THE MARINE BIOLOGICAL LABORATORY.

SIXTH ANNUAL REPORT,

FOR THE YEAR

1893.

BOSTON:

1894.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Officers of the Marine Biological Laboratory, 1893</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigators at the Laboratory during 1893</td>
<td>5</td>
</tr>
<tr>
<td>Students at the Laboratory during 1893</td>
<td>7</td>
</tr>
<tr>
<td>Annual Report of the Trustees to the Corporation</td>
<td>10</td>
</tr>
<tr>
<td>Annual Report of the Treasurer</td>
<td>12</td>
</tr>
<tr>
<td>Annual Report of the Director</td>
<td>18</td>
</tr>
<tr>
<td>List of Life Members of the Corporation</td>
<td>21</td>
</tr>
<tr>
<td>List of Members of the Corporation</td>
<td>32</td>
</tr>
<tr>
<td>List of Donors and Gifts</td>
<td>33</td>
</tr>
<tr>
<td>List of Annual Subscribers, 1893</td>
<td>37</td>
</tr>
<tr>
<td>Incorporation</td>
<td>37</td>
</tr>
<tr>
<td>By-Laws</td>
<td>38</td>
</tr>
<tr>
<td>The Annual Circular for 1893</td>
<td>39</td>
</tr>
<tr>
<td>Announcement for the Session of 1894</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>46</td>
</tr>
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</table>
OFFICERS.

1893.

Trustees.

SAMUEL H. SCUDDER, President, Cambridge, Mass.

WILLIAM K. BROOKS, Johns Hopkins University, Baltimore, Md.

SAMUEL F. CLARKE, Williams College, Williamstown, Mass.

FLORENCE M. CUSHING, 8 Walnut street, Boston.

WILLIAM G. FARLOW, Harvard University, Cambridge, Mass.

EDWARD G. GARDErER, 12 Otis Place, Boston.

WILLIAM LIBBEY, Jr., College of New Jersey, Princeton, N.J.

J. PLAYFAIR McMURRICH, University of Cincinnati, Cincinnati, O.

CHARLES S. MINOT, Harvard Medical School, Boston, Mass.

HENRY F. OSBORN, Columbia College, New York.

WILLIAM T. SEDGWICK, Massachusetts Institute of Technology, Boston.

BENJAMIN SHARP, Academy of Natural Sciences of Philadelphia, Philadelphia, Penn.

GEORGIANA W. SMITH, 286 Marlborough street, Boston.

SIDNEY I. SMITH, Yale University, New Haven, Conn.

WILLIAM TRELEASE, Missouri Botanical Garden, St. Louis, Mo.

EDMUND B. WILSON, Columbia College, New York, N.Y.

R. RAMSAY WRIGHT, University of Toronto, Toronto, Canada.

EDWARD T. CABOT, Treasurer, 53 State street, Boston.

ANNA PHILLIPS WILLIAMS, Secretary, 23 Marlborough street, Boston.

A. LAWRENCE LOWELL, Clerk, 53 State street, Boston.

Director.

C. O. WHITMAN, University of Chicago, Chicago, Ill.

Instructors at the Laboratory.

HOWARD AYERS, Lake Laboratory.

H. C. BUMPUS, Brown University.

E. G. CONKLIN, Ohio Wesleyan University.

PIERRE A. FISH, Cornell University.

J. L. KELLOGG, Olivet College.

F. R. LILLIE, University of Chicago.

JACQUES LOEB, University of Chicago.

J. PLAYFAIR McMURRICH, University of Cincinnati.

A. D. MEAD, University of Chicago.

W. J. V. OSTERHOUT, Brown University.

W. M. RANKIN, Princeton College.

W. A. SETCHELL, Yale University.
MARINE BIOLOGICAL LABORATORY.

Artist.
Ryoiche Takano.

Employees.
Collector.—F. W. Walmsley.
Janitor.—G. M. Gray.
Boatman.—J. J. Veeder.
Engineer.—Wm. H. Studley.
Assistant Janitor.—George David.
" " Shirlee Eldridge.
INVESTIGATORS AT THE LABORATORY.

1893.

A.—OCCUPYING PRIVATE ROOMS.

CHARLES B. ATWELL, Ph.M., Professor of Biology, Northwestern University, Evanston, Ill.

HOWARD AYERS, Ph.D., Director, Allis Lake Laboratory, Milwaukee, Wis.

MELVIN A. BRANNON, M.A., Professor of Biology, University of North Dakota, University, N.D.

HERMON C. BUMPUS, Ph.D., Professor of Comparative Anatomy, Brown University, Providence, R.I.

CORNELIA M. CLAPP, Professor of Zoology, Mt. Holyoke College, South Hadley, Mass.

EDWIN G. CONKLIN, Ph.D., Professor of Biology, Ohio Wesleyan University, Delaware, O.

WILLIAM T. COUNCILMAN, M.D., Professor of Pathological Anatomy, Harvard University, Boston, Mass.

CHARLES WRIGHT DODGE, M.S., Professor of Biology, University of Rochester, Rochester, N.Y.

PIERRE A. FISH, B.S., Instructor in Physiology, Vertebrate Zoology, and Neurology, Cornell University, Ithaca, N.Y.

KATHARINE FOOT, Evanston, Ill.

S. GWENDOLEN FOULKE, Philadelphia, Penn.

EDWARD G. GARDINER, Ph.D., Boston, Mass.

JAMES L. KELLOGG, Ph.D., Professor of Biology, Olivet College, Olivet, Mich.

FREDERIC S. LEE, Ph.D., Demonstrator of Physiology, Columbia College, New York, N.Y.

LESLIE A. LEE, Ph.D., Professor of Geology and Biology, Bowdoin College, Brunswick, Me.

FRANK R. LILLIE, B.A., Reader in Embryology, University of Chicago, Chicago, Ill.

WILLIAM A. LOCY, M.S., Professor of Animal Morphology, Lake Forest University, Lake Forest, Ill.

JACQUES LOEB, Ph.D., Assistant Professor of Physiology, University of Chicago, Chicago, Ill.

J. PLAYFAIR McMURRICH, Ph.D., Professor of Biology, University of Cincinnati, Cincinnati, O.

ALBERT D. MEAD, A.M., Fellow in Zoology, University of Chicago, Chicago, Ill.
THOMAS H. MORGAN, Ph.D., Associate Professor of Biology, Bryn Mawr College, Bryn Mawr, Penn.
W. J. V. OSTERHOUT, A.B., Instructor in Botany, Brown University, Providence, R.I.
JULIA B. PLATT, Munich, Germany.
HARRIET RANDOLPH, Ph.D., Demonstrator in Biology, Bryn Mawr College, Bryn Mawr, Penn.
WALTER M. RANKIN, Ph.D., Instructor in Biology, Princeton College, Princeton, N.J.
WILLIAM A. SETCHELL, Ph.D., Instructor in Biology, Yale University, New Haven, Conn.
OLIVER S. STRONG, M.A., Preparator in Biology, Columbia College, New York, N.Y.
S. WATASE, Ph.D., Instructor in Cellular Biology, University of Chicago, Chicago, Ill.
CHARLES O. WHITMAN, Ph.D., Director of the Marine Biological Laboratory; Editor of the American Journal of Morphology; and Professor in the University of Chicago, Chicago, Ill.
ARTHUR WILLEY, Tutor in Zoology, Columbia College, New York, N.Y.
EDMUND B. WILSON, Ph.D., Professor of Zoology, Columbia College, New York, N.Y.

B. RECEIVING INSTRUCTION.

ELIZABETH E. BICKFORD, S.B., Teacher of Science, Bryn Mawr School, Baltimore, Md.
EDWIN T. BREWSTER, A.M., Graduate Student, Harvard University, Cambridge, Mass.
FRED. J. BROCKWAY, M.D., Assistant Demonstrator of Anatomy, Columbia College, New York, N.Y.
BERTHA M. BROWN, S.B., Assistant in Biology, Vassar College, Poughkeepsie, N.Y.
ESTHER F. BYRNES, A.B., Assistant in Biology, Vassar College, Poughkeepsie, N.Y.
GARY N. CALKINS, S.B., Graduate Student, Columbia College, New York, N.Y.
FRANKLIN S. CONANT, Student, Williams College, Williamstown, Mass.
ELIZABETH COOK, Student, University of Chicago, Chicago, Ill.
H. H. CUSHING, Student, Brown University, Providence, R.I.
WILLIAM H. DUDLEY, Master in Science, Lake Forest Academy, Lake Forest, Ill.
HARRISON G. DYAR, S.B., Graduate Student, Columbia College, New York, N.Y.
WARREN H. EVERETT, Student, Hamilton College, Clinton, N.Y.
IRA VAN GIESON, M.D., Assistant in Normal Histology, Columbia College, New York, N.Y.
FRED P. GORHAM, A.B., Graduate Student, Brown University, Providence, R.I.
EMILY R. GREGORY, B.A., 310 N. Fortieth Street, Philadelphia, Penn.
INVESTIGATORS AT THE LABORATORY.

Robert A. Harper, A.M., Professor of Botany, Lake Forest University, Lake Forest, Ill.

Nathan R. Harrington, Graduate Student, Williams College, Williamstown, Mass.

Emma Keith, Student, Mt. Holyoke College, South Hadley, Mass.

Clara Langenbeck, B.S., Assistant in Biology, University of Cincinnati, Cincinnati, O.

Albert P. Mathews, S.B., Fellow in Biology, Columbia College, New York, N.Y.

William D. Merrill, A.B., Teacher of Science, Wayland Academy, Beaver Dam, Wis.

Harriet Bell Merrill, M.S., Instructor in Biology, Milwaukee High School, Milwaukee, Wis.

Marie L. Minor, Student, Bryn Mawr College, Bryn Mawr, Penn.

Albro D. Morrill, M.S., Professor of General Chemistry and Biology, Hamilton College, Clinton, N.Y.


William L. Poteat, M.A., Professor of Biology and Geology, Wake Forest College, Wake Forest, N.C.

D. L. Sharp, Student, Brown University, Providence, R.I.

Israel Strauss, Student, Brown University, Providence, R.I.

Ralph W. Tower, Student, Brown University, Providence, R.I.
STUDENTS AT THE LABORATORY.

1893.

A.—IN BOTANY.

Josephine Feger Ancona, Department of Philosophy, University of Pennsylvania, Philadelphia, Penn.
Clara A. Bliss, Teacher in Wells College, Aurora, N.Y.
Marion H. Carter, Teacher of Private Classes, Boston, Mass.
Margaret Greene, Boston, Mass.
Simeon C. Keith, Jr., S.B., Assistant in Biology, Massachusetts Institute of Technology, Boston, Mass.
Mrs. Cora E. Pease, Malden, Mass.
Robert S. Phillips, Student, Brown University, Providence, R.I.
Grace A. Smith, Student, Smith College, Northampton, Mass.
Katharine A. Taylor, 7 West Mt. Vernon place, Baltimore, Md.

B.—IN ZOOLOGY.

Alma E. Beale, Teacher of Science, State Normal School, New Britain, Conn.
Charles S. Benson, Student, Sheffield Scientific School, New Haven, Conn.
Edward M. Brown, Student, Sheffield Scientific School, New Haven, Conn.
E. D. Burbank, Teacher in Township High School, Evanston, Ill.
Henry W. Burr, Student, Columbia College, New York, N.Y.
Eloise Butler, Teacher of Botany, Central High School, Minneapolis, Minn.
Frederick C. Busch, Student, Cornell University, Ithaca, N.Y.
Fred. L. Charles, Student, Northwestern University, Evanston, Ill.
Lillie B. Clark, Vassar College, Poughkeepsie, N.Y.
Tracy E. Clark, B.S., Fellow in Zoology and Botany, Cornell University, Ithaca, N.Y.

Minnie A. Colburn, Student, Orange, Mass.
Henry E. Crampton, A.B., Assistant in the Biological Laboratory, Columbia College, New York, N.Y.
Ulric Dahlgren, Student, Princeton College, Princeton, N.J.
W. Edgar Deeks, M.D., Lecturer in Zoology, McGill University, Montreal, P.Q.
STUDENTS AT THE LABORATORY.

ELLiot R. Downing, B.S., Instructor in Natural Science, Beloit Academy, Beloit, Wis.
Rhoda A. Esten, Superintendent's Clerk and Assistant, Department of Public Schools, Providence, R.I.
Florence E. Flagg, Mt. Hermon School, Northfield, Mass.
H. H. Goddard, A.M., Principal, Oak Grove Seminary and Bailey Institute, Vassalboro, Me.
James S. Gorssline, Student, University of Rochester, Rochester, N.Y.
Henrietta L. Graves, Assistant in Natural Science Department, State Normal School, Framingham, Mass.
William Perry Hay, M.S., Instructor in Zoology, Central High School, Washington, D.C.
Helen P. Howell, Normal School of Physical Training, Cambridge, Mass.
Ernest V. Hubbard, Student, Columbia College, New York, N.Y.
Abram T. Kerr, Jr., Student, Cornell University, Ithaca, N.Y.
G. S. Machan, Student, Bowdoin College, Brunswick, Me.
Mary C. Mellyn, Teacher in the Rice Training School, Boston, Mass.
A. P. Morse, Assistant in the Zoological Department, Wellesley College, Wellesley, Mass.
Cora B. Mudge, Bowditch School, Jamaica Plain, Mass.
Daisy M. Orleman, Graduate Student, Columbian University, Washington, D.C.
Annie E. Ottaway, Teacher of Natural Science, The Misses Masters' School, Dobbs Ferry, N.Y.
Philip S. Sabine, Student, Princeton College, Princeton, N.J.
Georgiana Sands, Vassar College, Poughkeepsie, N.Y.
W. H. Sayward, Jr., Student, Massachusetts Institute of Technology, Boston, Mass.
C. Shearer, Student, McGill University, Montreal, P.Q.
Will L. Stubbs, Student, Miami University, Miami, O.
Geo. A. Talbert, M.S., Instructor in Science, La Porte High School, La Porte, Ind.
Inez L. Whipple, Teacher of Biology, State Normal School, Providence, R.I.
In presenting their sixth annual report on the condition of the Marine Laboratory the Board of Trustees are so fortunate as to be able to state that not only has the past season been very successful as far as the number of students and investigators and the quality of their work are concerned, but also that the condition of the finances is more satisfactory than at any time since the foundation of the Laboratory. In the last annual report mention was made of the important scientific and financial support which had been received from different Colleges and Universities. That already eighteen such institutions contribute annually to the support of tables in the Laboratory is very encouraging, as showing a wide-spread interest in the Laboratory as the summer working-place of both instructors and students interested in Biology, and an appreciation on their part of the scientific aims which it has been our endeavor to attain. It is the aid thus obtained from colleges and universities which, for the first time since its establishment, has rendered the Laboratory self-supporting during the past season.

Heretofore the running expenses were always greater than the receipts from colleges, investigators, and students, which made it necessary frequently to call on friends of the Laboratory to supply money for making good the annual deficit, the existence of which, to say the least, had a tendency to diminish somewhat the confidence in the chances of our future success on the part of those who had aided us liberally at the outset. With the disappearance of the usual deficit, besides being warranted in feeling that our own confidence in the ultimate finan-
cial solidity of the Laboratory has been justified, we are now better able than before to appeal to the public in behalf of an institution which experience has shown to be such an important factor in the development of biological studies in this country, since we are in a position to show that the funds intrusted to our care have been conservatively managed.

It was feared, when the prospects of the Laboratory for the past summer were discussed, that, owing to the attraction of the Chicago Exhibition, the number of students might be less than in previous years. On the contrary, however, the number of students and investigators has been larger, and the quality of the work done has been better than ever before. In fact, the resources of the Laboratory have been hardly sufficient to accommodate the large number present. Twice since the Laboratory was first opened have large additions to the original building been made in order to accommodate the continually increasing attendance, so that now the building is more than double its original size. To provide for these additions has been a task involving no small amount of labor on the part of some of the Board of Trustees. In preparation for the past season many changes were made so as not only to add to the facilities for work, but also to afford more room; yet last summer every available table space was occupied, and during the greater part of the season it would have been impossible to receive another worker.

A serious problem which must be considered by the Board of Trustees during the coming season is how to accommodate a larger number of students, for there is every reason to believe that the number of applicants for places next summer will considerably exceed the present capacity of the Laboratory. The number of students and investigators occupying working tables last summer was one hundred and eleven, the extreme limit which we are at present able to accommodate. Unless the present building is enlarged, the only alternative, if the number of applicants increases, as it is believed it will, would be to adopt some plan of exclusion,—a difficult thing to attempt without causing ill-feeling and unfavorable criticism. It is possible that,
by raising the fees, the number of applicants would be reduced; but by so doing we might drive away some of those best qualified to profit by the means for study and investigation offered by the Laboratory. Furthermore, we must consider the question of the extension of the field of usefulness by the introduction of departments of Biology not yet represented and the development of those recently introduced into the institution. Such an extension implies an increase of working room, as well as an increase in the Laboratory equipment. For the first time the Laboratory numbered last summer among its workers investigators in Comparative Pathology, and it is probable that, in the near future, this branch of Biology should be included among the lines of investigation to be carried on in the Laboratory as are Zoölogy, Botany, and Physiology at the present time. If, however, this new department is to be encouraged, extensive enlargement will be necessary, and without it such work will be very incomplete.

In discussing the estimates for the coming year the Trustees must, of course, take into consideration both the immediate needs of the Laboratory and the improvements which, although not absolutely necessary to be made at the present time, will ultimately be needed if the best work is to be done. Of the more pressing needs may be mentioned certain improvements in the building used for the dining club. The village of Woods Holl is so constituted that it is essential to have a dining club connected with the Laboratory and managed by its officers. Last summer Miss E. B. Richardson was employed to manage the details of this department; and if the results fell short of the standard we wish to maintain, the cause must be attributed to circumstances beyond her control. The kitchen is but a tumble-down old wood-shed, with uneven floors and leaky roof; ill arranged, badly ventilated, and quite destitute of modern appliances. There is no fresh water on the premises, that used being obtained from the Fish Commission, the drinking-water being brought in buckets. It seems probable that the Laboratory will always have to maintain the dining club, and it is to be hoped that, before another season, a large cistern and modern
kitchen and a larger dining-room can be built. Without these appliances it will never be possible to furnish satisfactory table board to such a large number of people.

In looking back at the history of the Laboratory since its establishment, we have reason to feel gratified at the steady progress which has been made. The success which has been achieved in scientific work we owe to the constant zeal and devotion of the Director and the body of Instructors who have so ably superintended the departments over which they presided. The question of finances, which has, at times, been somewhat perplexing, is now happily solved for the Laboratory, if conducted on its present basis, thanks to the liberality of friends and the generous and active support of the colleges and universities. After the experience of the last summer, the Trustees may feel with reason that the ordinary and necessary current expenses will be provided for without private appeals at the last moment to make good a deficit. It cannot, however, be supposed that the friends of Biological Science will be content that, for any length of time, the work of the Laboratory should remain fixed within its present limits. If we are to keep up with the times, provision must be made for an extension and perfecting of the means for research, implying more rooms and more complete equipment of private rooms and facilities for collecting material. Provision should also be made for enabling investigators to pursue their work at other seasons than midsummer. That the number of persons seeking instruction should increase for any length of time in the same ratio as in the past can hardly be supposed, but the number is sure to be greater than at present, and it would be scanty justice to the hard-worked instructors to say that they should receive a more adequate recompense than they now receive. It is never going to be possible to pay for improvements which will be needed by raising the fees of students and investigators to a self-supporting basis, for that would be to exclude precisely those for whose benefit the Laboratory was established. To furnish the equipment which we shall need, it will be necessary, sooner or later, to trust to the far-seeing liberality of our well-to-do friends to furnish a fund
which shall enable us to bear the comparatively heavy but indis­pen­sa­ble expense which a well-equipped scientific establish­ment implies. Patient waiters are said to be no losers, and with the return of prosperity in the business world let us hope that some of those who we feel sure sympathize with the work already done, will be able to secure for us the only sound basis of a permanent Laboratory, — a fund for its support.

We have once more gratefully to acknowledge the continued generosity of Miss S. B. Fay, of Woods Holl, to whom we are indebted for the free use of houses for lodgings, as well as for other substantial assistance. To Marshall McDonald, United States Commissioner of Fish and Fisheries, with his efficient corps of assistants stationed in Woods Holl, we desire to express our thanks for their unfailing courtesy and helpfulness. The Trustees would welcome any opportunity which should enable them to reciprocate the favors already received from this source.

(Signed)  
SAMUEL H. SCUDDER, President.  
EDWARD T. CABOT, Treasurer.  
ANNA PHILLIPS WILLIAMS, Secretary.  
A. LAWRENCE LOWELL, Clerk.  
WILLIAM K. BROOKS,  
SAMUEL F. CLARKE,  
FLORENCE M. CUSHING,  
WILLIAM G. FARLOW,  
EDWARD G. GARDINER,  
WILLIAM LIBBEY, JR.  
J. PLAYFAIR McMURRICH,  
CHARLES S. MINOT,  
HENRY F. OSBORN,  
WILLIAM T. SEDGWICK,  
BENJAMIN SHARP,  
GEORGIANA W. SMITH,  
SIDNEY I. SMITH,  
WILLIAM TRELEASE,  
EDMUND B. WILSON,  
R. RAMSAY WRIGHT.
## TREASURER'S

**Dr.** MARINE BIOLOGICAL LABORATORY IN

<table>
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<tr>
<td>To Instructors</td>
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<tr>
<td>Wages</td>
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<td>Stationery, printing, and postage</td>
<td>298 68</td>
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<td>Interest on advances</td>
<td>45 00</td>
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<td>Alcoholic specimens</td>
<td>192 77</td>
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<tr>
<td>Equipment</td>
<td>288 01</td>
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<tr>
<td>Alterations and repairs</td>
<td>1,107 92</td>
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<tr>
<td>Furniture</td>
<td>131 50</td>
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<td>Launch, boats, etc.</td>
<td>312 78</td>
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<td>Supplies</td>
<td>730 55</td>
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<td>Chemicals</td>
<td>393 81</td>
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<td>Sundries</td>
<td>166 63</td>
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<td>Freight and express</td>
<td>143 86</td>
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<td>Periodicals</td>
<td>206 17</td>
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<tr>
<td>Repayment of money advanced in 1892</td>
<td>2,000 00</td>
</tr>
<tr>
<td>Rent of Director's quarters at Woods Holl</td>
<td>51 50</td>
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<tr>
<td>Cash paid H. C. Bumpus to be accounted for</td>
<td>100 00</td>
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<tr>
<td>Balance, cash on hand, New England Trust Company</td>
<td>$259 20</td>
</tr>
<tr>
<td>With H. C. Bumpus, Bursar</td>
<td>80 41</td>
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</tbody>
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Total: $8,967 10
REPORT.

ACCOUNT WITH EDWARD T. CABOT, TREASURER.  Cr.

<table>
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<td>Annual assessments</td>
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<td>Contributions</td>
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<tr>
<td>Fees of students and investigators</td>
<td>2,446.00</td>
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<td>Fees of colleges</td>
<td>1,440.00</td>
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<td>Sale of supplies</td>
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<td>Rent of microscopes</td>
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<td>Room rent of cottage</td>
<td>10.50</td>
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<tr>
<td>Interest</td>
<td>20.61</td>
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<tr>
<td>R. W. Wood's estate, balance of legacy</td>
<td>250.00</td>
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<tr>
<td>Hooper, Lewis, &amp; Co., money refunded</td>
<td>5.25</td>
</tr>
<tr>
<td>Mrs. C. C. Smith, net profit &quot;Mess account,&quot;</td>
<td>9.33</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$8,967.10</td>
</tr>
</tbody>
</table>

E. & O. E., Nov. 8, 1893.

EDWARD T. CABOT,
Treasurer.

Feb. 17, 1894. Examined and approved.

CHARLES S. MINOT,
WM. T. SEDGWICK,
Auditors.
The Laboratory also has the following Endowment Funds:

**LUCRETIA CROCKER SCHOLARSHIP FUND.**

Invested as follows:
- 18 shares Vermont & Massachusetts R.R.
- Deposit in Savings Bank (capital), $83.50.
- Income on hand, $202.52.

**INVESTMENT FUND.**

Invested as follows:
- $1,000 4% bond St. Paul, Min., & Manitoba R.R., Mont. Extension.
- $1,000 5% bond Chi., Bur., & Northern R.R.
- Carter note and mortgage, $800.
- Deposit in Savings Bank (capital), $154.74.
- Income on hand, $300.97.

E. & O. E., Nov. 8, 1893.

EDWARD T. CABOT,

Treasurer.
REPORT OF THE DIRECTOR TO THE TRUSTEES

OF THE

MARINE BIOLOGICAL LABORATORY

ON THE WORK OF THE

SIXTH SESSION, 1893.

LADIES AND GENTLEMEN: The report on the Sixth Session of the Laboratory, herewith presented, is confined chiefly to statistics, which show what the Laboratory is now doing and what progress it has made in original work.

Most of the leading colleges and universities are now represented on your Board. Our officers have been drawn from as many as fifteen of our higher educational institutions, and our membership has extended to one hundred and thirty-one colleges, universities, seminaries, academies, schools, and laboratories. The following institutions, eighteen in number, subscribed for tables, and thus coöperated in the support of the Laboratory during the session of 1893:

- Bowdoin College,
- Brown University,
- Bryn Mawr College,
- University of Chicago,
- University of Cincinnati,
- Columbia College,
- Hamilton College,
- Massachusetts Institute of Technology,
- Miami University,
- Missouri Botanical Garden,
- Mt. Holyoke College,
- Northwestern University,
- Princeton College,
- University of Rochester,
- Smith College,
- Vassar College,
- Wellesley College,
- Williams College.
The American Association for the Advancement of Science becomes a subscriber for 1894.

During the same session forty-one investigators worked at the Laboratory, while the whole number, including students was one hundred and eleven, representing seventy-two institutions and no less than seventeen States. Nearly one hundred scientific papers and books have resulted from work at the Laboratory, and have been published or are now in press.

After twice adding new buildings within the first four years—more than doubling our original space—we have again outgrown our quarters, and cannot afford to allow another season to pass without providing, if possible, a dormitory and dining-hall, a new laboratory for Botany, and a number of minor improvements.

The record of the Laboratory as a scientific station is shown in the following list of works, based either wholly or in part upon investigations made at Woods Holl:

PAPERS PUBLISHED.

H. Ayers.


Concerning Vertebrate Cephalogenesis. *Journ. of Morph.*, IV., 1890.


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PUBLIC EVENING LECTURES DELIVERED AT THE MARINE BIOLOGICAL LABORATORY DURING THE SESSION OF 1893.


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1888.

No. 3170.

COMMONWEALTH OF MASSACHUSETTS,

BE IT KNOWN, That whereas Alpheus Hyatt, William Stanford Stevens, William T. Sedgwick, Edward G. Gardiner, Susan Minns, Charles Sedgwick Minot, Samuel Wells, William G. Farlow, Anna D. Phillips, and B. H. Van Vleck have associated themselves with the intention of forming a Corporation under the name of the Marine Biological Laboratory, for the purpose of establishing and maintaining a laboratory or station for scientific study and investigations, and a school for instruction in biology and natural history, and have complied with the provisions of the Statutes of this Commonwealth in such case made and provided, as appears from the certificate of the President, Treasurer, and Trustees of said Corporation, duly approved by the Commissioner of Corporations, and recorded in this office;

Now, therefore, I, HENRY B. PEIRCE, Secretary of the Commonwealth of Massachusetts, do hereby certify that said A. Hyatt, W. S. Stevens, W. T. Sedgwick, E. G. Gardiner; S. Minns, C. S. Minot, S. Wells, W. G. Farlow, A. D. Phillips, and B. H. Van Vleck, their associates and successors, are legally organized and established as, and are hereby made, an existing Corporation, under the name of the Marine Biological Laboratory, with the powers, rights, and privileges, and subject to the limitations, duties, and restrictions which by law appertain thereto.

Witness my official signature hereunto subscribed, and the seal of the Commonwealth of Massachusetts hereunto affixed, this twentieth day of March, in the year of our Lord one thousand eight hundred and eighty-eight.

HENRY B. PEIRCE,
Secretary of the Commonwealth.
BY-LAWS.

1. The annual meeting of the members shall be held in Boston on the second Wednesday of November in each year, at such time and place as shall be designated by the Trustees; and at such meeting the members shall choose by ballot a Clerk, Treasurer, and nineteen Trustees, who shall hold their offices for one year, and until others are chosen and qualified in their stead.

2. Special meetings of the members may be called by the Trustees, to be held in Boston at such time and place as they may designate.

3. The Clerk shall give notice of meetings of the members by publication in some daily newspaper published in Boston at least seven days before such meeting, and in case of a special meeting the notice shall state the purpose for which it is called.

4. Ten members shall constitute a quorum at any meeting.

5. The Trustees shall have the control and management of the affairs of the Corporation; they shall present a report of its condition at every annual meeting; they shall elect one of their number President, and may choose such other officers and agents as they may think best; they may fix the compensation and define the duties of all the officers and agents, and may remove them, or any of them, except those chosen by the members, at any time; they may fill vacancies occurring in any manner in their own number or in any of the offices. They shall from time to time elect members upon such terms and conditions as they may think best.

6. Meetings of the Trustees shall be called by the President, or by any two Trustees, and the Clerk shall give notice thereof by written or printed notice sent to each Trustee by mail, post-paid. Four Trustees shall constitute a quorum for the transaction of business.

7. The President shall, annually, in the month of December, appoint two Trustees who shall constitute a committee on finance to examine from time to time the books and accounts of the Treasurer, and to audit his accounts at the close of the year. No investments
of the funds of the Corporation shall be made by the Treasurer, except approved by the finance committee in writing.

8. The consent of every Trustee shall be necessary to a dissolution of the Marine Biological Laboratory. In case of dissolution, the property shall be given to the Boston Society of Natural History, or some similar public institution, on such terms as may then be agreed upon.

9. These by-laws may be altered at any meeting of the members, provided that the notice of such meeting shall state that an alteration of the by-laws will be acted upon.
The Annual Circular for 1893.

The Marine Biological Laboratory
At Woods Holl, Mass.

Incorporated in 1888.

Sixth Season, 1893.

June 1st—August 30th.

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H. C. Bumpus, Professor of Comparative Anatomy, Brown University.
W. M. Rankin, Instructor in Zoology, Princeton College.
Pierre A. Fish, Instructor in Physiology and Anatomy, Cornell University.
A. D. Mead, Fellow in Zoology, University of Chicago.
APPLICATIONS FOR ADMISSION TO THE VARIOUS DEPARTMENTS SHOULD BE MADE AS FOLLOWS:

INVESTIGATION: Professor C. O. Whitman, Univ. of Chicago, Chicago, Ill.


BOTANY: Dr. William A. Setchell, 2 Hillhouse Ave., New Haven, Conn.

PHYSIOLOGY: Professor Jacques Loeb, Univ. of Chicago, Chicago, Ill.

GENERAL INFORMATION.

The Laboratory was opened in the summer of 1888 for the use of students and investigators in Marine Zoology. Departments of Botany and Physiology have since been added. The work is now organized with reference to the needs of three classes of workers; namely, (1) students, (2) teachers of science, and (3) investigators. Regular courses of instruction, consisting of lectures and laboratory work under the constant supervision of the instructors, are given in Zoology, Botany, Embryology, Physiology, and Microscopical Technique. In addition to these there will be a number of lectures on special subjects by members of the Staff. A course of lectures in Embryology will be given by Professor Whitman; on the Morphology of the Vertebrate Head, by Dr. Ayers; in Physiology, by Dr. Loeb; and two or more courses in Invertebrate Zoology, by Drs. Bumpus, McMurrich, Rankin, and Morgan.

There will also be ten or more evening lectures on biological subjects of general interest. Among those who may contribute these lectures may be mentioned, in addition to the instructors above named, the following:

Drs. E. A. Andrews, Johns Hopkins University; Howard Ayers, of the Allis Lake Laboratory; Professors W. G. Farlow, Harvard University; William Libbey, Jr., Princeton College; J. M. Macfarlane, University of Pennsylvania; C. S. Minot, Harvard Medical School; E. S. Morse, Salem; H. F. Osborn, Columbia College; John A. Ryder, University of Pennsylvania; W. T. Sedgwick, Massachusetts Institute of Technology; E. B. Wilson, Columbia College.
Owing to the richness of the marine life in the neighboring waters, Woods Holl offers exceptional advantages. It is situated on the north shore of Vineyard Sound, at the entrance of Buzzard’s Bay, and may be reached by the Old Colony Railroad (2½ hours from Boston), or by rail and boat from Providence, Fall River, or New Bedford. Persons going from Boston should buy round-trip tickets ($2.85). Rooms accommodating two persons may be obtained near the Laboratory, at prices varying from $2.00 to $4.00 a week, and board from $4.50 to $6.00. By special arrangement, board will be supplied to members at The Homestead at $5.00 a week.

The Laboratory building, which stands near the Laboratories of the United States Fish Commission, consists of two stories, and has 33 private rooms for investigators and 5 general laboratories,—two for beginners in investigation in Zoölogy, one for teachers and students receiving instruction in Zoölogy, one for Botany, and one for Physiology. There are numerous aquaria supplied with running sea-water, boats, a steam launch, collecting apparatus, and dredges; it is also supplied with reagents, glassware, and a limited number of microtomes and microscopes. No alcohol can be supplied beyond what is required for work in the laboratories.

By the munificence of friends the Library will be provided not only with the ordinary text-books and works of reference, but also with the more important journals of zoölogy and botany, some of them in complete series.

A Department of Laboratory Supply has been established in order to facilitate the work of teachers and others at a distance who desire to obtain materials for study or for class instruction. Certain sponges, hydroids, starfishes, sea-urchins, marine worms, crustaceans, mollusks, and vertebrates are generally kept in stock, though larger orders should be filed some time before the material is needed. Circulars giving information, prices, etc., may be obtained by addressing the Collector, Mr. F. W. Walmsley, Woods Holl, Mass.

THE COÖPERATION OF THE COLLEGES.

The following colleges subscribed for students’ or investigators’ tables during 1892: Columbia, Brown, Williams, University of Chicago, Massachusetts Institute of Technology, Rochester, Bryn Mawr, Mount Holyoke, Vassar, Wellesley, Cincinnati, Miami, and Northwestern. The list has since been considerably extended.

THE LABORATORIES FOR INVESTIGATORS

Will be open from June 1 to August 30. They will be equipped with aquaria, glassware, reagents, etc., but microscopes will not be provided. In this department there are 33 private laboratories for the exclusive use of investigators.

Those who are prepared to begin original work under the guidance of instructors will occupy tables in the general Laboratories for Investigators, paying for the privilege a fee of fifty dollars. The number of such tables is limited to twenty.
An Elementary Course in Vertebrate Embryology will be introduced this season, designed to meet the needs of those who have completed the general courses in the Students' Laboratory. The study will be confined mainly to the fish-egg as the best type for elucidating vertebrate development. Each member of the class will be supplied with material and be expected to work out each step in the development from the moment of fecundation. The aim will be not only to master the details of development, but also to acquire a thorough knowledge of the methods of work. Methods of preparing surface-views, imbedding in paraffin and celloidin, various methods of staining and mounting, drawing, reconstruction, modelling, etc. The course will thus combine just what is needed as a preparation for investigation. The course will open Wednesday, July 5, and continue six weeks, and it will be conducted by Mr. Lillie and Professor Whitman. The fee for this course will be fifty dollars, and the class be limited to ten.

Applicants should state what they have done in preparation for such a course, and whether they can bring a complete outfit; viz., a compound microscope, a dissecting microscope (the Paul Mayer pattern made by Zeiss is the best), camera-lucida, microtome, etc. In case these instruments are furnished by the Laboratory, an additional fee of ten dollars will be charged therefor. No application for less than a whole course will be granted.

THE ZOOLOGICAL LABORATORY FOR TEACHERS AND STUDENTS

Will be opened on Wednesday, July 5, for regular courses of six weeks in Zoology and Microscopical Technique. The number admitted to this department will be limited to fifty, and preference will be given to teachers and others already qualified. By permission of the Director and by the payment of additional fees, students may begin their individual work as early as June 15, but the regular instruction will not begin before July 5.

The regular course in Zoology, in charge of Professor Bumpus, will embrace the study of the more typical marine forms and elementary methods of Microscopical Technique, though more advanced students who may wish to limit their work to special groups will have an opportunity to do so. The Laboratory work, outlined below, will be accompanied by lectures.


JULY 10-15. Cœlenterates (Campanularia, Tubularia, Metridium, Mnesepsis).


JULY 31-AUGUST 5. Crustaceans (Branchipus, Pandarus, Lepas, Idotea, Talorchestia, Cancer, Limulus).

ANNUAL CIRCULAR.

The tuition fee is thirty-five dollars, payable in advance. Applicants should state whether they can supply themselves with simple and compound microscopes, or whether they wish to hire. Microscope slides, dissecting and drawing instruments, bottles, and other supplies, to be finally taken away, are on sale at the Laboratory. Further information, in regard to this department, may be had by addressing Prof. HERMON C. BUMPUS, Woods Holl, Mass., to whom applications for admission should also be made.

THE BOTANICAL LABORATORY FOR TEACHERS AND STUDENTS

Will be opened on Wednesday, July 5.

The Laboratory work in Botany will be restricted to the study of the structure and development of types of the various orders of the cryptogamous plants. Especial attention will be given to the study of the various species of Marine Algae, which occur so abundantly in the waters about Woods Holl, and students desiring to give their entire attention to these plants will be encouraged to do so. The Fungi and Higher Cryptogams will receive less attention than the Algae, but will be studied in a few types.

Lectures will accompany the Laboratory work. The course may be outlined somewhat as follows:

FIRST WEEK. Cyanophyceae (*Lyngbya, Calothrix, Rivularia, Stigonema, Tolyphothrix, Anabaena*).


THIRD WEEK. Rhodophyceae (*Batrachospermum, Nemalion, Callithamnion, Chondriopsis, Rhabdonia*).

FOURTH WEEK. Phycomyctes (*Mucor, Sporodinia, Peronospora, Cystopus, Achlya*). Uredinei (*Eecidium, Uredo, Puccinia, Uromyces*).

FIFTH WEEK. Basidiomycetes (*Agaricus, Lycoperdon*). Ascomycetes (*Microsphaera, Sordaria, Peziza, Physcia*).

SIXTH WEEK. Muscineae (*Riccia, Madotheca, Marchantia, Mnium, Tetra-phis, Hypnum*). Filicineae (*Dicksonia, Adiantum, Equisetum, Lycopodium, Marsilia, Selaginella*).

The tuition for students in the regular course of Laboratory work and lectures is thirty-five dollars, payable in advance; for students engaged in investigation the tuition is fifty dollars.

Students are expected to supply their own instruments or to pay an extra fee for those borrowed from the Laboratory.

Applications should be addressed to WILLIAM A. SETCHELL, 2 Hillhouse Avenue, New Haven, Conn.
TRUSTEES.

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<td>R. RAMSAW WRIGHT</td>
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The Annual Report of the Trustees, containing an account of the organization and work of the Laboratory, may be obtained from the Secretary.

ANNOUNCEMENT FOR 1894.

The Annual Circular for the Session of 1894 will soon be issued and may be obtained from Mrs. ANNA PHILLIPS WILLIAMS, Secretary, No. 23 Marlborough Street, Boston, Mass.