

THE BROOKLYN INSTITUTE
OF ARTS AND SCIENCES
1898-9

THE
ELEVENTH YEAR BOOK
OF
THE BROOKLYN INSTITUTE
OF ARTS AND SCIENCES.

FOUNDED 1824.
RE-CHARTERED 1824, 1843, 1862.
THE PRESENT CHARTER GRANTED IN 1890.
1898-9.

CONTAINING
THE NAMES OF THE OFFICERS AND MEMBERS,
COPIES OF THE CONSTITUTION AND BY-LAWS,
A BRIEF HISTORY OF THE INSTITUTE, AN
ACCOUNT OF THE WORK OF 1898-9,
AND A COPY OF THE CHARTER.

"For the People, by the People."

BROOKLYN :
PUBLISHED BY THE INSTITUTE.
1899.

T

THE BROOKLYN INSTITUTE
OF ARTS AND SCIENCES.

1898-9.

THE BIOLOGICAL LABORATORY.

[Located at Cold Spring Harbor, L. I.]

BOARD OF MANAGERS.

EUGENE G. BLACKFORD,
Prof. FRANKLIN W. HOOPER,*President.*
*Secretary.*A. AUGUSTUS HEALY.
OLIVER L. JONES, M.D.
Rev. LYMAN ABBOTT, D.D.
Hon. DAVID A. BOODY.
Hon. STEPHEN V. WHITE.
HENRY M. MACCRACKEN, LL.D.
JOHN H. J. STEWART,
Col. ROBERT B. WOODWARD.
LOUIS C. TIFFANY,
CHARLES H. LEVERMORE, PH.D.
L. D. HUNTINGTON.
FRANK S. JONES,
LOWELL M. PALMER.Hon. SETH LOW, LL.D.
Judge ADDISON BROWN.
CHARLES L. WOODBRIDGE.
Gen. ALEXANDER WEBB, LL.D.
DAVID H. COCHRAN, LL.D.
Hon. WILLIAM J. COOMBS.
TRUMAN J. BACKUS, LL.D.
WILLIAM STRATFORD, PH.D.
JOSEPH H. RAYMOND, M.D.
H. MESSENGER AYRES, M.D.
Prof. J. MICKLEBOROUGH, PH.D.
Rev. GEORGE D. HULST, PH.D.
OLIVER D. CLARK, B.A.*Executive Committee.*EUGENE G. BLACKFORD.
CHARLES L. WOODBRIDGE,
H. MESSENGER AYRES, M.D.Col. ROBERT B. WOODWARD.
Prof. FRANKLIN W. HOOPER.
Prof. J. MICKLEBOROUGH, PH.D.

THE BOARD OF INSTRUCTION.

CHARLES BENEDICT DAVENPORT, PH.D., Instructor in Zoölogy, Harvard University, Cambridge, Mass., *Director.*
DUNCAN STARR JOHNSON, PH.D., Instructor in Botany, Johns Hopkins University, *Instructor in Botany.*
HENRY SHERRING PRATT, PH.D., Associate Professor of Zoölogy, Haverford College, *Instructor in Zoölogy.*
CHARLES PETER SIGERFOOS, PH.D., Professor of Zoölogy, University of Minnesota, *Instructor in Embryology.*
WILLIAM HARRY C. PYNCHON, A.M., Instructor in Biology, Haverford College, *Instructor in Photography.*
NELSON FITHIAN DAVIS, SC.M., Assistant Professor, Bucknell University, *Instructor in Bacteriology.*

- Mrs. GERTURDE CROTTY DAVENPORT, formerly Instructor in Zoölogy, Kansas University, *Instructor in Microscopic Methods*.
 STEPHEN RIGGS WILLIAMS, A.M., Assistant in Zoölogy, Harvard University, *Assistant in Zoölogy*.
 WILLIAM CHAMBERS COKER, B.S., Johns Hopkins University, *Assistant in Botany*.

STUDENTS ENGAGED IN RESEARCH, 1899.

- ELIZABETH BANGS BRYANT, Assistant at Boston Society of Natural History, *Botany*.
 ESTHER FUSSELL BYRNES, PH.D. (Bryn Mawr), Teacher of Zoölogy and Physiology, Girls' High School, Brooklyn, *Variation*.
 GEORG DUNCKER, DR. PHIL. (Kiel), Hamburg, Uhlenhorst, *Variation*.
 LOUISE BRISBIE DUNN, A.M. (Co'umbia), Tutor in Botany, Barnard College, *Botany*.
 CHARLES LINCOLN EDWARDS, PH.D. (Leipzig), Professor of Biology, University of Cincinnati, *Variation*.
 HARRY McCORMICK KELLY, A.M. (Harvard), Assistant Professor of Biology, Cornell College, Mount Vernon, Iowa, *Variation*.
 ELIZABETH VENABLE GAINES, A.B. (Adelphi College), Professor of Biology, Adelphi College, Brooklyn, *Variation*.
 WILLIAM J. MOENKHAUS, A.M. (Indiana University), Graduate Student, Harvard University, *Zoölogy*.
 MABEL ELIZABETH SMALLWOOD, Teacher of Biology, Englewood High School, Chicago, Ill., *Variation*.
 GERTRUDE STEIN, A.B. (Radcliffe College), Student, Johns Hopkins University, *Zoölogy*.
 JOHN CUTLER TORREY, A.B. (University of Vermont), Graduate Student, Columbia University, *Zoology*.
 WILLIAM LAWRENCE TOWER, Student, Harvard University, *Zoology*.
 WILLIAM SEWARD WALLACE, Student, Columbia University, *Zoology*.
 ADA WATTERSON, A.B. (Columbia University), Assistant in Botany, Barnard College, *Botany*.

ZOOLOGY I. HIGH SCHOOL ZOOLOGY.

- Mrs. GERTRUDE LANGLEY BLOOD, PH.B. (Cornell), Teacher, 84 St. James Place, Brooklyn, N. Y.
 SUSAN MARIA CUTTER, Teacher, Montclair, N. J.
 GERTRUDE HASTINGS, Student at Allegheny College, Meadville, Pa.
 HERBERT NORTON LOOMIS, Teacher at State Normal School, New Haven, Conn.

- HELEN LOUISE SEELY, Teacher, Jersey City High School.
 WILLIAM HOWARD SPRENKLE, B.S. (Gettysburg College), Teacher,
 Central Normal School, Lock Haven, Pa.
 ELIZABETH HUGHES RIGGS, Teacher, 441 Selby avenue, St. Paul,
 Minn.

ZOÖLOGY 2. COMPARATIVE ANATOMY.

- EDWARD FULLER BIGELOW, A.M., Taylor University, Editor Popular
 Science, Stamford, Conn.
 EMMA MAY CAPPEL, Teacher, 511 Willoughby avenue, Brooklyn, N.Y.
 DANIEL S. HARTLINE, A.B. (Lafayette College), Teacher, State Nor-
 mal School, Bloomsburg, Pa.
 DANIEL EDGAR HOTTENSTEIN, Student at Bucknell University, Lew-
 isburg, Pa.
 MARY KINGSLEY, Student, Tufts College, Mass.
 JAMES COLVIN LANDIS, A.B. (Ursinus College), Student at Med.
 Chirurg. College, Pennsburg, Pa.
 LEO LESINSKY, Student, 1109 Madison avenue, New York City.
 WAYNE L. SHEARER, Student, State College, Pa.
 GEORGE DIEHL STAHLEY, M.D. (University of Pennsylvania), Professor
 of Biology and Hygiene, Pennsylvania College, Gettysburg, Pa.
 ERNEST A. STERLING, Student, Bucknell University, Lunsburg, Pa.
 LUCIA KIEVE TOWER, PH.B., University of Michigan, 69 Oxford street,
 Cambridge, Mass.
 FRANK EVERETT WING, Student, Wesleyan University, Middletown,
 Conn.

ZOOLOGY 3. INVERTEBRATE EMBRYOLOGY.

- EMMA MAY CAPPEL, Teacher, Taylor University, Editor Popular
 Science, Stamford, Conn.
 MINNIE ADELAIDE COLBURN, Teacher, Springfield, Mass.
 DANIEL EDGAR HOTTENSTEIN, Student, Bucknell University, Lewis-
 burg, Pa.
 MARY KATHERINE PINKHAM, B.A. (Wellesley College), 64 Nahant
 street, Lynn, Mass.
 HENRY FARNHAM PERKINS, A.B. (University of Vermont), Graduate
 Student, Johns Hopkins University, Baltimore, Md.
 FRANK EVERETT WING

BOTANY I. CRYPTOGAMIC BOTANY.

- Mrs. GERTRUDE L. BLOOD.
 EMMA ABBOTT CUTLER, Teacher, Indian School, Carlisle, Pa.
 ESTHER ANNA HARRISON, A.B. (Woman's College), Student. Address,
 Govanstown, Md.

- WILLIAM FAY ROSS, Student, Pennsylvania State College. Address,
Williamsburg, Pa.
HELEN LOUISE SEELY.
WAYNE L. SHEARER.
WILLIAM H. SPRENKLE.
H. M. STEPHENS, A.M. (Dickinson College). Teacher, Carlisle, Pa.
ERNEST A. STERLING.
GILBERT HAVEN TRAFTON, PH.B. (Wesleyan University), Teacher,
Beaver College, Pa.
EDGAR NELSON TRANSEAU, A.B. (Franklin and Marshall College),
Teacher, High School, Williamsport, Pa.

BOTANY 2. PHÆNOGAMIC BOTANY.

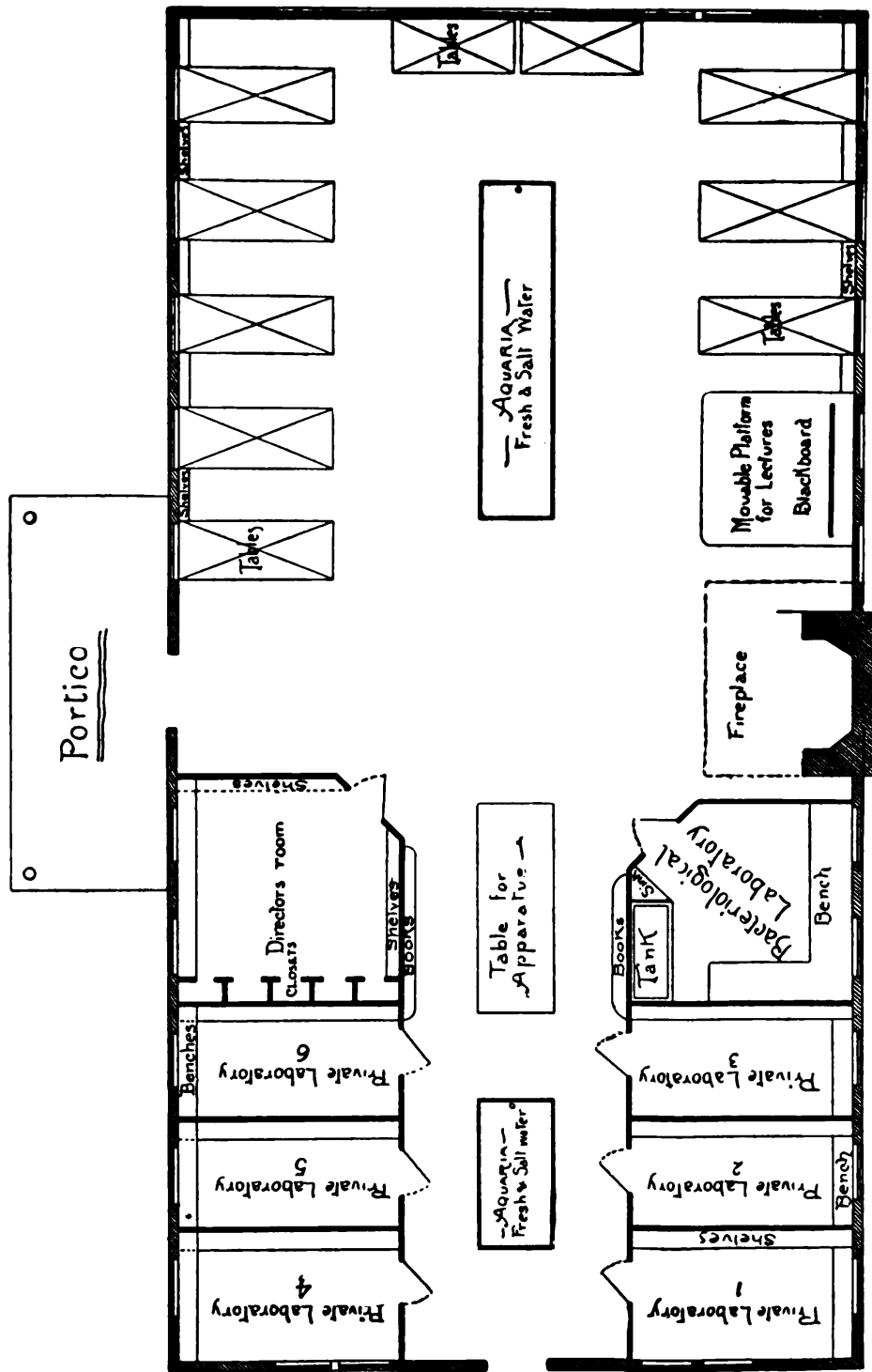
- ALFRED ABEL DOOLITTLE, A.M. (Princeton University), Teacher.
Address, Princeton, N. J.
GRACE OWEN, Student at Teachers' College, Address, The Yews,
Greenwich, London, S. E.
MARY KATHERINE PINKHAM.
DANIEL H. SHOEMAKER, B.S. (Earlham College), Graduate Student,
Johns Hopkins University, Baltimore, Md.

BOTANY 3. BACTERIOLOGY.

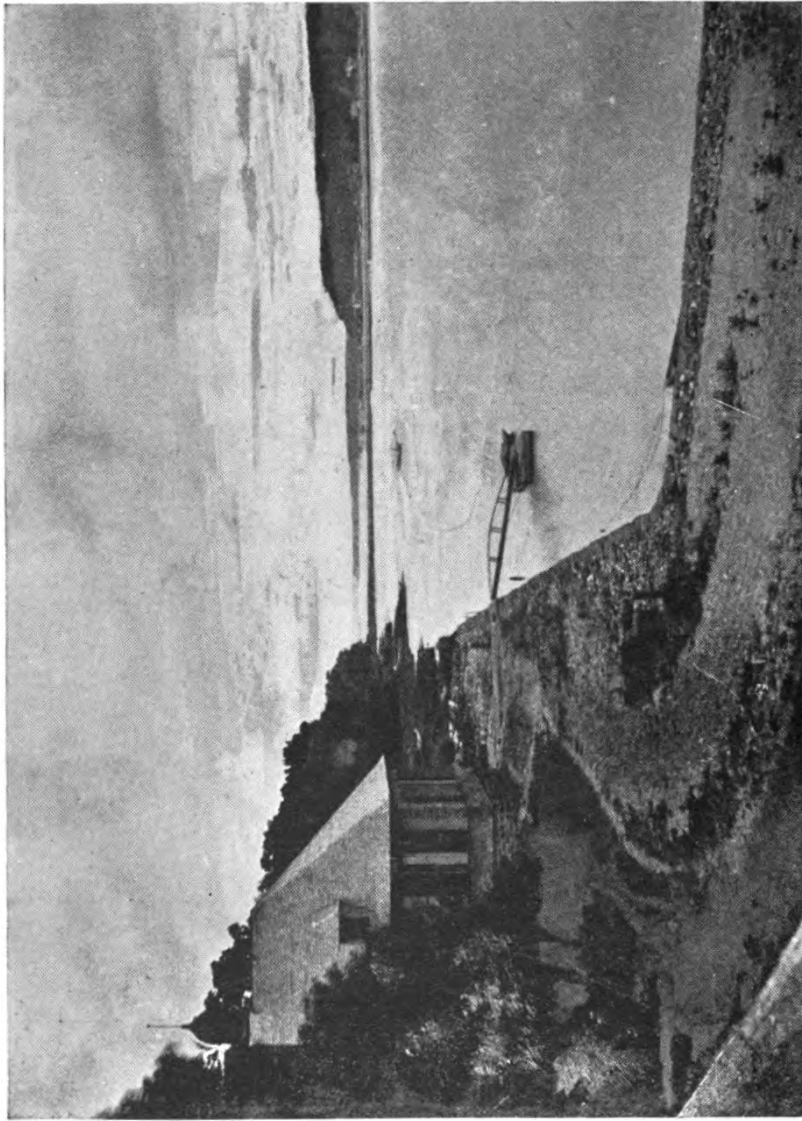
- FRANCIS JOSEPH BIRTWELL.
FRED GOLDFRANK, A.B. (Harvard), Student, 20 East Eighty-first
street, New York City.
GERTRUDE HASTINGS.
WILLIAM BRICKHERD LINDSAY, B.S. (Mass. Inst. Tech.), Professor of
Chemistry, Carlisle, Pa.
EDITH ADELAIDE MILLER, 212 Hooper street, Brooklyn, N. Y.
EVELINE JUDITH STANTON, PH.M. (Bucknell), Teacher, Lewisburg,
Pa.

MICROSCOPIC METHODS.

- EDWARD FULLER BIGELOW.
DANIEL S. HARTLINE, A.B. (Lafayette College), Teacher, State Nor-
mal School, Bloomsburg, Penn.
ELIZABETH HUGHES RIGGS, Teacher, 441 Selby avenue, St. Paul,
Minn.
GEORGE DIEHL STAHLEY.
GILBERT HAVEN TROFTON.
WILLIAM SEWARD WALLACE.



GROUND PLAN OF THE JOHN D. JONES LABORATORY BUILDING.



VIEW OF COLD SPRING HARBOR AND THE EAST END OF THE LABORATORY.

LOCATION OF THE LABORATORY.

The location of the Biological Laboratory, at the head of Cold Spring Harbor, is one of the most favorable on the coast. The country around is high and rolling, with abundant forests, glens and small streams, affording most excellent collecting ground for every form of animal and vegetable life common to our climate. Just above the Laboratory is a series of three beautiful fresh water ponds, each fertile in forms of fresh water life, and through which flows the water of Cold Spring Creek. Just below the Laboratory is the long and beautiful harbor of Cold Spring, divided by a sandy neck into an inner and an outer basin. The inner basin is particularly rich in marine life, and the channel between the inner and outer basins has a most varied and vigorous growth of algæ, molluscs, and echinoderms. The outer basin has rocky projections, shallow flats, banks and eel grass, sheltered pools, oyster beds, and other most favorable conditions for collection and study. The outer basin opens widely into Long Island Sound, whose shore is very varied in character for twenty miles in either direction.

LABORATORY AND APPLIANCES.

The facilities for Biological Work at the Summer Biological Laboratory of the Institute were materially increased in 1894 by the erection of a new and commodious laboratory building (36x72 feet), designed for the special purposes of the school. The laboratory building stands upon a wharf close by the water, and is provided with all the necessary conveniences for summer work. It contains (1) a general laboratory (36x40 feet), in which are located tables for students' work, aquaria supplied with running fresh and salt water, and conveniences for lectures and class instruction; (2) six private laboratories, which are assigned to persons who were competent to carry on independent work, and who were, as a rule, engaged in special investigation;

(3) a room equipped for and devoted to work in bacteriological technique, such as making cultures; isolating species of bacteria, etc.; (4) a room equipped with apparatus for photographing purposes, including ordinary photography, microscopic photography, and the making of lantern slides, and (5) a working library placed at the disposal of the members of the School. In addition, the students are furnished with all the necessary apparatus, reagents, etc., for biological work at the seashore. The Laboratory owns a launch provided with apparatus for the collection of material for laboratory work, and small rowboats are at the disposal of the School. Nearby the main laboratory is a second building, equipped and used for lecture purposes in cases where larger numbers attend the lectures than the general laboratory room will accommodate, or in cases when it is desirable to use the lantern for illustrative purposes. Through the generous hospitality of the New York State Fish Commission portions of the Fish Commission Building are also placed at the disposal of the School.

THE PURPOSES OF THE LABORATORY.

The objects of the Laboratory are (1) to furnish a place for general biological instruction, and (2) to offer opportunity for investigation to advanced students. The first object to which the energies of the School are devoted is to develop a first-class school of biological instruction for students who feel the need of practical study at the seashore and of assistance in their work. For this reason the school at Cold Spring Harbor is especially adapted, first, to college students who have not had extended laboratory work in Biology, or who, having had biological work, desire to supplement this work with the practical study of marine forms in their native condition, and desire to do this under the guidance of instructors; second, to teachers or other students who are desirous of obtaining a practical familiarity with

Botany or Zoölogy, to assist them in the work of instruction, or in gaining a practical knowledge of general biology; third, to medical students whose medical course is so crowded as to make it impossible to include in it any thorough study of biological principles and truths outside of those having direct application to medicine. To such students a general course in Biology proves very valuable, and the work in Bacteriology is of especial advantage; and finally, the School offers facilities for investigation by furnishing private rooms and collecting apparatus to any who are desirous of carrying on research.

COURSES OF INSTRUCTION.

I. ZOOLOGY.

1. *High-School Zoölogy.*—This course consists of the study, without the use of the microscope, of the external anatomy and the activities of at least ten types of animals selected from the following list: grasshopper, butterfly, fly, beetle, ant, Lithobius, spider, lobster, shrimp, Daphnia, Nereis, earthworm, clam, slug, Ilyanassa, starfish, sand-dollar, Hydra, fish, newt, and sparrow. Particular attention will be paid to observations on the living animal, especially its locomotion and reactions to stimuli. Those students who have already a knowledge of the external anatomy of these animals may substitute for the anatomical study the study of the activities of additional species. The laboratory work upon each type will be followed by some account of its habitat, distribution, and food; its economic importance, and its allies. Directions for finding the animals out-of-doors and for rearing them for laboratory work will be given, and collecting excursions will be made. It is the aim of the course to show the importance and the feasibility of introducing some work on the living animal into secondary school instruction. This course will occupy about three

hours daily for five days in the week, with Saturday excursions in addition. DR. DAVENPORT.

2. *Comparative Anatomy*.—This course consists of thirty lectures upon types of animals, the class work being accompanied by daily work in the laboratory on the forms studied in class. The laboratory work includes instruction in dissection and in methods of collecting and preparing specimens for class use. The laboratory work is entirely individual, each student being given the instruction that is best fitted for his own individual circumstances and purposes. The extensive collecting grounds about Cold Spring Harbor make it possible to have all types of animal life studied by the student from living specimens. The course is intended for teachers who desire such a training in Zoölogy as to enable them properly to conduct zoölogical courses in schools, for elementary students who wish an introduction into the study of biology, and for all students who, having had some previous class work in Zoölogy, desire to acquaint themselves with living animals by practical work on living forms. No preliminary training is necessarily required for the work. Prof. PRATT.

3. *Invertebrate Embryology*.—This course consists of the study in the laboratory of the development of certain types, including some of the following: Starfish and sea-urchin, fresh-water clam, snail, squid, annelids, lobster or crab, insect, tunicate, etc. Budding, regeneration, and the experimental control of development will also be studied. In the lectures especial emphasis will be laid upon development as a physiological process. This course is open only to those who have studied the comparative anatomy of invertebrates, and application to enter it should be made some time in advance. Prof. SIGERFOOS.

4. *Variation*.—In the laboratory, investigations will be made on the normal variation of the animals of the harbor, lakes, and woods, and the production of abnormalities;

discussions will be held on topics in normal variation and natural and artificial abnormalities. This course is open only to students who have had some training in Zoölogy.
Dr. DAVENPORT.

II. BOTANY.

1. *Cryptogamic Botany*.—This course of daily lectures, with laboratory or field work, covers as many types of the flowerless plants as thoroughness allows, and treats briefly of the evolution of the reproductive structures of flowering plants. It is designed for teachers or students who desire an introduction to the study of the morphology of cryptogams. The especial richness of the Cold Spring flora in myxomycetes, fungi, fresh-water and brackish-water algæ, together with a good representation of the red and brown marine algæ, makes it an exceptionally good place to gain an acquaintance with these groups. DR. JOHNSON.

2. *Phænogamic Botany*.—Laboratory work will be given in the morphology, physiology, and analysis of flowering plants to such as desire instruction in elementary botany as a preparation for teaching. DR. JOHNSON and Dr. COKER.

3. *Bacteriology*.—This course includes a series of fifteen to twenty lectures upon the principles of bacteriology, and is accompanied by laboratory work upon bacteriological methods, such as culture making, isolation of species, straining bacteria, especially tuberculosis and diphtheria, bacilli, the study of water bacteria, etc. This course is designed for medical students who wish a certain amount of practical knowledge of bacteria, and for all others who desire a knowledge of this important subject. MR. DAVIS.

III. MICROSCOPIC METHODS.

This course consists of a series of practical exercises, accompanied by lectures, upon the more ordinary microscopic methods, such as the use of the microscope, the function of

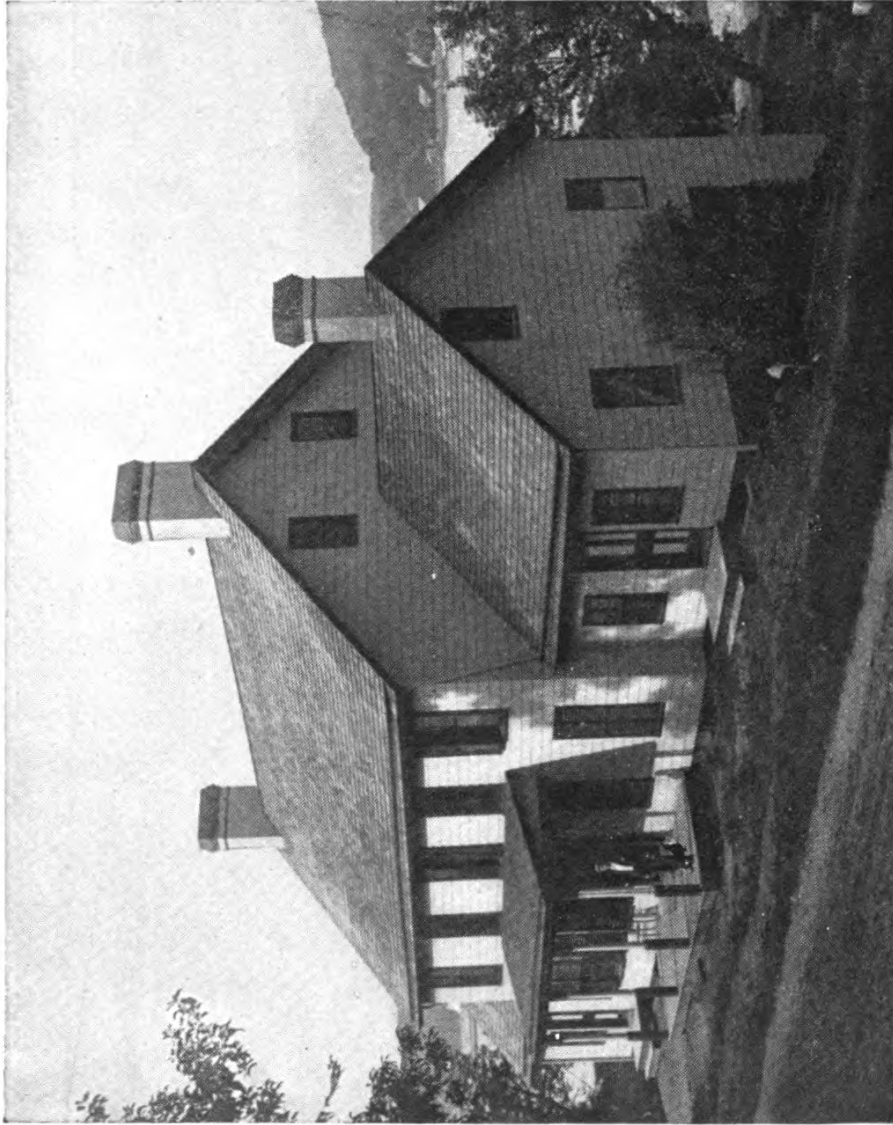
the different optical parts, focal distance, aperture, illumination, determination of resolving and magnifying powers; use of the camera; fixing, including the principal stupefying, killing, hardening, and preserving reagents, especially the technique of killing contractile organisms so as to preserve the normal form; staining and impregnation; mounting-media, cells, sealing of mounts, mounting of difficult objects like diatoms and protozoa; methods of studying living objects under the microscope, stage aquaria; section-cutting by paraffin and celloidin methods; use of microtome and the care of razor; the microscopic organisms of ponds and the sea; the principal tissues. Mrs. DAVENPORT.

IV. ORIGINAL RESEARCH.

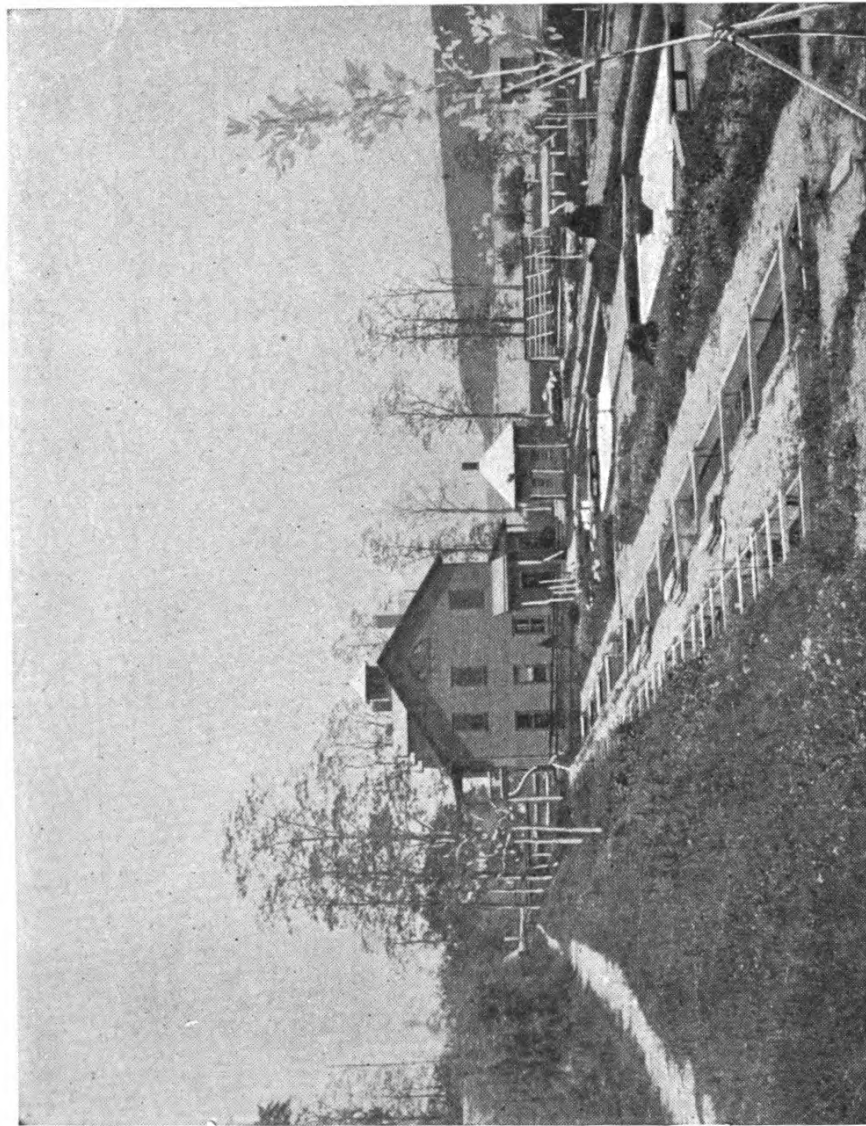
The Laboratory has several private rooms equipped with glassware, reagents, etc., designed for persons engaged in original research. At the disposal of such persons are placed the facilities of the Laboratory, including the use of the launch, boats, collecting apparatus, and books. Students engaged in research are urged to bring microscopes for their own use. Drs. DAVENPORT and JOHNSON.

V. BIOLOGICAL CLUB.

A club will be formed, meeting semi-weekly, and open without charge to all members of the Laboratory, for the purpose of giving abstracts of recent biological literature and discussing results. By this means it is hoped that all may be brought into touch with investigation, may get an insight into what biologists are working at to-day, and may gain some practice in the presentation of papers and in the free discussion of them. The club will be addressed also by visiting naturalists. Last year addresses were given by Professor C. I. BRISTOL, of New York University; Professors BASHFORD DEAN and R. E. DODGE, of Columbia University; Mr. JAMES E. PEABODY, of New York City High Schools, and others.



THE DINING HALL BUILDING AT THE BIOLOGICAL LABORATORY.



THE FISH COMMISSION BUILDING, WITH OUTDOOR AQUARIA IN FOREGROUND.

Located near the Biological Laboratory, and used in part by the Students.

VI. EVENING LECTURES.

A course of popular evening lectures will be given, open to the Members of the Laboratory and the friends of the school. These lectures will be given by the Members of the Board of Instruction and by a number of visitors from various educational institutions. These lectures are intended to be of general interest and will be fully illustrated. Among the lecturers are Prof. HERBERT W. CONN, PH.D., and the members of the Board of Instruction of the Laboratory.

EQUIPMENT.

The Laboratory has now possession of several buildings.

1. A large laboratory, accommodating about sixty students and fitted with aquaria, running fresh and salt water, private rooms, library, etc.
2. A lecture hall, used both for class lectures and for public lectures. It is furnished with an oxyhydrogen lantern. In the basement of this building is a dark room, for photographing purposes, equipped with cameras and arrangements for ordinary photography, microscopic photography, lantern slide making, etc.
3. A dining hall used by boarding the instructors and students.
4. Three dormitories for students; two of them are assigned to gentlemen, and the other to ladies. The rooms in these dormitories are newly furnished, and are rented to students for a small sum. In addition, the Laboratory is furnished with a naphtha launch, small boats, collecting apparatus, bacteriological apparatus, books, and all small apparatus needed for carrying on laboratory work. A limited number of microscopes are furnished the students, although each person is urged to bring a dissecting and a compound microscope if possible. The Laboratory has also the advantages of the aquaria and appliances of the neighboring hatchery of the New York Fish Commission. Teachers desirous of collecting class material are expected to supply their own alcohol, since the Laboratory is unable to furnish alcohol except at duty-paid prices.

A temporary dormitory building was erected in the spring of 1899 to accommodate the increased number of students applying for admission. This will be replaced by a larger and permanent structure.

CONTRIBUTIONS FOR ORIGINAL RESEARCH AND APPARATUS.

Subscriptions for the support of the Laboratory during the season of 1899 were made as follows: Mr. EUGENE G. BLACKFORD, \$100.00; Mr. A. AUGUSTUS HEALY, \$25.00; Mr. ROBERT B. WOODWARD, \$25.00; Mr. LOWELL M. PALMER, \$25.00; Mr. FRANK S. JONES, \$25.00; Dr. OLIVER L. JONES, \$25.00; Hon. ADDISON BROWN, \$5.00.

THE WAWEPEX SOCIETY.

The buildings and grounds occupied by the Laboratory are the property of the WAWEPEX SOCIETY of Cold Spring Harbor, a Society founded by the late JOHN D. JONES, of New York; and whose purpose it is to promote the increase and diffusion of knowledge in the Natural History Sciences. Through the great liberality of the Founder of the Society, the generous action of the Society itself, and the active co-operation and support of its members, the Laboratory buildings and grounds afford most advantageous conditions for biological study and research.

INSTITUTE EXTENSION LECTURES.

The Institute conducted twenty-five courses of lectures and conferences during the past season on the so-called "University Extension" plan. Arrangements for courses in History, Political Science, Philosophy, and Psychology; in Architecture, Sculpture, Painting, Music, and Literature; and in Astronomy, Geology, Archæology, Geography, Physics, Chemistry, Botany, and other kindred subjects were made by the Institute.

The American Association for the Advancement of Science contributed to the Laboratory \$100, to be expended in paying for the use of private Laboratories for the summer of 1895. The two Laboratories assigned to the American Association were occupied respectively by Mr. GILMAN DREW, of Johns Hopkins University, Baltimore, and Mr. M. A. CARLTON, of the U. S. Department of Agriculture, Washington.

Messrs. DREW and CARLTON were appointed by the American Association to carry on original research at the Laboratory during the summer. Mr. CARLTON'S work was upon "Marine Algæ and the Uredineæ," and Mr. DREW'S upon the "Fresh Water Bryozoa." The results of the researches of Messrs. DREW and CARLTON have been reported to the American Association.

TUITION, BOARDING AND ROOMS.

The Laboratory fee for six or more weeks, including any one course of instruction, the general lectures and the use of Laboratory privileges, is \$20.00, and for each additional course \$5.00. The private Laboratory fee is \$25.00 per month, or \$50.00 for the season.

A new Dining Hall was constructed in the spring of 1895 for the accommodation of the instructors and students in a building nearby the Laboratory. Excellent table board is furnished to all connected with the School at \$4.50 per week.

A new Ladies' Dormitory was constructed in the spring of 1895 for the accommodation of thirty students, and a dormitory for gentlemen was added to the number of buildings used by the Laboratory students. Both dormitories are convenient to the Laboratory, Lecture Hall and Dining Hall. Furnished rooms in the dormitories or in the neighborhood of the Laboratory may be obtained at rates varying from \$1.50 to \$3.00 a week, according to location, size, etc.; where two occupy the same room the expense of board and room is from \$6.00 to \$6.50 per week.