendroica palmarum** (Gmel.). PALM WARBLER.

An uncommon fall migrant. Dr. A. P. Chadbourne ('84) was the first to record its presence in the state on the strength of a specimen shot at *Shelburne*, in the Androscoggin valley, on

September 16, 1884. This bird was in company with a large flock of Warblers, Chickadees and other small birds among some low birches by the roadside. In the Saco valley at *Intervale*, I have found this species in small numbers usually in company with flocks of Bluebirds, Chipping Sparrows and Myrtle Warblers on the meadows, and have taken specimens between the 8th and 14th of September. Its reported presence at Manchester in spring is doubtless an error (Proc. Manchester Inst. Arts & Sci., Vol. II, p. 82, 1901).

**Dates:** September 8 to 16.

**223. Dendroica palmarum hypochrysea** Ridgw. YELLOW PALM WARBLER.

A migrant, common in spring and less common in fall. This bird appears in the White Mountain valleys after the middle of September, and usually is found on the intervales in company with small flocks of Chipping Sparrows and Bluebirds.

**Dates:** April 13 to May 10; September 16 to October 9.

**224. Dendroica discolor** (Vieill.). PRAIRIE WARBLER.

A very rare summer resident in the Transition valley bottoms of the southeastern part of the state. Two nests and an egg, taken at Northfield about 1880, have been recorded as belonging to this species, by Mr. F. H. Herrick ('83) who identified the specimens. The identification, in the light of our present knowledge, cannot, however, be considered as conclusive evidence that the Prairie Warbler occurs in summer so far north in the state. H. D. Minot's statement ('76) that the Prairie Warbler occurs at Bethlehem among the White Mountains, is generally discredited, and doubtless with reason. The only authentic records for the state appear to be the following: —*Hollis*, three birds taken by Dr. W. H. Fox, an adult male June 28, 1884, "in company of half grown young," one bird unsexed, shot August 23, 1876, and an adult female taken September 4, 1876; *Manchester*, a small colony is reported as found among an extensive growth of scrub pines and oaks in the early summer

of 1901. The birds were observed here by several persons, and also recorded by "Pinfeather Ornithologist" (:01, p. 33).

**225. Seiurus aurocapillus** (Linn.). OVEN-BIRD.

A common summer resident of the Transition and sub-Canadian areas, most plentiful in the rich shady woods of mixed growth, which it inhabits in the White Mountains up to nearly 3,000 feet. A few linger among the mountains until the last of September, and Dr. W. Faxon tells me that he observed one at Warren on the late date of October 2, 1895.

**Dates:** May 4 to October 2.

**226. Seiurus noveboracensis** (Gmel.). WATER-THRUSH.

A rather common spring and fall migrant and less common summer resident in the thick swamps of the Canadian fauna. It is said to be a common breeding bird about Lake Umbagog, and in the upper Canadian woods of the White Mountains it is found in summer about the cold streamlets on the mountains, or at lower elevations in wooded swamps. Mr. E. A. Preble has noted it as fairly common in such localities in the neighborhood of Ossipee. Mr. G. H. Thayer informs me that in a small wood swamp near Dublin, he has annually found a pair, and believes they breed there. At Intervale, I have rarely found the bird in June in the lowlands, and as early as the 10th of July, single individuals appear in the valley along the edges of shaded pools and brooks, whither they may have come from the immediate neighborhood.

**Dates**: May 15 to September 21.

**Note: Seiurus motacilla** (Vieill.). LOUISIANA WATER-THRUSH.

Mr. G. H. Thayer (:02) records having observed on Aug. 19, 1901, at Dublin, a bird which he feels convinced was of this species, though he admits that the record cannot be considered as more than an expression of his own conviction.

**227. Geothlypis agilis** (Wils.). CONNECTICUT WARBLER.

A rare fall migrant of rather irregular occurrence, sometimes appearing rather commonly for a few days. Mr. C. F. Good-

hue has observed the bird at Webster on several occasions. Elsewhere in the state, Dr. A. P. Chadbourne ('85) has recorded a female shot on September 14, 1884, on Mt. Baldcap in the town of Success, at an altitude of about 800 feet. Mr. G. H. Thayer writes me of one observed at Dublin on October 3, 1899. One was also shot by Mr. R. H. Howe, Junior, on September 6, 1899, at an altitude of about 2,000 feet on the Carter Notch trail, Jackson.

**Dates:** September 6 to October 3.

**228. Geothlypis philadelphia** (Wils.). MOURNING WARBLER.

A not uncommon summer resident, from the White Mountain valleys northward, being mainly confined to the tangles of bushes, grapevines, and blackberry canes on the edges of woods or along the mountain brooks; as a migrant, it is only rarely seen in the southern part of the state. It is said to be common about Lake Umbagog in summer and Dr. Walter Faxon has found it in small numbers during the breeding season about Mt. Moosilauke and North Woodstock. At Intervale, during the summer of 1899, three pairs bred in bushy spots on the outskirts of a sugar maple grove by the Saco river, the same grove, it may be added, that harbored a pair of Screech Owls and a Wood Thrush. These three pairs I observed almost daily for a large part of the summer. The song period was practically over by the middle of July, but the birds still lingered about their chosen locality until early September. During the first twelve days of July, I occasionally heard the males sing a flight song corresponding to the Maryland Yellow-throat's. This was usually given as the bird flew slantingly downward from a height of some 20 feet, though on one occasion, a bird after a period of silence, suddenly flew out from the bushes in which it had been concealed, nearly straight upward toward a bare limb of a white maple some 40 feet from the ground. Just before it reached the branch it burst into a short, ecstatic song and then settled on the chosen perch. I have found scattered pairs along the Pinkham Notch road, and in the Wildcat Valley have traced them up to the divide in Carter Notch at an altitude of

slightly over 3,000 feet. They avoid the forest, however, and are more frequent in low growth along open spaces.

**Dates:** May 19 to September 13.

**229. Geothlypis trichas brachidactyla** (Swains.). NORTHERN YELLOW-THROAT.

A common summer resident of swampy, weed-grown localities in the Transition and sub-Canadian areas, following the valleys up to about 2,000 feet in the White Mountains.

**Dates:** May 8 to October 7.

**Note: Icteria virens** (Linn.). YELLOW-BREASTED CHAT.

According to T. M. Brewer ('78, p. 303) a nest and four eggs of this bird were taken in the summer of 1877 at North Conway, by his "young friend, C. A. Hawes." It seems unlikely, however, that so southern a bird should breed thus far to the northward, and until a well authenticated specimen can be shown from the state it should not be given a place among the birds of New Hampshire. Careful search on our extreme southeastern borders might nevertheless establish its occasional presence there.

**230. Wilsonia pusilla** (Wils.). WILSON'S WARBLER.

An uncommon spring and fall migrant and a rare summer resident in the upper Canadian faunal area. Mr. F. B. Spaulding ('94) has recorded finding a nest with four eggs on June 5, 1894, near Lancaster. The female bird, he states, was captured on the nest. Dr. Walter Faxon informs me, also, that he observed a single bird below Warren Village on June 4, 1895, perhaps a late migrant. I have never found the bird among the White Mountains in the breeding season, and although Mr. C. J. Maynard ('72) quotes Mr. William Brewster as authority for its presence during summer at Gorham, it appears that the birds in question were probably early fall migrants. At Intervale, the first fall migrants appear in the valley about the middle of August, my earliest date being on the 15th of that month. Single birds are usually found, or more rarely two may be observed accompanying a flock of other Warblers and Chickadees in a damp, bushy locality. Dr. Walter Faxon has observed the bird at Warren so late as October 3d.

**Dates:** May 13 to October 3.

**231. Wilsonia canadensis** (Linn.). CANADIAN WARBLER.

A common spring and fall migrant, and less common summer resident within the Canadian faunal area. It is common in summer in the White Mountain region along the forest brooks grown up with spruce, balsam and a tangle of hobble bush, where the dampness keeps the ground deeply carpeted with moss; and in similar situations it occurs locally throughout the state, though in central and southeastern New Hampshire it is far from common. Mr. G. H. Thayer finds it in considerable numbers in the deep, well-watered woods about Mt. Monadnock. The greatest altitude at which I have observed breeding birds is 3,360 feet in the Carter Notch, where on June 21, 1900, a bird was heard singing by the lakes.

**Dates:** May 13 to September 13.

**232. Setophaga ruticilla** (Linn.). AMERICAN REDSTART.

A common migrant and summer resident of the Transition and sub-Canadian woods throughout the state. On the White Mountains it is fairly common in the deciduous and mixed woods up to about 3,000 feet, and appears to be commoner in such localities than about the village shade trees and the orchards. The Redstart is the "Paul Pry" of the woods, and in the northern forests I have usually found it to be about the first bird on the scene whenever a passing Blue Jay or other intruder appears.

**Dates:** May 4 to September 21.

**233. Anthus pensilvanicus** (Lath.). AMERICAN PIPIT.

A migrant, uncommon in spring but more numerous in fall. Inland, the bird appears to be rare in spring, though on the coast it is of regular occurrence. Messrs. Goodhue and Dearborn have noted it in spring in Belknap and Merrimack Counties. In the White Mountain valleys, I have usually observed it in small flocks after the 15th of September.

**Dates:** April to May 10; September 15 to November.

**234. Galeoscoptes carolinensis** (Linn.). CATBIRD.

A rather common summer resident of the Transition areas, following the valleys up to the outskirts of the White Mountains and reaching the lower country to the north of that range, as at Jefferson where it occurs sparingly. At Intervale, a few pairs are annually to be found in the river bottom, or rarely on the sides of the valley up to 500 or 600 feet. I know of one pair, presumably the same birds, which has nested for at least three or four consecutive years in the same isolated clump of bushes by a brook on the edge of our meadows. These birds, which I used often to watch, were frequently found to be active until it was quite dusk and after most of the other diurnal species had quieted down for the night. Mr. Bradford Torrey has observed this bird in Franconia up to Oct. 5, and a Mr. D. L. Oliver ( : 02 ) records one observed at Concord so late as the 3d of December, 1901.

**Dates:** May 6 to October 5 (December 3).

**234. Toxostoma rufum** (Linn.). BROWN THRASHER.

A summer resident within the Transition areas. In southeastern New Hampshire it is not uncommon but elsewhere it is found in less numbers following the river bottoms up into the White Mountain valleys. At Intervale, I have usually found two or three pairs each year in the fringe of vines and bushes on the banks of the Saco River. In a considerable stretch of rolling sandy country grown up to bear oak and grey birches in the vicinity of West Ossipee and Tamworth, these birds are fairly common, haunting the thickets with the Towhees. To the north of the White Mountains, I am not certainly aware of the presence of this bird, nor does Mr. F. B. Spaulding include it in a manuscript list of birds seen by him at Lancaster. Dr. W. Faxon has noted it at Warren.

**Dates:** April 16 to September.

**235. Thryothorus ludovicianus** (Lath.). CAROLINA WREN.

An accidental visitant from the south, having been once recorded at *Rye Beach*, where Mr. H. M. Spelman ('81a) on

August 7, 1880, shot one bird and saw at the time a second, which, however, he failed to secure. These birds were "in a thick piece of woods" in which Mr. Spelman was collecting. The sex of the specimen killed, is not stated. Mr. R. Hoffmann also writes me that a single one was observed singing at *Alstead*, on July 6, 1903, for part of that day only.

**236. Thryomanes bewickii** (Aud.). BEWICK'S WREN.

An accidental visitant from the south. The only record is of a bird shot at *Alton*, on April 25, 1890, by Mr. Ned Dearborn ('98, p. 32). Mr. William Brewster has examined this specimen and confirms the identification. Mr. Dearborn remarks that "this wren is not often found in New Hampshire," and it may be added that this record is not only the sole one for New Hampshire, but for New England as well.

**237. Troglodytes aedon** Vieill. HOUSE WREN.

An uncommon summer resident of the Transition valleys in the southern and central parts of the state. In the Connecticut valley I have found it rather common about Walpole, and it occurs at least as far up as Lancaster where Mr. F. B. Spaulding has observed it. In central New Hampshire it follows the course of civilization along the valley bottoms, but appears to be rare north of Lake Winnepesaukee. At Intervale a pair has summered for several consecutive seasons about an apple orchard near our grounds, and I have also found it in summer at North Conway, the nearest village to the south in the Saco valley. Mr. C. J. Maynard ('72) has even recorded the bird from Lake Umbagog, where he states it is rare. Mr. F. H. Allen has also once seen the bird in early summer at Jefferson on the north side of the White Mountains.

**Dates:** May 18 to September 24.

**238. Olbiorchilus hiemalis** (Vieill.). WINTER WREN.

A rather common spring and fall migrant, and, throughout the Canadian area, a summer resident of very general distribution along the cold brooks and swamps in the deep forest; it is also a very rare winter resident in the southeastern part of the state. Thus Dr. W. H. Fox writes me that at Hollis he ob-

served a male on February 19, 1875, and again on March 16 of the same year. The weather was cold at the time, thermometer 4 degrees below zero. Mr. W. E. Cram ('99) also records one seen at Hampton Falls in late December, 1897, and a Mr. J. H. Johnson ('92) records one seen in "central New Hampshire" on Nov. 25, Dec. 5 and Dec. 12, 1892. Throughout the northern part of the state, the bird is common as a summer resident in suitable localities. In the White Mountains it is common along all the little forest brooks up to their very sources. Thus in Tuckerman's Ravine, and at the head of the Great Gulf on Mt. Washington, a few are to be found among the scrub, where the mountain streamlets keep the mossy ground saturated, so high up as 4,500 feet. To the south of the White Mountains it breeds here and there at the lower elevations as where, on the northern exposures of hills, a growth of balsam and spruce forms a cold swamp or borders a dashing mountain stream. In such localities, the bird is not uncommon about Newfound Lake. Mr. C. F. Goodhue ('77a, p. 33) also notes a male in full plumage and song taken on South Kearsage, June 22, 1875. Mr. Ralph Hoffmann has once observed the bird at Marlow in the summer of 1900, and Mr. G. H. Thayer writes me that it breeds sparingly in the woods of Mt. Monadnock. In the Carter Mountains, about the lakelets in the Notch, it is not unusual to hear half a dozen birds singing from the dense forest round about, or from the wooded cliffs above. Long before daylight, their songs break the morning stillness, as one bird after another takes up the melody. Here they stay on their breeding grounds until at least the middle of September at which date I have heard occasional birds still singing in the early morning about the Carter lakes (3,360 feet).

**Dates:** April 5 to November 15 (Winter).

**239. Cistothorus stellaris** (Licht.). SHORT-BILLED MARSH WREN.

A rare and local summer resident in the southeastern part of the state. Mr. H. M. Spelman ('82) was the first to record the bird's breeding in the state. He found at Rye Beach on the 24th of August, 1882, some half a dozen birds inhabiting a

small fresh-water meadow about a mile from the sea. He also states that Mr. William Brewster found the bird in 1872, about five miles farther inland from this locality. Mr. W. E. Cram writes me that at Hampton Falls a few miles south of Rye Beach, the bird breeds in a swamp in the western part of the town. Mr. F. W. Batchelder (:00, p. 136) records further that at Manchester, in 1899, a nest was found in the Cohas Brook meadows. Still more recently in 1902, Mr. G. H. Thayer has discovered a pair of these wrens in a certain grassy swamp at an elevation of slightly over a thousand feet at Dublin. Throughout June the male was often seen singing, and on August 5th an old nest was found. Elsewhere in the state, I have no knowledge of its presence, save at Intervale where I shot an immature female specimen on September 15, 1898, as it was hopping about among some corn growing on the Saco meadows. The bird must have been a migrant, but its presence so far north as this valley in the mountains must be exceptional. It is now in the Howe-Shattuck collection, No. 936.

**Dates:** May 23 to October 4.

**240. Certhia familiaris americana** (Bonap.). BROWN CREEPER.

A permanent resident, confined during the breeding season to the thick coniferous woods of the Canadian faunal area, where, however, it is rarely common, though of general distribution. As a winter resident, it is fairly common throughout the lower parts of the state. Among the White Mountains it occurs in summer at least as high as 4,100 feet where I have seen it among the small timber in Tuckerman's Ravine. Mr. William Brewster ('79b) has given a good account of the nesting habits of this species about Lake Umbagog where it breeds not uncommonly in the deep woods, eggs being found from May 31 to June 23. At Intervale, I have usually found a pair or two among the big pines at about 525 feet. A few also regularly breed in the hill country in the western part of the state. Mr. G. H. Thayer writes me that it breeds sparingly on Mt. Monadnock above 1,500 feet. I have found a few birds in winter so high as 3,000 feet in the Carter Mountains.

**241. Sitta carolinensis** Lath. WHITE-BREASTED NUTHATCH.

A permanent resident, of common occurrence throughout the year in the Transition portions of the state and less common in the sub-Canadian areas. Mr. C. J. Maynard found it a common resident at Errol in 1870. In the White Mountains, I have usually found it in the wooded valley bottoms, and less often in the beech growth on the mountain sides up to 1,500 or 2,000 feet.

**242. Sitta canadensis** Linn. RED-BREASTED NUTHATCH.

A common permanent resident, confined during the breeding season to the Canadian fauna. In summer, this species entirely replaces *S. carolinensis* above 3,000 feet on the White Mountains, and is commonest from that level up to 4,500 feet in the thick forest of living and dead firs and spruces. In small numbers, it regularly breeds along the height of land in the western part of the state, and sporadically over the more southern districts. Mr. C. F. Goodhue ('77a, p. 33) has recorded it as nesting on South Kearsarge; Mr. Ned Dearborn ('98, p. 33) also notes it as nesting in central New Hampshire, and Mr. G. H. Thayer finds it regularly about Mt. Monadnock. In late summer and fall the birds wander about with the flocks of other small birds and even occur now and then above the upper limit of tree growth on the Presidential range. Thus Dr. A. P. Chadbourne ('87) records one seen on Sept. 2, 1884, running over the bare rocks on the summit of Mt. Clay, and Mr. Bradford Torrey has seen them on one or two occasions at this season scrambling about on the roof of the Summit House on Mt. Washington. Most of the birds move down into the valleys and the southern parts of the state during winter. In some seasons they are extremely abundant, and again few are seen. Dr. W. H. Fox writes me that at Hollis, in 1886, they were very abundant during late June and all of July. In 1895, they swarmed throughout the White Mountain forests in fall. They were also fairly abundant in 1899 over parts of the state, though in the

following summer and fall, they seemed strangely absent from much of the northern woods.

**243. Parus atricapillus** Linn. CHICKADEE.

A common permanent resident throughout the Transition and sub-Canadian areas. On the White Mountains, it is rarely observed much higher than the 3,000 foot limit during the breeding season, giving place about that level, to the Hudsonian Chickadee. After the nesting period, small family parties, consisting of the parent birds and their several full grown young, are frequent in all the woodlands, and rarely they wander up into the small timber growth to perhaps 4,000 feet, on the mountains. The immature birds are easily to be distinguished by their notes which somewhat resemble those of the Hudsonian Chickadee. In late summer, many warblers, nuthatches, kinglets, and vireos join these small flocks of Chickadees, and form large bands which rove through the forests in an apparently aimless way, searching for food. After the warblers and other birds of passage have left, these little flocks still hunt through the winter woods going at least as high as 3,400 feet, at which level in late December I have seen them in Carter's Notch. In April, these flocks break up, and the birds pair off to nest. Often at this season is heard their plaintive love note, and a whistled imitation, though usually disregarded at other seasons, is now eagerly answered by any single bird within hearing, and seldom have I failed on such occasions to bring the bird to the trees over my head. Sometimes, by continuing to imitate the note as I walked along, I have had a lone Chickadee follow me for over a mile, answering note for note. I have sometimes noticed also that birds which have evidently paired already, will pay no attention to the call even after many repetitions.

**244. Parus hudsonicus** Forst. HUDSONIAN CHICKADEE.

A rather common permanent resident of the upper-Canadian area on the higher White Mountains and in the northern part of the state. During the breeding season, it is confined, on the White Mountains, to the damp fir and spruce belt from 3,000

feet to the upper limit of small tree growth at 4,800 to 5,000 feet, though not at this time often seen above the timber, which extends to some 4,500 feet on the southern exposures. South of the great range, I have observed it in summer on Mt. Carrigain and on Mt. Hancock, and it is to be looked for on the higher peaks of the Sandwich range. In late summer, small flocks are frequently met with trooping through the evergreen forest and usually accompanied by a few Black-poll and Myrtle Warblers and a pair or two of Red-breasted Nuthatches or Golden-crowned Kinglets. These flocks in their wanderings reach the extreme upper limit of scrub growth on the mountains, and I have observed them on such occasions at Madison Hut, on the west side of Mt. Adams, and at the summit of Carter Dome (4,860 ft.). They move downward into the valleys as late fall and winter approach. Thus Mr. C. J. Maynard ('72) found them quite common in late October, 1869, in the heavily wooded mountain valleys at Errol. Frank Bolles ('93b) noted them repeatedly about Chocorua in December, single birds being usually seen, though once he mentions a flock of four on December 22d; he also mentions one at Whitten Pond on November 7th. Mr. G. C. Shattuck has twice observed the bird near Albany Intervale during the last of December, 1900, and again on February 17th, of the following year. Doubtless however, a large part of the birds remain throughout the winter at high altitudes, and I have observed one or two at about 3,000 feet on the Carter Notch trail during the last of December, 1900, after severe weather. Rarely, straggling birds reach the country to the south of the White Mountains in fall or winter; thus Mr. C. F. Goodhue ('85) records one shot at Webster in November, 1875, and two seen there in November, 1878, and I am told of two specimens taken near Mt. Monadnock in winter, by Mr. H. L. Piper. Mr. A. A. Eaton, of Seabrook, writes me of one taken February 15, 1890, in Salisbury, Mass., but a few yards from the state line.

**245. Regulus satrapa** Licht. GOLDEN-CROWNED KINGLET.

A permanent resident, confined during the breeding season to

the Canadian area. It is common as a spring and fall migrant throughout the state and less common as a winter resident at least as far north as the coniferous forests of the White Mountains. In southern and central New Hampshire it is found in summer almost wholly in spruce woods, and sometimes a pair will spend the entire season in a grove of these trees of very small extent. On the White Mountains, the birds occur in the warmer months up to the limit of tree growth at 4,800 feet as I have noted on Mt. Madison. In the Carter Mountains on Sept. 5, 1899, I observed considerable numbers of Kinglets in the thick balsam forest on Carter Dome (4,860 feet). In flocks of from four or six birds to in one case forty, they seemed to be moving down the mountain, passing us by as we ascended. Mr. G. H. Thayer finds this a common breeding bird in the spruce woods of Mt. Monadnock and at other places in the southwestern part of the state it occurs locally in summer.

**246. Regulus calendula** (Linn.). RUBY-CROWNED KINGLET.

A common spring and fall migrant. It is not positively known to summer in the state, and Mr. F. H. Allen is now inclined to the belief that the birds noted by him ('89) as seen in early August, 1885, at Moultonboro, were not of this species. The first fall migrants appear in the White Mountain valleys in early September, and I have seen them at Intervale by the 9th of that month.

**Dates:** April 14 to May 11; September 9 to October 10.

**Note: Polioptila cærulea** (Linn.). BLUE-GRAY GNATCATCHER.

This species is recorded in Vol. 2 of the Proceedings of the Manchester Institute of Arts and Sciences (pp. 77, 83) as having been seen at Manchester on May 10, 1900, by two ladies. Although the Blue-gray Gnatcatcher is known from southern Maine, and might thus accidentally occur in New Hampshire, its presence in the state does not seem sufficiently authenticated to warrant its inclusion in this list.

**247. Hylocichla mustelina** (Gmel.). WOOD THRUSH.

A rare summer resident, of occasional occurrence in the Transition valley bottoms so far north at least as the White Mountains. Apparently this bird has slightly extended its range

within the last five or six years, but so far as I can ascertain in New Hampshire, this appears not to be noticeably at the expense of any other species. On the coast, Mr. W. E. Cram has noted it in summer at Hampton Falls. In the Merrimack valley, Mr. F. W. Batchelder (:00) gives it as a summer resident about Manchester, and at Concord I am informed of its presence by Mr. W. W. Flint. Mrs. E. E. Webster also writes of having observed it at Franklin Falls on May 21, 1900, and Mr. Ned Dearborn ('98, p. 34) records it from Franklin on local authority. In the southwestern part of the state, a few reach the lower Connecticut valley and Mr. Ralph Hoffmann has observed it at Alstead in 1899 and 1900. Mr. G. H. Thayer assures me that up to about 1895 he had never seen the bird about Dublin, but that it now appears annually in small numbers about Dublin Lake, and occurs also at Keene, Hancock and Marlboro, preferring the sugar maple groves. Evidently these birds have followed up the side valley from the Connecticut. Farther to the northward, I have observed a single bird at Wonalancet on the Birch Intervales, July 14, 1899. Mr. F. H. Allen has also observed one on June 7, 1900, at Chocorua. In the Saco valley at Intervale, I had never seen the Wood Thrush until July 5, 1899, when I found a bird singing among some undergrowth in a large grove of sugar maples by the river. The bird was observed singing in the same spot the following year on June 18th. Dr. Walter Faxon also tells me that he observed two Wood Thrushes singing near Mt. Moosilauke on June 20, 1894, and two others in song on the Breezy Point road, North Woodstock, on June 1, 1895. In the latter instance the birds were at so considerable an elevation as about 2,000 feet. More recently, Mr. Bradford Torrey ( :00) has for the first time found it in the Franconia woods, two birds in full song being noted in late May and early June, 1899. In one case, at least, the bird was in a large sugar maple grove. Mr. Horace W. Wright ( :02) has recorded the bird for the first time to the north of the White Mountains in the Jefferson valley in 1902.

**Dates:** May 15 to September.

**248. Hylocichla fuscescens** (Steph.). WILSON'S THRUSH.

A common summer resident throughout the Transition valley bottoms, frequenting the courses of shaded streams. In the Connecticut valley of southwestern New Hampshire, this is a very common bird, nesting along the river banks among the rank growth of Equisetum. It is common in the White Mountain valleys on both sides of the main range, and follows up the side branches of the rivers to about 1,500 feet, thus reaching well into the lower edge of the sub-Canadian area. At Intervale, these thrushes occur in bushy places all over the valley floor of the Saco, and numbers follow back the little side streams well up onto the mountain sides. so that it is possible in some places to hear the Hermit, the Olive-backed and the Wilson's Thrushes all singing at once. I observed a single bird singing in the wet woods at 1,700 feet on June 16, 1902, at Jackson.

**Dates:** May 10 to September 8.

**249. Hylocichla aliciæ** (Baird). GRAY-CHEEKED THRUSH.

A rare migrant. Mr. G. H. Thayer writes me of a male shot at Dublin on Oct. 2, 1899, by Mr. L. A. Fuertes, who identified it as of this species.

**250. Hylocichla aliciæ bicknelli** Ridgw. BICKNELL'S THRUSH.

A common summer resident of the upper Canadian zone on the higher mountains of central New Hampshire. Mr. Bradford Torrey, in 1882, was the first to call the attention of ornithologists to the presence of this bird in summer on the White Mountains, and Mr. William Brewster ('83a) took the first New England specimens on Mount Washington in the same year. It is plentiful in the damp, stunted fir growth above 3,000 feet on all the larger mountains, and on the Presidential range occurs as high as the upper limit of stunted tree growth. South of the main ranges, it doubtless breeds in small numbers on the Sandwich range, where Mr. F. H. Allen has found birds in late June on Tripyramid (4,184 feet) and Black Mountain (3,900 feet) as well as on Osceola and Tecumseh (both over 4,000 feet) and has also heard them singing June 7, 1900, near the top of Mt. Chocorua (3,508 feet) the easternmost mountain of this range.

Frank Bolles appears not to have observed the bird here in summer, however, nor did I find it during a day and night spent near the summit of Chocorua in late August. On Moat Mountain, an adjacent ridge, I have nevertheless observed a single bird on July 17, 1898, in a damp thicket of spruces at hardly more than 2,700 feet, and others in early September, 1902, in the stunted growth at 3,000 feet. Dr. Walter Faxon tells me that at Mount Moosilauke. he has found these birds arriving on their breeding grounds between the 25th and 30th of May, and that a nest was observed there by Mr. William Brewster and himself, which on June 22d, contained the full complement of three fresh eggs. On the Presidential and Carter Mountains, where I have been familiar with the bird, an occasional outlying pair may be found as low as perhaps 2,600 feet in some cold brook bed, but they are commonest from about 3,300 feet up to the limit of small tree growth, at about 4,800 feet. They are silent much of the day, and are effectually concealed in the almost impenetrable thickets of scrub growth. In the early dawn and after sunset, they are active, however, and from all sides may be heard their clear, wild call-note, or less often the far-away, high-pitched notes of their song, strangely impressive in the mountain solitudes. The song period is practically over by the middle of July, though I have heard an occasional song in the early morning as late as September 15th, in Carter Notch, where at this date the birds are still on their breeding grounds. They are then only to be heard, however, in the very early morning or just at dusk. On September 15, 1900, while camping in the notch by the lakes (3,360 feet), I arose early and by 4 o'clock A. M., the first dim light of dawn was faintly to be discerned over the eastern wall of the notch. At just 4 : 37 A. M., as the pale light of the half moon was giving place to the first rays of day, a single Bicknell's Thrush was heard far overhead, on the big ledge which faces the east and forms the other side of the notch. Soon others were heard above, but as the sun, some while later, struck the upper ledges, only the birds still in the shadow below continued to call. It was most interesting to note the manner in which the birds successively became

quiet as the rising sun lit up more and more of the far side of the notch, until finally by 8 : 30, its rays shone full into the cleft of the mountain, and only a single bird was still calling from a spot yet shaded by a protruding shoulder.

**Dates**: May 25 through September.

**251. Hylocichla ustulata swainsonii** (Cab.). OLIVE-BACKED THRUSH.

A rather common spring and fall migrant and summer resident. During the breeding season it is commonest in the damp, cool undergrowth of evergreen and young second growth along brooks, or wood-swamps of the sub-Canadian regions, where it is found with the Winter Wren and Canada Warbler. It is essentially a bird of the cool, moist thickets, and is found in the White Mountains up to 4,500 feet. Above 3,000 feet or thereabouts, on entering the upper Canadian zone, its numbers become slightly less, and the few birds occurring above 4,000 feet are confined rather closely to the stream beds. This distribution, which has also been noted by Dr. A. P. Chadbourne ('87), I was interested to observe among other places in the mountains, while on a trip with Mr. V. D. Lowe in June, 1900, through the Great Gulf of Mt. Washington. We camped at Spaulding's Lake, a tiny sheet of water at the foot of the head wall and at an elevation of about 4,500 feet. All about was a thick growth of scrubby balsams and large alder bushes. Bicknell's Thrushes inhabited this growth on all sides well up onto the walls of the gulf, and at all hours of the day were heard calling. There was noted here but a single Olive-backed Thrush, this being a fine male, who sang persistently from 3 o'clock in the morning until our departure, a few hours later, secured from view the while by the thick balsam scrub at the foot of the lake. A little farther down the brook, a second bird was heard singing on that morning of June 21st, but it was evident that these were the extreme outposts which at these upper levels had invaded the Bicknell's Thrushes' territory. On the lower mountain tops, Olive-backed Thrushes are not uncommon in dry spruce thickets with the Hermits. South of the White

Mountains, these thrushes are rare and local in summer, but occur here and there in cool swamps or along mountain brooks, as I have noted rarely at Bridgewater in 1900. Mr. E. A. Preble writes me of a nest found on June 20. a number of years ago, on the Ossipee Hills at Ossipee. Mr. C. F. Goodhue ('77a, p. 33) has also recorded it as having bred once near Webster. Farther south, Mr. G. H. Thayer writes me that it breeds regularly in small numbers among the thick spruces near the summit of Mt. Monadnock above 2,500 feet, and sporadically in the lower country to the northward; he has also found it in some numbers at Nubanusit Lake, Hillsboro' County.

**Dates:** May 16 to October.

**252. Hylocichla guttata pallasii** (Cab.). HERMIT THRUSH.

A rather common summer resident of the sub-Canadian woods to which it is almost entirely confined during the breeding season. A few summer in the extreme southwestern portions of the state, and in the lower Connecticut Valley it is not uncommon on the ridges and among the dry woods of mixed growth. In central New Hampshire in the Winnepesaukee region it is certainly the commonest thrush, frequenting the dry hillside woods. Among the White Mountains, Hermit Thrushes are fairly common at the lower levels, inhabiting the white pine forests, or the more open scattered growth of red and pitch pine in the valleys, where a sandy soil supports an undergrowth of bear oak and braken. In the beech woods about the foot of the mountains up to 2,000 feet, these thrushes are less common or absent, but on the lower peaks, as on Bartlett and Kearsarge, they appear again in small numbers in the dry clumps of dense spruces which grow here and there among the barren ledges up to 3,000 feet or so. Above this level on the larger mountains, the bird is practically absent. Dr. A. P. Chadbourne ('87) has, however, recorded a single specimen seen in summer as high as 3,300 feet on Mt. Washington. Hermit Thrushes, even in late summer, are active until the twilight becomes almost too deep to permit more than a dim view as a bird is startled here and

there from some wood road, and flies to the bushes with its characteristic "chuck." In the Acworth Public Library collection there is a specimen taken at that town so late as November 24, 1883. I have observed the males already in song on their arrival at their breeding grounds at Chocorua, April 20, 1900; the song period is practically over by July 20.

**Dates:** April 19 to November 24.

**253. Merula migratoria** (Linn.). AMERICAN ROBIN.

An abundant spring and fall migrant and common summer resident of the Transition areas; also a rather irregular winter resident. During the summer, these birds are generally found near habitations, and nest in the shade trees about dwellings or in the orchards. Occasionally, however, as in the White Mountains, birds will nest in the pine trees on the edge of the woods, and Mr. G. H. Thayer also writes me that they sometimes breed in the wild spruce woods of Mt. Monadnock. On June 14, 1902, Mr. A. H. Clark and I noted a single bird in the dense woods on Imp Mountain of the Carter Range, at about 3,500 feet, possibly only a stray specimen. In August after the young are on the wing, large flocks gather to feed on the wild cherries ripening in the valleys. Others are to be found scattered in small flocks through the woods at the lower altitudes, and I have on one or two occasions found small flocks about the lakelets in Carter's Notch in mid-September, the birds having apparently paused in their southward flight to feed. Again, I noted a single bird on the nearly barren summit of Mt. Hight (4,770 feet) of the Carter range, and on Aug. 27, 1901, three birds flew past me and alighted among the scrubby firs in the col between Mt. Jefferson and Mt. Adams of the Presidential range. Dr. A. P. Chadbourne ('87) also notes a wandering pair seen on July 12, 1886, on the Crawford Bridle path at an altitude of 5,080 feet. A few robins appear to winter with more or less regularity in the southeastern part of the state. Mr. W. E. Cram reports them as found at Hampton Falls the year round; and Mr. F. W. Batchelder (:00, p. 138) states that a few winter about Manchester, while a Mr. J. H. Johnson ('92) records them in January, 1892, in "central New Hampshire." There are apparently but few oth-

er wintering records. Mr. F. B. Spaulding ('86) reports robins as numerous about Lancaster during the winter of '85–'86, "something very unusual." Mr. V. D. Lowe also tells me that occasionally a few winter about Randolph, to the north of the White Mountains in the valley of the Androscoggin.

**Dates:** (February 28) March 3 to December 25; Winter.

**254. Sialia sialis** (Linn.). BLUEBIRD.

A common summer resident of the Transition regions. It is generally found in open land near farms, or among the orchard trees, and the birds are already on their breeding grounds before the snow has disappeared. The great destruction of Bluebirds by a blizzard which swept the country as they were journeying northward in the spring of 1895, is well known, and in New Hampshire as elsewhere a great scarcity of Bluebirds was recorded for that spring. They seem quickly to have recovered from the blow, however, and in 1897, I almost daily observed from 4 to 20 or more birds in the Saco valley during September, and they have since been present in about their former numbers. Single flocks will often, in their leisurely fall migration, stop for three or four days at a time in the same locality, evidently finding food in plenty, and thus being in no haste to pass on. Mr. C. J. Maynard ('72) records their breeding at Lake Umbagog.

**Dates:** March 2 to October 9.

## INTRODUCED SPECIES.

**1. Tympanuchus americanus** (Reich.). PRAIRIE HEN.

According to Mr. Ned Dearborn ('98) a number were liberated in Blue Mountain Park, Croydon, some years ago, and soon disappeared. Mr. Dearborn believes that this will sufficiently account for the fact that one was shot in Sanbornton in March, 1893, and that others were reported from Boscawen.

**2. Phasianus colchicus** Linn. ENGLISH PHEASANT.

Belknap (1792) records that "the late Governor Wentworth brought several pairs of pheasants from England, and let them fly in his woods, at Wolfeborough; but they have not since been seen."

**3. Passer domesticus** (Linn.). HOUSE SPARROW.

Abundant as a resident about the large villages and cities. Among the country towns of central and northern New Hampshire, it seems not to be increasing, and indeed barely holds its own in many places among the White Mountain valleys. Thus at Intervale, I have not observed any increase in numbers during several years, though a single pair or two is annually found nesting about the village.

## POSTSCRIPT.

While these pages are going through the press, there has appeared an important contribution to the ornithological literature of the state, in the shape of a paper by Mr. Ned Dearborn on the "Birds of Durham and Vicinity" (:03). This list is important, especially because it covers the southeastern part of New Hampshire and is the result of long observation in a region on which there has hitherto been little published. Mr. Dearborn's researches now make it possible to add to the avifauna of New Hampshire no less than twenty-nine species, which had not been included in the foregoing list, mainly because of a lack of definite records. These additions are as follows: —

**1. Alca torda** Linn. RAZOR-BILLED AUK.

Stated to occur "in more or less abundance on the coast every year from November to March."

**2. Larus delawarensis** Ord. RING-BILLED GULL.

Found by Mr. Dearborn to be a spring and fall migrant along the coast.

**3. Sterna caspia** Pallas. CASPIAN TERN.

Two were shot at Hampton in the fall of 1899. Both were in immature plumage, and the skin of one is now in the collection of Mr. S. A. Shaw, of Hampton.

**4. Sterna antillarum** (Less.). LEAST TERN.

Mr. Dearborn includes this species on the testimony of Mr. S. A. Shaw, who finds it uncommon at Hampton, and has a single specimen in his collection.

**5. Puffinus gravis** (O'Reilly). GREATER SHEARWATER.

A specimen, taken near Portsmouth, is stated to be in the collection of Mr. W. M. C. Philbrick, of Kittery, Me.

**6. Chaulelasmus streperus** (Linn.). GADWALL.

A pair of spring birds taken on Little Bay, near Portsmouth, is said by Mr. Dearborn to be in the collection of Mr. George Wentworth of Dover, and Mr. S. A. Shaw is authority for the statement that a few have been killed at Hampton during the last twenty-five years.

**7. Dafila acuta** (Linn.). PINTAIL.

"Rather scarce spring and fall migrants."

**8. Aythya americana** (Eyt.). REDHEAD.

Mr. Dearborn states that he has found several autumnal specimens in local collections.

**9. Clangula islandica** (Gmel.). BARROW'S GOLDENEYE.

Mr. Dearborn has examined a specimen of this species in the collection of Mr. George Wentworth of Dover, which was shot "some years since on Little Bay."

**10. Somateria spectabilis** (Linn.). KING EIDER.

A female taken at Hampton, and in the collection of Mr. S. A. Shaw, is identified by Mr. Dearborn as of this species.

**11. Ardea egretta** Gmel. AMERICAN EGRET.

A specimen is recorded as shot in the summer of 1897 on the river about a mile above Newmarket village.

**12. Rallus crepitans** Gmel. CLAPPER RAIL.

A specimen taken at Portsmouth some years since, after a southwesterly gale, is said to be in the collection of the college at Durham.

**13. Porzana noveboracensis** (Gmel.). YELLOW RAIL.

A specimen taken at Hampton is in the collection of Mr. S. A. Shaw.

**14. Ionornis martinica** (Linn.). PURPLE GALLINULE.

A specimen was killed at Rye some years since, and a second at Willand's Pond, Dover.

**15. Gallinula galeata** (Licht.). FLORIDA GALLINULE.

One was killed at Rollinsford some years ago.

**16. Himantopus mexicanus** (Mull.). BLACK-NECKED STILT.

Mr. Dearborn states that "some years ago a summer visitor at Rye Beach" brought one to Mr. Shaw, at Hampton, to be mounted.

**17. Tringa canutus** Linn. KNOT.

Of "fairly common occurrence along the coast spring and fall."

**18. Tringa maritima** Brunn. PURPLE SANDPIPER.

In eight local collections, Mr. Dearborn finds but two specimens of this bird. One was killed in January.

**19. Ereunetes occidentalis** Lawr. WESTERN SEMIPALMATED SANDPIPER.

Mr. Dearborn refers to this species a long-billed female bird, taken at Hampton, Oct. 10, 1899. That the unusual length of bill might fall within the limits of variation of the eastern bird, however, is a possibility which should not be overlooked.

**20. Limosa hæmastica** (Linn.). HUDSONIAN GODWIT.

"Taken in October at Hampton."

**21. Symphemia semipalmata** (Gmel.). WILLET.

"It is a rather irregular migrant along the coast, generally seen in autumn, if at all."

**22. Ægialitis meloda** (Ord). PIPING PLOVER.

"A regular migrant along our coasts."

**23. Arenaria interpres** (Linn.). TURNSTONE.

Said by Mr. Dearborn to be a regular coastwise migrant in spring and fall, but comparatively few in numbers.

**24. Icterus spurius** (Linn.). ORCHARD ORIOLE.

This bird is added to the avifauna of the state on the basis of an adult male taken some years ago at Rollinsford, by Mr. George H. Yeaton, of that town, in whose collection the specimen is.

**25. Quiscalus quiscula** (Linn.). PURPLE GRACKLE.

Out of nine grackles shot from a flock at Tilton on Sept. 13, 1902, two specimens are stated by Mr. Dearborn to be unquestionably of this form. The skin of one is now No. 13,446 of the Field Columbian Museum at Chicago.

**26. Acanthis hornemannii exilipes** (Coues). HOARY REDPOLL.

Mr. Dearborn has identified as of this race, a specimen in the collection of Mr. S. A. Shaw, of Hampton, where it was presumably taken.

**27. Calcarius lapponicus** (Linn.) LAPLAND LONGSPUR.

This species, which should occur as a fairly regular late fall migrant on the coast, is now definitely added to the list on the strength of Mr. Dearborn's record of three seen at Hampton Beach on Nov. 30, 1899.

**28. Ammodramus princeps** (Mayn.). IPSWICH SPARROW.

This bird also is to be stricken from the hypothetical list, and is found by Mr. Dearborn to be a regular spring and fall migrant on the sand hills of the coast in March and April, and from the latter part of October to early December.

**29. Mimus polyglottos** (Linn.). MOCKINGBIRD.

According to Mr. Dearborn, an immature bird, apparently a young of the year, was shot at Hampton, Aug. 24, 1900, and is now in the possession of Mr. S. A. Shaw. The possibility of this having been an escaped cage bird is, of course, not altogether excluded.

In addition to these birds which are now added to the New

Hampshire list, the following important records in Mr. Dearborn's paper may be mentioned:—

**Larus glaucus** Brunn. GLAUCOUS GULL.

One taken at Hampton in May, some years since.

**Spatula clypeata** (Linn.). SHOVELER.

"Mr. Shaw has a male taken in autumn some years ago, at Hampton."

**Aythya collaris** (Donov.). RING-NECKED DUCK.

A fine adult male was taken in the fall on Little Bay.

**Histrionicus histrionicus** (Linn.). HARLEQUIN DUCK.

"Three or more" are said to be in the collection of Mr. S. A. Shaw, of Hampton.

**Olor columbianus** (Ord). WHISTLING SWAN.

"Some years ago one was wounded and captured alive on Great Bay" and "another was killed on Great Bay, December 16, 1902," and is now in the College collection at Durham.

**Ardetta exilis** (Gmel.). LEAST BITTERN.

One taken at Hampton some years ago.

**Micropalama himantopus** (Bonap.). STILT SANDPIPER.

A specimen taken at Hampton is in Mr. S. A. Shaw's collection.

**Tryngites subruficollis** (Vieill.). BUFF-BREASTED SANDPIPER.

One is in the possession of Mr. Joseph Turner of Portsmouth.

**Numenius longirostris** Wils. LONG-BILLED CURLEW.

Two specimens are noted in local collections, one each at Portsmouth and Rollinsford.

**Ægialitis vocifera** (Linn.). KILLDEER.

Mr. Dearborn is "assured by Mr. Wentworth of Rollinsford that years ago Killdeers nested regularly on his farm," and another informant states that they formerly bred about the marshes near Portsmouth.

**Nyctala tengmalmi richardsoni** (Bonap.). RICHARDSON'S OWL.

A specimen killed in Dover and now in the collection of Mr. G. F. Wentworth of that city, is the sixth record for the state.

**Surnia ulula caparoch** (Mull.). AMERICAN HAWK OWL.

Mr. Dearborn adds two records for the state, a single bird having been taken "recently near Portsmouth" and another near Piscataqua bridge.

**Coccyzus americanus** (Linn.). YELLOW-BILLED CUCKOO.

Mr. S. A. Shaw "has taken it at Hampton."

**Melanerpes erythrocephalus** (Linn.). RED-HEADED WOODPECKER.

Two specimens in immature plumage are said to be in the collection of Mr. S. A. Shaw, of Hampton. An additional record is of one seen at Hebron by Mrs. C. P. Webster (see Howe, Pasquaney Annual, 1902, N. S., vol. IV).

**Perisoreus canadensis** (Linn.). CANADA JAY.

According to Mr. Shaw of Hampton, two were killed at Boar's Head, some years ago.

**Cocothraustes vespertinus** (Coop.). EVENING GROSBEAK.

Additional records for the 1890 flight are of two birds secured from a flock of sixteen at Newmarket.

**Helminthophila chrysoptera** (Linn.). GOLDEN-WINGED WARBLER.

A male specimen is recorded as taken at Durham on May 24, 1898, and now in Mr. Dearborn's collection.

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**Note:** It has not been possible to incorporate in the present paper the numerous changes in nomenclature found necessary in the Twelfth Supplement to the American Ornithologists' Union Check-List of North American Birds (Auk, vol. 20, no. 3, July, 1903).

Cambridge, Oct. 26, 1903.

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# THE BIRDS

OF THE

# JEFFERSON REGION

## IN THE WHITE MOUNTAINS

## NEW HAMPSHIRE



BY

HORACE W. WRIGHT

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# THE BIRDS

OF THE

# JEFFERSON REGION



The region covered in this paper includes primarily the territory of the town of Jefferson, also that of the adjoining towns of Lancaster, Whitefield, Carroll, and Randolph, and the northern and western slopes of the Presidential Range to the Crawford House plateau.

The town of Jefferson is situated immediately northwest from the Presidential Range. The elevation of the village, known as Jefferson Hill, upon the southwestern slope of Mt. Starr King is 1450 feet. Mt. Starr King is the most southern member of the Pilot Range extending northward, and rises to a height of 3900 feet. Four miles eastward stands the little hamlet of Jefferson Highland, situated on the southwestern slope of Bois or Boy Mountain, at an elevation of 1650 feet. Boy Mountain rises to a height of 2240 feet and terminates the Randolph Range, which extends in an easterly direction nearly parallel to the northern peaks of the Presidential Range. Southward and westward from these settlements on the mountain sides, and lying between Mt. Starr King and Boy Mountain on the northeast and Cherry Mountain and the Dartmouth-Deception Range on the southwest, is the valley section of Jefferson, having an elevation of 1100 to 1300 feet at the valley bottom. This is the valley of Israel's River. The river flows in a generally northwesterly direction the entire length of the town into the Connecticut River at Lancaster. Along its course are two mill ponds, one known as Davis's pond, formed by

damming a tributary stream just above its point of entry into the river, in that part of the town called "the Meadows," and the other in the portion bearing the name of Riverton. Israel's River rises on Mounts Adams and Jefferson of the Presidential Range and receives countless mountain brooks along its course. Chief of these are the South Branch and the Great Brook. Eastward is the scattered town of Randolph between the Presidential and Randolph Ranges in the narrow valley of the Moose River, which flows into the Androscoggin at Gorham. Westward the country opens out over hills to Carroll in the valley of the Lower Ammonoosuc, to Whitefield by John's River, and to Lancaster, which is in the valley of the Connecticut, at little more than half the elevation of Jefferson Highland, namely, 870 feet.

One rather large pond lies within the territory of Jefferson, in the west portion, Cherry Pond, at the foot of Cherry Mountain. This pond is two miles or more in circumference. It is muddy-bottomed ; the surface is much covered with growth of pickerel weed, yellow lilies, sagittaria, and other aquatic plants, and it is bordered by cat-tails, grasses and sedges. This pond was formerly surrounded by forest, but now lines of railway extend rather closely on two sides of it, and on the other sides stand mostly second-growth woods with scarcely any large timber remaining. As indicating, however, the still secluded location of this pond, I may mention that on several occasions, when we have been upon its waters, deer have been seen on its shores, and that on a day in late August in 1910 a doe with her two white-spotted fawns came out of the woodland and waded in the tall grasses along the shore. They remained in sight ten minutes or more, while we had quietly paddled to within twenty rods of them.

Near Cherry Pond, and fed from it by an outlet stream, is Little Cherry Pond, having scarcely more than an eighth of the area of Cherry Pond. This pond is also bordered and overgrown with aquatic plants, including the white water-lily. An extent of tamarack swamp surrounds Little Cherry Pond. Much

smaller and more hidden away in the forest lies Muddy Pond, in close proximity to the other two. Three or four miles distant westward are two other ponds in East Whitefield, known as Weed's and Weeks's ponds, also of a swampy nature and formerly in the forest, but now in thinned woodland and not far from farms. Still farther westward is Martin Meadow Pond in Lancaster, second in size to Cherry Pond, a body of clear water. In the opposite direction, eastward, and situated five miles away from highways and within a devastated forest, is the Pond of Safety, also a body of clear water, fed by springs, a veritable little mountain lake. The pathway to the pond follows up the valley of the Great Brook, so called, which lies between the Randolph and the PlinyRanges, these constituting with Mt. Starr King, the mountain background to Jefferson on the northeast. This brook in its outward course, and within a mile or so of its emptying into Israel's River, runs through a hollow dividing Jefferson Hill from Jefferson Highland, known as Stag Hollow, where it broadens out into a small disused mill-pond, called Brooks's Pond. All these ponds are within easy reach of a bird observer and have been visited from time to time. But Cherry and Little Cherry Ponds have been visited much more frequently than the others, because of their natural attractions for birds and their easy accessibility by rail, and also for the reason that they possess boating facilities which afford opportunity for a thorough search of the waters and the surrounding shores.

By paths and trails the neighboring mountains are accessible, including all the members of the Presidential Range, on whose sides on the north are countless pathways opening up the forest to an observer. This forest has been severely cut into by the lumber companies during the last ten years and some sections of the mountain sides almost denuded of heavy timber, thus producing some changes in the distribution of the birds, but as yet probably eliminating no species having its habitat thereon. By mountain roads we have frequently made full days' observations by carriage, moving slowly and recording every bird-voice as well as bird-form which came within our

hearing or sight. Thus we have repeatedly tallied the respective numbers of each species along such roads and obtained the facts of their comparative abundance or scarcity. One such road, a State road, opened up through the forest in 1902, leads directly from the foot of Jefferson Highland, following much of the way the South Branch of Israel's River, ascends to a pass between Mt. Jefferson and Mt. Dartmouth, 3000 feet elevation, known as Jefferson Notch, and continuing down on the southerly side passes through Bretton Woods to the Crawford House; or by taking the old toll road, now also a State road, one reaches the base of Mt. Washington and, passing out thence, the grounds of the Mt. Washington Hotel, from which the return is made over the Cherry Mountain road to Jefferson Meadows. Several cross-country drives have also regularly been taken, including Lancaster by various routes, which lying through open country have furnished a quite full knowledge of its bird life. On some of these all-day excursions seventy-five species of summer resident birds have come under observation, and once the number has risen to eighty species. The variety and extent of the summer bird-life of the region have thus been determined.

In that portion of the broad Jefferson Valley which lies to the westward of Israel's River and between it and Cherry Pond is a swampy section which a few years ago was grown to spruce and tamarack. But the extensive fires of June, 1903, swept through this swamp and destroyed it almost completely as a breeding place. Here I had found in the years preceding the forest fires the Black-poll Warbler as a common summer resident and the Hudsonian Chickadee as a breeding bird. This swamp is known as the Davis Swamp. It is bordered on one side by the turnipke road to Lancaster, this road following the general course of the river and passing through the recently fire-devastated country which is now beginning to be opened up for farms. Along this turnpike, for a short extent of the way, the Wilson's Warbler now regularly breeds, while not far away in the Meadows portion of the valley there has come to be in recent years a small representation of the Yellow

Warbler, the Meadowlark and the Red-winged Blackbird as breeding species, the last named having perceptibly gained in numbers year by year.

As a part of our homestead on the Highland upon the side of Boy Mountain, and reaching to the river under neighbors' ownership, is an extent of woodland of about fifty acres, composed of most of the native trees, spruce, hemlock, fir, beech, maple, birch, ash, poplar, elm, and also well furnished with undergrowth such as hobble-bush, yew, young seedling trees, and ferns and plants in great variety. Here almost daily early morning records of the singing birds have been made with the result that somewhat nearly the exact ornithological population of the wood has been obtained season by season. This enumeration shows that fourteen species of warblers commonly breed therein and upon its borders. They are: Black and White, one or two pairs; Nashville, one or two pairs; Parula, eight to ten pairs; Black-throated Blue, three to five pairs; Magnolia, three or four pairs; Chestnut-sided, two or three pairs; Bay-breasted, three or four pairs; Blackburnian, ten to twelve pairs; Black-throated Green, two or three pairs; Oven-bird, eight to ten pairs; Mourning, one or two pairs; Maryland Yellow-throat, two or three pairs; Canada, three or four pairs; and Redstart, four or five pairs. These numbers are based on the records of the season of 1909, modified by those of other seasons. The variations, however, are surprisingly small year by year. The warbler representation in this woodland was not as large in the season of 1910. With these warblers are associated as breeding species or frequenters of the wood, represented by a single pair, or two or three pairs, Canada Ruffed Grouse, Broad-winged Hawk, Black-billed Cuckoo, Belted Kingfisher, Hairy and Downy Woodpecker, Yellow-bellied Sapsucker, Northern Pileated Woodpecker, Northern Flicker, Ruby-throated Hummingbird, Olive-sided Flycatcher, Wood Pewee, (five or six pairs), Alder Flycatcher, (two or three pairs), Least Flycatcher, Blue Jay, Crow, Purple Finch, Goldfinch, White-throated Sparrow, Slate-colored Junco, Song Sparrow, Rose-breasted Grosbeak,

Indigo Bunting, Scarlet Tanager, Cedar Waxwing, Red-eyed Vireo, (ten to twelve pairs), Blue-headed Vireo, (four or five pairs), Winter Wren, Brown Creeper, White-breasted Nuthatch, Chickadee, Veery, Olive-backed Thrush and Hermit Thrush, (four or five pairs each), and Robin. Not all of these species are represented every season, but the exceptions are few. I have not found other pieces of woodland as rich, perhaps, in their warbler life as this. Still, the warblers are everywhere abundant in their appropriate haunts. There are nineteen resident species in the region.

All the mountains remain in large part forest-clad in spite of the rapid cutting of timber which has been going on. But the thick spruce and fir growth have to a great extent disappeared in extensive sections of the forests and only thinned woods remain. However, forest fires have been avoided almost altogether on the mountain sides, so that the slopes, where they had been laid somewhat bare by the lumbermen, have already come to be partially covered by young growth, thus preventing an outward appearance of bareness, although they are most seriously stripped. The forests of the Jefferson valley have not fared so well. A fire which ran extensively through them in June, 1903, left little of a true forest nature standing. And the farming industry of the community has been extending over these burnt lands, reclaiming them, and bringing them under cultivation.

Thus two changes have been steadily going on by man's agency within the territory under consideration during the dozen years in which the bird-life has been studied, namely, the continuous cutting of the forests on the mountain slopes and the logging and destruction by fire of the forests in the Jefferson valley, followed by the reclaiming of the lands for pasturage and cultivation. The first named change has resulted undoubtedly in the decrease of such species as the Canada Spruce Partridge, the Arctic Three-toed and the Three-toed Woodpeckers, the Canada Jay, the Winter Wren, the Brown Creeper, the Red-breasted Nuthatch, and the Hudsonian Chickadee. Large

sections of forest in which these birds were formerly seen no longer possess them, or possess them in diminished numbers, as in the case of the four last named. The second change mentioned has wrought to bring in the Meadowlark, the Yellow Warbler, the Wilson's Warbler, and the Wood Thrush, the two first named species by the extension of their breeding-ground from the Connecticut valley into the valley of Israel's River; and the two last named by extension southward and northward respectively, both species having made choice of the territory of Jefferson rather than that of Lancaster, and established themselves with good promise of continuance. Due also to the second change mentioned above, other species have increased during these years, such as the Prairie Horned Lark, the Red-winged Blackbird, the Field Sparrow, and the House Wren; the lark, in the course of the general eastward movement of the species from the west into Maine and New Brunswick, the Redwing, as local conditions furnished more suitable haunts; the Field Sparrow, by a further advance from the south, and now holding a recently acquired place among the summer residents; and the House Wren, as a nesting bird of stumpy pasture land in the valley bottom, where the woods have been cut and old stumps remain. I suppose the Wren has long been a resident of house-sheds in Lancaster, but it has only begun to make choice of such homes in Jefferson, a dozen pairs occupying stumps to one making use of a shed. One species has wholly disappeared from the region, the Pine Warbler, which at the beginning of the period of observation had but a slight hold in two groves of white pine, *Pinus Strobus*, which were then standing. With the destruction of these groves this warbler was lost. One other species, the Migrant Shrike, is probably holding its own, having entered the territory under consideration thirty or more years ago and meanwhile increased its representation.

Four species which are regular summer residents of Lancaster have not as yet become nesting birds in Jefferson, namely, the Cowbird, the Baltimore Oriole, the Bronzed Grackle, and the Warbling Vireo, with probable exceptions in two of the

years in the case of the last named. Following, however, upon the further reclamation of the territory of Jefferson from a state of wildness to a country of farms and a general condition of cultivation, as it becomes more settled and an older community, these species, like others which have been named, may extend their breeding ground nearer the Presidential Range and become summer residents of Jefferson itself. On the other hand, the elevation of Jefferson may continue to present a barrier, since the Connecticut valley at Lancaster is less than 900 feet above the sea, while the valley of Israel's River is from 1100 feet at its bottom to 1450 feet where the village of Jefferson stands. The probable nesting of the Warbling Vireo in Jefferson in two recent years furnishes some basis for the thought that these several species in time not remote may extend their breeding ground to favorable localities in Jefferson, although these be higher and nearer the Presidential Range.

The valley, as it reaches up eastward toward the base of Mt. Jefferson, becomes very narrow at the foot of the Highland. The slopes of Boy Mountain on the northerly side and those of the Dartmouth-Deception Range with its foothill, Hardwood Hill, on the southerly side leave only a width sufficient for the the river, the highway, and the railroad. Through this narrow valley the migration of the summer resident warblers in September from the mountain ranges and beyond is quite extensive. With them always come a few Philadelphia Vireos and representatives of the warblers which do not breed in the immediate region, namely, the Tennessee, the Cape May, the Palm, the Yellow Palm, and the Connecticut. There are occasional days in early September when many hundred migrant birds are passing westward through the growth along the river, apparently bent on reaching the main Connecticut valley pathway. The larger flocks move steadily on and pass. Upon days when there is no extensive movement a representative or two of the rarer species may be found remaining in the same place a second or even a third day. In a thick growth of small birches, but a short distance from the river at the Meadows, a collection of

migrant birds is sometimes found upon successive days, the membership of which shows that many of the insectivorous birds are lingering there, finding an ample supply of food on the trees infested with the *aphis*. This grove has proved in recent seasons one of the treasure islands for the rarer migrant warblers as well as for Philadelphia Vireos and other uncommon species. A somewhat similar growth along the railroad at Jefferson Junction in the vicinity of Cherry and Little Cherry Ponds has afforded another location in which a good collection is likely to be found. At either place fifteen species of warblers have sometimes been identified in association with other birds during an hour's stay.

In this Jefferson region I have carried on active and systematic observation for twelve successive seasons, beginning with 1899. The period of my observation year by year has extended from late May or the first days of June to the early days or the middle of October. Each succeeding season the occupation has been prosecuted with closer attention and a fuller allotment of time. Thus the data obtained are the result of an increasingly careful search. That they are not yet complete, although, perhaps, approximately so, is a stimulating thought for years yet before me, it may be. During the last eight seasons I have had the valuable aid of my assistant, Mr. Edward D. Parker, who has been my intelligent companion on all trips by horse and upon all mountain climbs and longer walks. By his alertness and accuracy of sight and hearing he has rendered most valuable service. Others have shared also in walks and drives for observation and have contributed to the sum of knowledge gained. These will not be named except in specific cases where a rarer bird was seen. Species which appear only during the late fall, the winter, and the early spring have not come under the writer's observation. But these, most happily, have been added to the list by Mr. F. B. Spaulding of Lancaster, who also contributes a number of interesting casual records. Mr. Spaulding furnishes exclusively twenty-four species and has also contributed many valuable data which have been incorporated in

the notes on other species. Mr. Richard M. Marble contributes five species from the vicinity of the Crawford House, which otherwise would not have been in the list, and furnishes notes on some other species. Mrs. Edmund Bridge has also contributed from her September records in Randolph and on the Presidential Range. Mr. Nathan Clifford Brown furnishes several interesting notes. Use has also been made of quotations from Dr. Glover M. Allen's valuable work on the "Birds of New Hampshire," covering some of Mr. Spaulding's earlier records as well as those of other observers. Thanks are returned to all these contributors.

I am especially indebted to Dr. Allen for the happy suggestion of the Manchester Institute of Arts and Sciences as the medium for the publication of this paper.

# ANNOTATED LIST

OF THE

# BIRDS OF THE JEFFERSON REGION

**1. Colymbus auritus.** HORNED GREBE.

A spring and fall migrant. Mr. Spaulding states that "several were shot on the Connecticut meadows during high water in the spring of 1908." He has one of these in his collection, which was shot on April 29. Mr. Marble contributes the record of one seen on Saco Lake at the Crawford House on September 23, 1906.

**2. Podilymbus podiceps.** PIED-BILLED GREBE.

A not uncommon fall migrant, found on several of the ponds and on the rivers in late August and in September and early October. In 1900, two were seen on Israel's River at Riverton on August 23, and one on September 21. In 1902, one was observed at Riverton on September 7, and one on Davis's Pond on September 24. In 1908, one was seen on Cherry Pond on August 25 and again on September 1, and this bird was followed by an unusual number during the month, some of them, doubtless, continuing there, six being present on September 8, seven on September 15, three on September 18, two on September 22 and 25, and four on October 1. In this year one was seen also on the Connecticut River at Lancaster on September 9. In 1909, four birds were observed between August 23 and September 30, on three of the different ponds; and in 1910, six birds were seen singly between August 18 and October 4, on four of the different ponds.

**3. Gavia immer.** Loon.

Mr. Spaulding states that he has seen Loons many times on Martin Meadow Pond in Lancaster in the spring, but that he does not know of their ever breeding there.

**4. Larus argentatus.** Herring Gull.

A rare migrant. Mr. Marble furnishes three records. He states that on September 25, 1907, three birds were observed in flight at the Crawford House; that two of them remained in the air, while the third alighted for a few minutes on Saco Lake; that on September 25, 1908, a young bird passed the morning on the same lake; and that on September 19, 1910, a fine adult bird was observed flying over the lake, but that it did not alight.

**5. Larus philadelphia.** Bonaparte's Gull.

Mr. Spaulding furnishes one record, which he regards as "of course purely accidental," namely, "a boy shot one from the cupola of his father's barn, November 8, 1904, and brought it to me." Mr. Spaulding has the bird in his collection.

**6. Hydrochelidon nigra surinamensis.** Black Tern.

A very rare migrant. One was seen at Cherry Pond during the forenoon of September 12, 1907, almost ceaselessly skimming the surface of the waters in its pursuit of dragon-flies, which it darted for in zigzag flights. Once it alighted on a stub which rose three or four feet above the water and rested a few minutes. When we left the pond shortly before noon the bird was still pursuing its insect game and showed no disposition to leave. Mr. G. B. Wellman and my assistant were observers of the bird with me.

Dr. G. M. Allen cites three inland records for the State, namely: Chocorua, September 30, 1889, according to Mr. Frank Bolles, one remained half a day on a small lake; Lake Winnepesaukee, June 10, 1878, one was seen by Mr. C. F. Goodhue; Newfound Lake, September 9, 1902, an immature bird was shot by Mr. H. T. Winchester and is now in the collection of Camp Pasquaney. (*Birds of New Hampshire.*)

**7. Oceanodroma leucorhoa.** LEACH'S PETREL.

In Dr. Allen's "Birds of New Hampshire" it is recorded that two were seen and one of them shot, October 1, 1897, on a small pond in Lancaster by Mr. F. B. Spaulding. The pond referred to, Mr. Spaulding informs me, is Blood's Pond, which is a little removed from Martin Meadow Pond; and he states, "I did not shoot the bird; a boy shot it with a rifle and brought me the remains."

**8. Sula bassana.** GANNET.

Soon after leaving Jefferson in early October, 1910, I learned by letter from my assistant that a large web-footed bird, "measuring thirty-six inches in length and having a spread of wings of seventy inches, brownish black with small white spots on the back of the shape of arrowheads, the bill opening back five and a half inches," had been shot at the Meadows and on October 14 brought to a local taxidermist to be mounted. It appeared from the description furnished that this bird could be none other than a Gannet. A few days later at my suggestion Mr. Spaulding drove to Jefferson, saw the bird, and pronounced it "a Gannet in the plumage of the immature, of full size, and in good condition." The bird was shot on October 13. A subsequent letter states that it was first seen on the farm barn at the Davis place, passed from there to the store building, and was shot on the ground back of the store. At the time of this occurrence severe gales were reported as sweeping the Atlantic coast and delaying transatlantic steamers. Perhaps the presence of the bird was due to these, Jefferson being a hundred miles from the seacoast. Large numbers of Gannets were reported about this time as seen at Ipswich, Mass., on their southward flight.

**9. Mergus americanus.** MERGANSER.

An uncommon summer resident on the rivers. One was seen on June 12, 1903, in flight along Israel's River at the Meadows. On June 24, 1907, a female was observed on the Moose River in Randolph, flying down stream from the bridge

at the Woods farm. Messrs. F. G. and M. C. Blake were observers of this bird with me. On June 26, 1908, a mother and brood of ten young were seen on the Peabody River at the bridge where the road over the shoulder of Mt. Madison crosses the stream, two miles north from the Glen. The young were estimated to be about three weeks old. The family was swimming near or under the bridge when we approached toward six o'clock in the afternoon, and scurried in a bunch down stream, the mother surrounded by her ducklings, all seeming to run on the water by the use of both wings and feet. They got away very quickly, but not until viewed by us for perhaps two minutes. On June 22, 1909, a female flew in and alighted on Cherry Pond. On the following day a female was seen flying back and forth over Israel's River near the Meadows. The movement was uninterrupted during the half-hour that we remained. My assistant went to the bank of the river to investigate whether young were on the water, but could not see any. His approach, however, led the bird to extend her flight somewhat farther down stream and there to resume her elliptical courses. In 1910, while waiting for a train in the valley at Boy Mountain station in the early morning of September 29, nine Mergansers passed over in flight eastward at rather low range.

**10. Lophodytes cucullatus.** HOODED MERGANSER.

A spring and fall migrant. Mr. Spaulding states that "Hooded Mergansers have been taken in Lancaster both in spring and fall." He has a handsome male in his collection which he shot on Israel's River on April 19, 1893.

**11. Anas platyrhynchos.** MALLARD.

An uncommon spring and fall migrant. In Dr. Allen's "Birds of New Hampshire" Mr. Spaulding contributes the record of "one shot on a pond near Lancaster in the spring of 1888 or '89." Mr. Spaulding furnishes an additional record, that of a bird "shot on November 3, 1906, from a flock of about seventy-five on the Connecticut River below the village."

## 12. Anas rubripes. Black Duck.

A regular summer resident breeding in small numbers, and a spring and fall migrant. Black Ducks have been seen upon several of the ponds during all the summer months and more numerously in August, September, and early October. Several summer records were obtained in each of the years 1905 to 1908. In 1909, on June 22, on Cherry Pond were seen two mothers with their broods of eight and six ducklings respectively, the young about one-third grown. In 1910, on June 29, a company of eleven birds, two adults and nine immature, seen together on Cherry Pond, suggested that they constituted a family reared upon these waters; on July 1, a single bird of the *tristis* type swam across Weed's Pond, while we stood on the bank, and although later it rose on wing it did not leave but lit in again. In September and October flocks varying in number from a dozen to thirty birds are seen from time to time on Cherry or Little Cherry Pond, or in flight in the vicinity.

Most of those birds which have been seen on the ponds in the summer, near enough to distinguish whether they were of the type *rubripes* or *rubripes tristis*, have been of the latter type. Perhaps only two have been distinctly seen which were of the former type, namely, on July 30, 1908. These took wing so near to us on our approach that the red legs were clearly seen.

## 13. Nettion carolinense. Green-winged Teal.

In Dr. Allen's "Birds of New Hampshire" Mr. Spaulding is recorded as noting the occurrence of Green-winged Teal in the Connecticut valley at Lancaster.

## 14. Querquedula discors. Blue-winged Teal.

A not uncommon fall migrant. In the last four seasons several have been seen on Cherry and Little Cherry Ponds in late August and in September, the earliest record being that of eight birds seen on August 31 and again on September 3 in

1910, on Cherry Pond, and the latest, that of seven birds on the same pond on September 25, in 1908. Mrs. Bridge states that for several seasons, prior to 1908, she saw one or two Blue-winged Teal on the Moose River in Randolph on or about September 16 of each year.

**15. Dafila acuta.** PINTAIL.

A rare fall migrant. One record. A young male was seen on Cherry Pond by Mr. G. B. Wellman, my assistant, and myself on September 18 and 25, 1908. This bird had been first seen by Mr. and Mrs. Edmund Bridge on September 17. It was very unsuspicious of harm, especially on the day of our first observation, and allowed us to approach as near as twelve feet, while it sat on the water unconcerned, tipping, feeding, and pluming itself, near the shore of a cove. When at length it arose, it alighted again only a short distance away. A week later it behaved much the same, but was somewhat more shy, and on our next visit, again a week later, it was not found.

**16. Aix sponsa.** WOOD DUCK.

A rare migrant. On October 4, 1910, when paddling with my assistant on Little Cherry Pond, he called my attention to two ducks sitting quietly on the water with a patch of frost-bitten pickerel-weed as their background, which in its browned condition afforded them essential concealment and yet left them open to our view. They were about eight rods in advance of us. I slowly raised my glasses and saw at once that the two birds were a pair of Wood Ducks in full adult plumage. We were able to view them two or three minutes before they rose on wing and flew to the inlet stream which is hidden by alders and tamaracks, where they appeared to alight; but we did not find them when we paddled about in that vicinity. As we had been a number of times on this pond and on Cherry Pond during the season and had obtained no trace of a Wood Duck, these must be regarded as a pair of migrant birds. The species had not been seen in previous seasons on any waters in the region.

**17. Marila affinis.** LESSER SCAUP DUCK.

A rare migrant. One record. A young male was seen on September 30, 1909, on Cherry Pond, showing some white area about the base of the bill, but having a dark breast and head. Inasmuch as it impressed both my assistant and myself as a small duck, it was probably *affinis* and not *marila*.

**18. Clangula clangula americana.** GOLDEN-EYE.

An uncommon summer resident, breeding on Weed's Pond. A mother and six ducklings, estimated to be two or three weeks old, were seen on this pond June 23, 1905. Five weeks later, July 27, three well grown immature birds were seen. On June 21, 1906, five immature birds were observed on the same pond. On June 29, 1908, two females, a duckling somewhat well grown and apart by itself, and a brood of five young in downy plumage were seen on this pond. The single larger duckling swam rapidly away from the shore, which we had approached as we emerged from the woods, soon dived and was not seen again. The two females, who kept by themselves, rose on wing together a few rods at our right, as soon as they perceived that they were discovered, flew around over the pond several times, and, without leaving it, at length dropped in again at the lower end, remaining in sight there during our stay, which was forty minutes. The brood of young remained close by the opposite shore, swimming among the yellow lily pads, and did not appear in the open water at all. The adult birds at no time were with the young. On July 9, 1909, a small duckling, probably not over three weeks old, was seen on this same pond. Peeping, it swam out from near shore, at length dived when about a hundred feet away, and was lost to view until it came up near the opposite shore, where it remained, swimming, diving, and running forward on the water, apparently after insects. Presently a second duckling of similar size came into sight. No adult bird was seen on this occasion. On no other pond have young been observed.

Adult birds have been seen on six occasions at Cherry Pond: one on August 7, 1906; one on September 24 and two on October 5, 1907; one on September 25, 1908; one in flight from the pond on September 3, 1910, seen by Mr. M. C. Blake and myself; and one on the wing, September 22, 1910. The last two birds were in the plumage of the adult male; the others were in the plumage of the female.

**19. Harelda hyemalis.** Old-squaw.

Mr. Spaulding has in his collection a pair shot on the Lancaster meadows during high water in the spring of 1909, the day being April 17. He states that he also "saw one that was shot on the river near South Lancaster a few years ago."

**20. Oidemia americana.** Scoter.

Mr. Spaulding states that he has two fall records of birds shot on Martin Meadow Pond in October. One of these records, as given in Dr. Allen's "Birds of New Hampshire," is, "on October 12, 1894, two gunners brought in four, three males and one female, shot from a flock of eight." One of these birds is in Mr. Spaulding's collection.

**21. Oidemia perspicillata.** Surf Scoter.

Mr. Marble furnishes two records. A flock of six birds was seen by him on Saco Lake in front of the Crawford House on September 27, 1905, four of which were secured. On September 28, 1907, a single bird was seen on the same lake. Mr. Marble writes me, "I saw this bird before and after it was shot."

**22. Erismatura jamaicensis.** Ruddy Duck.

A rare migrant. On September 22, 1910, when paddling on Cherry Pond with Messrs. C. A. Merrill, R. M. Marble, and my assistant, a small duck was seen, which upon nearer approach proved to be a Ruddy Duck. At length we obtained views of the bird less than a hundred feet away. When it took wing it flew close to the water and soon lit in again. A second similar duck was seen in flight. The presence of these two Ruddy Ducks furnishes the first record for the region.

**23. Branta canadensis canadensis.** CANADA GOOSE.

Mr. Spaulding states that "the Canada Goose is a regular spring and fall migrant, being seen and heard annually," and that "often small flocks remain about Lancaster for a few days, feeding in the Connecticut meadows." I am informed that Irving Bedell, of Jefferson, had one among his tame geese for a long time, which was winged from a flock that flew over. The birds were loaded down with ice and flew very low.

**24. Botaurus lentiginosus.** BITTERN.

An uncommon summer resident, breeding in the Davis swamp, and perhaps other localities. On June 14, 1904, June 11, 1907, June 11, 1908, and June 10, 1909, one has been heard "pumping" in this swamp in precisely the same spot. In 1910, on June 9, one was seen in flight in the vicinity. In all of the twelve years except three, 1899, 1903, and 1906, one or more birds have been seen in various localities, either standing on the shore of a pond or in flight, occasionally throughout the summer. Brooks's Pond, Riverton Pond, Cherry Pond, and Little Cherry Pond furnish records between May 28 and September 27. In 1910 two birds were seen at Cherry Pond on August 10, one was again observed there on August 17, and one on September 22.

**25. Ardea herodias herodias.** GREAT BLUE HERON.

An uncommon summer resident, undoubtedly sometimes breeding at the Meadows or about the Cherry Ponds. I have June and early July records in five of the years: 1903, June 22; 1905, June 2, 7, and 23; 1906, June 4, 16, 21, July 2 (two birds), 10, and 12 (three birds); 1907, June 18, 21, and 26; 1908, June 29. August and September furnish by far the largest number of records, one or two individuals having frequently been seen passing over in flight. The records extend to early October, the tenth day, in 1903, being the latest. On August 7, 1907, two were seen perching high on a dead tree in a recently burned-over section along the turnpike near Israel's River. Their forms were strikingly presented in this position.

In 1910 the largest company on my record frequented Cherry Pond in August and September. On August 10 four birds were noted; on August 17, seven were present. Four of these were perching on one rather small tamarack tree, one on the tip, while a fifth stood on the shore below. They constituted a picturesque group. Sometimes in their flights from shore to shore two or three of the birds alighted upon clumps of pickerel-weed in the middle of the pond and stood erect on the leaves. One to four birds were observed on successive visits to the pond up to September 22.

### 26. Butorides virescens virescens. Green Heron.

A rare migrant or summer resident. On August 11, 1909, two birds were seen by Mr. G. B. Wellman and myself beside Israel's River in Lancaster, perching on willow trees at the water's edge just on the outskirts of the village, about a mile distant from the Connecticut River. They remained in the vicinity several days and were seen also by Mr. Spaulding, to whom I made known our discovery. In 1910, at nearly the same spot by the river, on June 9, Mr. Spaulding with Mr. F. H. Kennard and Mr. F. B. McKechnie saw a single bird.

In Dr. Allen's "Birds of New Hampshire" Mr. Spaulding is credited with the record of a bird twelve years earlier, not a mile away from the location of these later birds. The statement is, "On June 6, 1897, while near the Connecticut at that place [Lancaster] in company with Judge J. N. Clark, a bird flew over which the latter gentleman pronounced to be 'unmistakably a green heron.' Mr. Spaulding had never met with the bird there previously."

### 27. Rallus virginianus. Virginia Rail.

A rare summer resident, and possibly a rare fall migrant. I have no record of the species which I can vouch for. On two occasions with a companion we have been quite sure that we have caught a glimpse of one among the grasses on the shore of Cherry Pond, namely, on August 25 and September 8, 1908.

If we did, the birds were probably migrants. A night spent at the pond, June 22-23, 1909, failed to furnish any evidence of the presence of the species as a breeding bird. But in Dr. Allen's "Birds of New Hampshire" Mr. Spaulding testifies "that several years ago a boy found a nest containing about ten eggs on a low meadow near the Connecticut and that Capt. B. F. Goss identified the eggs as of this species." Dr. Allen states that this is the only record he had obtained for the northern part of the State.

### 28. Porzana carolina. Sora.

A rare summer resident, and a fall migrant. In the early morning of August 21, 1903, one was found dead in the yard of the Pliny Range House on the Highland, having apparently struck a wire in flight in the night. It was brought to me, and I identified it in the hand. On August 28, 1904, an injured bird was picked up by a farmer in his yard, about a mile from the scene of the former fatality, and was given into the care of a neighbor, but it died four days later. This bird also I was called in to see and I identified. On September 18, 1908, one was seen walking on the shore of Cherry Pond at the water's edge.

But on June 29, 1910, two immature birds were clearly seen on the shore of this pond, when we paddled up the narrow outlet stream bordered with alders and other bushes. They gave, when startled, sharp, harsh calls, which they continued to repeat. At the same time an adult bird was heard calling a short distance away, giving both the "*kur-wee*" and the "*whinny*" calls. We had several near views of the immature birds. Thus in 1910, at least, the species was breeding at Cherry Pond.

### 29. Fulica americana. Coot.

An uncommon migrant. One was seen on Cherry Pond on September 24, 1907, and one on the same pond on September 22, 1908. None have been seen the last two seasons.

**30. Lobipes lobatus.** Northern Phalarope.

Mr. Spaulding has in his collection a bird which he shot on the rainy morning of October 8, 1888, in Lancaster.

**31. Philohela minor.** Woodcock.

A regular summer resident, breeding in the Stag Hollow region, in the valley at the foot of the Highland, and elsewhere. In late April and during May the song-flights of the male birds have been noted by local observers. On June 4, 1909, I heard one calling in the dusk of the evening near Stag Hollow, but did not perceive that it took any song-flight, the season for this probably being over. The farmer living near told me the bird had been making ascents evening by evening for some time previous.

Mr. Spaulding states, "In the spring of 1909 I picked up a dead bird in the road in Randolph about a half-mile over the Jefferson line, killed by striking a telephone wire." He further states for Lancaster that the Woodcock is a regular summer resident and that he sees birds every year. Mr. Spaulding has two records of eggs, namely, June 1, 1891, and May 4, 1907. He says he has seen the young many times.

**32. Gallinago delicata.** Wilson's Snipe.

An uncommon fall and spring migrant. One was seen on September 20, 1906, at close range, on the grassy shore of Davis Pond near the dam. The bird, when startled, took a short flight to the west side and dropped upon the mud, where it was under full color-protection. When I took a few steps to obtain a nearer view, it rose on wing and flew swiftly off in a tortuous manner, turning up one side and then the other. Mr. Spaulding states that he has seen a bird of this species a number of times and that he has a specimen that he shot on March 5, 1887.

**33. Pisobia maculata.** Pectoral Sandpiper.

A not uncommon fall migrant. A flock of five birds was seen on a partly submerged ploughed field bordering the North

Road in Lancaster on October 5, 1904. They severally stood or waded in the shallow water. Following a fence line between this ploughed field and an adjoining grassy field, I came to within fifty feet of the birds. They moved slowly about, fed, or stood still, quite unconcerned, while I observed them for a half-hour. Mr. Spaulding has in his collection a bird which was shot on October 8, 1888. He states, "I have seen birds on numerous dates that I have not recorded."

**34. Pisobia minutilla.** LEAST SANDPIPER.

A rare spring migrant. One was seen at Davis Pond, June 1, 1903, in company with three Spotted Sandpipers.

**35. Ereunetes pusillus.** SEMIPALMATED SANDPIPER.

An uncommon fall migrant. Two were seen at Davis Pond on August 23 and again on August 25, 1909, with two Solitary Sandpipers each day. Mr. Marble furnishes the record of a single bird in company with a Semipalmated Plover on September 3, 1908, on a sand-bar in Saco Lake, which remained but a few minutes.

**36. Calidris leucophaea.** SANDERLING.

Mr. Marble furnishes the record of a single bird which passed the forenoon of August 18, 1909, on the shore of Saco Lake. He states that the weather was rainy and that the bird was not at all shy.

**37. Totanus melanoleucus.** GREATER YELLOW-LEGS.

A not uncommon fall and spring migrant. On October 4, 1906, a flock of eight birds was seen at Cherry Pond, visible on the wing for several minutes and calling, but not alighting. When it appeared that they were about to alight, they wheeled, rose again, and continued on their way. In 1909, on August 19, seven birds were similarly heard and seen at Cherry Pond; and on September 6 a single bird remained there for some time, standing on a rock which rose out of the water; while on September 18 one was seen on the muddy shore of Davis Pond

for some minutes before it took wing. In 1910 one appeared in flight over Cherry Pond on September 3; and on October 4 at Little Cherry Pond one came on the wing near our boat and was seen not more than thirty feet away, remaining on wing for several minutes before flying off southwestward.

Mr. Marble furnishes the record of two or more birds heard calling over Saco Lake late in the afternoon of September 25, 1910. Mr. Spaulding states that his son Roger brought him a fine specimen during the spring migration of 1909, shot from a flock of four birds on May 21. Mr. Spaulding observed a bird on the Connecticut meadows in the spring of 1910.

**38. Totanus flavipes.** YELLOW-LEGS.

An uncommon fall migrant. On August 21, 1903, one was seen in a field in Lancaster near the Connecticut River. The bird came out into the road, when it was followed up by my friend with a camera, merely taking wing over the roadside fence. It showed no shyness, while we viewed it at a distance of only fifteen to twenty feet. We left it standing in the road when we proceeded on our way. On August 8, 1907, August 25, 1908, August 19 and 31, 1909, a single bird was seen in flight at Cherry Pond. In 1910 a bird in flight, calling, was observed at Cherry Pond on four occasions, August 17 and 29 and September 3 and 17.

**39. Helodromas solitarius solitarius.** SOLITARY SANDPIPER.

A regular spring and fall migrant. The spring migration is usually missed, but on May 27, 1903, four birds were seen on the shore of Davis Pond. With them were two Spotted Sandpipers and a Semipalmated Plover. Two Plover were present the following day, but the Solitary Sandpipers had gone.

In the fall migration the earliest birds noted have been one at Brooks Pond, July 16, 1905, which continued there to August 20, thirty-six days, presumably the same bird, as it was frequently seen; and one on July 20, 1908, by a small pool at

Bowman station in Randolph, produced by the overflow from the watering tank for engines. In the fall migration a single bird has also been several times seen about a pool in a barnyard or by a mere roadside puddle. The latest dates in the autumn have been: 1904, September 26, three in a partly submerged field in Lancaster, one being seen there again on October 5, when a flock of five Pectoral Sandpipers was present; 1905, October 2, one about the foul water of a barnyard across the Connecticut from Lancaster; 1909, one at Muddy Pond on September 27. In 1910 seven birds were seen successively between August 10 and September 10 on the shores of six of the different ponds.

**40. Bartramia longicauda.** Upland Plover.

A rare migrant and summer resident. Mr. Spaulding furnishes the record of a pair seen in Lancaster in 1895 from May to September. He states that "they were undoubtedly breeding, as they remained in one field a number of weeks and were very noisy."

I am informed by Mr. Marble that on August 19, 1909, at about 7:30 in the evening Mr. Nathan Clifford Brown heard a bird of this species calling near the Crawford House; that it answered the call which Mr. Brown gave, and remained in hearing for a few minutes. Mr. Brown writes me, "The Plover was flying rapidly south, along the easterly side of the Crawford plateau. It whistled repeatedly and very clearly, whether in response to my own whistling or not."

**41. Actitis macularia.** Spotted Sandpiper.

A rather common summer resident along Israel's River and the larger brooks and about the ponds. Later in the summer individuals are sometimes seen quite far up the South Branch, four miles or more within the forest, at an elevation of 2000 feet or so. I have no October records and but one record in the second half of September, namely, on the 22d in 1903. And for the first half of the month the records are few, the species seeming to remain but few days into September.

**42. Oxyechus vociferus.** KILLDEER.

One casual instance. I quote from Dr. Allen's "Birds of New Hampshire:" "A second accidental record is of a bird shot at Jefferson, to the north of the White Mountains, in December, 1893. Mr. F. B. Spaulding, to whom I am indebted for this record, states that the bird was in a very emaciated condition and evidently unable to proceed further."

**43. Aegialitis semipalmata.** SEMIPALMATED PLOVER.

An uncommon spring and fall migrant. One was seen at Davis Pond, May 27, 1903. Two were seen at the same pond on the following day. These were not shy, while three Spotted Sandpipers took wing repeatedly and flew from point to point of the muddy shore. Again, on August 27, 1908, two were seen at Davis Pond; one also on the 31st and on September 2, and two on September 3.

Mr. Marble states that on September 3, 1908, during a northeast rainstorm, a single bird in company with a Semipalmated Sandpiper remained for several minutes on a sand bar in Saco Lake. The birds allowed him to make a close approach.

**44. Aegialitis meloda.** PIPING PLOVER.

A rare fall migrant. One record only has been obtained. On September 7, 1903, two birds were seen on the shore of Davis Pond, which were clearly identified as Piping Plover.

Dr. Allen in his "Birds of New Hampshire" gives no record of this species within the State except, upon the authority of Mr. Ned Dearborn, as "a regular migrant along our coasts."

**45. Canachites canadensis canace.** CANADA SPRUCE PARTRIDGE.

An uncommon resident on the Presidential Range and formerly in heavily timbered lands in the valley bottom. On September 17, 1901, a male bird was seen on the Durand ridge of Mt. Adams near the timber line among the thick stunted

spruces. It showed the fearlessness usual with birds of this species, although it rose at length from the ground to a spruce bough. There it remained in full view and allowed my companion to touch it with a four-foot stick. On October 5 in the same locality a female bird was seen, which we approached as near as ten feet, and she showed no fear. On June 10, 1904, a male bird was met beside the path on Israel's ridge of Mt. Adams, a half mile below the "Perch Camp;" and on July 14 Mr. G. B. Wellman at this same point saw a hen and four chicks half-grown. He states that he thinks there may have been more chicks in the brood, but that he counted four. On June 16, 1905, a male bird was again seen in this same locality, so precisely where the 1904 bird had been seen that when we reached the point on the path and my assistant said, "Here is the tree which I marked as the place of the Spruce Partridge," I returned answer, "And there is the partridge;" for at once my eye caught sight of the bird perhaps thirty feet away. I have seen the species on these two ridges of Mt. Adams only. In each instance the elevation was 4000 feet or more.

Mr. Wellman writes me that he saw a Spruce Partridge on the Osgood trail on Mt. Madison in 1908, and one in the Great Gulf in 1909. Mr. Spaulding informs me that he saw in the Jefferson Notch on June 26, 1910, a Spruce Partridge with one chick. The bird with her young was in the road at the highest point of the pass, 3000 feet elevation. Mrs. Bridge writes me that she observed one on the same road on September 12 of that year.

Mr. Hugh Brady, who occupied a camp on Nowell's Ridge of Mt. Adams in the summers of 1909 and 1910, stated to me that in the former year he saw repeatedly in August three different broods of Spruce Partridges beside a trail to his camp. He described the old birds as very tame and said that neither brood appeared to have more than four or five chicks. In 1910 he had seen none at all.

**46. Bonasa umbellus togata.** CANADA RUFFED GROUSE.

A common resident throughout all the wooded country and as high as the scrub growth extends on the Presidential Range,

The numbers seen season by season vary according as the conditions have been favorable or unfavorable for raising young. During the early summer females with broods are not infrequently met upon the mountain paths or along the wooded roads, and in autumn fully grown broods are sometimes flushed numbering eight to ten birds. On October 1, 1903, nine birds were feeding in the early morning in the top of a tall birch in a piece of woodland on the Highland. The drumming of male birds is regularly heard occasionally in late September and early October.

## 47. Circus hudsonius. Marsh Hawk.

An uncommon, though regular, summer resident. Marsh Hawks are seen from time to time in the valley region and over the hillside fields throughout the season. It is not unusual to meet with one or two on a day's or half-day's drive through the open country, and they are frequently observed in flight over the fields of the Highland slopes and about Cherry Pond.

On July 27, 1905, in a trip to Weeks Pond, on which Mr. H. A. Purdie accompanied me, we came upon a nest with five fully grown young in the low swampy growth bordering the pond and outside the line of the surrounding forest. Upon our approach four of the young birds took wing and disappeared in different directions. The fifth, not being sufficiently developed, remained. Mr. Purdie took this bird up in his hands, we examined it, and he replaced it in the nest, where it remained. One of the parent birds had been circling in the sky from the time of our arrival, but made no movement of coming to the protection of its young. The nest was fully exposed to the sun's heat and the weather, being placed on the ground in an opening of the low growth, which afforded no shelter, while it screened the location from view until one was close beside it. As the trail we were following was a little aside, we very probably would not have detected the nest or the young, had not the four birds which were ready to fly risen on wing at our advance out of the forest.

**48. Accipiter velox.** SHARP-SHINNED HAWK.

A summer resident; more common as a fall migrant. Birds are infrequently seen in June and July, but are almost daily noted in August and September. Few remain in early October. When the Flickers are migrating in September in scattered companies, sometimes numbering many birds, they have several times been seen to be pursued by one or two or several of these hawks across the pastures of the Highland, apparently in play. On September 18, 1903, four of these hawks were so engaged in the early morning among a company of half a hundred Flickers.

Dr. Allen in his "Birds of New Hampshire" records that he saw "a single bird on the rocks near the summit of Mt. Washington on ths 28th of August, 1901."

**49. Accipiter cooperi.** COOPER'S HAWK.

A summer resident; more common as a fall migrant. This species is less frequently seen in June and July than the Sharp-shinned Hawk, and is also less common in the fall migration in August and September. On August 21, 1902, a Cooper's Hawk suddenly darted from the hillside to Israel's River, where were four Kingfishers. These with a chorus of rattles flew off down stream. The hawk did not pursue. On August 21, 1906, an identical date four years later, circumstances were reversed, and a Kingfisher was the aggressive bird and drove off two Cooper's Hawks.

In the summer of 1910 a pair nested in the fifty-acre piece of woodland on the Highland. On June 10 one of the parent birds was first noted when I was passing through the wood in the early morning recording its tenants by their songs. The bird called noisily, giving a continuous cackle as it flew about, without coming into view. But a few days later, on the 14th and 15th, glimpses of the bird were obtained as in its flight it came several times within the range of vision. It was not until the 22d that the bird was plainly enough seen to be identified as a Cooper's Hawk. On the 25th the nest was found located in a yellow birch about a foot and a half in diameter at the butt

and probably standing seventy to eighty feet high. The nest was placed about fifty feet up, was made of sticks, and rested in the main crotch where a half-dozen branches separated in as many directions. The undergrowth below was much fouled with the droppings from the nest. On the 30th a young bird appearing hardly half grown was perceived perching on a bough about two feet from the nest and there remained for the time motionless and silent. Again on July 1 one of the young birds was seen perching about six feet from the nest. On July 3 one of the old birds was still heard cackling, as I made my morning rounds, but was heard for the last time. The nest was apparently empty, and no more was seen or heard of the family.

**50. Astur atricapillus atricapillus.** GOSHAWK.

Mr. Spaulding states that "this is not a rare winter bird;" that he has "known of a number that have been shot or caught in traps," and further says, "On a day in February, 1908, I saw one kill a dove in the street in front of my store." In Dr. Allen's "Birds of New Hampshire" Mr. Spaulding testifies "that he has found its nest and eggs on the banks of the Connecticut River on the Vermont side opposite Lancaster."

**51. Buteo borealis borealis.** RED-TAILED HAWK.

Resident and breeding in the wooded districts. Seen singly or in pairs early in the season. More in evidence in August, September, and early October. On the northern slope of Boy Mountain I have several seasons noted a pair in June; also far up the Jefferson Notch road, as well as on the road to the Glen over the shoulder of Mt. Madison, and along the turnpike in the region of Bray Hill.

On August 30, 1910, at one view seven were seen passing in scattered flight southwestward over the Meadows, indicating a migratory movement; and on September 12 three were also seen at one time over Cherry Pond.

**52. Buteo lineatus lineatus.** RED-SHOULDERED HAWK.

An uncommon resident. Thoughout the summer hawks of this species are occasionally recorded. Sometimes their cry is

heard as they circle high in the air. I have about an equal number of records for each month of the season, year by year.

Mr. Spaulding states that he has several records for Lancaster and says, "One year it was unquestionably nesting, but I could not locate the nest."

**53. Buteo platypterus.** BROAD-WINGED HAWK.

A common summer resident, breeding in the woods and mountain forests of the region, A pair has been regularly observed at the foot of the Highland and the base of Hardwood Hill, where the narrow valley separates the two slopes. On many occasions and in different localities a bird has been seen perching by the roadside, which has gone on with us for some distance by successive short flights, repeatedly taking a perch and upon our near approach leisurely going on to another, showing absence of fear. On August 19, 1903, one was seen flying up the Randolph road ahead of us, carrying a snake apparently two feet or more long, which was so heavy that the hawk lifted itself in its flight not more than three or four feet from the roadbed. By September 20 the last bird has usually disappeared, but one was seen on September 25, 1902, one on October 9, 1905, and one on September 29, 1910.

**54. Archibuteo lagopus sancti-johannis.** ROUGH-LEGGED HAWK.

An uncommon fall and winter visitant. On October 4, 1901, one was seen in flight over Boy Mountain. On October 8, 1904, one remained in view for several minutes in slow, heavy flight over the North Road section of Jefferson, moving in the direction of Mt. Starr King. A Red-tailed Hawk and several Crows were in view at the same time and afforded a fine opportunity for a comparison of the birds.

On September 12, 1908, one was seen perching in the top of a dead spruce on the Jefferson Notch road three miles within the forest. It remained on its perch several minutes while we

viewed it, noting its large size and very dark coloration throughout. When it took flight, it went off on big wings at a moderate pace. On September 21, nine days later, over the same locality the same bird, or a similar one, was finely seen circling in the air and appearing entirely black. These are earlier dates than Dr. Allen assigns for the advent of this species in New Hampshire in its fall migration, and than Mr. O. W. Knight names for its arrival in Maine. But I think we were not mistaken in our identification of these birds, my assistant viewing them with me.

Mr. Spaulding regards the Rough-leg as one of the rarest hawks that he has recorded in his local list. He has a bird in his collection which was shot and brought to him April 8, 1906.

**55. Haliæetus leucocephalus leucocephalus.** BALD EAGLE.

An uncommon summer resident. I have six records. On June 23, 1905, one was seen in flight over the woods bordering Weed's Pond. We were following a logging road to the pond when this big bird crossed the piece of sky in view above us and was clearly seen with its great expanse of wings for an instant. On September 2, 1909, one remained in view in the sky for quite five minutes over the region of Lancaster bordering the Connecticut River. This bird showed plainly to us the whiteness of his head, neck, and tail.* The hour was midday. At about the same hour of this day Mr. G. B. Wellman and others had seen a Bald Eagle of similar appearance fly westward over the Randolph valley in the direction of the Connecticut.

In 1910 four records were obtained, one in each of the four successive months of the season. On June 29, when we were in a boat on Cherry Pond in the forenoon hours, an adult Bald Eagle was seen in flight over the eastern shore. At length it alighted on the top of a tamarack tree, showing its entire white head and neck plainly. Here it remained until we pushed further out in our boat, when it took wing to another perch some distance back, alighting on a branch of a big dead tree which

rose above the surrounding trees. On this dead tree-top the large size of the bird was well seen. A Red-tailed Hawk flew about the Eagle while perching here, making darting flights at it. Presently it took wing again and disappeared from our view behind the trees which stood in the foreground. But about three hours later it was again in the sky, pursued by a Red-tailed Hawk, and flew off in the direction of Mt. Starr King. In its several flights the complete whiteness of the tail was many times observed. On July 4, while the town celebration of Independence Day was proceeding on Jefferson Hill in the afternoon, my assistant, who had seen the Eagle with me at Cherry Pond, informed me that one passed in flight over the assembly from Mt. Starr King toward the pond, attracting much attention. On August 22 an adult bird was again seen in Lancaster near the Connecticut River, flying southward. On September 27 an adult bird was once more seen over the Jefferson valley, as we were driving on the turnpike. Not improbably these four records are based upon but two birds. But, however that may be, the season of 1910 was the first to furnish a succession of records.

In Dr. Allen's "Birds of New Hampshire" Mr. Vyron D. Lowe, of Randolph, testifies "that a pair of Bald Eagles has summered for perhaps twenty five years on the Presidential Range and that until seven years ago [1895?], or thereabouts, the nest was nearly at timber line on Mt. Adams, but that some one robbed it, and the birds have left the site, though he still sees them on the range at intervals during the summer; in 1902, Mr. Lowe first saw the birds on March 23d."

### 56. Falco peregrinus anatum. Duck Hawk.

Mr. Nathan Clifford Brown writes me: "During the first week of August, 1907, I saw one morning at Jefferson some magnificent evolutions on the part of a Duck Hawk. He swooped several times with astonishing velocity toward a farmhouse and recovered himself with wonderful quickness just before reaching the

ground. Altogether he was in sight but a few minutes and flew away to the westward without quarry, I believe."

Mr. Marble states that on September 15, 1910, in company with Mr. C. A. Merrill, he saw a Duck Hawk on Mt. Clinton and another on Mt. Franklin, and that he has several times noted a bird of this species in previous years in the latter half of September, when following the old bridle-path on the Presidential Range.

## 57. Falco columbarius columbarius. Pigeon Hawk.

Mr. Marble furnishes two records. The first is taken from his "List of Birds found within a radius of one mile from the Crawford House," published in 1907, namely, "During the season of 1901 several were shot by my father; but in the last few years this hawk has rarely been seen." The other record is of a Pigeon Hawk seen by him on August 29, 1908, on Mt. Willey.

Dr. Allen in his "Birds of New Hampshire" states, "Dr. A. P. Chadbourne records that one was 'seen' in the Great Gulf, Mt. Washington, at about 3000 feet, on July 8, 1886. The bird was not secured, however, so that the record does not certainly establish the bird's presence in New Hampshire during the breeding season."

## 58. Falco sparverius sparverius. Sparrow Hawk.

A not uncommon summer resident and fall migrant. It is somewhat regularly seen throughout the summer in the valley, at the Meadows, and along the turnpike at several points, and occasionally at higher elevations. It is more frequently seen in August and in September up to the end of the month. In 1903 one was observed on Jefferson Hill on October 2. On August 6, 1901, one flew about the summit of Owl's Head, the northern peak of Cherry Mountain, having an elevation of 3200 feet, reappearing several times successively, while we remained. On August 25, 1902, one was noted perching on the vane of

the chapel on the Highland engaged in pluming itself. On August 18, 1910, seven were seen in one tree-top near Riverton.

Dr. Allen in his "Birds of New Hampshire" states that two were noted by Dr. A. P. Chadbourne flying low over the summit of Mt. Clay, of the Presidential Range, on September 2, 1884, and that "the next day another came sailing down from above and disappeared in Tuckerman's Ravine;" also that "Mr. Bradford Torrey saw one fly close by the summit of Mt. Washington (6290 feet) about the 28th of August, 1901."

### 59. Pandion haliaëtus carolinensis. Osprey.

An uncommon spring and fall migrant. One, two, or three records have been obtained each season, except one, 1906. Several birds have been seen in June, namely, one on June 7, 1904, at Randolph; one on June 7, 1905, in the Cherry Pond region; and one on June 4, 1907, at Lancaster. The fall occurrences, all in September, except one, and of a single bird each, have been between the ninth day, on which there are three records, namely, in 1904, 1907, and 1910, and the twenty-eighth day, in 1907. The latest record is one seen in 1907 over Cherry Pond on October 5.

Mr. Spaulding informs me that he observes the Osprey in its migration every spring, while the water is over the Connecticut meadows.

Dr. Allen in his "Birds of New Hampshire" states that "Dr. A. P. Chadbourne has recorded one which flew a few yards over his head on Mt. Jefferson, September 2, 1884; elevation about 5500 feet."

### 60. Asio wilsonianus. Long-eared Owl.

A rare resident. I have but one record, that of a bird becoming disabled and being picked up water-soaked from the lily-pads on the surface of Cherry Pond, August 8, 1907. The circumstances were these. While we paddled about the pond, two men in another boat, who were engaged in fishing and from

whom we had kept apart, came upon this owl incapable of moving itself, and laid it in the bottom of their boat. They brought the bird in to us when we landed, knowing that we were interested in birds. So we took it into our hands and thus identified it. When we laid it up on the roof of a low camp to dry, it refused to remain there and flopped down into the neighboring bushes, seeking apparently shelter from the clear sun, and a hiding-place. So we left it in the bushes out of harm's way, thinking that a drying out of its pinions would enable it to use its wings again and take care of itself. We did not see that it was injured, but judged it to be disabled merely by its soaked condition. How it came to be upon the lily-pads and became water-soaked we could not determine, neither did the men who were its rescuers know.

Mr. Spaulding states that he has several records of this species and that one year he found it nesting. He says, "On May 25, 1905, the nest, when found, contained five half-grown young. The nest was in a deserted Crow's nest in heavy growth of swamp spruce."

**61. Asio flammeus.** SHORT-EARED OWL.

A rare fall migrant. Mr. Spaulding states that he has taken this owl once within his recollection, namely, in 1895, on one of the meadows below the town (Lancaster), late in the fall.

**62. Strix varia varia.** BARRED OWL.

An uncommon resident. One only, it may be, is heard hooting in the course of the season, and there have been four seasons, without a record of the species. In 1908 one occupied the fifty-acre piece of woodland on the Highland the entire summer. It was repeatedly seen throughout June and July, and although not recorded in August, was again seen in September up to the latter part of the month. On other occasions one has been heard hooting on the Highland. On September 1, 1904, one was seen perching beside the Mt. Madison road in Randolph at midday. On September 27, 1906, one was heard calling at the foot of Mt. Adams in Randolph, as we returned home at dusk.

**63. Cryptoglaux acadica acadica.** SAW-WHET OWL.

An uncommon resident. Mr. Spaulding states that he has "seen or heard this owl nearly every year for the past twenty-five." Some of his nesting records are, May 15, 1887; May 5, 1888; May 23, 1893; May 10, 1895; May 8, 1896; May 7, 1897 (young birds); April 21, 1898; May 1, 1899; May 24, 1904 (young); May 17, 1908 (young).

**64. Otus asio asio.** SCREECH OWL.

Mr. Spaulding states that he has "found the Screech Owl quite rare, and never found it nesting, although one was seen on May 4, 1898." He further states that his "last record was of a bird that followed a dove into the cupola of a blacksmith's shop in Lancaster, February 7, 1907, and came down through to the floor and was killed."

**65. Bubo virginianus virginianus.** GREAT HORNED OWL.

An uncommon resident. Mr. Spaulding has found this owl "nesting on three different occasions," and thinks "it should be considered a regular resident." He states: "In the summer of 1894 a woodchopper brought in a pair of young Great Horned Owls which he said he secured from a nest about three miles from town (Lancaster). So I made a trip after the nest, April 11, 1895, and secured a set of two eggs. The next year the nest was occupied by a Red-tailed Hawk. On April 21, 1897, it contained two downy young owls. The tree then blew down, and I have no other records since, although I have heard the owls on different occasions."

I have two records. One was seen on September 10, 1906, perching on a stub about thirty feet high in a recently cut section of the forest on the westerly side of Mt. Jefferson. It remained in view for several minutes and then flew silently back out of sight. This occurrence was in the late forenoon at an elevation of about 2800 feet and where two years previous a virgin forest of spruce had stood. At this time the deciduous trees

which had been left furnished only a thin standing of timber. The other record is of a bird heard calling several times at midday on the back or eastern slope of Boy Mountain on September 4, 1910, at an elevation of about 2200 feet.

Mr. Marble informs me that in recent years Mr. N. C. Brown and himself have frequently heard a Great Horned Owl calling in the evening from the woodland on the east side of the Crawford House in the months of August and September.

**66. Nyctea nyctea.** Snowy Owl.

A winter visitant. Mr. Spaulding states that he has seen and shot Snowy Owls on a number of occasions. His latest record is of a bird in his collection, which was taken on December 1, 1905.

**67. Surnia ulula caparoch.** Hawk Owl.

Mr. Spaulding furnishes one record, that of a bird he shot on November 19, 1884. This was the year of the very unusual flight of Hawk Owls in northern New England when "four were secured by Mr. William Brewster at Lake Umbagog on the dates October 25, October 31, November 15, and November 16, respectively; and at Colebrook Mr. Ned Norton found them common, writing under date of December 1, 'Hawk Owls came three weeks ago in greater numbers than ever before. Farmer's sons have been killing them all over the country.'" [*Allen's Birds of New Hampshire.*]

**68. Coccyzus americanus americanus.** Yellow-billed Cuckoo.

The one occurrence of this species by my own observation was at the boundary line of New Hampshire close by the Connecticut River on the Vermont side in Guildhall, opposite Lancaster. But as the river for its entire width belongs to the State of New Hampshire, it is not improbable that this bird came into New Hampshire air, if not on to New Hampshire soil. The occurrence was on September 18, 1899. The bird was clearly

seen at the roadside by myself and three companions and was identified beyond a doubt, by our mutual mention of its characteristic features, as a Yellow-billed Cuckoo.

In Mr. Marble's local list of birds about the Crawford House one record is given, that of a bird seen on July 26, 1907. Mr. Marble informs me that the bird was first seen by Mr. Nathan Clifford Brown and shown by Mr. Brown to him.

**69. Coccyzus erythrophthalmus.** BLACK-BILLED CUCKOO.

A rather uncommon summer resident, breeding occasionally on the slopes of Boy Mountain, Mt. Starr King, and other hillside lands, as well as in the valleys of Israel's and Moose Rivers, and along their tributary streams. On June 25, 1905, one was heard singing on the back or eastern slope of Boy Mountain at an elevation of over 2000 feet, where was also the voice of the Wood Thrush. Some seasons the records extend well toward the end of September. In 1900 one was seen in the valley on September 26. In 1909, two birds were observed near the shore of Cherry Pond on September 6; on the 13th one was heard singing in the valley; and on the 27th I came upon one in the Muddy Pond woods. The latest bird observed was one on October 3, 1900, at the Meadows. Not unlikely these later birds are in migration from points farther north. In 1910 the representation of the species in the region was scanty, not more than five scattered birds having been noted.

**70. Ceryle alcyon.** BELTED KINGFISHER.

A regular summer resident along the rivers and tributary streams and about the ponds, seen singly or in pairs, rarely more than two together. In late summer and early autumn individuals are frequently seen or heard far up mountain brooks. Thus repeatedly toward the latter part of the season one or two birds have been observed up the South Branch as high as 2500 feet and four miles within the forest. On September 2, 1908, ten were seen singly and successively on a day's drive which followed mountain streams as well as river courses.

**71. Dryobates villosus villosus.** HAIRY WOODPECKER.

A rather common resident, nesting on Boy Mountain in the woods which reach to the river, and throughout the valley region. Found nesting also in Jefferson Notch, on Mt. Starr King almost to the summit at elevations of 3500 or 3600 feet, and on the Presidential Range. The young are heard twittering in nests during the first half of June.

**72. Dryobates pubescens medianus.** DOWNY WOODPECKER.

A common resident, nesting in all the woodlands and forests, but not reaching so high on the mountain sides as the Hairy Woodpecker. The records indicate that the Downy is about twice as numerous as the Hairy. They also indicate that more individuals are in evidence in July and August than in June and September, which perhaps is due to the fact that the young are abroad after the month of June and that by September they have scattered more or moved somewhat southward in migration. The last five years' records have been examined, and this increase and subsequent decrease are found to be true of them all.

**73. Picoides arcticus.** ARCTIC THREE-TOED WOODPECKER.

An uncommon resident. I have found it breeding in the Jefferson Notch and on Mt. Starr King. The records for the Notch are: 1903, July 15, a pair seen; September 11, a male bird; 1904, June 2, a female bird; August 19, a male bird; 1905, June 29, a pair, and on several occasions during the season one or two birds; 1906, June 7, a male bird; July 28, three birds together, two of which were males; August 4, September 5 and 10, a pair; 1907, June 11, one calling; June 29, a male bird. In 1908 and 1909 no records in this locality were obtained, probably on account of the severe cutting of the spruce growth. But in 1910 again a bird was seen on June 4 and 13. The records for Mt. Starr King are: 1903, September 25, a female bird; 1906, July 7, pair and nest containing chattering young,

at an elevation of probably 3500 feet; 1907, June 22, a male bird; 1908, June 22, pair and nest containing young near the summit at an elevation of 3600 feet or more; August 15, two birds calling in the vicinity of the nesting site; 1909, June 28, a male bird and nest containing chattering young, very near to the nesting site of 1908. The forest has been badly cut where these woodpeckers are permanent residents, but a portion along the trail to the summit remains intact, affording still a suitable place for breeding. I am informed by my assistant, who has been engaged in winter logging on this mountain, that he has often seen one of these birds during his season's work. The nest of 1906 was in a spruce trunk partly alive and on the northwest side of the tree; that of 1908 at a height of about eighteen to twenty feet in a dead spruce about fourteen inches in diameter; that of 1909 in a dead spruce at a height also of about twenty feet and on the northeast side of the tree. In each instance both parent birds were assiduously engaged in procuring and bringing food to the young.

Another locality where occasionally a bird of this species has been seen is the Davis swamp and Muddy Pond region. In the swamp a male bird was seen on June 16, 1904, and again one on May 31, 1905. In the woods about the pond a bird was seen on October 8, 1904, and one on October 4, 1905. These localities are in the Jefferson basin about 1100 feet elevation. In early August in 1903 and 1904 I found one and two birds respectively at the foot of the Highland in the valley. Twice a bird has been seen on Boy Mountain in early October, namely, in 1903, and again in 1904, once on the western slope perching on a dead spruce in a limited patch of spruce growth disconnected by pasture land from the woods of the summit, and once on the southern slope at about the same elevation in forest of mixed growth. Undoubtedly these were birds which had moved somewhat out from their breeding places.

Mrs. Edmund Bridge informs me that she has seen the bird in September on Mt. Crescent in Randolph (1906), and on the "air line" path on Mt. Adams (1908), when she saw three birds on the 16th day.

**74. Picoides americanus americanus.** THREE-TOED WOODPECKER.

A rare resident. This species has been found mostly in the same two localities as the preceding, the Jefferson Notch and Mt. Starr King. In six of the last seven years a single bird, or a pair, has been seen in the Notch. Three of the seasons furnish two records or more. In 1905, a pair nested by the roadside in a spruce stub just below the highest point of the pass on the southerly declivity, the nest-hole being apparent to one passing by, whose attention would be attracted by the chattering young within. On July 5 we were in this way made aware of it. The male bird was engaged in feeding the young and showed no concern over our near approach. We could see the heads of the young birds raised for food. Two days later we saw the feeding done by the female bird. The nest-hole was about fifteen feet from the ground on the westerly side of the tree. Neither parent bird was disturbed by our standing directly under the nest when it came with food, but performed its errand and departed. In this instance, at least, the parent birds showed an entire absence of fear, and on other occasions when met by the roadside they have allowed near approach without manifesting alarm. In the case of all three nestings of the preceding species the parent birds were much excited by our presence, called loudly, refrained from going to the nest while we were near, and the male bird by much demonstration endeavored to lead us away from the nest, excitedly calling and moving in a different direction, going on before us by short flights. The chattering of the young birds served, however, in all these cases to make the locating of the nest easy. The calls of the *americanus* male bird were not excited or loud. The single calls were somewhat like the robin's call at dusk, and the rattling calls resembled a Hairy Woodpecker's rattle, but were less loud and sharp. Six days later, when we made our next trip through the Notch, there was no chattering of the young and none of the family were seen.

On Mt. Starr King a male bird has twice been observed, namely, on June 5, 1905, and on June 28, 1909, but we have not located a nest, although there is no doubt that the species breeds there. On Mt. Adams a bird has been twice seen, namely, a male bird on June 10, 1904, and a female bird on October 5, 1906, when following the "Randolph path" to the "Perch Camp." This species, therefore, has been met in fewer localities than the preceding and must be regarded as somewhat rarer.

Mr. Spaulding informs me that on June 19, 1910, in company wlth Mr. F. H. Kennard and Mr. F. B. McKechnie, he saw a male bird in Lancaster, which they watched a long time, but that they were unable to locate any nest. Mr. Spaulding has also a record in May, and states that he has several times seen a bird in the winter.

**75. Sphyrapicus varius varius.** YELLOW-BELLIED SAPSUCKER.

A common summer resident, more numerous in the fall as a migrant. It nests on Boy Mountain and in the woods of the Highland and of the valley and is frequently seen along the Jefferson Notch road. In 1900 a pair was engaged in feeding their young, July 29 to July 11; on July 13 the family was gone. In 1909 two nests with young were in the fifty-acre piece of woodland in early July.

In September the birds are much more in evidence and are often seen on the telephone posts along the highways and also upon the apple-trees and birches in open lands, on which they show a disposition to work persistently, although often driven off, and which they encircle with many rows of holes, to the detriment or death of the trees.

**76. Phlœotomus pileatus abieticola.** NORTHERN PILEATED WOODPECKER.

A not uncommon permanent resident, breeding in the woodlands and forests of the region. It is not unusual to hear their long, loud, laughing calls on the Highland or coming up from

a bird in the valley. They are occasionally seen in flight across open country. Their large, elongated excavations in dead tree-trunks are observed everywhere in the woods. Many of these holes are within three to five feet of the ground. The sounds of the heavy blows they strike with their bills are loud and carry a considerable distance and indicate by the tempo that they work deliberately rather than rapidly. While sometimes they are not very shy, usually much care has to be used in making an approach in order to see one at work. They are not met with on the higher elevations of the mountains, but have been often noted in the swampy woods around the several ponds.

In 1908, on August 26, two were at work on the same tree upon the side of Boy Mountain at an elevation of about 2000 feet, and a third was seen but a short distance away. In the fall one has occasionally been seen on the grounds of one of the hotels or cottages on the Highland very near to the house. Throughout the season of 1910 the species was more than usually in evidence both by call and repeated observation of birds, although they may not have been many in number.

**77. Melanerpes erythrocephalus.** RED-HEADED WOODPECKER.

A rare visitant. There are two records. On September 16, 1900, one came flying from the westward across a broad field at the foot of the Highland and alighted at the border of the fifty-acre piece of woodland, where I viewed it for ten minutes or more upon its perch. It was an immature bird, showing no red upon the head and neck.

Mr. Spaulding furnishes the other record, that of an adult bird seen by Mr. Owen Durfee and himself on June 14, 1906. This bird, they state, "was tame and allowed a quite close approach; it was noisy, and a very conspicuous bird."

**78. Colaptes auratus luteus.** NORTHERN FLICKER.

A rather common summer resident of the more open country and thinned woods, but not found in the deep forests, preferring

valley lands and lower mountain slopes. It is much more numerous in the fall as a migrant, when sometimes scattered companies pass over the Highland, taking short flights from perch to perch on their way, or scatter about for a brief stay. On September 16, 1903, such a company numbered by count nearly a hundred birds. On other occasions fifteen to twenty birds have been seen. Sharp-shinned Hawks, migrating at the same time, sometimes chase the Flickers about the pasture lands.

**79. Antrostomus vociferus vociferus.** WHIP-POOR-WILL.

An uncommon and local summer resident, breeding at a few points in the valley and in the Cherry Pond region. On a few occasions one has been heard on the lower slopes of the Highland. The first instance was on May 27, 1902, at three o'clock in the morning. I had risen to make a full record of the morning awakening of the birds by recording every voice heard and the time at which each species first voiced itself. The Whip-poor-will's song was then heard by me for the first time in Jefferson, coming from the direction of the valley. The song lasted fifteen minutes and then ceased. On two or three other occasions one has been heard on the Highland. In June, 1907 and 1908, a pair probably bred in the Stag Hollow neighborhood, as testimony was given me of repeated hearings of the song in the evenings of June. Another pair has often been located on the lower slopes of Mt. Starr King at an elevation of about 1400 feet.

**80. Chordeiles virginianus virginianus.** NIGHTHAWK.

An uncommon summer resident. The call has been heard on a few occasions during the nesting season over the Highland, but seldom has a bird followed up the narrowing valley to a point so near the Presidential Range. Most of the instances of hearing or seeing one have been at the Meadows or along the turnpike where the forest has been burned. Here not infrequently a single bird, or a pair, has been heard, and the tumbling and booming witnessed. On July 2, 1904, sixteen birds

were in the air together, indicating the nesting of several pairs in that locality. The same season a nesting was begun in late June in an open field in the valley bottom near the Highland station. Two eggs were laid, and the bird sat upon them several days, but a few days later the nest was found empty, having been robbed by some unknown agency.

In 1901 a distinct migration of Nighthawks was witnessed on August 20 and 21. Twenty-five to thirty birds were seen in the air at 5 P. M. of the first day over the Meadows in company with swifts and swallows. On the following day in the late afternoon, as we were returning from the Glen, about twenty birds were seen near the Randolph station, and forty more as we proceeded farther up the valley of the Moose River. In 1910, on August 22, a smaller migratory movement was witnessed, when twelve birds were seen over the valley moving westward. I have but one September record, namely, two birds seen on the 4th, in 1900.

**81. Chætura pelagica.** CHIMNEY SWIFT.

A rather common summer resident, regularly nesting on the Highland and here and there in chimneys in different sections of the town. On June 10, 1907, in a drive of about a dozen miles within town limits, fourteen pairs were recorded. They have nested in one of our own chimneys, and the young have fallen to the hearth. Our neighbors have had similar experiences. Swifts are frequently seen during the summer over the extensive wooded tracts of the Presidential Range. So often have three birds in flight together been recorded at different times and places that we have come to remark of our observation, "There are the usual three." Repeatedly evening after evening and in different seasons the flight of our local band at sundown has consisted of three birds.

I have seen no large flocks of swifts at the time of their leaving in late summer. A dozen to less than twenty birds constitute as large a company as has usually been observed. But in August, 1910, on the 11th and 22d days, at 5:30 P. M.,

twenty were counted in the air over the valley, and on the 23d day forty-two were observed. They were departing, for they were the last seen that season. While in half of the years the last record for the season has been in late August, in the other half the records have extended to the 4th, 10th, 11th, and 13th of September respectively, the latest occurring in 1906. These latest records have also consisted of three individuals.

**82. Archilochus colubris.** RUBY-THROATED HUMMINGBIRD.

A not uncommon summer resident. Birds are seen throughout the region. One or two pairs visit the flower gardens of the Highland constantly, and individuals come to the woodbine on the home porch. Certain points by the wayside, where we have repeatedly seen a bird perching, have become interesting as showing the fixedness of choice of perch. For several seasons one was seen on a certain section of the telephone wire in Randolph almost as frequently as we drove that way. Another has been regularly seen for two or three seasons past on the tip of a small, dead, deciduous tree beside the Jefferson Notch road two miles or more within the forest, where clearings have been made. This tip has held the bird time and time again, when we have passed over the road. I have sometimes seen a hummingbird resting, indeed asleep, for some minutes in the middle of the day on a bush by an open spring on our place. On one occasion, when I had gathered a bunch of sweet peas in the garden, a hummingbird came in his usual hurried visit to the row and lit upon the bunch in my hand, repeating this several times and making no discrimination between the plucked and the growing flowers.

While according to six years' records the latest bird has been seen between September 15 and 19, in five other years the records have extended later, namely, three times to the 21st day, once to the 27th, in 1905, and once to the 28th day, 1907.

## 83. Tyrannus tyrannus. Kingbird.

A rather common summer resident of the open country, breeding sparingly on the higher open slopes of Mt. Starr King and Boy Mountain, and more commonly in the valleys. More individuals are met with always in driving away from the higher elevations of Jefferson toward the river courses in the valleys. About thirty individuals have been recorded several times on such drives occupying most of the day. Kingbirds are also seen quite regularly about the shores of the several ponds. The last leave usually in the first week of September, but in four of the seasons one or two birds have been recorded on the 10th (twice), the 11th, and the 13th, the latest record, in 1904, consisting of two birds. Mrs. Bridge noted two birds in Randolph on September 14, and two at Cherry Pond on the 15th, in 1910.

In an apple tree in the neighborhood several seasons ago a nest was built and an egg laid, but it was then deserted. When I examined the nest I found that the twine which the bird had used, as is not unusual, in putting her nest together had been twice carried across the top, like a double handle, and I surmised the desertion was due to the bird finding she became entangled in passing in and out. The twine was fastened somewhat loosely, so that it furnished the more difficulty and danger. I carried home the nest safely by the crossed twine as a handle.

## 84. Myiarchus crinitus. Crested Flycatcher.

An uncommon summer resident, a few pairs each season breeding. They have been noted on the Highland, 1650 feet, several seasons; but in the valley, at the Meadows, and in the turnpike district they have been oftener found. Some seasons they have disappeared in early July, but in other seasons records of individuals occasionally seen have extended to August 18, 19, 20, and 24. On August 15, 1910, four birds were recorded as seen separately in the valley, and these constituted the last record of the season.

### 85. Sayornis phoebe. Phoebe.

A rather common summer resident, regularly nesting on the Highland (1600 feet). The first song period continues to about July 20, and there is a second period of song in August and September. The latest record of a bird singing quite freely is October 2, 1902, on the Highland. The last birds disappear in the first week of October. We had a nesting many years ago on a beam of our piazza, which was successful in the rearing of the young, but while we had admired the beauty of the moss-decorated nest in its freshness, after a period of family life it was a very undesirable possession.

Mr. Spaulding, writing me under date of April 3, 1910, says, "Phoebes are singing everywhere. It is the earliest spring record I have."

### 86. Nuttallornis borealis. Olive-sided Flycatcher.

A not uncommon summer resident, found in the valley, along the turnpike, and on the mountain slopes where the forest has been cut into and the trees are somewhat sparse. Its bold, challenging song is heard much in such locations and arrests attention. The song period extends to the middle of August or later. Some individuals are usually noted up to early September. The latest records have been September 12 and 18 in 1900, and September 14 in 1909.

### 87. Myiochanes virens. Wood Pewee.

A common summer resident in all woodland and regularly heard in the large elms on the streets of Lancaster. The song continues without much abatement to the end of August, is heard commonly into the early days of September, and sometimes does not cease until the middle of that month. One was heard singing on September 17 and 19 in 1909. The latest individuals have been seen on September 23, 26, and October 3 in 1905, and on September 22 in 1909.

**88. Empidonax flaviventris.** YELLOW-BELLIED FLYCATCHER.

A not uncommon summer resident on the higher forest-covered mountain slopes and also found in damp woods about the ponds in wooded swamps. The song has sometimes been heard as late as the last of August. The latest records of individuals have been October 7, 1904; October 3, 1905. Usually the species disappears in early or mid-September. Mr. Spaulding has found the nest at Lancaster and records one with five fresh eggs on June 14, 1886, "near a low, swampy piece of woods." (*Allen's Birds of New Hampshire.*)

**89. Empidonax traillii alnorum.** ALDER FLYCATCHER.

An abundant summer resident along Israel's River and its tributaries on the hillsides, especially those bordered with alder growth. On June 9, 1910, nearly fifty birds in song were recorded on the drive to Lancaster, following Israel's River and its tributaries much of the way. The song is much heard in late May, through June, and into July, and is renewed in late July and early August, constituting a second period of song. In 1910 the song was occasionally heard to the end of August. Although the birds of this species keep much in the bushes about their haunts, they have often been seen singing from telegraph wires. The latest individuals are usually recorded in the first week of September. Mrs. Bridge furnishes two later records in 1910, namely, a bird seen in Randolph on September 14 and one seen at Cherry Pond on September 15.

**90. Empidonax minimus.** LEAST FLYCATCHER.

A common summer resident, found in the deciduous woods of the lower slopes of the mountains and in the trees along the highways in the valleys. The species extends up the slopes of Boy Mountain to 1700 feet or higher. The song is less prevalent than are the songs of the Wood Pewee and the Alder Flycatcher.

It is little heard in August. The last birds seen are usually recorded from September 18 to 23. One was seen on October 3 in 1905.

**91. Otocoris alpestris alpestris.** Horned Lark.

A rare migrant. On October 7, 1904, a flock of about fifty birds was seen feeding in a ploughed field on the lower slopes of Boy Mountain near the river. I was able to make several near approaches to them, while they walked about or took short flights to other parts of the field. They were all, so far as I was able to determine, *alpestris*, plainly showing yellow foreheads, eye-patches, and throats. This is the only occurrence of which I have record.

**92. Otocoris alpestris praticola.** Prairie Horned Lark.

A locally not uncommon summer resident in recent years. My first record was of two birds seen in Lancaster by the roadside near the Connecticut River on August 7, 1899. If the species was present in the years immediately succeeding it escaped notice until 1903, in which season and since then it has been unfailingly in evidence. On July 13, 1905, forty-two adult and immature birds were seen at the Meadows in three separate flocks. At half-a-dozen localities in Jefferson the species has nested in recent years. At the Meadows in June immature birds have been seen with adult birds, and the song-flight has been many times witnessed.

In 1905 in a cornfield on the Highland a nest was built and four young were reared. The nest was placed on the ground after the planting of the field and was discovered on June 20, when the corn was about four inches high and men were at work running a cultivator. They saw the nest just in time to prevent the horse from stepping upon it. I was informed, and the next day I found in the nest birdlings covered with buffy down. The nest composed of grasses was sunken in the ground

so that the rim was about level with the surface. It seemed very compactly woven together. The altitude of the location was about 1500 feet. Seven days later the young had weathered a severe easterly rain-storm and were well feathered. On the 30th they had left the nest, and two were seen in the field. Other nestings in farmers' fields have come to my knowledge, discovered also in the work of cultivating the planted ground.

Prairie Horned Larks have been seen on the grounds of the Mt. Washington Hotel during the past six seasons, both adult and immature birds, the flock sometimes numbering a dozen and once twenty birds. They have been seen in Randolph in two different localities four miles apart.

The song is often heard from a bird on the ground and has been many times enjoyed from one high in the air, as for several minutes it has maintained its altitude and poured forth its bubbling notes. I am informed by my assistant that some birds appear as early as February and are then seen feeding in the roads like the House Sparrows. They are generally seen on ploughed ground and have seldom been observed upon fields covered with old sod. On the Mt. Washington Hotel grounds they walk over the closely-shaven turf of the golf-links. As immature birds are commonly seen with adult birds in early June and nestings occur in late June, it seems probable that two broods are often raised. Some individuals continue to be observed up to early October in some seasons. In other years September 20, or thereabouts, is the date of their departure.

### 93. Cyanocitta cristata cristata. Blue Jay.

A permanent resident in moderate numbers and a fall migrant. The birds are very quiet during much of the summer, especially during July, and are then little observed. In the autumn they are gathered in smaller or larger flocks. These flocks, numbering from a dozen to a hundred birds, are seen occupying pieces of woodland or moving across open areas, passing by short flights from tree to tree. These migratory

movements occur mostly during the middle of September. One hundred or more birds constituted such a company on September 19, 1908. Half a hundred similarly passed on September 12, 1903, and September 23, 1904. The number remaining in the early days of October is small.

**94. Perisoreus canadensis canadensis.** CANADA JAY.

An uncommon permanent resident on the higher slopes of the higher mountains, 3000 to 4000 feet elevation, among the dense balsam and spruce growth. Most commonly two birds have been seen together. Sometimes these have been accompanied by one or several immature birds, constituting a family of from three to six birds. They have been observed on Mt. Adams, Mt. Jefferson, Mt. Starr King, and Cherry Mountain. In recent years, since the opening of the Jefferson Notch road, a pair or a family has been occasionally seen near the summit of the road, 3000 feet elevation. The latest record was of two birds observed there on September 26, 1910.

A pair has been seen several times on the summit of Mt. Starr King among the dwarf spruces, an elevation of 3900 feet. Here on September 8, 1902, we found the birds so tame that they came and fed from our outstretched hands, from our knees, and at length from the lips of my companion as he lay upon the ledge, taking such share of our noonday lunch as we were willing to spare, bits of bread, boiled egg, and raisins. They gave soft, cooing sounds, low whistles, and at times harsher cries. These jays become familiar with men at the logging camps in winter, where they are fed and also help themselves to food.

On one occasion, May 30, 1904, a company of seven birds passed up over our garden slope from the woods below to the upper portion of Boy Mountain. On an earlier occasion, May 26, 1899, one was seen at Bowman's at the foot of Mt. Jefferson. In these last two instances the birds were probably on their way to higher elevations. On September 23, 1904, two birds were seen in the valley, which were evidently in a migratory movement to lower levels.

**95. Corvus brachyrhynchos brachyrhynchos.** Crow.

A fairly common summer resident and abundant spring and fall migrant. Occasionally a few remain throughout the winter. In the winter of 1909-10 Mr. Spaulding informs me that he saw Crows every month both in Jefferson and Lancaster. During the summer they occupy the open country or woodlands bordering clearings. In September they are gathered in flocks often numbering from a hundred to two hundred and fifty birds. These flocks remain for two or three weeks about the hillsides and in the fields, sometimes passing across the sky and furnishing an opportunity to number them. The numbers decrease after early October, the larger flocks having passed southward.

**96. Dolichonyx oryzivorus.** Bobolink.

A common summer resident. A dozen pairs, it may be, nest in the mowing fields on the Highland at 1500 to 1600 feet elevation. Along the roads to Lancaster the song is constant in the month of June. In the fields in Randolph close up to the base of the Presidential Range the song is heard throughout the breeding season. The song season continues to early or mid-July. July 6 marks its termination in several seasons, while in other years it has extended to July 14 and 16. Occasionally the full song has been heard once given some days after the singing had ceased. The first notes of the song are always heard for a few days after the birds have ceased to sing their full song.

They move about in families as soon as the young are reared, and later the families join into neighborhood flocks, which remain throughout August and into the first days of September. These flocks number variously from twenty to a hundred birds. At the end of the season they are invariably in the grain fields feeding, and one has no idea of their number, hidden away as they are in the standing grain, unless he disturbs them and they rise successively until half a hundred or a hundred may have been counted. These largest flocks are seen in late August. A few birds occasionally remain to the middle

of September. Four were seen in an oat field on September 24, 1902. In early August male birds are sometimes noted in the process of change to the winter plumage.

### 97. Molothrus ater ater. Cowbird.

A rare summer resident in Lancaster. None have been seen within the territory of Jefferson. Mr. Spaulding testifies that he has not infrequently seen a bird and found the eggs. I have seen a single bird or a company of several birds in pastures near the Connecticut River in June, July, or August in recent years. On September 28, 1908, fourteen were observed on the Vermont side of the Connecticut River. This flock may have consisted of local birds gathered for migration.

Mr. Spaulding has twice noted a single Cowbird wintering at Lancaster. One was shot there on January 18, 1895, which had been observed throughout the winter to that date, feeding in the streets with the House Sparrows; and a second was seen up into December, 1899, keeping about with the sparrows. (*Allen's Birds of New Hampshire.*)

### 98. Agelaius phœniceus phœniceus. Red-winged Blackbird.

A rather uncommon summer resident, which appears, however, to be steadily gaining in numbers in Jefferson. It is found nesting in small swampy places near Israel's River at several points along its course, and a colony of perhaps a dozen pairs about the shores of Cherry Pond. In Lancaster small colonies occupy swampy lands bordering the Connecticut River and its tributary streams. The species is regularly present also throughout the season at Fabyan's in marshy spots near the Ammonoosuc River, at an elevation of 1400 feet. One or two pairs evidently breed there. A pair has also been located several seasons high on a hill lying between Jefferson and Lancaster, where is but a bit of a marsh with a few cat-tail flags. Indeed, wherever there

is a spot suitable for nesting, there the Redwing seems now to nest, even if it be but a single pair. At the Meadows the number of pairs has increased from one or two in the earlier years of my observation to several pairs in the later seasons.

Neighborhood flocks are formed after the middle of July and are seen also in August. On August 6, 1906, a flock of a hundred birds was observed in Lancaster, and on August 18, 1910, a similar flock. In early September large flocks of migrating Redwings have been seen by the Connecticut River, notably one of 700 birds, according to estimate, on September 2, 1909. Some individuals are joined with the large flocks of Rusty Blackbirds which appear by the Connecticut in early October; and at Cherry Pond a small remnant has been observed between October 1 and 4 in some seasons.

### 99. Sturnella magna magna. MEADOWLARK.

A rather rare local summer resident, but becoming less rare. The species had not been observed by me until 1903. Mr. Spaulding testifies that he found a single pair nesting on his father's meadows in Lancaster in 1901, the first he had ever noted there (Allen's Birds of New Hampshire). It was here that the family seen by me in 1903 was located. In the more recent years several pairs have been located in the upper or northern part of Lancaster. On June 8, 1908, five singing males were heard in that section.

The same year two pairs were located at the Meadows in Jefferson, separated from each other by a distance of about a mile. That year undoubtedly marks the entrance of the species as a breeding bird within the limits of Jefferson. In 1909 two pairs were located respectively in the same fields as in the preceding season. On July 6 my assistant took up out of the grass of one of these fields a young bird, nearly full-grown, which from the road had attracted our notice by its calling. In the season of 1910 again two singing males were noted at the Meadows, but these were heard in fields somewhat removed from the former

locations. The song period extends to the end of July. On August 5, 1909, a flock of fourteen birds was seen at the Meadows, the presence of which suggested that the two families had joined together for early departure, and although two birds were again noted there on the 9th, these constituted the last record of the season.

### 100. Icterus galbula. Baltimore Oriole.

An uncommon summer resident in Lancaster, where a few pairs breed in the elms of the village streets. A nesting or two has also occurred in some seasons two or three miles out from the village on the north road leading to Jefferson, and once several years ago in an elm near the boundary line of the two towns. The birds are seldom seen after the young have been reared. Occasionally a male or a female bird has been noted in August.

On one occasion, July 17, 1903, a male bird was seen on the north road in Jefferson less than a mile from the Waumbek Hotel. On one or two other occasions a male bird has been reported to me as seen within the territory of Jefferson, but I have no evidence that the species has nested within the town limits.

### 101. Euphagus carolinus. Rusty Blackbird.

A fall migrant, a single bird or a few birds usually appearing in the middle of September, from the 13th to the 22d. In 1908, one bird was seen on the 9th at the Meadows. In late September and early October larger flocks appear, sometimes numbering twenty, forty, sixty, or eighty birds. And in the Connecticut valley at Lancaster twice in early October, namely, the 5th in 1904 and the 2d in 1905, flocks have been seen numbering according to estimate two hundred and one hundred and fifty birds respectively, on the first occasion associated with a few Redwings and Bronzed Grackles. On September 9, 1900,

a lone bird was observed perching on a dwarf spruce by Hermit Lake at the entrance to Tuckerman's Ravine. On October 4, 1910, a flock numbering nearly fifty birds appeared on the Highland chattering in a neighbor's apple-trees.

**102. Quiscalus quiscula æneus.** Bronzed Grackle.

A rather uncommon summer resident in Lancaster and an autumn migrant sometimes in large numbers. A colony consisting of several pairs regularly breeds in the pines of the cemetery on Main St. Mr. Spaulding testifies in Dr. Allen's "Birds of New Hampshire" that formerly more pairs nested in the village, but that their numbers have decreased since the removal of some of the trees. On August 11, 1909, a flock of about forty birds was seen beside Israel's River in the village, which not unlikely represented the combined local families of resident birds. On September 2 of the same year a flock numbering five hundred migrant birds, by estimate, thickly occupied a few trees near the Connecticut River; and on September 20, a flock of about one hundred and twenty-five was seen beside the north road leading to Jefferson.

Occasionally a single bird has been observed within the limits of Jefferson, namely, on June 9, 1902; September 30, 1904; June 2 and July 11, 1905; June 17, 1907; and July 17, 1908. These would appear to have been wandering birds.

The latest record has been that of a flock of about a dozen birds beside the Connecticut River on October 5, 1904, associated with a large flock of Rusty Blackbirds.

**103. Hesperiphona vespertina vespertina.** Evening Grosbeak.

Mr. Spaulding writes me under date of January 22, 1911, "I know you will be interested to hear of the appearance of the Evening Grosbeak in Lancaster, January 15. A friend asked me if I had seen the Evening Grosbeak and described the bird accurately, saying it was with a flock of Pine Grosbeaks

which were eating seeds from frozen crab-apples. The bird was a fine male in adult plumage and very tame, as are the Pine Grosbeaks which have been here in limited numbers all winter." Mr. Spaulding adds, "I do not think there can be any doubt of the identity of this conspicuously marked bird."

**104. Pinicola enucleator leucura.** PINE GROSBEAK.

A regular winter visitant, upon the statement of Mr. Spaulding, but in varying abundance. Mr. Spaulding, however, noted none in the winter of 1909-10. My assistant informs me by letter, dated October 26, 1910, that he had already noted a number of Pine Grosbeaks in Jefferson. The first bird in this season seen by me at Boston, Mass., was in the Public Garden on October 22 and 23. The respective dates of appearance in both States indicated an early movement of the species southward. Mr. Spaulding, writing under date of January 22, 1911, states that Pine Grosbeaks have been present in limited numbers all winter.

**105. Carpodacus purpureus purpureus.** PURPLE FINCH.

A rather common summer resident. The song is much heard on the Highland during the period of nesting and in less measure again in the autumn. The species is somewhat sparingly distributed throughout the region, being found both by the roadsides and in the woodlands; and in the mountain forests, up to about 3000 feet, birds are occasionally noted.

**Passer domesticus.** HOUSE SPARROW.

An increasingly common resident. For many years it has been a common resident of Lancaster. Ten years ago there were but few pairs in Jefferson, and these were about the Waumbek Hotel. Steadily the species has distributed itself throughout the town, until there are now several colonies of some size in each section, excepting the more sparsely settled

Highland District, which is also nearest the Presidential Range. But here a small colony has gained a foothold at the buildings of one of the largest farms, and a pair makes use of the chapel belfry for nesting.

Five or six summers ago a family of six birds appeared on our place in the garden. We gave the word to our man to shoot them. He secured four. The other two left. And we have had no further trouble with the House Sparrow on our domain.

### 106. Loxia curvirostra minor. Crossbill.

Very irregular in its appearances, and perhaps breeding. It is usually much in evidence in June in smaller or larger flocks, sometimes numbering from twenty to fifty birds. These flocks move over the Highland and are also seen at various other points. A flock of sixty birds was seen in the Jefferson Notch on July 1, 1903, and a similar flock on June 6, 1905. In July and August fewer birds are always noted, and still fewer in September and early October, when the calls heard may come from a single bird only or from two or three birds.

During the season of 1909 scarcely any birds were noted. I have but four records in that season, and they are either of a single bird or of two to four birds. The last record was of two birds in Randolph on July 30. This summer dearth was followed by a complete absence of the species in the Eastern United States in the winter following. In 1910 three birds were noted on Mt. Starr King on July 7. From July 19 to 29 a small flock was about the Highland. On August 5 seven birds were seen there. Mrs. Bridge noted three birds when following the "air line" path on Mt. Adams on September 17.

### 107. Loxia leucoptera. White-winged Crossbill.

Rarely noted. In 1904, on July 5, a flock of about sixty birds was seen in the valley. On August 18, of the same year, two birds were seen by the second camp on the South Branch. On June 14, 1906, two birds were observed in the Jefferson

Notch. In 1908, on September 12, a single bird was seen beside the South Branch; on September 16, Mrs. Bridge informs me that she saw a flock of twelve birds on Mt. Adams; on October 5 a flock of fifteen was noted in Lancaster; and on the following day a small flock was heard calling on the Highland. The movement, of which these 1908 records were an indication, extended well to the southward, and White-winged Crossbills were seen near Boston, Mass., later in October and in November.

These are all the occurrences which have been noted. In several of the seasons the species has not come under observation, and it did not in 1909. In 1910 a single bird was noted on the Cherry Mountain road on August 27, and another three days later at Jefferson Meadows.

### 108. Acanthis linaria linaria. Redpoll.

A regular winter visitant, upon the statement of Mr. Spaulding, differing as to abundance in different years. Mr. Spaulding in writing me under date of October 24, 1910, says, "I saw a flock of seventeen Redpolls today, very early in the season, I think. They flew into an elm in my dooryard just as I was going in to lunch, about one o'clock, but immediately flew away again."

I noted the first Redpoll about Boston on November 1 of this year, and a few days later, November 9 to 18, several flocks were observed in the Middlesex Fells.

### 109. Astragalinus tristis tristis. Goldfinch.

A very common summer resident, not present in the winter. On July 5, 1905, a flock consisting of thirty full-plumaged male birds was seen by the roadside on the Highland, evidently newly arrived. We could not perceive that a single bird in the plumage of the female was present with them. Nestings are frequently observed in August, and it is then and in July that the most joyous flight-songs are heard and the birds are seen in pairs. Flocks of from ten to thirty adult and immature birds are seen in the autumn.

**110. Spinus pinus.** Pine Siskin.

A rather uncommon summer resident, a pair or two breeding on the Highland, on the Hill, and in Lancaster, where it is usual to hear a few birds calling in the trees on Main Street. The distribution of the species in the forests of the Presidential Range throughout the summer also indicates that it nests sparingly there. In 1900 a flock of about twenty birds was seen on the Highland on June 24, and a similar flock remained there in June, 1902, from the tenth to the thirtieth day. The birds were often seen feeding on the grass land. In July, 1906 and 1907, the song was heard day by day in our neighborhood.

In the autumn, flocks which have gathered together for migration appear again on the Highland, in the valley, in the Jefferson Notch woods, and elsewhere. On October 4, 1906, seventy birds were recorded passing westward in squads over Cherry Pond in the direction of the Connecticut valley, while we occupied a boat upon the waters.

**111. Plectrophenax nivalis nivalis.** Snow Bunting.

A regular winter visitant. Flocks are occasionally seen about the snow-covered fields throughout the winter. Mr. Spaulding states that he saw several flocks during the winter of 1909-10.

**112. Pooecetes gramineus gramineus.** Vesper Sparrow.

A common summer resident of the open lands in the valley and on the hillsides. The song period extends through July, and the song is heard intermittently in August, September, and early October. Twice a flight-song has been heard in early October, on the 2d in 1906, and on the 4th in 1908. As is common experience, probably, I have not found the song of the Vesper Sparrow to be any more prevalent at evening than the songs of the savannah, chipping, and song sparrows. Sometimes quite in the middle of the day one has perched on the saddleboard of our house and sung for a considerable period.

Small companies representing families or neighborhoods are seen in the autumn. One such company on September 26, 1908, numbered thirty-five birds. The habit of the Vesper Sparrow to go for some distance in advance of one walking or driving on the highway, by making runs or taking short flights without leaving the road, has been very often exemplified in our experience.

**113. Passerculus sandwichensis savanna.** SAVANNAH SPARROW.

A common summer resident in fields in the valley and on the hillsides. The song period extends almost or quite through July, and sometimes reaches a few days into August, but expressions of the song are not heard later. The birds are less in evidence, therefore, after the first of August than are the Vesper Sparrows, and they seem not to gather as much into companies or to remain quite as late as the latter. The song is much heard from fence posts, or the wires strung between posts, and is one of the earliest songs heard in the morning and one of the latest given in the evening.

**114. Zonotrichia leucophrys leucophrys.** WHITE-CROWNED SPARROW.

A spring and fall migrant, often in the autumn in good numbers. On May 24, 1903, one was seen singing in the yard of the Pliny Range House on the Highland, and on May 25, 1900, one was observed in the highway.

In the fall the earliest birds which have appeared were seen on September 21, in 1904, and in two years, 1901 and 1908, on September 23. In five other years the first autumn record has been on September 25 or 26. The numbers increase the next few days, and the largest numbers are usually present in the first week of October. They often occupy the roadsides where there is bushy growth, frequently in association with White-throated Sparrows, and feed, when unmolested, on the road-bed,

as do House Sparrows. Or they are found at the wooded borders of fields and get back into hiding when one passes along. A few notes of song are often rather huskily given. A little company of several birds has some seasons occupied our garden during its stay, picking among the blackberry canes and the currant bushes, doubtless finding the seeds of some of the fruit which had fallen over-ripe. Several years ago one member of such a company, remaining four or five days, was a partial albino, having a head almost entirely white without stripes. In 1909, up to October 1, no individual had been observed. In 1910, the earliest bird was seen in Lancaster on September 27, and several were seen on October 3 in Jefferson. But the migration of both of these years seemed small.

**115. Zonotrichia albicollis.** WHITE-THROATED SPARROW.

An abundant summer resident in deforested or fire-swept woods in the valley and among the foot-hills, also about clearings and wooded roadsides where the timber has been thinned, as well as in the forests of the higher mountains up to the limit of scrub growth and even higher. It is also an abundant fall migrant. Along the turnpike through a burnt forest often year by year thirty to forty male birds in song are recorded upon days in June and July. Up the Jefferson Notch road through a severely cut forest twenty-five to thirty singing males are usually noted in successive trips during the full-song period. Many sing from the woods bordering the several ponds, and the song is frequently heard along the paths which lead high up the mountain sides, and in the ravines. The song period extends with little abatement about a week into August. Later the song is heard only occasionally and with gradually diminished length until only the first two notes may be given.

In late September and early October flocks of many migrating birds are met at roadsides and in the bushy borders of fields. On October 4, 1910, it was estimated that fully a hundred were

distributed about in an acre at the foot of the Highland calling and scratching at an early hour, having just arrived on a southward flight.

### 116. Spizella monticola monticola. Tree Sparrow.

A common migrant in spring and fall, and a rare winter resident. The earliest fall record was of two birds seen on October 7, 1904; five birds were seen two days later.

Mr. Spaulding informs me that during the winter of 1909-10 he saw Tree Sparrows each month in Lancaster. This was due, no doubt, to a comparatively open winter; for he records two birds seen by him on December 9, 1899, at Lancaster, as "the latest he had ever noticed there in winter." (Allen's Birds of New Hampshire.) Mr. Spaulding writes me that he has a record of Tree Sparrow on December 5 in 1910.

### 117. Spizella passerina passerina. Chipping Sparrow.

An abundant summer resident found about all dooryards and orchards and living in familiar relation to almost every household. Several times a pair has nested in the woodbine on our piazza, the nesting sometimes carried successfully through and sometimes meeting with mishap from violent storms or the visits of red squirrels. In June, 1904, a brood was reared, the birdlings leaving the nest on the 24th. On the 26th the mother bird had a new nest, built a few feet from the first in another portion of the woodbine, and the father bird was caring for the first family still dependent on being fed. In 1905 a female Chippy, after looking through and through the woodbine in its entire extent for a day or two, rebuilt the nest of the previous season, being engaged on it June 11. A robin had already built her nest in the vine, and the Chippy's nest was placed only two feet distant. The birds were good neighbors, and both families were reared. The song period usually extends about a week into August, and seldom is the song heard, even

intermittently, later. It is very unusual to hear a Chippy sing in the autumn. When I have taken the record of the morning awakening of the birds by their songs within hearing of the yard, on different June mornings, I have invariably recorded season by season four Chippies singing on different sides, indicating this to be the number of pairs within hearing distance.

In September and early October flocks numbering from fifty to a hundred birds are seen on the Highland, probably composed of local families. These remain about for many days. A small flock or a single bird has been observed in some seasons as late as the middle of October.

### 118. Spizella pusilla pusilla. Field Sparrow.

A rare summer resident on hillside pastures, but becoming less rare. In 1902 one was clearly identified on June 11 on a neighbor's grounds on the Highland, but the bird was not seen again. The same day on the South Lancaster road one was heard singing. In 1903, on May 27, the song was heard from the pasture below the same neighbor's house, but on this day only. In 1904 and 1906 no record was obtained. In 1905, on July 5, one sang many times in the vicinity of the chapel on the Highland and was heard on no other day.

In 1907, on June 28, one was seen singing in a pasture on a hillside in Lancaster near the Coos Junction railway station. On July 18 the bird was still singing there, and the female was also seen, indicating without doubt a nesting. This was the first instance of a probable nesting which had come under my observation. In 1908, on June 9, a bird sang for four hours on the side of Boy Mountain opposite our house. This bird remained on the Highland and was heard singing in the neighborhood on many of the days following in June and in July up to the 23d day, indicating a probable nesting. This was the first year that the song of the species had been heard on the Highland at frequent intervals throughout the breeding season. In 1909 the song was heard for the first time in Randolph. This

was on June 21 in pasture land about a mile eastward beyond the limits of Jefferson. Here on July 30 the bird was still singing, and two immature birds were also seen. The song was again heard at this place three days later, and a bird was seen in the vicinity on the 17th of September. This was the first breeding of the species which had come under my observation in Randolph. On June 26 of that year again a bird was heard singing on the Highland, but on that day only. In 1910, no bird was heard or located in Jefferson. But at four different points in Lancaster the song was heard by Mr. Spaulding and myself, indicating four probable nestings of the species, while just across the Connecticut River in Lunenburg, Vermont, two others were singing at noonday on June 27, while our lunch was taken at the roadside.

Mr. Spaulding, writing me in the spring of 1910, states, "The Field Sparrow is a new bird within the past five or six years, I never having previously identified it, which I think I would have done readily by its song." He testifies that he has several recent records. The Field Sparrow would appear, therefore, to have somewhat recently secured a hold in the region and to have already extended its local breeding ground.

On the other hand, Mr. Francis H. Allen writes me that in June, 1889, while spending ten days at the Mt. Adams House, he found the Field Sparrow in Jefferson and Randolph and recorded it as "not uncommon" there, meaning in this case, he states, "five or six birds singing." This would indicate that it was a resident bird earlier than my first observation in 1902 and than Mr. Spaulding's, that it apparently disappeared subsequently, and has recovered its ground in these later years.

**119. Junco hyemalis hyemalis.** SLATE-COLORED JUNCO.

A common summer resident and an abundant spring and fall migrant. Nests have been discovered in hillside pastures under shelving rocks or at the foot of coniferous trees, along

mountain roads in the roadside banks, and high on the mountains among the scrub growth at or near their summits. Nestings probably occur on the bare summit of Mt. Washington. Frequently in passing along a mountain road the female is seen to leave her nest, when we are approaching its location, and the eggs or young are disclosed. Invariably the nest is set into the bank, so that it has a protecting roofing.

In 1908 a pair chose a very unusual location, and the nest was built in the woodbine on our piazza. It was begun on July 12 and was placed about seven feet above the floor and eight feet above the ground. It rested on several stouter stems of the vine, but lacked the firm setting which the solid ground always furnishes the Junco for her nest. The nest was completed and two eggs had been laid, when on July 19 a severe easterly storm came which so racked the nest and tipped it that the eggs fell out and were broken. The birds then deserted it. In this case the boarding of the piazza roof reached somewhat over the nest and afforded it the customary protecting cover above, but the instability of the setting was very unlike the Junco's practice of building upon the solid ground. During the brief time that the birds were occupied with the nesting they were much about on the floor of the piazza, and the male bird sang from the vine and the railing, quite as the Chippies behave which select the vine for their nestings.

Nests with three to five eggs have been found on various dates from June 13 to August 4. Song continues to the end of July or a week into August, after which it is rarely heard. In October large flocks of migrating birds appear and pass. On September 30 and again on October 4, 1910, such flocks were estimated to number 200 birds each.

### 120. Melospiza melodia melodia. Song Sparrow.

An abundant summer resident and spring and fall migrant, found in all the open country and in clearings in the woods, about lumber-camps, and along logging roads. The song continues to the middle of August, or somewhat later, and is not

infrequently heard intermittently up to the middle of October. On October 13, 1903, one sang his full song twenty-eight times between 5:30 and 5:45 A. M. Many tailless birds in their moult are seen in late August and in September. Song Sparrows are very numerous in the fall migration movements along roadsides and on the bushy borders of fields.

**121. Melospiza lincolni lincolni.** LINCOLN'S SPARROW.

A not uncommon fall migrant and possibly a rare summer resident. In 1906 a bird was clearly seen on August 5 in a dead spruce tree at the border of an evergreen thicket on the side of Boy Mountain. Mr. G. B. Wellman was with me, and we both had a full view of the bird for its sure identification. It was moving about on the boughs of the tree. A Hudsonian Chickadee was in the same clump of trees. The bird was not seen again, and no other Lincoln's Sparrow was seen until September 8, which is about the date of the earliest appearances of migrant birds in the series of years. On September 3, 1910, a bird was seen by Mr. Maurice C. Blake and myself at a wood border near Little Cherry Pond, this constituting the earliest of my September records. The August 5 record, therefore, is suggestive of a local nesting, perhaps not far from where the bird was seen; although the song had not come to my hearing when from time to time I had traversed the mountain side. Mr. Ora M. Knight in his "Birds of Maine" states that in 1904 a few Lincoln's Sparrows were seen in early July at Fort Kent in the Woolastook Valley, Aroostook County, and that in early August, 1905, they were more numerous. His conclusion is that these represented breeding pairs and nestings, although no nests were found or young seen. On one other occasion in August, namely, August 21 and 23, 1908, a Lincoln's Sparrow was seen by the roadside on the Highland. No other individual was seen until September 13 of that year. This bird, therefore, was eighteen days in advance of the usual earliest record date of migrants

and may also have been a summer resident bird in a locality not far removed from Jefferson.

Mr. Knight's Maine records give September 8 to October 13 as the period of the fall migration. In some seasons the first migrant has not been seen until the middle of September or even the 19th or up to the 22d. The latest records are variously October 10, 11, and 12 in some of the years, a single bird being then recorded. Several are noted usually in the earlier days of the month, distributed in different places; and there is always a small representation of the species throughout the period of the migration, which lasts generally from three to four weeks and sometimes even a few days more. The birds are usually in association with Song and White-throated Sparrows in weedy patches and at bushy or wooded borders of fields, and sometimes among the roadside growth. Seldom are more than two seen together, and quite frequently a single bird only with its associates of other species. When approached, the Lincoln's Sparrow often gives from a bush an anxious, rather sharp and strong call-note, which it constantly repeats during the presence of the intruder.

### 122. Melospiza georgiana. Swamp Sparrow.

A locally common summer resident and an uncommon fall migrant, found breeding about the shores of the ponds and in swampy lands throughout the valley region both in Jefferson and Lancaster. The shores of Cherry Pond furnish in June and July from ten to fourteen singing males; those of Little Cherry Pond, from seven to twelve; those of Weed's and Weeks's ponds, from seven to nine. The song is heard from two or three birds in the Davis swamp, from one or two in swampy places along Israel's River, and at Fabyan's by the Ammonoosuc. The song period usually extends about a week into August, and in the first week of October several birds have been regularly heard again singing on the shores of Cherry Pond. A few migrants appear in October on the Highland and at the foot of the Highland. The latest records are October 13, 1903, and October 11, 1906.

**123. Passerella iliaca iliaca.** Fox Sparrow.

A rather uncommon spring and fall migrant, first appearing in the autumn in early October. I have few records, as the migrations precede and follow my stay in Jefferson. In 1904 two birds were seen on October 7; in 1906 one was seen on October 11; in 1907 two were in our yard on October 10; in 1908, on October 3, one was observed on the Highland and one in the valley; in 1910 one was seen with a large flock of White-throats at the foot of the Highland on the early date of September 29. My assistant, writing me under date of October 26, 1910, says, "I saw five or six Fox Sparrows yesterday."

**124. Pipilo erythrophthalmus erythrophthalmus.** Towhee.

An accidental visitant. Mr. Spaulding furnishes one record, that of a bird seen on May 23, 1907, by the roadside on Bridge St., Lancaster.

**125. Zamelodia ludoviciana.** Rose-breasted Grosbeak.

A not uncommon summer resident of the woodlands of the lower mountains and of the devastated forests upon the lower slopes of the higher mountains. Several pairs nest on the sides of Boy Mountain. The song is heard in the thinned forests of the South Branch and of the northern slope of Mt. Adams and the eastern slope of Mt. Madison. On June 10, 1906, and June 2, 1907, eight males were singing on Boy Mountain. Some of these were located near the summit, or at an altitude of 2000 to 2200 feet. On June 10, 1908, five were singing by the road to the Glen over the shoulder of Mt. Madison. Some of these birds were near the top of the pass, or at an elevation of about 1700 feet. The song period continues usually to nearly the middle of July, and the song is rarely heard later. The young are around with the parent birds in early July. Usually the last

birds have been seen or heard between the 10th and the 16th of September. In 1906, however, a bird or two birds were noted almost daily up to October 2.

### 126. Passerina cyanea. Indigo Bunting.

A rather common summer resident. The song is heard at various points on the Highland and along the road through Randolph, also on other hill and mountain sides, coming from wood borders and clearings. Several seasons a nesting has been carried through in our blackberry row, the male bird often singing from our stable roof and from the apex of its ventilator. In 1907 a nest was built in a small clump of wild raspberry canes by an open spring. On June 30 it held three eggs, but winds so swayed the canes as to tip the nest and spill out the eggs, and the nest was deserted. A similar mishap overtook another nest built at the same time in the row of blackberries and holding eggs. Both males sang freely throughout the season. In 1901, on August 4, a female bird was seen with a miller in her bill, flying to her young, thus indicating without doubt a second nesting. In 1910 a nest was again built in the row of blackberries and two young were reared, and this was likewise a second nesting in all probability, the birds having moved up from lower down on the mountain side, where the male had previously sung. The young were a few days old on July 26. The song period extends usually well into August, and the song is heard intermittently in some seasons to almost the end of the month. The last birds usually remain to the middle or end of September, when a family of half a dozen may sometimes be noted, all in brown plumage.

### 127. Piranga erythromelas. Scarlet Tanager.

A not uncommon summer resident of the woodlands of the lower mountains to an altitude of 2000 to 2200 feet. Three or four singing males have been recorded each season high on the sides of Boy Mountain, and two or three others in the woods of

the valley and on the Highland. Several are usually heard and seen along the road through Randolph and up on the shoulder of Mt. Madison, also along the Jefferson Notch road. The song continues to late July and is occasionally heard in the early days of August. On July 16, 1901, one of the male birds on Boy Mountain proved to be an orange-plumaged bird. A scarlet male was in sight at the same time.

Some seasons a single bird in winter plumage has been noted in late September, but the species usually drops out of sight earlier. In 1904, however, there was a remarkable lingering of an individual, that of a male bird in winter plumage, which came daily to the woodbine berries on the vine upon our piazza from October 7 to 12. Many times each day members of the family saw this bird come from nearby woodland and satisfy himself. On October 4 of the same year one had been seen four miles away on Jefferson Hill. The only other October record is of a bird on the Highland on the 3d day in 1908.

### 128. Progne subis subis. Purple Martin.

A few colonies regularly breed in the village of Lancaster, and the species has been noted in Whitefield village and in the city of Berlin. I have observed year by year three or four colonies in Lancaster occupying bird-houses erected for their use. Two of these colonies consist of several pairs. Once only during the period of my observation has a pair occupied a house in Jefferson. I recall that in a summer preceding 1899 I saw the birds going in and out of a bird-house in a yard not far from the Waumbek Hotel. In one of the bird-houses in Lancaster I observe the Martins and the House Sparrows apparently amicably occupying the premises together, although making use of different apartments.

The birds have generally disappeared by the middle of August or even earlier. One seen at the Meadows on August 16, 1902, was probably a migrating bird. Two seen on July 28, 1908, over Cherry Pond were likely also to have been birds in

migration flight, although they may only have made an excursion from the village either of Whitefield or Lancaster, a few miles distant. Four birds seen in Randolph on August 13, 1909, were undoubtedly in migratory flight. The latest record is of three birds in Lancaster on September 2, 1909.

**129. Petrochelidon lunifrons lunifrons.** Cliff Swallow.

A common summer resident, several colonies occupying the eaves of barns in Jefferson and other colonies breeding in the adjoining towns. At a large farm barn on the Highland a numerous colony regularly breeds. In 1904, on June 16, I counted sixty-five nests arranged along the southeast side belonging to this colony. In 1905, on June 26, there were seventy-five nests. No use is made of the opposite northwest side, with the rarest exceptions. In the more recent years the colony has not been as large until in 1910, when on June 13 seventy-eight nests were counted. On June 27 of the same year a colony possessing one hundred and twenty-seven nests was seen occupying the eaves of a big barn across the Connecticut River in Lunenburg, Vermont. In late July large flocks, sometimes numbering two hundred birds or more, are on the wing and occupy the telephone wires. The latest records, year by year, are of a single bird, or a few birds, in the early days of September, seen between the first and the eighth days. In 1904 one was seen on the seventeenth day.

**130. Hirundo erythrogastra.** Barn Swallow.

A common summer resident. Nearly every farm barn has its larger or smaller colony breeding within it. In late July large flocks of adult and young birds are seen on the wires. A month later the numbers have considerably diminished, but small flocks are still seen in the early days of September. The latest records are of a single bird on the 23d in 1903, and of three birds on the same date in 1907, after an interval of a week when no Barn

Swallow had been recorded. In 1909 the last two were seen over Cherry Pond on September 21. When the morning awakening of the birds has been chronicled on several occasions, one of the earliest sounds has been the constant twitter of the Barn Swallows at the nearest farm barn, while the darkness remained, proceeding from the birds, I surmised, before they were on the wing.

### 131. Iridoprocne bicolor. Tree Swallow.

A quite uncommon summer resident. My records would indicate that not more than a half-dozen pairs have lived year by year in the region. In 1902, 1903, and 1904 a pair nested in a bird-box on the Highland. The species appears to have been even less represented in the last two or three seasons than in the earlier years. This may be due to the steady increase of the House Sparrows during these same years. In several of the earlier seasons two pairs occupied two boxes respectively on the Hill. But these boxes have been in the possession of the House Sparrows in recent years. The latest records have been of two birds on September 5, 1907, of one bird on September 2, 1909, and of one bird on September 3, 1910.

### 132. Riparia riparia. Bank Swallow.

A common summer resident locally. Two or three large colonies and several small colonies breed. In 1902 a colony estimated to number a hundred pairs bred in a sand bank near the Connecticut River in Lancaster. The shelving away of the bank has rendered it much less suitable for nesting, and in recent years few pairs have been able to make use of it. At the Meadows in Jefferson a large colony has its nest-holes in a high bank of Israel's River. At the foot of the Highland, at an elevation of probably 1300 feet, one or two small colonies excavate their nests in the banks of road or railroad cuts, but these locations do not prove permanent on account of the detrition of the banks. The Bank Swallow disappears somewhat earlier than

the other species of swallows. After July a few only are seen in the period up to the middle or sometimes to the end of August. I have but two September records, namely, of one bird on the 1st in 1906 and of two birds over Cherry Pond on the 6th in 1909.

### 133. Bombycilla cedrorum. Cedar Waxwing.

A common summer resident. The birds appear when the apple blossoms are unfolding, and I have often seen a flock of perhaps twenty birds voraciously engaged in swallowing the petals, taking constantly more into their bills when their mouths seemed full already. They remain in flocks almost to the end of June, and, to some extent, later. The nestings which have come under observation have almost all been in August, sometimes in the last of the month, and young have been seen in the nest in early September. Perhaps these have been second nestings. In 1900 a nest contained three young on September 1. In 1909 a nest containing three young was seen on September 4. The birds are in neighborhood flocks in September and are usually leaving toward the end of the month. In some seasons a few have been seen in early October, namely, in 1902, up to the 7th, in 1904 on the 4th and 5th, in 1907 on the 1st to the 3d, and in 1908 on the 5th day.

### 134. Lanius borealis. Northern Shrike.

A rather uncommon late fall migrant and winter resident. I have but one record of my own observation. On a warm late October day, in a year or two preceding 1899, a Butcher-bird alighted on a tree in our yard at midday and sang very beautifully. His song attracted our attention when indoors with open windows and drew us outside to enjoy it. We saw the bird on his perch and also on the ground, to which he dropped several times. He passed on after a season of song.

Mr. Spaulding informs me that he sees several birds every winter. In the winter of 1909-10, which was open, he noted the first bird for the season on February 5. In the winter of

1910-11 he writes under date of January 22, "Northern Shrikes are about, and I know of two instances where they have attacked English Sparrows on the street. Success to them!"

**135. Lanius ludovicianus migrans.** MIGRANT SHRIKE.

An uncommon summer resident, a few pairs breeding in the region. In 1899 a nest was located in the Starr King district. It was placed about ten feet above the ground upon a low branch of an elm near the trunk of the tree. The farmer in whose pasture the tree stood told me that a pair of the same birds had nested in that tree for four or five seasons preceding. The birds were frequently seen by the roadside during the month of July after the young had been raised. In the year following the same location was not used, but the pair, or their successors, removed farther back from the highway. In 1905 a nest was built and young were reared in a stunted spruce standing apart in a pasture not far removed from the location first spoken of. White twine and pieces of white cloth had been woven into the rather coarse but strongly constructed nest. The location was four to five feet above the ground, and the nest rested upon a horizontal bough where it joined the trunk. The birds were often seen during the month of July after the young were on the wing. In 1907, on June 28, a pair with one immature bird was seen in Lancaster near the Connecticut River, and the nest, which was empty, was placed in a stunted spruce nearby. In 1909, on June 8, a pair and nest was seen on the North road in Lancaster in a roadside spruce. The nest was placed from fifteen to twenty feet from the ground. The parent birds were bringing food to their young. A week later, June 15, one adult bird and five young were seen on the branches of the tree near the nest, the young evidently having just left the nest.

In several localities year by year occasionally one, two, or three birds are seen, representing, doubtless, breeding pairs and broods. They are always seen in open country and frequently are perching on telephone or telegraph wires. They

are seldom seen after the middle or latter part of August, but in 1906 two were observed on October 2 in South Lancaster. In 1910 two single birds only were seen throughout the season, and these were at widely separated points in Randolph.

### 136. Vireosylva olivacea. Red-eyed Vireo.

An abundant summer resident in all the woodlands of the lower slopes of the mountains, up to about 3000 feet, and of the valleys; also of the shade trees of the villages. The song extends with little abatement to late August and is much given in the remaining days of August and in the early days of September. The last are usually seen between September 20 and 25. In several seasons, 1901, 1906, 1907, 1908, and 1910, a bird or two birds have been seen in the early days of October, the fifth day, in 1908, being the latest. Ten to twelve singing males have been found occupying the fifty-acre piece of woodland on the Highland. On some all-day drives sixty to sixty-five singing birds have been recorded.

### 137. Vireosylva philadelphica. Philadelphia Vireo.

A rather rare fall migrant, usually seen in the valley near the river or in the vicinity of Cherry Pond, but sometimes on the Highland and beside mountain roads at considerable elevation above the valley. In 1903 one was seen on September 13 in the valley at the foot of the Highland. In 1904 one was again seen there on September 14, and a week later two birds were observed passing through the growth on the bank of the river in company with a Red-eyed Vireo and a Blue-headed Vireo with other birds. In 1907 nine individuals were noted in succession between September 11 and 19. Six of these were seen at various points in the valley, while one was observed on the Highland and two up the South Branch road at some altitude above the valley. In 1908 two were seen on September 11 up this same South Branch road and two weeks later one in the small growth about Cherry Pond. In 1909 seven or eight differ-

ent individuals were observed between September 4 and 23. On the first date one was seen high on the Jefferson Notch road at nearly 2500 feet elevation, moving down through the roadside growth with a Bay-breasted Warbler as one of its companions. The others were seen as usual in the valley or on the Highland. In 1910 two were observed as early as August 29 in the vicinity of Cherry Pond, two others the following day in a grove of birches in the valley bottom, and other individuals up to September 27, twelve birds in all.

**138. Vireosylva gilva gilva.** WARBLING VIREO.

Possibly a rare summer resident in Jefferson, but a common summer resident in the village of Lancaster. In 1902, a pair may have nested in Jefferson, the song having been heard in the early days of June midway between the Highland and the Hill. In 1903, three male birds sang in the roadside trees on the Hill in the last days of May and early days of June, and the song continued to be heard to the end of the month. In no succeeding year has the song been heard within the town limits. From the street elms in Lancaster, however, especially within the village, a dozen to twenty voices have been recorded on the same day. The song has seldom been heard after the early days of July.

**139. Lanivireo flavifrons.** YELLOW-THROATED VIREO.

I am informed by Mr. Spaulding that a pair undoubtedly nested in Lancaster in the summer of 1910. One or both birds were first seen by Mr. F. H. Kennard and Mr. F. B. McKechnie on June 15 in a grove just outside of the village limits. Three days later Mr. Lewis Childs in company with Mr. Spaulding saw the birds and observed the female gathering nesting material. The nest was not located. Mr. Spaulding heard the male bird singing on several occasions. This is the first occurrence, so far as known, of the Yellow-throated Vireo in the Jefferson-Lancaster region, and in this case it was probably breeding.

**140. Lanivireo solitarius solitarius.** BLUE-HEADED VIREO.

A rather uncommon summer resident in respect to general distribution in the woodlands. Yet four to six pairs nest season by season in the fifty-acre piece of woods on the Highland. The song is heard practically the entire season. There is some diminution in the middle of August, but an increase in September, and the song is continued into the early days of October.

I have sometimes heard at the end of the season a more beautiful song than that heard in June and July, being richer and sweeter and continuous after the manner of the song of the Purple Finch. This song has been heard along the roadside, when the birds, having come out of the woods, are frequenting the roadside trees. On September 18, 1900, I listened to one thus singing for a half-hour in an apple-tree. In most seasons the last individual has been recorded between October 4 and 7. In 1901, however, the song was heard on the 10th day and one was seen on the 11th day; in 1902 one was heard singing on the 12th day; in 1903 one was seen on the 8th day; and in 1907 one on the 10th day.

**141 Mniotilta varia.** BLACK AND WHITE WARBLER.

A fairly common summer resident in woods of mixed or deciduous growth in the valleys and upon the lower levels of the mountains. The period of song extends uninterruptedly to about the middle of July, but the song is heard occasionally quite through August and into the early days of September. The latest bird which has been recorded was seen on September 28 in 1907. Last records range usually from September 19 to 23.

**142. Vermivora rubricapilla rubricapilla.** NASHVILLE WARBLER.

A common summer resident of the valleys, the hillsides, and the scrub forest of the higher mountains to the limit of tree growth, about 4500 feet. The song has been regularly heard

from several birds far up in Tuckerman's Ravine, about the "Perch Camp" at the head of the Ravine of the Cascades on Mt. Adams, in the Jefferson Notch, as well as elsewhere on the Presidential Range, and in the ravines of Mt. Starr King. The song period extends to about the middle of July. Twenty to thirty singing birds have often been recorded when we have been following the valley and turnpike route to Lancaster, or when taking the Cherry Mountain-Jefferson Notch drive to and through Bretton Woods. Some individuals are usually seen up to the last week in September. The latest birds observed were seen on October 1 in 1901, on October 3 and 4 in 1904, on October 1 in 1906, and on October 1 and 3 in 1908, a single bird in each instance.

**143. Vermivora peregrina.** TENNESSEE WARBLER.

A rather rare fall migrant. One or two only are commonly seen each season in early or mid-September. These are usually found in the valley. But in 1910 at least a dozen different birds were observed between August 29 and September 20. On August 30 five were seen in the grove of birches at the Meadows. On September 3 three were seen in the vicinity of Cherry Pond along the track of the Maine Central railroad. On September 10 two were on the Highland at the roadside, and one of these sang. On September 20 two were seen in the valley at the foot of the Highland. This is the latest date on which one has been observed. Mrs. Bridge informs me that she saw one in Randolph on September 11, 1910.

**144. Compsothlypis americana usneæ.** NORTHERN PARULA WARBLER.

A common summer resident in all the woodlands and in the forests on the lower slopes of the mountains. Eight to ten pairs season by season occupy the fifty-acre piece of woodland on the Highland. I have not observed the species when ascending the paths on the higher mountains above the lower levels. The

song period extends to late July and intermittently through August and into September, and it is not unusual to hear the last recorded bird at the end of September or in early October sing a recognizable song. The latest records are of one bird on October 2, 1902; of three birds on October 2 and 3, 1905; and of one bird on October 5, 1908.

### 145. Dendroica tigrina. Cape May Warbler.

A rather rare fall migrant. One or two birds only are usually recorded in late August or the first half of September. In 1908 four birds were seen; the first on August 23 on the Highland, the second on September 2 in Jefferson Notch, the third in the Muddy Pond woods on September 7, and the fourth on September 16, which is the latest recorded date. Again in 1910 four or more birds were observed; the first two on August 30 and again on September 1 in the grove of birches at the Meadows, and two others on September 3 in the vicinity of Cherry Pond. Mrs. Bridge informs me that three birds were seen by her on September 14, 1910, in Randolph beside the Moose River.

### 146. Dendroica æstiva æstiva. Yellow Warbler.

A rare summer resident in the valley bottom of Jefferson, and a not uncommon summer resident in Lancaster. For the last nine seasons one or two pairs have undoubtedly nested beside Israel's River at various points along about two miles of its course. In 1907 probably three pairs bred in this section. In 1910 one pair was located about a mile farther up the river than the species had hitherto advanced, being almost at the foot of Boy Mountain. In 1905 four birdlings a day or two old were seen in the nest in a clump of willows by Jewett's mill on the river on June 23. At Riverton, five or six miles farther down the course of the river, not uncommonly a pair has been located.

In Lancaster perhaps a dozen pairs breed. On June 9, 1910, I heard nine males singing in and about the village. That

season the song was heard for the first time by the Ammonoosuc River, near Fabyan's, where the elevation is 1400 feet. In early September one or two birds are sometimes seen which may be migrants. On September 18, 1907, one was observed in the grove of birches at the Meadows. This is the latest record for the species. On September 3, 1910, two were seen near Cherry Pond in a considerable company of migrant warblers.

**147. Dendroica cærulescens cærulescens.** BLACK-THROATED BLUE WARBLER.

A common summer resident in all woodland and mixed forest on the lower mountain slopes. Three to five pairs nest in the fifty-acre piece of Highland woodland and several pairs on the higher slopes of Boy Mountain to the summit. In following the trails on the Great Range the song is heard after the song of the Black-throated Green Warbler has been left behind. In Jefferson Notch a bird is regularly heard at nearly 3000 feet elevation. Although the song period proper extends to about the middle of July, after which there is a time of silence, the song is heard at intervals throughout the remainder of the summer and sometimes to the middle of September. The latest records of a bird seen are: October 4 in 1901, October 3 in 1903, October 4 in 1904, October 1 in 1905, October 4 in 1906, a male in full song, October 6 in 1907, and October 5 in 1908. None were seen later than September 20 in 1910, all the warblers seeming to disappear earlier than usual that season.

**148. Dendroica coronata.** MYRTLE WARBLER.

A rather uncommon summer resident in coniferous growth on the Highland and in the valley, and a fairly common summer resident of the upper forests of the Presidential Range even to scrub growth, also of the lesser mountains to their summits, namely, Boy of 2250 feet elevation and Starr King of 3900 feet. It is also an abundant fall migrant. The song is seldom heard after the middle of July.

Some seasons the species appears very numerously in the valleys in September and early October, alighting much on the roofs of buildings with Bluebirds, which they chase in sport, and on fence rails and posts, also dropping to the ground and feeding like sparrows. A flock numbering from thirty to forty birds is often found in the grove of birches at the Meadows in late September, with, and sometimes without, other warblers. In autumn drives many are seen along the roadsides.

### 149. Dendroica magnolia. Magnolia Warbler.

A common summer resident of the coniferous growth of the Highland and along the water-courses, also of the mountain sides to high altitudes, and a common fall migrant. In 1902 a bird was heard singing at about 4000 feet elevation on Mt. Adams. Three or four pairs breed season by season in the fifty-acre piece of Highland woodland. The song period extends with little interruption throughout July and into the early days of August, and occasionally the song is given later in the month. Many singing males have been heard when the Cherry Mountain-Jefferson Notch drive has been taken from time to time, about twenty miles of which is through forest of mixed growth, the number ranging between twenty-five and forty-five songsters. Many are seen in the fall migrations in the general movements from the mountains and beyond to the Connecticut valley. The latest records for an individual are October 3 and 7 in 1900, October 4, 6, and 8 in 1904, October 4 in 1908, and October 1 in 1910.

### 150. Dendroica pensylvanica. Chestnut-sided Warbler.

A common summer resident of clearings and of forests which have been logged, thus leaving the standing trees sparse and with young growth springing up, also a common fall migrant. It is not found, however, on the mountain sides far above the lower levels, or about 2000 feet. The song period

extends to about the middle of July, and the song is seldom heard later in the month or during the remainder of the summer. In the early autumn many immature birds, more particularly, are seen in migrating flocks of warblers. The only October records are of one bird in 1905 on the first day and of one in 1908 on the fourth day. Usually the species has disappeared a week or more before the end of September.

**151. Dendroica castanea.** BAY-BREASTED WARBLER.

A not uncommon summer resident of mixed woodland or forest in a few localities. In 1906, 1907, and 1908 four singing males, presumably representing four nesting pairs, occupied the lower portion of the fifty-acre piece of woodland on the Highland. In the same years ten, twelve, and eighteen singing birds respectively were recorded in two separate localities on the Cherry Mountain drive to and through Bretton Woods to the base of Mt. Washington, one extending about a mile on the Cherry Mountain road on the southern declivity, and the other colony extending through about six miles of Bretton Woods. In these localities the songs of Blackburnian Warblers are invariably heard with the songs of the Bay-breasts, the association of these two species seeming to be very close. In 1909 twenty-seven singing males were recorded in the same two localities on June 25. In 1910 twenty-one were heard. Another colony, occupying but a limited area, has been noted along the path into Tuckerman's Ravine a half-mile above the Crystal Cascade. This consisted, so far as noted, in 1905 of three singing males, in 1906 of four, and in 1907 of eight. In other than these four specified localities the species has scarcely been found in the breeding season.

Perhaps in seasons previous to 1905 the species was overlooked in these localities. I was not aware of its presence. But the records would also show that it increased in numbers season by season after it was discovered until a maximum was attained in 1909. There was some diminution of numbers in 1910, but this may have been incidental to the season merely, as many of

the warblers were in diminished numbers. In the fifty-acre woodland no representatives remained to breed that season, although on June 4 I recorded four singing males therein. A nesting of Cooper's Hawks in the wood may possibly account for this. The song period is quite extended, reaching with only slight decrease to the end of July and in some seasons into the early days of August. Few migrants are observed in the fall movements. The latest records are between September 14 and 20 in the seasons 1907 to 1910.

**152. Dendroica striata.** Black-poll Warbler.

An abundant summer resident in the coniferous growth of the mountain slopes even to the tree limit, and also breeding sparsely as low as 1100 to 1400 feet. Forty or more singing males have been recorded by the roadside on the Jefferson Notch road along the upper three miles of its course. Sixty to eighty have been recorded on the road through the notch to Bretton Woods upon various drives. Fifty have been heard singing along the path into Tuckerman's Ravine and within the ravine itself. The species used to breed in the small spruces in the Davis swampy wood at the Meadows until the swamp was completely burned in the forest fires of 1903. Several singing males used there to be noted throughout the season. In 1907 the song was heard during June and early July from a bird near Stag Hollow, the nesting probably being in a pasture dotted with spruces at about 1300 feet elevation. Two singing males are located season by season at the first camp on the South Branch, the elevation of which is about 1400 feet. Quite three miles of ascending road stretch between this outpost of breeding territory and the great continuous breeding-ground higher up. Some individuals continue to sing into the month of August, but the period of full song ends before the middle of July. I have also heard the song several times in September, the fourteenth being the latest day. The species is not numerously represented in the fall movements of warblers. Some individuals are recorded in early October, the fifth, seventh, and ninth being the latest dates.

**153. Dendroica fusca.** BLACKBURNIAN WARBLER.

A common summer resident of mixed woods, coniferous and deciduous, and a common fall migrant. Ten to twelve pairs nest season by season in the fifty-acre piece of Highland woodland, this species outnumbering all others therein. The song has been heard at an elevation as high as nearly 3000 feet, but the range of song is mostly below that level and extends to the valley bottom. The song continues with little interruption to about the twentieth of July and is usually heard occasionally in August and September. The latest records of a bird seen in six of the years are September 15, 17, 19, 23, 25, 26 respectively. In 1907 one was seen in the valley on October 3. On September 13, 1903, the Blackburnians outnumbered all other species in a large migratory movement of warblers including fourteen species.

**154. Dendroica virens.** BLACK-THROATED GREEN WARBLER.

A common summer resident of pine and spruce woods and not uncommon in woods of mixed growth, also a common fall migrant. Nineteen singing males were recorded in making the ascent of Mt. Starr King on June 9, 1905. Two or three pairs usually occupy the fifty-acre piece of Highland woodland. Twenty-five singing birds have been noted on the Jefferson Notch-Cherry Mountain drive. The song period extends to about the twentieth of July, but the song is heard occasionally in August, and in the fall migration individuals not uncommonly sing a husky song which has little of the character and form of either of the songs of the species. Many individuals are seen in the fall flocks of warblers. The latest records are October 3 in five of the years, October 10 in 1904 and 1906, October 5 in 1908, and October 4 in 1910.

**155. Dendroica vigorsi.** PINE WARBLER.

A pair was found occupying a grove of white pines in the valley in 1899 and 1900 and not improbably had been there in

previous seasons. The male was frequently heard singing. When the grove was cut down in 1901 the species disappeared from this section. In 1901 the song was heard in a similar pine grove near the village of Whitefield. This grove also fell under the woodman's axe. Mr. Spaulding informs me that he has not found the Pine Warbler in Lancaster at any time, although there have been and still are groves of white pine there. There is no growth of pitch pine in this section. The species is probably not now in the region.

**156. Dendroica palmarum palmarum.** Palm Warbler.

A rare fall migrant. One was observed on September 14, 1904, on the Highland. And for three days, October 2 to 4, in the same season one remained about our stable, flying in and out of the manure cellar. As often as one went to the door the bird was found within and would fly out and perch outside, indicating that it made the cellar its chosen stopping-place and feeding ground. In 1906 one was seen on September 10 beside the South Branch road, and another on October 4 on the Highland. In 1907 on September 21, 22, and 26 one was noted on the grounds of the Highland House, presumably the same bird each day. In 1908 on September 23 three were seen together in the grove of birches at the Meadows. In 1909 on September 18 one was observed in the valley and two others in the birch grove on the same day. In 1910 two were seen at the roadside on the Highland on September 11. Mrs. Bridge informs me that she saw one in the vicinity of Cherry Pond on September 15 of that year. The range of the appearance of the species, therefore, has been from September 10 to October 4, and within this period of twenty-four days one, two, or three individuals respectively have been seen in each of the last seven years, except in 1905.

**157. Dendroica palmarum hypochrysea.** Yellow Palm Warbler.

A rather uncommon fall migrant, but much less rare than the preceding species. In 1900 ten birds were recorded between

September 30 and October 7. In 1905 fifteen birds were noted, twelve being in the valley on October 11. In other seasons one to four birds only have been seen. The range of date has been from September 22 in 1910 to October 11 in 1904 and 1905, but lies chiefly in October. Mrs. Bridge informs me that she saw two birds in the vicinity of Cherry Pond on September 15, 1910.

**158. Seiurus aurocapillus.** OVEN-BIRD.

A common summer resident in mixed woods on the mountain slopes and in the valley, but not found high on the mountains. In following trails up the mountains the song is rather soon left behind. The song period extends usually through three weeks of July. Later the song is seldom given, although it has been occasionally heard at various times in August and even early September. Many times the flight-song has been enjoyed. Eight to ten pairs occupy the fifty-acre piece of Highland woodland. In some seasons sixteen to eighteen singing males have been recorded in making the ascent of Boy Mountain from the Highland road, these being located between the elevations of 1600 and 2200 feet. Individuals are seldom seen after the nesting season, seeming not to come under observation, although they may still be within the wood; but occasionally one is seen walking on the ground or upon the bough of a tree. Very few birds have been recorded in September, and these have been seen late in the month as frequently as early. I have only two October records, a bird on October 8 in 1904 and one on October 1 in 1906.

**159. Seiurus noveboracensis noveboracensis.** WATER-THRUSH.

A not uncommon summer resident along the brooks and rivers on the lower mountain slopes and in the valleys. Along Israel's River in its course through the Jefferson valley ten singing males were noted in 1905. In 1907 thirteen were recorded along the same extent of the river. In the last three seasons there have been fewer birds. In 1904, 1905, and 1906, in the

latter part of June of each year, the song was heard at a point in Pinkham Notch opposite the path leading into Tuckerman's Ravine. The elevation here is about 1900 feet. The song period is very limited, hardly extending beyond the first of July, and, when concluded, the song has scarcely been heard even occasionally. In 1910, however, two birds were heard singing on August 3, and one from a high perch by the roadside at the Meadows on August 18. The latest dates of a bird seen are September 1 in 1900 and September 16 in 1907, these being the only September records.

**160. Oporornis agilis.** Connecticut Warbler.

A somewhat rare fall migrant; in some seasons several have been noted. The earliest occurrence was in 1904, when on September 6 one was seen in the woods bordering Weeks pond in East Whitefield. Three others were noted the same season. In 1903 five were seen in one day in the valley September 25, constituting the only record for the season. In 1909 five were successively seen in different localities between September 21 and 27. In three of the last eight years only a single bird was recorded each season. In 1908 one was seen on October 6 on the Highland, constituting my latest record in the series of years. The more usual time of occurrence is between September 19 and October 4. Mrs. Bridge informs me that she saw one by the Jefferson Notch road on September 14 in 1908, and one in Randolph on the same date in 1910.

**161. Oporornis philadelphia.** Mourning Warbler.

A fairly common summer resident on the edges of woods in the valley, and along the streams up the mountain sides, sometimes to an elevation of 2500 feet or higher, in forest which has been logged and is consequently somewhat open and possessed of undergrowth. The full song period extends quite definitely to the middle of July, but after a brief period of cessation the song is much heard from a bird here and there throughout July

and even to the end of August. Several times a flight song has been once given in the early morning of a mid-August day. Four or five pairs are sometimes located in the valley at the foot of Boy Mountain, as many more along the South Branch which the Jefferson Notch road follows, and as many more along the turnpike out through the valley to Riverton. The song is regularly heard also from several birds near the summit of the Mt. Madison road to the Glen, where the forest has been cut and later a fire ran, making it a comparatively open woodland with young growth.

The song is rich and full, as warbler songs go, and gives pleasure by its cheeriness. The songster usually occupies a somewhat high perch, when he gives himself over to song, often a dead tree or dead branch, where his form can be well seen and his combination of bright and sombre coloring can be well discerned. So situated, he will continue his song many minutes before dropping into the bushes beneath. The species disappears early, frequently no birds being noted after late August. The latest record of a bird is September 13, 1903, when in the valley one sang once the full song. The song has also been heard on September 1 and 2, in 1907 and 1906 respectively, given by the last bird recorded for the season.

**162. Geothlypis trichas trichas.** MARYLAND YELLOW-THROAT.

A common summer resident in the valleys and along the streams on the mountain sides up their courses for a few hundred feet elevation. The species is very numerous along the turnpike through the valley to Riverton, the forest on either side of which has been burned. On July 2, 1906, and July 1, 1908, thirty-seven singing males were recorded there, the tally on both occasions being the same. The song period extends into early August with little interruption, and the song is regularly heard at times throughout the month and into the middle of September, also sometimes upon a late September day. The flight song

not infrequently has been heard. Some birds almost always remain through the first week of October and in 1907 and 1906 were seen to the tenth and eleventh days respectively.

### 163. Wilsonia pusilla pusilla. Wilson's Warbler.

A rare summer resident, but becoming less rare, and a not uncommon fall migrant. One colony has established itself in a limited area along the turnpike in the valley bottom, keeping mostly within an extent of less than a half mile. In 1905 I first became aware that the species was breeding in Jefferson. On May 31 of that year the song was heard in this locality, and again on June 7, from a single bird. On June 15 two were heard singing, and the song was again heard on June 23 and July 1. On June 16, 1906, three singing males were located here, and the song was heard also on June 21 and July 2. In 1907 and 1908 the same number was recorded. In 1909, on June 14, five birds were heard singing, and on July 1, eight birds. In 1910 five were singing on June 9 and 20, and six on June 27.

It is quite possible that the species was resident here before the season of 1905; but, if that be the case, it has been obtaining a firmer hold during the six years of my observation, and it would seem to be now well established as a regular summer resident. That it may not have antedated 1905 as a resident bird is not improbable, however, since previously to 1903 the turnpike here ran through forest and the territory would not have been suitable. Following general logging operations, fire swept this region in 1903, laying it comparatively bare, and second growth began to spring up. The locality chosen is naturally somewhat swampy and has become overgrown with bushes and sprouts. The elevation of the haunt may be about 1100 feet. On June 22, 1910, the song was heard in another piece of swampy second-growth, which also had been burned over, about two miles from the original haunt. Here, therefore, a pair would seem to have located somewhat removed from

the original colony, and its choice may signify a widening out of the breeding territory. The species has not been located elsewhere in Jefferson. On July 24, 1906, a male bird in song was seen at the roadside on the Highland. As there was no suitable nesting haunt near, I suppose he may have moved out from breeding ground not distant.

Mr. Spaulding, however, has found a pair located in a little swamp in Lancaster in recent years, but, I believe, not so long as the species has been resident in Jefferson. In 1908 he found the young birds just out of the nest; in 1909 a nest and eggs. There was no nesting in this swamp in 1910, he states.

As a migrant the Wilson's Warbler has been noted year by year. Every season a number of birds have come under observation on the Highland, in the valley, and elsewhere. The earliest appearances have been August 8 in 1904, August 12 in 1902, and August 14 in 1900 and 1901. The latest records have been September 20 in 1906 and 1908, September 21 in 1903, and September 28 in 1907, male birds all.

### 164. Wilsonia canadensis. Canada Warbler.

A common summer resident of damp thickets in the valley and along the streams on the mountain sides up to rather high altitudes, 3000 feet or more. It is a most persistent singer. The song period extends to the end of August and early days of September. A few individuals have sometimes been heard singing beyond the middle of September. I know of no other warbler whose song will be so likely to be heard daily throughout August. The species is rather abundantly located along the South Branch and its tributaries up to the elevation of the Jefferson Notch. Here on June 2, 1904, twenty-two individuals were heard singing; on June 29, 1905, twenty-one; on June 2, 1906, eighteen; on June 15, 1908, twenty; and on June 4, 1910, twenty-five. In the valley at the foot of the Highland along a half-mile stretch nine or ten singing males have often been recorded. Three or four pairs occupy the fifty-acre piece of Highland woodland in its border along the river. The latest

records are September 23 in 1909, September 24 in 1907, and September 27 in 1901. The usual time of disappearance is from September 13 to 18.

### 165. Setophaga ruticilla. Redstart.

An abundant summer resident in all deciduous and mixed woods up to 3000 feet or higher, and a common fall migrant. It is seldom found outside of woodland tracts during the breeding season. Like the Canada Warbler the Redstart is a persistent singer. The song period extends through July with little abatement, and the song is heard frequently throughout August and into early September. Four or five pairs occupy the fifty-acre piece of Highland woodland. Twenty to twenty-five birds have been heard singing along the road up into Jefferson Notch on many occasions, the last songsters singing in the pass itself at an elevation of 3000 feet. Forty singing birds were recorded on the round drive through Bretton Woods and returning over the old Cherry Mountain road on June 11, 1907; thirty-nine on the same drive on June 12, 1908; and forty-two on June 10, 1909. The latest records are October 6, 1907, a female bird, and October 8, 1902, a male bird. In three other years the last bird has been recorded on September 25 or 26.

### 166. Anthus rubescens. Pipit.

A common fall migrant, appearing sometimes in quite large flocks. The earliest records are September 8 in 1908 and September 12 in 1907 and 1910, a single bird each time passing over in flight. Few appear before the last of September and early October, when flocks of many birds have been recorded. In 1904, on September 26, a flock of about a hundred was seen on the North Road in Lancaster. On October 4 and 5 of the same year a flock of similar size was seen in a field midway between the Highland and the Hill in Jefferson. In 1905 flocks of thirty, fifty, and eighty birds were observed in different localities, including Randolph and the Glen, in the last days of September. In 1908 a flock numbering quite a hundred and fifty

birds was seen on the North Road in Lancaster on September 28. They are frequently observed in small flocks or singly up to the end of my summer sojourn and doubtless may be present some time longer. On October 3, 1900, two birds were seen demurely walking on the railroad in Carroll near the White Mountain House.

Mrs. Bridge writes me that she has several times noted Pipits in the middle of September on the Presidential Range above the tree limit. On September 20 of a recent year, she states, the birds, too numerous to count, were on the summits and sides of Mounts Jefferson and Clay; and in 1908 and again in 1910 a small flock was seen near Star Lake between Mounts Adams and Madison on September 16 and 17 respectively.

**167. Dumetella carolinensis.** CATBIRD.

A somewhat uncommon summer resident, but becoming less uncommon, and appearing occasionally also as a fall migrant on the Highland. The song and call are heard from the growth bordering Israel's River at infrequent intervals along its entire course through the valley, also at a few points by the Moose River in Randolph. The species also breeds to a limited extent along some of the tributary streams a short distance up their courses. It is found also about the shores of Cherry Pond and in Lancaster, and has been heard at Fabyan's by the Ammonoosuc River.

Birds appearing occasionally in late September or early October on the Highland, in our garden, for instance, are probably migrants. In 1904 one was observed in a group of shrubs by the house on October 4; in 1905 one was seen almost daily in the garden from September 2 to 21, spending much of its time in the currant bushes; and in 1906 one was observed there on September 26 and 27.

**168. Toxostoma rufum.** BROWN THRASHER.

A rare spring and summer visitant. On May 31, 1905, in the early morning, one was seen perched high in an elm near

the Chapel on the Highland singing freely. Presently he took successive flights southeastward along the Highland, singing from each perch without passing out of my hearing, while I walked home to call others out to hear him. By these successive flights he at length came upon our own place and sang, and then passed on in his eastward course beyond our observation. On June 20, 1910, at 5:15 in the morning, I was called to hear a Brown Thrasher singing but a short distance from our house and confirmed my sister's identification of the song. After a period of singing he ceased and was not heard again. In both of these instances the bird would seem to have been a wanderer beyond his usual domain.

Mr. Spaulding furnishes other records. He states that one was seen by him on May 13, 1907, and that it remained about the same locality near his home for three weeks and then disappeared. He also states that he saw one by the roadside north of the town (Lancaster) about twenty years ago, but that he did not make any record of the observation. It is of interest to add upon the further statement of Mr. Spaulding that "a few years later a pair nested across the Connecticut River in Vermont, the nest being placed in a brush heap." Mr. Spaulding states, "I did not see the nest, but think there can be no doubt about it, as a friend of mine described the nest and eggs to me, and there could not be any confusion about it."

Mr. Marble, in his "List of Birds" found near the Crawford House, furnishes one other record, that of a bird seen in July, 1905, in the vicinity of the hotel.

### 169. Troglodytes aëdon aëdon. House Wren.

Locally a fairly common summer resident. The species is well distributed along the old turnpike road for two or three miles of its length, where the forest has been cut and fire has swept through and now in essentially open country overgrown with birches old stumps remain. In these the nests are placed. Here in recent years from ten to sixteen singing males have

been recorded upon various dates in June and July. At several other points in the valley single pairs have been located as far up as the foot of the Highland.

Here and there in the village of Lancaster a pair locates in a house-shed upon its principal streets. In 1910, on June 27, one was heard singing on the shed-roof of a house in Jefferson, situated in the Starr King district on the side of the mountain at about 1400 feet elevation. The song period extends into the early days of August.

Occasionally in September one or two birds have been seen on the Highland. In 1901 one was seen singing on the tenth day and again on the thirteenth on a pile of brush in a pasture; and in 1908 on the ninth day one was heard singing. These were probably migrant birds. The latest records are September 24 and 25, except in 1908, when three birds were seen on October 3 in the valley and one on October 5 on the Highland.

**170. Nannus hiemalis hiemalis.** WINTER WREN.

A common summer resident of the forests from the valley bottoms to almost the limit of tree growth on the mountains, found along the brooks. It has become less common with the felling of the trees and the opening up of the forests to the sun. Along the Jefferson Notch road, following the South Branch, eight to ten years ago twice as many singing males were recorded as in more recent years. Then the road led through forest only partially despoiled. Now along its entire course the lumbermen have taken pretty much all of the well matured coniferous trees, and the thinness of the standing woods makes them far less desirable to the wrens. The song period extends through July and a week or more of August, and the song is occasionally heard even a month longer and sometimes in late September. Some individuals have been recorded up to the middle of October and doubtless linger in the region much later.

**171. Cistothorus stellaris.** SHORT-BILLED MARSH WREN.

Mr. Spaulding furnishes one record, that of a bird seen by him, together with Mr. F. B. McKechnie, in Lancaster on June

7, 1907. Mr. Spaulding states that "the place was a small meadow, quite wet, and covered with tussocks of grass—quite the appropriate place for the species."

**172. Certhia familiaris americana.** BROWN CREEPER.

An uncommon summer resident. More were formerly noted than have been seen in recent years. The cutting of the local forests may account for this. In 1904 a pair nested in our own woods. The nest was placed behind the coarse, loose bark of a big black birch tree, three feet or more in diameter at the butt, at about eight feet from the ground. Some of the leaves used as nest material protruded from the slight interspace. The nesting spot was discovered on June 9. Three days later both parent birds were bringing food to the young. On June 23 one of the young birds was seen on a near tree with the parent birds, and one was seen again on the twenty-eighth day. In the virgin forest through which the Raymond trail to Tuckerman's Ravine passes more birds have been noted than elsewhere.

In September and October birds are observed in migration. They appear on roadside trees as members of mixed flocks of migrating birds. One such bird was creeping round a telephone post on the Highland as early as August 25, in 1904. Some birds are recorded up to the middle of October, and a few remain as winter residents. My assistant, writing from a logging-camp in late February, 1911, informs me that on the sixteenth day of that month, which he describes as warm and pleasant, he observed six Brown Creepers on one big birch tree. In the vicinity were seen also the Downy, the Hairy, and the Pileated Woodpecker, Blue Jays, Red-breasted Nuthatches, and Black-capped and Hudsonian Chickadees; and he mentions that a Barred Owl was heard hooting several times at midday on that date.

**173. Sitta carolinensis carolinensis.** WHITE-BREASTED NUTHATCH.

A rather uncommon permanent resident. As a summer resident a few individuals are recorded throughout the season

in the valleys and on the lower slopes of the mountains up to about 2000 feet. On June 23, 1903, six birds moving together in the valley at the foot of the Highland evidently constituted a family. There is no perceptible increase of individuals during the general fall migrations.

### 174. Sitta canadensis. Red-breasted Nuthatch.

A rather uncommon permanent resident. As a summer resident it occupies the range of the White-breasted Nuthatch and reaches also beyond on the sides of the higher mountains as far as a thick growth of spruces and firs extends. Some seasons a pair has occupied the fifty-acre piece of Highland woodland, which contains many coniferous trees. It has been found also during the breeding season higher on the side of Boy Mountain at about 1700 feet, occupying a limited dense growth of spruce and fir, and likewise near the summit of the mountain at 2000 to 2200 feet. Before the burning of the swampy woods at the Meadows it was a resident there in the valley. Its voice is heard on Mt. Starr King, in Jefferson Notch, on the Cherry Mountain road, and in Bretton Woods. In the autumn some are seen in the mixed flocks of small migrant birds, and a few remain, I am informed, as winter residents.

### 175. Penthestes atricapillus atricapillus. Chickadee.

A common permanent resident in all woodland and forest up to 3000 feet or higher. In late August and in September it is seen and heard in much increased numbers. The song or call-note of the Chickadee, if heeded at this time, very frequently leads the observer to a migrating band of small birds, in which not unlikely there will prove to be among the many species present a rare warbler or two, or, it may be, a Philadelphia Vireo. The Chickadee by his voice contributes the element of cheeriness to such moving companies and is, perhaps, an influential agent in holding the numbers together, as they move onward.

**176. Penthestes hudsonicus hudsonicus.** HUDSONIAN CHICKADEE.

A not uncommon permanent resident, breeding in the fir and spruce forests above 3000 feet and sparingly at much lower levels. In 1900, on July 3, several individuals were found in a swampy wood at the Meadows within the Jefferson valley, where the elevation is about 1200 feet. Here on July 2 and 11, 1902, a single bird was again observed. These dates suggest that the species may have bred in this swamp at that time. As all the tree growth was destroyed by fire the next year, the place ceased to be a haunt of the species, whether for breeding or not. On June 30, 1904, one was noted in the Weeks Pond woods at an equally low elevation.

Mr. Spaulding informs me that he found the species breeding in Lancaster in 1908 and 1909. On June 3 in the former year and on June 7 in the latter year a nest and seven eggs in each instance was found. These nestings, he states, were at an elevation of less than 1000 feet. Mr. Spaulding heard the song both seasons. In 1910 he found no nest. On July 18, 1910, an adult bird with two immature birds was seen in the Great Gulf near the Appalachian Mountain Club's camp.

After the breeding season birds are regularly noted in the forest on the southerly decline of the Cherry Mountain road, where is much growth of fir and spruce, and in Bretton Woods. In some seasons individuals have appeared on the Highland. On July 27, 1906, my assistant observed one in a crab-apple tree on our place. He stated to me that he saw the bird plainly. This was a very early date for a bird to be distant from its breeding ground, but I have no reason to doubt the correctness of the identification. Later, on August 5, I noted one higher up on the side of Boy Mountain, perhaps the same bird. In late September two were noted in this same locality. I have never found the species on Boy Mountain in the breeding season. On October 11 of the same year two birds were seen by the roadside on the Highland. In 1907 again a bird was on our place

on September 7, and another on October 9. These instances show that some individuals move out from their nesting grounds comparatively early in the season and sometimes take their place in the open country with the birds which are leaving. Thus on September 11, 1906, one was noted in a roadside elm in the Hazen's section of Whitefield. In 1904 one was about the Highland and observed daily from October 7 to 11. This was the season in which three records were obtained in eastern Massachusetts, in the vicinity of Boston, as given in "The Auk," Vol. XXII, Jan., 1905, p. 87.

As regards the song, I can give but the scanty information furnished in "The Auk's" general note, namely, that the Ipswich bird "gave a sweet warbling song" and that the Belmont bird "gave a few notes of the warbling song." These utterances may not have been the breeding song of the species. Indeed, they were very likely but a feeble suggestion of it. In 1905 I have the field-note on August 12 that "a Hudsonian Chickadee sang a short trill somewhat like a single trill of the Winter Wren's song." These are the only occasions on which a song has been heard other than the *day, day.*

**177. Regulus satrapa satrapa.** GOLDEN-CROWNED KINGLET.

A permanent resident, fairly common in the breeding season in the spruce growth on the higher slopes of the mountains and found also at lower levels. A pair regularly breeds in a limited growth of spruce on the side of Boy Mountain at about 1700 feet elevation. In September and early October many migrant birds are sometimes noted by the roadside on the Highland. Thus on October 4, 1904, over fifty were recorded, many in song. On various dates at this season they appear in considerable numbers. Comparatively few remain in the winter, I am informed.

**178. Regulus calendula calendula.** RUBY-CROWNED KINGLET.

A rather common fall migrant. The earliest appearances were in 1903 and 1909, when a bird was seen on September 12.

From September 19 to 25 is the usual time of its appearance. Eight to ten birds frequently constitute a day's record. Thirty birds were observed on October 4, 1904, eighteen on October 10, 1907, and fifteen on October 4, 1910. In 1901, 1902, and 1903 one or more were still present on October 16, 13, and 14 respectively. The song is often heard. Mrs. Bridge informs me that she saw a Ruby-crown in 1910 at Cherry Pond on September 5, and another in Randolph on September 10.

**179. Hylocichla mustelina.** Wood Thrush.

A somewhat rare summer resident since the year 1902. The song was first heard in Jefferson on May 25 of that year, the morning after my arrival on the Highland, when I stepped forth at an early hour. The bird was singing at the border of our woods and furnished a happy surprise, as the species had not been known to be in the Jefferson region. It was a month later, June 27, when the song was next heard, this time from a bird on Boy Mountain well up toward the summit, at an elevation of 2000 or 2100 feet. Here on July 4 four birds were located by their song, constituting a promising colony. Mr. Bradford Torrey had first noted the Wood Thrush in Franconia in 1899, hearing two birds in full song in late May and early June of that season. In 1903 the species was found in three localities. Four singing males were again heard on Boy Mountain at about the same altitude as in the previous season; four others were heard in woodland in the valley, where the elevation is 1200 or 1300 feet; and two others near a hillside road on Mt. Pliny. In 1904, a single bird only was heard in the valley, and only one in the Boy Mountain haunt; but two sang in the piece of woodland opposite our house throughout June and into July; two others were heard by the roadside in Randolph in the vicinity of the Ravine House; and three were located near the highest point of the Mt. Madison road to the Glen, at a probable elevation of 1600 feet. The species was evidently extending its breeding grounds. In 1905, the Boy Mountain colony was again strong, numbering five singing males, and again a pair

was located in the woodland opposite and within hearing of the house, while on the Mt. Madison road the song was heard from three birds. In 1906, the representation on the Highland and on Boy Mountain held good, while on the Madison road six singing males were recorded. In 1907, 1908, and 1909 the song continued to be one of the choice songs heard at our house and was given in 1907 up to the first day of August; Boy Mountain had its usual quota of songsters in these seasons; and the Madison road in the first two of the years. In 1910, not more than two pairs seemed to be located on Boy Mountain, and the song was heard in no other locality. There was somewhat of a decrease, therefore, in the number of birds which came under observation in 1909, and much more of a decrease in 1910. So well established, however, was the species for eight successive years in several localities, we can but think that its small representation in 1910 was due to seasonal conditions only.

The birds slip out of notice by July 20, to which date the song usually reaches. In 1904, however, one was seen on August 20 and another on September 4. The species has proven to be an occupant of high levels rather than the valley, and for the most part has located well up on the mountain sides instead of on their lower slopes. Mr. Spaulding informs me that he has observed a Wood Thrush but once in Lancaster, namely, on June 3, 1907. I have obtained no Lancaster records.

### 180. Hylocichla fuscescens fuscescens. Veery.

A common summer resident in the valley bottoms along Israel's and the Moose rivers and their tributary streams, also about the shores of the ponds. A few birds have sometimes located as high as 1600 feet on the Highland in damp sections of the woods. On the northern slope of Boy Mountain, at an elevation probably of 1800 feet, where the Olive-backed Thrush is abundant, the song of the Veery has been heard, sometimes together with the songs of the Wood Thrush and the Hermit. The song is but little given after the middle of July and in some

years has not been heard after the eleventh day. A few birds are located by call-note or are occasionally seen up to the middle of August. In early August, however, the species has generally dropped out of sight and hearing.

**181. Hylocichla aliciæ aliciæ.** GRAY-CHEEKED THRUSH.

A rare migrant. On October 3, 1908, two thrushes were seen near the first camp on the South Branch, which by reason of their size were identified as Gray-cheeked, and not Bicknell's, Thrushes. They were well seen and compared with an Olive-backed Thrush both in tone of color and in size.

**182. Hylocichla aliciæ bicknelli.** BICKNELL'S THRUSH.

A not uncommon summer resident in the ravines of the Presidential Range and along its streams above 2500 feet; found also on Mt. Starr King in the dwarf evergreens on the summit and in its ravines. At the "Perch Camp" on Mt. Adams, at an elevation of 4400 feet, beside the headwaters of the Cascade Brook, several birds have been heard singing and calling, the singing being mostly confined to the sunrise hour. In Jefferson Notch, 3000 feet elevation, and for 500 feet below on either declivity, birds have often been heard singing in June in the forenoon hours. Also in Tuckerman's Ravine the song has repeatedly been heard at noonday and in the early afternoon, but the repetition of it has not been long continued. Two birds were heard singing on Mt. Clinton on July 22, 1909, while eight others called, in the middle of the day. The song period extends to about the middle of July. By early August the birds are mostly silent except in the very early morning and evening. In the evenings of August 9 and 10, 1900, when at the "Perch Camp," the nighthawklike calls were heard. I have but one September record, namely, on the nineteenth day in 1900, when in the middle of the day the usual call-note was heard in Tuckerman's Ravine.

**183. Hylocichla ustulata swainsoni.** OLIVE-BACKED THRUSH.

A very common summer resident in all damp woodland from the valleys up the mountain sides to almost the limit of tree growth, where it becomes in smaller numbers a companion of the Bicknell's Thrush. It occupies the damper portions of the mountain slopes. Thus on Boy Mountain the voice of the Olive-back is rather infrequent on the southern, sunny side, while it is much heard on the northern slopes. In the fifty-acre piece of Highland woodland four or five pairs are usually found in the portion near the river. The species is abundant along the road following the South Branch and extending up into Jefferson Notch. Here nearly fifty singing birds have been recorded, when we have taken the drive leisurely, and on June 21, 1907, seventy-one singing birds were recorded on this drive continued through Bretton Woods and over the Cherry Mountain road.

In recent seasons the song has been regularly heard in the woodland opposite our house, where formerly the voice of the Hermit only had reigned, but where now is heard also a voice or two of the Wood Thrush. The song period usually extends through July and but seldom into early August, the latest hearings having been August 5 in 1907 and August 7 in 1900. The call-note continues to be heard occasionally throughout August and to late September. Some birds are present in early October, the eighth day in 1904 furnishing the latest record.

**184. Hylocichla guttata pallasi.** HERMIT THRUSH.

A common summer resident, seeming quite as numerous about the Highland as the Robin and in some seasons more numerous. The song period reaches without interruption to the middle of August. In 1910 three birds had continued to sing on the Highland in the early morning up to August 15 inclusive. On the following day I could hear neither bird, and I did not hear the song again. In the two years next preceding the song

was last heard on the same date. In 1901 and 1904 the song was also continued to the same date. In two other seasons it has not been heard after August 10 and 11 respectively. But in three of the years it has continued to the 17th, and in one year, 1902, was heard repeated a few times at dawn on the 20th. The date to which the song extends varies but little, therefore, based on the records of eleven seasons, it having continued up to August 15 in five of the years and to August 17 in three other years. The Hermit sings the latest in the season of all the thrushes. Very rarely have I heard the song given at all after this definite ending even to the close of the season. On October 6, 1903, however, I have it recorded that "a Hermit once sang its full song today."

The birds are located in the mixed woodland of the valleys, on the drier slopes of Boy Mountain to almost its summit, and on the lower slopes of the Presidential Range and other mountains a short distance up from the clearings of the valleys. As soon as one proceeds much beyond the beginning of his ascent on the mountain trails, he leaves the song of the Hermit behind, and it is the song of the Olive-backed Thrush which goes with him on his further ascent almost to the limit of tree growth. Indeed, I have seldom heard the song of the Hermit Thrush after I had penetrated any of the forests a short distance. But on the borders of well sunned woodland, from which the birds come forth to do much of their singing in the open, is rather the home of this thrush in the Jefferson region. Nesting in banks by the roadside, or on the ground in open fields near wood borders, or by ledges which constitute small openings for the sun to shine in, the birds are seldom found within the deeper recesses of the woods. So on Boy Mountain the song is heard almost entirely on the southern slopes and scarcely at all on the northern slopes.

Nestings have several times occurred on the Highland in a roadside grassy bank, above which a narrow border of trees stands, the road being the road for through travel over the Highland. The bird on her nest learned not to leave it on

account of passing vehicles or pedestrians, although they moved within five feet of her, if they continued on their way. So it was our wont to walk by within this near range of her bright eyes and simply exchange happy glances with her. These nestings were first nestings, observed in early June and begun in May.

What was probably a second nesting of a pair, for it occurred in haying time toward the middle of July, ended in a sad fatality. The bird had placed her nest about fifty feet out from the wood-border in the open field, where the grass was scanty, due to almost continuous shade, and low plant growth had sprung up. When the mowing-machine made its rounds, wholly unsuspectingly to the farmer driving it, the knife-blade in its five or six feet outreach decapitated the faithful mother upon her nest. She evidently had sat courageously and let the horses pass thus near, never suspecting that behind them reached a blade long enough to bring her instant death. The tragedy was discovered when later in the day the ground was raked, the headless body was seen, three dispersed eggs were found, and the nest torn from its setting. The eggs proved to have fully developed birdlings in each.

The latest nesting which has come under observation occurred in the middle of August not far below the summit of Boy Mountain beside the footpath. On August 16, in 1906, when the female bird left her nest, it contained three eggs. This would seem probably to have been a third nesting of the bird that season. The late continuance of song on the part of many birds every season suggests that three nestings may be the rule rather than the exception. For there is little abatement of song in the hot July days, and it comes forth as spontaneously in all the heat of midday as before sunrise and after sunset.

So much at home about houses do some of the Hermits feel that we have had them come and alight upon our hitching-post by the front door and upon the posts for the clothesline back of the house. I have seen them also perching on the guard-fencing of our neighbor's tennis-court, quite as robins are wont to do.

Many birds are still remaining when in the first half of October we come away. At this time and in September the plaintive call of the species is much heard in all woodland, and it is almost peculiar to this season. It is heard chiefly on the warmer days, when to one passing through the woods the call comes from one quarter and another. Upon chilly and colder days this call is scarcely ever heard. Its plaintiveness seems to express regret over the closing of the happy summer season.

### 185. Planesticus migratorius migratorius. Robin.

A spring and fall migrant, and a common summer resident. The Robin is not abundant in Jefferson, on the Highland probably not outnumbering the Hermit Thrush. The species increases in number relatively as one proceeds toward the lower levels of the Connecticut valley. Neither is the Robin as persistent a singer as the Hermit. His voice becomes stilled sooner in any period of song and earlier in the season than the Hermit's. While the song may be occasionally heard in the first half of August, practically the song-season is over with July. Some nestings in August suggest that sometimes three families are raised.

By the end of August, after a period of scarcity of individuals, flocks appear and continue to appear in larger numbers through September and early October. While the Robin is found mostly in the open country, it is seen also far within the forest where logging operations have been carried on, camps built, and clearings made. Under these conditions he penetrates the forest much farther than the Hermit Thrush has ever been observed. Unless, however, there are evidences at hand that man has wrought, even if it have been some years before, the Robin as a resident of the forest is absent.

### 186. Sialia sialis sialis. Bluebird.

A fairly common summer resident, but much less common than the Robin and the Hermit Thrush. Jefferson has many young orchards set, but possesses few old orchards of sufficient

decadence to furnish nesting holes. Fence and telegraph posts which are in the process of decay become, therefore, often the nesting-places. The song is heard to about July 10 and seldom after that time, except in late September and early October, when sometimes there is a marked renewal of song. Flocks are then seen and sometimes noted passing in somewhat scattered bands southward, giving their pleasant good-bye calls, "far-a-way, far-a-way, far-a-way," as they move high in the air, often not easily discernible in the blue sky. Such flights occur even in early November days, when, I am informed, it may be the case that much of the day at intervals this call of passing Bluebirds is heard, coming to sensitive ears while the work of the farm proceeds.

# ADDITIONAL NOTES

## FOR THE SEASON OF 1911

NOTE.—The numbers assigned the species in these additional notes are the same which the respective species bear in the general Annotated List. Two species have also been added with appropriate numbers.

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**9. Mergus americanus.** MERGANSER.

Mr. John Rogers and his son, living at the Meadows, informed me on June 26 that a family of ducks was on Israel's River in a certain secluded portion of its course. On the following day a mother Merganser with her brood of eleven young was seen. As I came to the bank of the river after crossing an extensive meadow the family was sitting on the water just below and did not notice me for two or three minutes, but continued their quiet movements, busied in snapping after insects. The young may have been three or four weeks old. Suddenly taking alarm they scurried up stream, being on the up-stream side of me. As in the case of the Peabody River family observed in June, 1908, wings and feet were used to hasten their escape, the young showing more agility than the mother in this double-propelling movement through the water, as she was somewhat in the rear of her brood. I was informed that several successive times during the summer the family or some members of it were seen on the river in the vicinity of the point where they were first observed. This is the first occurrence of the breeding of

the Merganser in Jefferson which has come under my observation. Doubtless there have been previous instances, as the presence of a female in June seen in flight on several occasions would indicate.

### 187. Mareca americana. Baldpate.

My first record of a Baldpate in the Jefferson region was obtained on September 19, when in company with Mr. C. A. Merrill, Mr. R. M. Marble and my assistant one was observed on Cherry Pond. The bird sat quietly on the water and gave us a sufficient view of it for identification before taking wing. Four days later a Baldpate was again seen on this pond, presumably the same bird, on both occasions a male.

### 14. Querquedula discors. Blue-winged Teal.

In the season of 1911 four Blue-winged Teal were seen on Cherry Pond on August 23. This occurrence is eight days earlier than the earliest record given in the general list. Mr. R. M. Marble was my companion. These teal, hidden among the bushes bordering the shore, rose successively, when we paddled near their hiding-place, and in their haste seemed to get entangled in the bushes, so that their fluttering efforts to free themselves were heard before they came into the open on the wing. Others were observed in mid-September both on Cherry and Little Cherry Ponds.

### 188. Marila marila. Scaup Duck.

Mr. Ernest L. Dorr shot a female on the Pond of Safety in October, 1908. He has the bird in his collection.

### 99. Sturnella magna magna. Meadowlark.

The representation at the Meadows was doubled in 1911, four singing birds being recorded on June 15 and again on June 23.

**107. Loxia leucoptera.** White-winged Crossbill.

In the summer of 1911 White-winged Crossbills were quite generally distributed in the region. None were observed in June or early July, but on July 20 five individual birds were successively heard on the Cherry Mountain drive to Bretton Woods. Four days later the calls were heard on the Highland, and on July 30 seven birds were seen there. Frequently thereafter the calls of passing or perching birds were noted. On July 26 three birds were seen on Mt. Starr King.

At this time I was informed by Miss Ella F. Carr that unusual birds were present on Randolph Hill, which were spoken of as "wild canaries" by those who were hearing and enjoying their beautiful songs. For some time all efforts on the part of local observers to see the singing birds were unsuccessful. But at length they were identified as White-winged Crossbills. On August 4 I drove to the Hill and both saw and heard several of them. They had been singing freely for three weeks or more. Miss Carr stated to me that upon her arrival in Randolph on July 14 she had at once been attracted by the song, new to her then. She informed me that the singing was not as spontaneous and the song not as long or as varied as it had been earlier. It consisted of a series of trills varied in character, beginning with a trill very similar to the Junco's, and also included beautiful notes not in the form of a trill. Several individuals sang. The singing was given from the tops of the coniferous trees in the vicinity of the Mt. Crescent House and before the birds were known by name had attracted the attention and admiration of many of the guests of the hotel, who subsequently by throwing crumbs into the yard also had opportunity to see and enjoy the birds at near range.

Miss Carr a few days later found White-winged Crossbills singing freely at Trefethen on Peak's Island, Maine. She states that at one time four birds were singing together, composing a notable chorus.

Mr. Marble informs me that birds of the species were almost daily observed by Mr. Nathan Clifford Brown and himself in

the vicinity of the Crawford House in late July and throughout August and into September. In drives through Bretton Woods I several times noted birds near the Mt. Washington Hotel and at Twin Rivers. An August 17 one sang finely from the tip of a spruce directly in the rear of the hotel. On August 30 eleven birds were feeding in the old cellar of the burned building at Twin Rivers, formerly a logging camp. Upon our approach they rose out from the cellar, but soon sought it again for something to their liking; what this was we could not ascertain. Mr. John H. Baker writes me that White-winged Crossbills have been present at Madison throughout the season, and Mr. M. C. Blake that he saw many birds of the species in the Chocorua-Whiteface region.

Thus for the first time in the dozen years of my observation White-winged Crossbills have been present in various localities during July, August and September, singing freely. This might be taken as evidence of presumable breeding, if a three weeks' season, or more, of free, spontaneous song much of the day may serve as a criterion of nesting. But on the other hand the species has been regarded as commonly nesting in late winter or early spring from data which various observers have furnished, and I have no direct evidence of its breeding on Randolph Hill in July, where it was definitely located and in full song.

**118. Spizella pusilla pusilla.** Field Sparrow.

The representation of the Field Sparrow in the season of 1911 was small. Yet the song was heard on the Highland on June 5 and again on June 8 and in another locality on July 1 to 9, indicating the probable nesting of the species. On June 15 a bird was heard singing in Lunenburg, Vermont, where two had been heard on June 27, 1910. Mr. Spaulding did not find any individuals in Lancaster, neither did I upon successive drives there.

**151. Dendroica castanea.** Bay-breasted Warbler.

The species was greatly diminished in the season of 1911. As in 1910, no representatives occupied the fifty-acre piece of

woodland on the Highland. While on the Cherry Mountain-Bretton Woods drive but four singing males were recorded on June 19, where twenty-one were heard in 1910 and twenty-seven in 1909.

### 163. Wilsonia pusilla pusilla. Wilson's Warbler.

As a summer resident there was a smaller representation in the usual haunt in the valley than in 1910, since but four singing males were recorded on June 15, and this proved to be the maximum number for the season of 1911.

### 179. Hylocichla mustelina. Wood Thrush.

The Wood Thrush continued to be represented by two nesting pairs at least on Boy Mountain in the season of 1911. One other bird was heard singing in the fifty-acre piece of woodland on the Highland on June 13 and 15, but not longer. In other localities in which the species had been found in recent years the song was not heard. I am informed, however, by Mr. T. Otis Fuller that he heard the song upon many days in the vicinity of the Ravine House in Randolph from a bird located there. Thus the diminished representation of 1910 was continued in the season of 1911.

### 184. Hylocichla guttata pallasi. Hermit Thrush.

The Hermit Thrush hardly held its position on the Highland as an abundant bird in the season of 1911. While the song was heard here and there, it did not prevail as usual. The same decrease was noted in other localities in the region, as the record of every drive and walk indicated.

### 185. Planesticus migratorius migratorius. Robin.

The Robin in the season of 1911 was present on the Highland in plainly increased numbers. While it had previously been a fairly common bird, it became more common, and the relative numbers of Hermit Thrushes and Robins for the season were reversed, Robins becoming the more numerous.

Generally speaking the bird life of the region was less abundant in 1911 than usual. Some species quite held their own, but many species were decreased in numbers. Thus the general collection of nesting birds in the fifty-acre piece of woodland on the Highland was not as large as in previous seasons, while still it remained comprehensive. I do not know of untoward circumstances to explain the decrease, unless, perchance, it may have been a drought, which beginning in early May continued to late July, made naturally wet places dry, eliminated small streams, and robbed vegetation of much of its freshness, thus to some degree changing for the time the usual nature of the bird haunts with which I make myself familiar, and, perhaps, having an influence in determining the choice of location of some birds. The summer resident species which are rarer in the Jefferson Region were almost all much more rare in the season of 1911, namely, Prairie Horned Lark, Cowbird, Field Sparrow, Migrant Shrike, Bay-breasted Warbler, Wilson's Warbler, and Wood Thrush.

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