LONG ISLAND BIOLOGICAL ASSOCIATION

ANNUAL REPORT
OF
# THE BIOLOGICAL LABORATORY

COLD SPRING HARBOR
LONG ISLAND, NEW YORK
1942

# LONG ISLAND BIOLOGICAL ASSOCIATION

INCORPORATED 1924

# ANNUAL REPORT

OF

# THE BIOLOGICAL LABORATORY

FOUNDED 1890

FIFTY-THIRD YEAR

1942

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## HOLDING THE LINES

During 1942, the Laboratory, in common with most other scientific and educational institutions, became attuned to war. We concentrated our activities and tightened our belt. The relative facility with which the change was effected is well told in the following report of the Director, whose account of airborne instrument research by a score of physicists, and of molecularized sprays of value in the dread field of chemical warfare, strikes a new and necessary, but, we hope, transitory note in the peaceful history of Cold Spring Harbor.

Despite all exigencies, a Symposium, which must, however, be the last until the return of better days, was successfully conducted. It is a cause of gratification that 117 scholars participated in the sessions devoted to hormones and development. The text, published as the tenth quarto volume in our notable series, is slightly thinner than its predecessors but fully maintains their high standard and scientific timeliness.

Today, it is the future rather than the present that claims our deep concern. Mars invariably finds means to keep his helpers going. Next year, as last, we can undoubtedly claim the resources and furnish the housing for work that should and must take precedence over all else.

But we pray that our friends will remember that war ends, and that its needs in relation to such institutions as ours make no provision for the aftermath. Our true program is a long-term affair; our aims lie in pure research, rather than in fields that even border on industrial research. War supports only what it uses. The upkeep looking toward tomorrow, the gradual, healthy growth, the intellectual and spiritual enrichment of our tradition, depend through the decades upon the faith of membership, expressed as it has been in the past. Our fame is too widespread and too well founded for us to falter in the parental neighborhood of home.

In this last connection, it is probable that biologists the world over have long thought of "our" Sand Spit as part and parcel of the Laboratory at Cold Spring Harbor. It is therefore a particular pleasure to preface the more detailed announcement of the Director by reporting that what was formerly an assumption has now become fact. Through the foresight and generosity of Mrs. Henry W. de Forest, the miniature "barrier beach" of the inner harbor, together with nine acres of adjacent mellow land and several eminently practical buildings, have become the property of the Association and a permanent memorial to our late benefactor, Mr. de Forest. The bearing of this friendly and sumptuous gift upon the future usefulness of the Laboratory and the well-being of all who become associated with it would be hard to exaggerate.

**Robert Cushman Murphy,** President
The Long Island Biological Association, Inc.

# REPORT OF THE DIRECTOR

The last few decades have been characterized by a rapid extension of the role played by science in the life of civilized nations. Automobiles, fast trains and ships, airplanes, the radio, electric appliances, and an increased output of industrial and agricultural products, are but a few of the many results of scientific research that have greatly affected our mode of living. Science has become an integral part of our civilization. It has made available to us a multitude of implements which in peacetime contribute to the fullness, ease and comfort of our lives, but which, employed in war, make it more devastating and terrible. Because of science, normal living is today quite different than it was even a generation or two ago; and so is war. Modern war is fought as much in the laboratories at home as on the battle fronts.

Since its establishment fifty-two years ago, the Biological Laboratory has provided scientists with facilities for research. These have been well utilized in peacetime, and they are also being used to good advantage now that our nation is at war. In January 1942, at its first meeting after the entry of the United States into the war, the Board of Directors discussed various possibilities for active participation by the Laboratory in research related to war problems. At that meeting the Director of the Laboratory was instructed to prepare a statement listing laboratory rooms and equipment, and living accommodations, that could be made available for such research. The list was prepared and submitted to the Chairman of the National Research Council, with an offer to place these facilities at the disposal of a competent research group engaged in war work.

## War Research

In September 1942 the Laboratory was approached by a group of physicists connected with the Airborne Instruments Laboratory of the Columbia University Division of War Research, operating under the auspices of the National Defense Research Committee, with a request for laboratory space to accommodate a part of their rapidly expanding research program. On October 20 the Executive Committee approved the use of the Walter B. James Biophysical Laboratory and the Urey Cottage by this group; and at a later date the use of the Cole Cottage was included as well. Thus, since last autumn, a group of between twenty and thirty physicists has been using a part of our laboratories in research that has produced new tools important to the prosecution of the war. Before this arrangement was made, our machine shop was located in the Walter B. James Biophysical Laboratory. In order to comply with security regulations covering the confidential work conducted by the Airborne Instruments Laboratory, the shop was moved into a frame building especially constructed for that purpose.

During the summer of 1942 Dr. Harold A. Abramson, in collaboration with Miss Bernice Samuels and the Director, conducted a series of experiments with mists consisting of extremely fine droplets (aerosols). An instrument was developed by means of which it is possible to sift out larger droplets and obtain an aerosol composed of very small particles.

In September a contract was signed with the Chemical Warfare Service of the War Department, to continue these experiments along lines specified by them. With the support of the Josiah Macy, Jr. Foundation, and in collaboration with Dr. Frank Fremont-Smith of that Foundation, experiments were begun under the contract. The George Lane Nichols Memorial Laboratory is used as headquarters for these experiments. Mr. Sidney Laskin was employed as a biophysicist; and in November Dr. J. S. Potter, staff member of the Department of Genetics of the Carnegie Institution of Washington, was assigned by that Department to join the group as a full-time member.

Since September the Laboratory has received two additional contracts from the Chemical Warfare Service for carrying on research related to the initial problem. The expenses of this work have been defrayed partly by a grant received from the Josiah Macy, Jr. Foundation ($3,500) and partly by funds provided by the War Department ($3,500). A plan is now under way to extend the program along biological lines. For that purpose, the Macy Foundation has appropriated $10,000, and the Carnegie Institution has approved the use of certain facilities available at the laboratories of the Department of Genetics, and participation in the work by several of its staff members.

## Research

In the Review for 1942 of the Rockefeller Foundation, its President, Dr. Raymond B. Fosdick, expresses well the thought of many research workers connected with scientific institutions. Among other things, he writes:

"We must of necessity serve the war effort, for there is no future for what we most desire in a world dominated by fascism. But we have a responsibility equally compelling to preserve the treasures of the spirit which we hold in trust from the past for the benefit of the generations to come. There must be no broken link in the chain, no flaw in the title deeds by which what we most cherish is transferred to the future."

Our Laboratory is ready and eager to aid in the war effort; but at the same time we feel that, as an established research institution, we have an obligation to assist in facilitating fundamental research in a manner commensurate with present conditions. During 1942, therefore, the Laboratory was open to scientists and was effectively used in research on fundamental problems.

We again had with us the group working with bacterial viruses (bacteriophage). The group was larger than last year, and consisted of Drs. M. Delbruck, S. E. Luria, and J. Spizizen, Miss Edna Cordts, and Mr. Howard Gest. Our Laboratory made it possible for them to spend the summer together and to work jointly on problems in which they are interested. During the summer they found that sulfa drugs do not affect the growth of the coli virus, except indirectly through their effect on bacteria. They investigated the growth of the virus on bacteria raised in a synthetic medium, studied the effect of simple inorganic salts on virus growth, and spent some time on the analysis of 185 photographs taken with the electron microscope.

The group interested in the genetics of the vinegar fly (Drosophila) was again well represented. Six workers came to the Laboratory; and these, together with the Drosophila group of the Department of Genetics, formed an effective unit for discussions for critical analysis of data. Prof. and Mrs. H. Bentley Glass studied the effect produced on offspring when the sex cells of the mother are treated with X-ray irradiation; Dr. S. Zamenhof made an unsuccessful attempt to induce hereditary changes by treatment with various chemicals; and Dr. D. Bodenstein and Dr. Arthur G. Steinberg spent their time on problems involving studies of embryonic development. Dr. J. Neel devoted a part of his time to completing manuscripts, and also continued some work on the inheritance of red hair-color in humans, using the records of family histories available in the archives of the Genetics Record Office of the Department of Genetics.

Dr. Myron Gordon had good success in conducting the Wildlife Study Course, which was attended by about 40 boys and girls living in the neighborhood. He also continued his research program with tropical fishes, partly at The American Museum of Natural History and partly at this laboratory. By crossing two species of fish he found that offspring having a particular genetic make-up invariably developed melanoma tumors. This discovery is another link in the accumulation of evidence concerning the role played by heredity in the development of cancer.

Because of the close relationship existing between the Laboratory and the Department of Genetics, we were once again able to accommodate a research worker who required facilities for breeding plants. Miss Dorothy J. Longacre made an extensive study of crosses between several species of digitalis; her findings included two plants with a drug content about four times greater than that of the usual drug-producing variety.

A number of summers ago Dr. Richard T. Cox carried on his studies with the electric eel here, and many visitors to the Laboratory at that time saw the interesting performances of that fish. Dr. Cox again spent part of the summer with us, and used the time to analyze experimental data and prepare the manuscript describing these studies.

In addition to the group of physicists connected with the Airborne Instruments Laboratory, two other physicists made this Laboratory their headquarters for the summer. Dr. Ronald W. Gurney worked on the manuscript of his book dealing with ionic solutions; and Dr. Solomon Rosenblum conducted a series of experiments designed to develop a method for depositing a very thin layer of radioactive matter.

## The Symposium

A reviewer of the 1941 volume of the Symposia on Quantitative Biology for an English scientific journal, early in 1942, concluded that as a result of the United States' having entered the war it would not be possible for us to continue with the Symposia that year. Apparently

he judged conditions here by the situation that then prevailed in England, where a scientific meeting like our Symposium would not have been feasible in 1942. The United States, however, had then been at war for only a short time, and the effects of the shortages of manpower were not yet fully evident. It was still possible for us to hold a symposium last summer, although difficulty was experienced in securing adequate coverage of certain topics, particularly those involving physics and chemistry. By the end of 1942, however, the United States had reached a stage comparable to that existing in England a year or more earlier; and when an attempt was made to organize a symposium for 1943, it became apparent that leading scientists were so preoccupied with duties brought about by the war that a meeting of broad scope lasting for several days could hardly be arranged. Therefore, the Scientific Advisory Committee recommended and the Executive Committee decided that the Symposium should be omitted in 1943 and thereafter until conditions again become favorable for leisurely discussion of scientific topics. A similar decision was announced by several other groups that usually hold meetings comparable to our Symposia.

The topic of the 1942 Symposium was "The Relation of Hormones to Development." The subject was suggested by Prof. L. C. Dunn, and the program was worked out by him in collaboration with Drs. G. W. Corner, Oscar Riddle, and W. J. Robbins. Because of the national emergency, many scientists already had their time fully occupied; a number of those who were invited to take part in the program were not able to accept, and some could attend the meeting for a limited time only. For this and other reasons, the program of the meeting was condensed and the time shortened to ten days, whereas the 1941 Symposium had lasted fifteen days and previous Symposia five weeks. Scientists from Europe were not present; but we had a very good representation from Canada, and one of the eighteen participants on the program came from Chile.

As is evident from the table of contents of the Symposium Volume (reproduced on page 32 of this Report), the topics discussed at the meeting covered a broad field. The problem of hormones and development was discussed in relation to protozoa, insects, the lower vertebrates, birds, higher animals, and man, as well as plants. The chemistry of hormones was considered, and a number of special problems were taken up.

One hundred and fifteen individuals were registered as attending the meetings. Attendance at the various single sessions ranged between 50 and 90. On June 17 the entire group was entertained at a tea given by Mrs. George S. Franklin, a member of the Board of Directors of the Long Island Biological Association and President of the Women's Auxiliary Board, where there was an opportunity for the visiting scientists to meet a few of the neighbors of the Biological Laboratory.

Since the Symposia were started, in 1933, they have been financed by grants of the Rockefeller Foundation. This year the Foundation made a final grant of $15,000, which, it is hoped, will make possible an indefinite continuation of these meetings.

## Instruction

Two years ago, when the reorganization of the Laboratory took place, it was decided to concentrate on research and to omit formal teaching on the university level. This policy was continued during 1942. Research workers present at the Laboratory held numerous informal conferences and discussions, but no organized courses were given.

The only formal teaching offered was the Wildlife Study Course for young people, which will be described in a later section of this Report.

## Evening Lectures

Regularly throughout the summer, a technical lecture of general interest was scheduled to take place every Thursday evening in the lecture room at Blackford Hall. These lectures were given by the scientists working at the Laboratory, and presented reviews of the research problems in which they are interested. Again, as in 1941, the evening lectures were arranged as joint meetings with the Journal Club of the Department of Genetics, with Dr. Barbara McClintock acting as chairman. Titles of the lectures are listed below:

July 8: E. H. Anthes, Bausch & Lomb Optical Co. Short history of the importance of optical instruments as used in modern warfare.

July 16: S. E. Luria, Guggenheim Fellow. Size and structure of bacterial viruses.

July 30: Clifford Grobstein, Oregon State College, Corvallis, Oregon. Endocrine and developmental studies of gonopod formation in Poeciliid fishes.

August 6: S. Rosenblum, New School for Social Research, New York, New York. Isotopes and radioactivity.

August 13: Alfred E. Mirsky, Rockefeller Institute, New York, New York. Some nucleo-proteins.

August 20: Max Delbruck, Vanderbilt University, Nashville, Tennessee. Image formation in the Electron Microscope.

August 27: Myron Gordon, New York Zoological Society, New York, New York. Twelve genetic factors for spontaneous melanoma.

In addition to the technical lectures, two illustrated general lectures were given. These were well attended by the residents of the neighborhood. They are described below:

July 21: Morris Steggerda, staff member, Department of Genetics. Indians of North and South America. Description of some ethnological items and physical characteristics of several Indian groups in the Western Hemisphere.

August 25: Robert Cushman Murphy, Curator, American Museum of Natural History, and President of the Long Island Biological Association. By Land and Sea in the Choco. Description of activities of his trip, made in a Diesel-powered schooner equipped with the latest devices for studying the upper layers of the ocean. Colored still and motion pictures illustrated the coasts and islands visited, the marine and animal life seen, and the picturesque Choco Indians.

## Scholarships

The John D. Jones Scholarship was divided, part being given to Mr. Howard Gest and the remainder used to support the research of the group working with bacteriophage, of which Mr. Gest was a member. The Dorothy Frances Rice Scholarship was held by Miss Dorothy J. Longacre; while the Temple Prime Scholarship supported the work of Dr. S. Rosenblum.

## Institutions Represented

The following institutions were represented during the summer of 1942, by students, investigators or participants in the Symposium who were in residence at the Laboratory for several days or longer:

American Genetics Association, Washington, D. C.
American Home Products Corporation, Richmond Hill, N. Y.
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Carnegie Institution of Washington, Baltimore, Md.
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New York Zoological Society, New York, N. Y.
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Queens College, Flushing, N. Y.
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U. S. Nutrition Laboratory, Ithaca, N. Y.
University of Bristol, England
University of California, Los Angeles, Calif.
University of Chicago, Chicago, Ill.
University of Indiana, Bloomington, Ind.
University of Minnesota, Minneapolis, Minn.
University of Missouri, Columbia, Mo.
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Vanderbilt University, Nashville, Tenn.
Wellesley College, Wellesley, Mass.
Yale University, New Haven, Conn.
Yale University, School of Medicine, New Haven, Conn.

This list does not include institutions represented by the twenty to thirty physicists connected with the Airborne Instruments Laboratory.

## Other Activities

Restrictions resulting from the war, and particularly the rationing of gasoline, affected to some extent the activities of the group present at the Laboratory during the summer. Excursions and trips to nearby collecting grounds and beaches were greatly curtailed, and social events were almost entirely limited to the region within easy walking distance of the Laboratory. On the whole, the reduction in transportation facilities benefited social life at the Laboratory. On warm, sunny days the families of the group were to be found on the lawn in front of the John D. Jones building, relaxing in the sun and enjoying the swimming. As has already been mentioned, Mrs. George S. Franklin gave a tea for members of the Laboratory and Carnegie Institution and the guests attending the Symposium. This was one of the highlights among the social events of the summer.

Scientists working at the Laboratory, as well as the members of the Carnegie Institution, were available to demonstrate their work to members of the Long Island Biological Association and their guests. An announcement of summer activities, which was sent to members, listed the research projects being carried on at the laboratories and invited anyone wishing to see the work to make an appointment for a visit.

## Dining Room

The Blackford Hall dining room was again operated as a joint undertaking of the Laboratory and the Department of Genetics, under the very competent management of Mrs. E. L. Lahr, graduate in home economics of Kansas State College with special training in dietetics at Washington University. Meals were served to as many as 98 people during the Symposium, and to varying smaller numbers throughout the rest of the summer. In spite of the unusual difficulties in obtaining labor and supplies, and the relatively small number of meals served, the accounts showed a small surplus at the end of the summer. The joint dining room furnished an additional opportunity for informal contacts between members of the Laboratory and of the Carnegie Institution.

## Laboratories and Equipment

A large constant-temperature room, equipped with a cooling unit, was completed in the John D. Jones Laboratory this year. It was used principally for experiments with Drosophila, which cannot be carried on at the high temperatures often experienced in Cold Spring Harbor. This is an important and a very useful addition to our research facilities.

Most of the equipment and all instruments that could be moved easily were removed from the Walter B. James Biophysical Laboratory when that building was taken over for war research by the Airborne Instruments Laboratory. The physical instruments were transferred to the George Lane Nichols Memorial Laboratory, where a room is set aside as a stock room for instruments.

A considerable amount of new equipment has been required for research on the war problem carried on at the Laboratory, and several rather expensive pieces were acquired this year; notably, an ultra-microscope and apparatus for generating high air-pressure. A number of tools and some shop instruments were also purchased in connection with this work.

## Buildings and Grounds

Our Laboratory is situated on the western shore of the tip of Cold Spring Harbor, an elongated body of water about a mile wide and five miles long which opens at its northern end into Long Island Sound. Nachaquatock Creek flows into the Harbor at its head. A sand spit about half a mile long serves as a natural breakwater to the inner harbor.

The Laboratory owns a small strip of beach at the head of the inner harbor, and controls a considerably larger strip through long-term

lease from the Wawepex Society. At high tide a part of that beach is suitable for swimming. About a half-mile from the Laboratory, on the northern shore of the Sand Spit, is a good beach which may be used at either high or low tide. With the permission of the owners, this beach has been used by members of the Laboratory ever since its establishment. Since it is unusually rich in the variety of its fauna, it has been used not only as a swimming beach but also as a collecting ground for materials to be studied. In fact, it seems probable that more extensive biological studies have been made of the fauna of the Sand Spit than of any other similar strip of seashore in this country.

Through the generosity of Mrs. Henry W. de Forest, the Laboratory has acquired the major ownership of the Sand Spit. This is an event of great significance for the future work and development of the Laboratory. It insures for us full control of a beach which is essential to the comfort of visiting scientists and to a complete utilization of the facilities for scientific research in this community.

In addition to the Sand Spit, Mrs. Henry W. de Forest's gift to the Laboratory includes a parcel of land of about nine acres, with a substantial building containing two apartments, a number of garages, and good storage space. The property is located at the end of Bungtown Road, and its northeast corner adjoins the southwest corner of the Sand-Spit parcel. A portion of the nine-acre tract has been used as a vegetable garden in the past, and makes a very suitable site for an experimental garden; while the remaining portion could be developed into building lots for members of the Laboratory. The Executive Committee has decided that the property acquired through Mrs. de Forest's generosity shall be known as the "Henry W. de Forest Gift", the building as the "Henry W. de Forest Cottage", and the private road going through the north end of the property as "de Forest Lane". It has also been decided by the Executive Committee that the name of the building heretofore known as the Fire House shall be changed to "Reginald G. Harris House".

During 1942 expenditures were limited to essentials; and, when it became evident that a surplus would be available at the end of the year, the Board of Directors at its July meeting approved the use of that additional sum for the repair of buildings. Under present circumstances, it was considered a good investment to take care of repairs which in normal times might have been postponed for another year.

During the year the inside of the Harris House was completely repainted; additions to the Urey and Cole Cottages were completed; and work was begun on replacing the foundation beams of the porch and one room of the Williams Building. Major repair work on the Osterhout Cottage included: rebuilding a chimney and fireplace; replacing the foundation beams on one corner of the house and straightening that part of the building; insulating the north and east walls; and repainting the whole inside of the cottage. A new roof was put on the Henry W. de Forest Cottage; its heating system was gone over and a stoker installed; both apartments were repainted; and a section of the garages was rebuilt into a large living room, the expense for this piece

of work being shared by Dr. B. P. Kaufmann, who is renting one of the apartments.

As was mentioned earlier in this report, the Laboratory acquired a new shop building, built for us by the Airborne Instruments Laboratory. The shop is located on the site of a dilapidated woodshed and garages, which were torn down to make room for it. A new garage was built for our truck; and a large woodshed was acquired as part of the Henry W. de Forest Gift.

## Acknowledgments

I wish to acknowledge the splendid gift of property, consisting of the Sand Spit and about nine acres of land with buildings, made by Mrs. Henry W. de Forest in 1942. The location of the property makes it an exceedingly valuable asset, and one which will contribute greatly to the future development and work of the Laboratory. With this gift, which is to be known as the Henry W. de Forest Gift, Mrs. de Forest has established a permanent memorial to her distinguished husband, who was a patron of the Laboratory and for many years one of its supporters.

It gives me great pleasure to acknowledge the support given to the Laboratory by the members of the Long Island Biological Association. It is due primarily to their interest and generosity that the Laboratory has become an outstanding scientific center and is continuing in that status.

The Women's Auxiliary Board, under the presidency of Mrs. George S. Franklin, made an important contribution toward the support of the scientific work of the Laboratory; and the House Committee of the Board, under the chairmanship of Mrs. Percy H. Jennings, collected furniture for residences and contributions for the purchase of additional furnishings.

Acknowledgment is also made here of the contribution of the Wawepex Society toward the upkeep of buildings and grounds, and of the John D. Jones Scholarship maintained by that Society.

The Laboratory is grateful to the Rockefeller Foundation for its generous final contribution in support of the Symposia, and to the Josiah Macy, Jr. Foundation for its grant in support of the war project.

The Laboratory acknowledges the assistance given by the Carnegie Institution, and particularly the opportunity for close cooperation with the Department of Genetics, which is proving very helpful to the work of the Laboratory.

**M. Demerec,** Director

# WILDLIFE STUDY COURSE FOR YOUNG PEOPLE

Dr. Myron Gordon
New York Zoological Society, New York, N. Y.

The purpose of the course was to acquaint young people with the rich and varied wildlife within the Cold Spring Harbor area and to help them relate the natural life about them to their own experience.

The Biological Laboratory is particularly fortunate in its location. It is situated in the midst of a variety of ecological conditions, including fresh-, salt- and brackish-water areas. Thick woods and open meadows are within a short walking distance of the Laboratory, as are the sandy beaches of the Sand Spit and the shores of large fresh-water lakes and ponds.

The Wawepex Laboratory served as headquarters for the Wildlife Course. It was admirable for this purpose, for it is equipped with running water, is well lighted, and has a darkroom and a refrigerator.

The young people were divided into three age groups; the youngest, beginning at six years, met every Tuesday, those up to twelve met on Thursdays, and the older ones on Saturdays. A typical day began at nine o'clock in the morning with a field trip, which lasted about two hours. After the group had returned to the laboratory and deposited the collections of the day, light refreshments were available at Blackford Hall at nominal prices. The remaining time, until twelve o'clock, was devoted to closer study of the organisms collected, and informal discussions.

Whenever practicable, the animals collected were kept alive and as comfortable as possible, in terraria and aquaria. The young people were given instruction in the animals' special life requirements. The students were encouraged to collect not only the animals but also a part of their environment—such as plants, logs, stones and other materials—so that the artificial homes of the captured specimens were made as natural and attractive as possible. During the course, many species of insects, fishes, frogs, salamanders, and turtles, as well as a field mouse, were observed in terraria and aquaria.

The class that met on Saturdays combined field work with special laboratory research. Among the research projects undertaken was a study of the complete life cycle of the common mosquito, from the egg stage to the emergence of the winged insect. A study of inheritance of color markings in the fruit fly, Drosophila, was carried through the first and second generations. Each student participated in the work of segregating the flies by sexes, making the appropriate matings, and counting the offspring. The results were pooled and compared with the theoretical expectancy; they were extremely satisfactory. Some students learned how to preserve the skins of birds, and others made insect collections. The details concerned with a biological survey of aquatic resources, as practiced by State Conservation Departments, were demonstrated on one of the field trips.

## Field Trips

1. Life close to the laboratory: mosquito larvae, fresh-water shrimps.
2. The Sand Spit: salt-water shrimps, fiddler crabs, fishes, worms.

3. The grassy upland meadows and woods: grasshoppers, insect galls, bugs.
4. The Davenport fresh-water pond: daphnia, dragonflies, turtles.
5. The fresh-water lakes and the fish hatchery: sunfish nests, salamanders.
6 Transition zone between fresh and salt water: bass, sticklebacks, prawns.

The first field trip was made within a stone's throw of the laboratory. Mosquito eggs and larvae were found in the whaler's kettle outside the Jones Laboratory. Fresh-water shrimps were caught in a cold spring-pool nearby. Caddis-fly larvae in their snail-like stone cases were found in the spring run a few feet outside the laboratory door. A box turtle was found in the hedges close by.

The trip to the Sand Spit revealed the scavenger animal populations along the beaches. The seaweeds and dead animals cast high upon the shore by every incoming tide are cleaned up by the myriads of shrimps that may be seen when a portion of the wreckage is uncovered. The number of animals within a square foot was estimated, and in this way the total number of shrimps along the entire beach could be appreciated. Similarly the fiddler-crab population was estimated by counting the number of fresh burrows per square yard. The shore waters were seined, yielding the class some sardines, eels, flounders and killifish. A representative collection of sea shells was made, and many students took these collections home. Holes made by the shipworm were found in a log, and its destructive work was explained.

A trip through the woods leading to the grassy meadow revealed insect galls, wood-boring beetles and a hornets' nest. On the uplands the students collected with their insect nets a representative group of animals, which included grasshoppers, spiders, plant bugs, and the peculiar spittle insects. Singing thrushes in the woods were compared with the sparrows in the open fields. Crickets were found underneath wet logs near the laboratory.

The life within a small, stagnant pond was explored at Davenport Farm. The duckweed formed a covering over the water. Beneath, the water teemed with daphnia, leeches and aquatic insects, particularly their larvae. The relationship of the brilliant, flying dragonfly to its drab, horny, wingless larva was pointed out. An example of parasitism was seen in the special leeches attached to the aquatic turtles. Some of the turtles were taken to the laboratory and maintained during the course.

The fresh-water lakes trip featured the nests of sunfish. At one point along the sandy bottom of the lake shore, six nests were seen guarded by as many male sunfish. Bass were also seen. One of the dangers threatening the survival of our native fish populations was illustrated when the group saw anglers fishing at the same time that the fish were attempting to propagate their kind. The stream connecting the two fresh-water lakes was explored, and salamanders were found in the cold, moss-lined spaces underneath stones and fallen logs. A few well-advanced eggs of the salamanders were brought to the laboratory and allowed to hatch under observation. The salamander tadpoles were maintained to the end of the course.

Through the courtesy of Superintendent Walters of the New York State Fish Hatchery at Cold Spring Harbor, a visit was made to the hatchery and the story behind the scenes was described to the students. All were amazed by the sight of a triple-headed trout hatched there. The part played in the conservation program by fish hatcheries operating under state and federal agencies was later explained. A biological survey was made of the outlet of the lakes. The amount of water-flow was estimated, the temperature of the water was taken, and the species of fish found there were listed. These were compared with the species found below, where the water was brackish. In fresh water, bass, sunfish, and eels were taken; but in the brackish water sticklebacks and killifish were found. The students learned the use of minnow seines. The fish were brought back alive and kept in a large aquarium, where they were fed on prawns collected in the tidewater pool outside the laboratory.

On Tuesday, August 11, at the end of the course, a public exhibit was arranged by the students. The young people guided their parents and friends over the grounds, showed them the demonstrations, and explained the material. The individual student had been encouraged to make a personal, completely unaided report in the form of an arranged aquarium or terrarium or a special display. Some students drew pictures of things they had seen that appealed particularly to them; others wrote stories about some phase of their work. This attracted much attention and was well received by the parents and their friends. Following the demonstration in Wawepex Laboratory, a luncheon was served at Blackford Hall to all those attending; and at two o'clock a half-hour illustrated talk was given by Dr. Myron Gordon on his collecting trip through Mexico for the purpose of gathering living fish for his experiments.

The following is a list of the students enrolled in the course:

Abramson, Sandra
Bodenstein, Evelina
Booth, John
Bowman, Donald
Campbell, Alexander
Dean, Nick
Demerec, Rada
Demerec, Zlata
Fisher, Peter
Glasier, Margot
Glass, Alan
Glass, Lois Ann
Gordon, Albert
Gordon, Barclay
Graves, Jonathan
Hague, Jack
Hawkins, Kyra
Hawkins, Liza
Holbreich, Laurie
Ingersoll, Stuart
Kaufmann, Anders
Knowlton, Eben
Kortright, James
Liburt, Warren
MacKay, John
Machado, Mildred
Martin, Toby
McDonough, Jane
Nielsen, Gordon
Packard, Jerry
Parks, Thomas
Ripley, Patricia
Sanderson, Molly
Sansome, John
Schwartz, Lily
Semon, Peter
Spence, Charles
Sragow, Ann
Steggerda, Charles
Von Clemm, Mike
Walton, Connie
Walton, John
Walton, Richard
Whitman, Bob
Wright, George
Wright, Richard

**Abramson, H. A., and Samuels, Bernice,** Edgewood Arsenal, Md., and Mount Sinai Hospital, New York, N. Y.——An instrument was developed by means of which aerosols consisting of very small droplets might be provided. Experiments conducted with a hydrogen peroxide aerosol indicated a surprising stability of peroxide. During a 45-minute period of nebulization, the volume of the solution decreased one-half, but the peroxide content increased 25 per cent. This increase was probably due to evaporation of the water. It was found that hydrogen peroxide mists formed by nebulization show excellent peroxide activity (gaseous or droplet) for as long as ninety minutes, at least, after the mist has been formed.

**Bodenstein, D.,** Fellow of the John Simon Guggenheim Foundation, Columbia University, New York, N. Y.——At the beginning of the summer I attended the Symposium on The Relation of Hormones to Development, to which I contributed a paper dealing with hormone-controlled processes in insect development. The opportunity for personal discussion with other workers in related fields who attended the Symposium was of great value.——The major part of the summer was occupied with the assortment of experimental data and the preparation of two manuscripts for publication. The first of these papers deals with the factors that control the processes of growth and differentiation in the salivary glands of Drosophila; the second deals with the relationship between hormones and tissue competence in the development of Drosophila. Discussions with members of the Carnegie group, as well as with investigators at the Biological Laboratory, made this a profitable and stimulating summer.

**Cox, Richard T.,** New York University, New York, N. Y.——Studies of electric fish, some of which were carried on at the Biological Laboratory in the summer of 1940, have been continued with various collaborators at the Palmetto Key (Florida) Laboratory of the New York Aquarium, at the Neurological Laboratory of the Yale University School of Medicine, and at the Physical Laboratory of New York University. This summer I have appreciated the opportunity to use the facilities of the Biological Laboratory in order to study and prepare for publication some of the results obtained. These included observations on the electric discharge of Narcine brasiliensis, made with Dr. C. M. Breder, Jr., of the New York Aquarium, and on the electrical and enzyme activities of Electrophorus electricus, made with Mr. C. W. Coates of the Aquarium and Dr. David Nachmansohn and Dr. A. L. Machado of Yale University.

**Delbruck, M., and Luria, S. E.,** Vanderbilt University, Nashville, Tenn., and College of Physicians and Surgeons, Columbia University, New York, N. Y.——The growth of bacterial viruses on bacteria in the presence of sulfa drugs was studied. It was thought that such a study might throw light on the mechanism of virus growth or on the mechanism of the drug action, or on both. The sulfa drugs show their effect on the bacterial growth and metabolism only several hours after contact, indicating an

interference with a process remote from the immediate necessities of the bacterium. Virus growth on the bacterial host is a very sensitive and quick indicator of bacterial health; and, therefore, interference with virus growth immediately after contact of the host with the sulfa drug could be expected.——Our results did not fulfill this expectation. Virus growth was not affected immediately after addition of a sulfa drug, and later it was affected only in proportion to the bacteriostatic effect of the drug. It is concluded that there does not exist a close connection between the processes involved in virus growth and the processes primarily affected by the sulfa drugs.——In an extensive series of preliminary experiments the bacteriostatic action of the drugs and the antagonistic action of paraaminobenzoic acid was studied. Results of other observers were quantitatively confirmed and extended.——The work on interference between two bacterial viruses reported last year was extended to the study of a third virus acting on the same host. So far this extension has only been carried to the isolation of the new virus and of suitable bacterial indicator strains which will be required for its study in mixed infections with the other viruses.——Some time was spent on the analysis of 185 electron-microscope pictures of bacterial viruses which had been taken during a two-weeks' stay at Woods Hole. Many of these pictures show interesting details; but it is felt that further progress along this line will depend on the availability of an electron microscope over a prolonged period at the place of residence of the investigators.

**Gest, Howard, and Cordts, Edna,** Vanderbilt University, Nashville, Tenn.——The virus-host interaction of an E. coli strain and its specific virus, T, was found to be markedly affected by simple inorganic salts. Previously, one of us (E. C.) had studied the action of sodium chloride. This summer we made a more extensive study of this and of other salt effects. It had been found that T produced extremely turbid plaques when plated with the host bacteria on nutrient agar containing 1 per cent NaCl. It was found that the virus exhibits a similar sensitivity to other salts with monovalent cations, the turbidity of the plaques increasing with rising concentrations of salts. On the other hand, salts with divalent cations diminish the plaque size with increasing concentrations and prevent visible plaque formation at a critical point. Microscopic observations of host bacteria, multiply-infected with virus T showed that lysis is largely suppressed in the presence of 1 per cent NaCl. On the other hand, lysis was not suppressed on a medium containing 0.1 per cent $MgCl_2$, that percentage which prevents plaque formation and which does not inactivate the virus.——Single- and multiple-infection, one-step growth experiments showed no significant differences between saltless and 1 per cent NaCl broth with regard to virus T growth; that is, the average number of virus particles liberated per infected bacterium is 120. Data concerning the survival of bacteria multiply-infected with virus T seem to indicate that liberation of virus occurs without lysis of the bacterium and that such a bacterium continues to multiply normally. Under conditions of single and multiple infection in 0.1 per cent $MgCl_2$ broth, the average burst size is 150. Similar growth of the virus T was found in 0.5 per cent $MgCl_2$ broth. It is probable that bacterial survival occurs in the presence of mag-

nesium as in the case cited above.——We regard these observations as important to the more general problems of the mechanism of plaque formation and the nature of the bacteria surviving virus infection and liberation in the presence of salts.——We wish to thank Dr. M. Delbruck and Dr. S. E. Luria for their guidance and advice.

**Glass, H. Bentley, and Glass, Suzanne S.,** Goucher College, Baltimore, Md.——The major experimental work of this summer was a continuation of the investigation of the effects of X-rays in inducing chromosomal rearrangements in female germ cells of Drosophila melanogaster. 1. Adult females with attached-X chromosomes (heterozygous for yellow and for scute) were treated, and their daughters bred in single cultures. The progenies were then checked (a) for induced inversions in the attached-X chromosomes, detected by an absence of both y and sc daughters; (b) for lethals, detected by an absence of either y or sc daughters; (c) for dominant viability genes, detected by a lowering of the female:male sex ratio in the presence of both y and sc daughters; and (d) for detached X's, evident from the production of y or sc sons. 2. In a second approach to the problem, salivary-gland chromosome smears were prepared from the offspring of treated males and females. This was the major work of Mrs. Glass. Analysis of these will occupy much of the coming winter. 3. A third attack on the problem was the study of detached X's arising from X-ray treatment of attached-X females at this laboratory last summer. About half of these, numbering 11 cases, were suspected of being non-homologous chromosomal exchanges between X and Y chromosomes, as they each carried a lethal at the extreme right end of the X chromosome. This summer, definite genetic evidence was found that one of these involved a deficiency and that all of them show abnormal crossing over in the right end of the X. Salivary-gland preparations of each were made for later analysis.——A second line of experimentation confirmed a result obtained last summer. X-ray treatment of 10-hour-old Drosophila embryos, kept at 25 degrees C., of a certain brown, scarlet eye-color stock, leads to the production, in nearly every fly, of bristle-bearing fleshy eruptions in the center of each eye. This has been shown to be due to the effect of the treatment on an inhibitor reaction, stemming from a gene in the second chromosome, that normally inhibits the action of a mutant gene in the third chromosome responsible for the eye defect. Further localization of the inhibitor and erupt genes is proceding. This case is believed to be the first demonstration of an action by X-rays upon a specific gene-controlled developmental process.——The third experimental study carried on this summer was an analysis of the environmental factors and polygenes affecting the expression, penetrance, dominance and independent variability of a complex of fourth-chromosome characters (Cell, Ocelliless, Soutenick-G), which arose successively in the same chromosome and are inseparably linked.——The possibility of keeping cultures at controlled temperatures, in the incubators and the new cold room provided in Jones Laboratory this summer, was an important element in all of these lines of experimental work.

**Gordon, Myron,** The New York Zoological Society, New York, N. Y. ——Work on the genetics of melanoma in fishes was continued through the summer of 1942, and the results reported on August 27, 1942 at a technical

evening lecture. The talk may be summarized as follows.—A series of five primary factors is found in Platypoecilus maculatus for the development of macromelanophores. The spot gene (Sp) is expressed in an irregular array of black markings all over the sides; the black-band gene (N) is expressed as a fairly even, solid black band on both sides of the flanks; the spotted-dorsal gene (Sd) is expressed by one, two and sometimes three large black spots on the dorsal fin; the striped gene (Sr) resembles the black-band except that the band is broken up into a series of three or four rows of black spots; the spotted-belly gene (Sb) resembles the Sp effect except that most of the black spotting is to be found on the ventral surface and the black is continued into the pelvic fins. When each of the five genetic strains of P. maculatus is mated with Xiphophorus hellerii, the hybrids come down with melanosis of varying severity, roughly according to the following order: Sp, Sb, N, Sd, Sr. The last named, Sr, failed to produce a good melanosis in the first-generation hybrids, but produced not only generalized melanosis but melanomas in the backcross of the hybrid to the X. hellerii. In all others as well, the backcrossed hybrids (F-1 to X. hellerii) produced melanomas. Other factors not primarily concerned with macromelanophores enhance the effect of macromelanophores. The stipple factor (St), the comet factor (Co), and the Co extensor (E), increase the severity of melanosis when present with any one of the primary macromelanophore factors. The albino factor (i) in the heterozyous state (Ii) also works in this direction. The red factors, R for red body and Dr for red dorsal fin, seem to restrict melanosis.——In another project, working with Miss Frances Kuchler, a study was started for an analysis of the inheritance of taxonomic "key" characters. Utilizing the gonopodia of the viviparous fishes of the genera Platypoecilus and Xiphophorus, a detailed examination of these fins will be made in the pure species, in species hybrids and in generic hybrids, and in a series of backcross hybrids. For this purpose, a large series of gonopods was mounted on microscopic glass slides for detailed study.

**Gurney, Ronald W.,** Columbia University, New York, N. Y.—During my visit to Cold Spring Harbor in the summer of 1942 I made progress with the book which I am writing on ionic solutions. In cellular physiology, in nerve physiology and in many other biological and chemical studies, a need is felt for a clearer understanding of the various ionic processes that take place in solution. The small book which I wrote some years ago on ions in solution, was intended only to pave the way for another, in which I am considering in greater detail the basic mechanisms underlying the behavior of ions in aqueous and non-aqueous solutions.

**Longacre, Dorothy J.,** Fordham University, New York, N. Y.——During the summer of 1942 plant breeding work on digitalis was carried out in the field, and consisted of cross-pollinations among five species of digitalis. Many interspecific crosses as well as self-pollinations were made. Seeds were collected from these crosses at the end of the summer.——In the laboratory, several species of digitalis, aconitum and belladonna plants were studied histologically and cytologically for any changes that might be due to previous treatments with colchicine or other chromosome-altering agents. Several interspecific hybrids of digitalis from controlled pollina-

tions of the previous year were studied. Biological assays on two of the plants indicated a toxicity four times greater than that of Digitalis purpurea. ——Induced tetraploid (double diploid) aconites had a larger-size pollen grain, increased leaf epidermal area, and larger flowers; and the period of blooming was later in the season than with the normal diploid plant. The tuberous roots of the aconites were treated with colchicine in lanolin. In the treated plants, bulbs were produced in the leaf axils on the stems in addition to the normal tuber formation. The size of the pollen grains of the induced tetraploid plant approximated the size of the pollen grains from tetraploid plants growing wild in nature.——The series of belladonna plants which were treated with colchicine gave varying results. In all cases seeds treated with colchicine gave a higher percentage of germination. Controls averaged 55 to 60 per cent germination, while treated seeds averaged 85 per cent. Leaf epidermal areas were increased, but pollen grains showed little increase in size over control plants. Plants grown from treated seeds were more vigorous than controls, resulting in a large increase in the weight of dried leaf per plant. The alkaloidal content of the plants under investigation is being studied.

**Luria, S. E., and Spizizen, J.,** College of Physicians and Surgeons, Columbia University, New York, N. Y., and Fellow of the National Medical Research Council.——The growth of bacterial viruses on bacteria growing in a synthetic medium was investigated. Such research is an indispensable prerequisite for chemical and metabolic studies of the growth of bacterial viruses. Two points are of importance: first, the stability of viruses in synthetic medium, and second, the suitability of a medium for supporting the growth of the viruses.——The medium chosen was a buffered glucose-asparagine medium. Two viruses active on the same strain of Escherichia coli were investigated. One of these viruses, alpha, can grow in the medium, but becomes rapidly inactivated, apparently by the presence of glucose. Nevertheless, it is possible to analyze the growth of this virus by taking into account its rate of inactivation. The second virus, gamma, is not inactivated by the medium; but it showed peculiar and erratic irregularities of growth. While the virus is always able to grow when added to a concentrated bacterial culture, it often fails to grow when the mixture is diluted in fresh medium. On the other hand, the rate of bacterial multiplication is not affected by dilution. The addition of filtrates of bacterial cultures to the same medium permits the virus to grow in the diluted suspensions. It is clear that the growth of the virus gamma is made possible either by the presence of some substance contained in the filtrate and produced by the bacteria, or by the removal of some inhibitor from the medium during bacterial growth. Further experiments are planned to decide between these possibilities.

**Neel, J.,** Columbia University, New York, N. Y.——This year my stay at the laboratory was limited to the month of June. During this period I attended the Symposium, worked over several manuscripts, and began an analysis of certain data on file at the Genetics Record Office, pertaining to the inheritance of red hair-color.—It is maintained by some that red hair is due to a single dominant factor, and by others that it depends on a recessive. Information concerning the offspring of marriages between two

red-headed people is important in reaching a decision as to which hypothesis is correct. Only six such marriages could be located in the literature. However, reports of 26 additional marriages of this type were found in the Record Office files. The offspring of these marriages consisted of 101 red-heads and 13 non-red-heads. From an analysis of these results it appears that the trait is not due to a single dominant or recessive factor. The possibility exists that red hair may depend on any one of two or more independent factors, or else on an incompletely recessive factor, with approximately two-percent penetrance in the heterozygote.

**Rosenblum, Solomon,** Palmer Physical Laboratory, Princeton University, Princeton, N. J.——During the summer I was able to carry out some researches in Cold Spring Harbor on the preparation of very thin layers of radioactive matter. These layers were obtained by the incorporation of radioactive matter into the surface of solid materials, so that alpha and beta radiations could be fully utilized (the range of alpha-particles in solid matter is only about 1/100 of an inch). This technique of preparation of the radioactive carriers is of some importance for the war effort, and may also be useful in researches connected with the study of the velocity-repartition of alpha-particles, as well as in some biological researches where alpha-particles are applied. Further details on this preparation of radioactive carriers will be published after the war.——Part of this work was carried out in the Research Laboratory of the Canadian Radium and Uranium Corporation in New York City. My work on problems of radioactivity, particularly on alpha-particles, in the Curie Laboratory in Paris had been interrupted by the war, and was continued by means of a grant of the Rockefeller Foundation which enabled me to come to this country.

**Steinberg, Arthur G.,** McGill University, Montreal, Canada.——A study of the histology of the development of wild-type and Bar eyes of Drosophila melanogaster during the larval, pre-pupal and pupal periods was continued during the summer. In addition, data obtained in conjunction with Mr. F. C. Fraser of McGill University was analyzed. These data concern the effects of eight different X-chromosome inversions on crossing over in the third chromosome. Particularly valuable discussions concerning these data were held with Dr. U. Fano and Dr. B. P. Kaufmann, of the Department of Genetics of the Carnegie Institution of Washington. The discussions with Dr. Kaufmann led to a tentative hypothesis in explanation of the data already obtained. This hypothesis is to be tested this fall at McGill University by Mr. Fraser and myself. Because of the tentative nature of the hypothesis, it will not be published at this time. As an extension and corollary of this hypothesis, a rule concerning position effects has been derived. Here again, publication must await further testing. Tests of this rule are to be carried out on data already collected by Dr. Demerec and on some to be collected by Dr. Kaufmann.

**Zamenhof, S.,** New York, N. Y.——Studies on induction of mutations by chemicals were continued. One series of experiments was designed to test whether proteolytic enzymes in sublethal doses are able to split "non-vital" linkages in the gene molecule and produce mutations. Sublethal doses of trypsin and pancreatin have been introduced by injections into Drosophila larvae. In addition, eggs younger than 1 hour (timed) have

been treated with trypsin solution. The mortality was 75 per cent, owing to proteolytic action. Surviving animals were tested by means of the ClB method. The test did not show any increase in mutation rate. It seems, therefore, that the proteolytic enzymes are unable to produce mutational changes prior to death of the cell; however, it is also possible that because of the selective permeability of the cell membrane the enzyme cannot penetrate into the living nuclei of the germ cells.——A part of the time was therefore devoted to studying the possibilities of introduction of chemicals into young, living Drosophila eggs. Such a study seems to be necessary for all further investigations of induction of mutations by chemicals.——A part of the time was also spent in preliminary investigations of whether the supposed mutation-stimulating factor (a product of the mutation-stimulating gene) can be transferred in food or injections from a high-mutability stock to a low-mutability stock. The high-mutability stock studied by Neel (Genetics, 27: 519, 1942) was used as the donor, and a low-mutibility wild Oregon stock, kindly furnished by Carnegie Institution, as the receptor. Fresh or boiled body fluid of old donor larvae was introduced in food or by injections into old receptor larvae. The standard ClB test did not show any increase in mutation rate. No conclusion on this work can be reached, however, until a pure and true-breeding high-mutability stock has been built up to serve as a dependable donor.——The location and facilities of the Biological Laboratory, together with the kind cooperation of the Carnegie Institution, and especially of Dr. Demerec, made it possible to do the above work in Cold Spring Harbor during week ends, and to do national defense work in New York on week days.

# SYMPOSIA ON QUANTITATIVE BIOLOGY, VOLUME X

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### Introductory Papers



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## LIST OF THOSE ATTENDING OR PARTICIPATING IN THE SYMPOSIUM

Abbe, Ernst C.—University of Minnesota, Minneapolis, Minnesota.
Adams, Elizabeth—Mt. Holyoke College, South Hadley, Massachusetts.
Allen, Edgar—Yale University, New Haven, Connecticut.
Ansbacher, S.—American Home Products Corporation, Richmond Hill, New York.
Antikajian, Grace—Hunter College, New York.
Avery, George S. Jr.—Connecticut College, New London, Connecticut.
Ball, Ernest—Yale University, New Haven, Connecticut.
Bates, Robert W.—Difco Laboratories, Detroit, Michigan.
Baumgartner, Inez M.—Brown University, Providence, Rhode Island.
Behnke, John A.—W. B. Saunders Company, Philadelphia, Pennsylvania.
Blair, Albert—New York Zoological Society, Bronx, New York.
Blakeslee, A. F.—Carnegie Institution of Washington, Cold Spring Harbor, New York.
Blanchard, E. W.—Research Laboratories, Schieffelin and Company, New York.
Bodenstein, Dietrich—Columbia University, New York (Guggenheim Fellow)
Brehme, Katherine S.—Carneigie Institution of Washington, Cold Spring Harbor, New York
Bryson, Vernon—Carnegie Institution of Washington, Cold Spring Harbor, New York.
Burks, Barbara S.—Columbia University, New York.
Burns, R. K. Jr.—Carnegie Institution of Washington, Baltimore, Maryland.
Castelnuovo, Gina—University of Missouri, Columbia, Missouri.
Clarke, Eleanor L.—McGill University, Montreal, Canada.
Clum, Harold H.—Hunter College, New York.
Conklin, Marie E.—Huntington, New York.
Cook, Robert C.—American Genetic Association, Washington, D. C.
Corner, George W.—Carnegie Institution of Washington, Baltimore, Maryland.
Danchakoff, Vera—Boyce Thompson Institute, Yonkers, New York.
Davenport, Charles B.—Carnegie Institution of Washington, Cold Spring Harbor, New York.
Demerec, M.—The Biological Laboratory and Carnegie Institution of Washington, Cold Spring Harbor, New York.
Dunn, L. C.—Columbia University, New York.
Ehrenberg, Alexander—New York University, New York.
Engle, Earl—College of Physicians and Surgeons, Columbia University, New York.
Ephrussi, Boris—Johns Hopkins University, Baltimore, Maryland.
Fano, U.—Carnegie Institution of Washington, Cold Spring Harbor, New York.
Flavin, John W.—Fordham University, New York.
Gerber, Clifford F.—Schieffelin and Company, New York.
Gersh, I.—Johns Hopkins Medical School, Baltimore, Maryland.

Gest, Howard—University of California at Los Angeles, Los Angeles, California.
Gillman, Joseph—University of the Witwatersrand Medical School, Johannesberg, South Africa.
Glass, H. Bentley—Goucher College, Baltimore, Maryland.
Glass, Suzanne S.—Baltimore, Maryland.
Goldsmith, Eli D.—College of the City of New York, New York.
Gordon, Myron—New York Zoological Society, American Museum of Natural History, New York.
Grattan, Jerome F.—Research Laboratories, American Home Products Corporation, Richmond Hill, New York.
Grobstein, Clifford—Oregon State College, Corvallis, Oregon.
Gurney, Ronald W.—University of Bristol, Bristol, England.
Hagen, Charles W. Jr.—University of Indiana, Bloomington, Indiana.
Hammond, Dorothy—Hunter College, New York.
Hamner, Karl C.—U. S. Nutrition Laboratory, Ithaca, New York.
Hicks, Henry—Hicks Nurseries, Westbury, New York.
Hollaender, Alexander—National Institute of Health, Bethesda, Maryland.
Hollander, Willard F.—Carnegie Institution of Washington, Cold Spring Harbor, New York.
Huskins, C. Leonard—McGill University, Montreal, Canada.
Jailer, Joseph W.—College of Physicians and Surgeons, Columbia University, New York.
Jones, Rosalie—Cold Spring Harbor, New York.
Kaeiser, Margaret—Cedar Crest College, Allentown, Pennsylvania.
Kamenoff, Ralph J.—College of the City of New York, New York.
Kaufmann, B. P.—Carnegie Institution of Washington, Cold Spring Harbor, New York.
Kimball, R. F.—Johns Hopkins University, Baltimore, Maryland.
Koch, Elizabeth M.—University of Chicago, Chicago, Illinois.
Koch, F. C.—University of Chicago and Research Laboratories, Armour and Co., Chicago, Illinois.
Laanes, T.—Carnegie Institution of Washington, Cold Spring Harbor, New York.
Lahr, Ernest L.—Carnegie Institution of Washington, Cold Spring Harbor, New York.
Lane, Jean—Carnegie Institution of Washington, Cold Spring Harbor, New York.
Levine, Michael—Montefiore Hospital, New York.
Lipschutz, A.—National Health Service, Santiago, Chile.
Long, C. N. H.—Yale University School of Medicine, New Haven, Connecticut.
MacDowell, E. C.—Carnegie Institution of Washington, Cold Spring Harbor, New York.
Marcy, Elizabeth—Hunter College, New York.
Marvin, H. N.—Carnegie Institution of Washington, Cold Spring Harbor, New York.
McClintock, Barbara—Carnegie Institution of Washington, Cold Spring Harbor, New York.

McCurdy, Harriet M.—Ramsey, New Jersey.
Miller, Dorothea Starbuck—Connecticut College, New London, Connecticut.
Miller, Helena A.—Harvard University, Cambridge, Massachusetts.
Miller, Ray S.—Knox College, Galesburg, Illinois.
Moore, John A.—Queens College, Flushing, New York.
Morgan, Ann H.—Mt. Holyoke College, South Hadley, Massachusetts.
Mullahy, John H.—Fordham University, New York.
Neel, James V.—Columbia University, New York.
Nigrelli, Ross F.—New York Zoological Society, Bronx, New York.
Orr, H. W.—Oklahoma A. and M. College, Stillwater, Oklahoma.
Perkins, David—Columbia University, New York.
Poulson, Donald F.—Yale University, New Haven, Connecticut.
Rekers, Paul—Memorial Hospital, New York.
Riddle, Oscar—Carnegie Institution of Washington, Cold Spring Harbor, New York.
Ris, Hans—Columbia University, New York.
Rosenblum, S.—Curie Laboratory, Paris, France.
Sansome, Eva R.—Carnegie Institution of Washington, Cold Spring Harbor, New York.
Satina, Sophia—Carnegie Institution of Washington, Cold Spring Harbor, New York.
Saxe, L. H. Jr.—University of Pennsylvania, Philadelphia, Pennsylvania.
Schiller, Olga—Carnegie Institution of Washington, Cold Spring Harbor, New York.
Schwenk, Erwin—Schering Corporation, Bloomfield, New Jersey.
Selye, Frances L.—McGill University, Montreal, Canada.
Selye, Hans—McGill University, Montreal, Canada.
Severinghaus, Aura E.—College of Physicians and Surgeons, Columbia University, New York.
Skoog, Folke—Johns Hopkins University, Baltimore, Maryland.
Snider, Hester—Carnegie Institution of Washington, Cold Spring Harbor, New York.
Sonneborn, T. M.—University of Indiana, Bloomington, Indiana.
Sonnenblick, B. P.—Queens College, Flushing, New York (Guggenheim Fellow).
Spizizen, John—Vanderbilt University, Nashville, Tennessee.
Spratt, Nelson T. Jr.—Johns Hopkins University, Baltimore, Maryland.
Steggerda, Morris—Carnegie Institution of Washington, Cold Spring Harbor, New York.
Steinberg, Arthur G.—McGill University, Montreal, Canada.
Sutton, Eileen—Carnegie Institution of Washington, Cold Spring Harbor, New York.
Taylor, Martha J.—Carnegie Institution of Washington, Cold Spring Harbor, New York.
Tolksdorf, Sibylle—Schering Corporation, Bloomfield, New Jersey.
van Overbeek, J.—California Institute of Technology, Pasadena, California.
Vorhaus, Jane—Mt. Holyoke College, South Hadley, Massachusetts.
Ward, Elsie N.—Carnegie Institution of Washington, Cold Spring Harbor, New York.

Ward, Johanna—New York City.
Warmke, H. E.—Carnegie Institution of Washington, Cold Spring Harbor, New York.
Warren, Charles O.—Cornell University Medical College, New York.
Whitenton, R. O.—Oklahoma A. and M. College, Stillwater, Oklahoma.
Whittinghill, Maurice—Bennington College, Bennington, Vermont.
Willier, B. H.—Johns Hopkins University, Baltimore, Maryland.
Witschi, Emil—Iowa State University, Iowa City, Iowa.
Zamenhof, S.—New York City.
Zimmer, Esther—Hunter College, New York.
Zimmerman, P. W.—Boyce Thompson Institute, Yonkers, New York.

## RESEARCH INVESTIGATORS AND ASSISTANTS

Abramson, Harold A., Major, M. C.—Edgewood Arsenal, Baltimore, Md.
Bodenstein, Dietrich—Columbia University, New York, N. Y.
Cordts, Edna—Vanderbilt University, Nashville, Tenn.
Corner, George W.—Carnegie Institution of Washington, Baltimore, Md.
Cox, Richard T.—New York University, New York, N. Y.
Curtis, Howard J.—College of Physicians & Surgeons, Columbia University, New York, N. Y.
Delbruck, Max—Vanderbilt University, Nashville, Tenn.
Gest, Howard—Vanderbilt University, Nashville, Tenn.
Glass, H. Bentley—Goucher College, Baltimore, Md.
Glass, Suzanne S.—Goucher College, Baltimore, Md.
Gordon, Myron—American Museum of Natural History, New York, N. Y.
Gurney, Ronald—University of Bristol, England.
Hollaender, Alexander—National Institute of Health, Bethesda, Md.
Houlahan, Mary—National Institute of Health, Bethesda, Md.
Huskins, C. Leonard—McGill University, Montreal, Canada.
Kuchler, Frances—New York, N. Y.
Longacre, Dorothy J.—Fordham University, New York, N. Y.
Luria, S. E.—Guggenheim Fellowship, Vanderbilt University, Nashville, Tenn.
Neel, James V.—Columbia University, New York, N. Y.
Rosenblum, S.—Princeton University, Princeton, N. J.
Samuels, Bernice—Mount Sinai Hospital, New York, N. Y.
Spizizen, John—National Research Council Fellowship, Vanderbilt University, Nashville, Tenn.
Steinberg, Arthur—McGill University, Montreal, Canada.
Whittinghill, Maurice—Bennington College, Bennington, Vt.
Zamenhof, S.—Columbia University, New York, N. Y.

## LABORATORY STAFF

* Blount, Alvin—Kitchen assistant
* Brehme, Katherine S.—Editor of Symposium volume
* Comithier, Lillian—Laundress
Demerec, M.—Director
* Dorsey, Emma—Maid
Dorsey, Henry—Laborer
* Gest, Janet—Clerical assistant
* Gordon, Myron—Wildlife Course Instructor
* Holm, Paul—Kitchen assistant
* Holmes, Joseph—Outside handyman
Klem, Dorothy V.—Secretary
* Lahr, Hettie (Mrs.)—Dining Hall Manager
Laskin, Sidney—Research investigator
* McKinley, Peter—Laboratory assistant
Reddy, William—Laborer
* Robinson, Charlie Mae—Maid
* Taylor, Addie—Cook
* Taylor, Daniel—Chef
Wheeler, Thomas—Superintendent of Grounds

* Summer Staff

# REPORT OF THE SECRETARY

The 43rd meeting of the Board of Directors was held at the Century Club in New York City on January 26, 1942. The resignation of Mr. Oliver B. James from the Board, on account of removal, was received and accepted with regret and with an expression of appreciation of his long services upon the Board and in otherwise promoting the interests of the Association, of which his father was for some time President. It was agreed to establish a new type of sustaining membership for those scientists who pay a minimum fee of $5.00: such to receive free a copy of the Symposium volume. The officers of the Association were re-elected for the year 1942. Dr. Demerec presented the budget for the Laboratory for 1942, and this budget was adopted. The Finance Committee was appointed, consisting of Messrs. William Nichols, Willis D. Wood, and Marshall Field. The Director of the Laboratory announced plans for the Symposium for 1942 on the subject, "The Relation of Hormones to Development," this program to be arranged in cooperation with Drs. G. W. Corner, L. C. Dunn, Oscar Riddle, and W. J. Robbins. The Director also reported plans for the continued support of the Symposia by the Rockefeller Foundation. A proposal was made for cooperation by the Laboratory in research upon the topic "Wound Healing," and it was voted to place the facilities of the Laboratory at the disposal of such research.

A meeting of the Executive Committee was held on May 13, 1942, at the Century Club in New York City. A letter was received from Henry C. Taylor stating his resignation from the Board on account of duties in the Navy for the duration of the war. The resignation was accepted and a letter of appreciation sent to Mr. Taylor. A resolution was passed designating the Bankers Trust Co. as Custodian Depository of the Corporation. Mrs. George S. Franklin was elected President of the Women's Auxiliary Board and a member of the Board of Directors.

A meeting of the Executive Committee was held on May 15, 1942, at the office of Vice-President Page, 195 Broadway, New York City. A proposed gift from Mrs. Henry W. de Forest, of about nine acres of land and rights in Bar Beach, was considered. The offer of land and appurtenances was accepted, and a letter sent to Mrs. de Forest, thanking her for her gift.

The 19th Annual Meeting of the Association was held at Blackford Hall, Cold Spring Harbor, on July 28, 1942, under the chairmanship of President Murphy. The acts of the Board were read, approved, and adopted. The following were elected members of the Board of Directors, to serve until 1946: Robert Chambers, George W. Corner, Th. Dobjhansky, Mrs. Van S. Merle-Smith, John M. Schiff, Harold C. Urey, and Willis D. Wood.

The 44th meeting of the Board of Directors was held at the George Lane Nichols Memorial Laboratory, Cold Spring Harbor, on July 28, 1942. The Executive Committee was elected for the coming year. Prof. B. H. Willier, of Johns Hopkins University, was elected to the Board of Directors, to fill a vacancy in the Class of 1944. The Committee on

Improvement of Buildings and Grounds was appointed. Dr. Robert Cushman Murphy was re-elected President of the Association for the year 1943.

A meeting of the Executive Committee was held at the Century Club in New York City on October 20, 1942. The Director of the Laboratory presented a letter received from the Associate Director of the Airborne Instruments Laboratory of Columbia University (acting under the auspices of the National Defense Research Committee), requesting the use of certain facilities of the Laboratory, under certain conditions. The request was granted.

**C. B. Davenport,** Secretary.

## REPORT OF THE TREASURER

The Treasurer reports total income for the year of $39,205.33 and disbursements of $37,979.74.

The Women's Auxiliary Board, under the leadership of Mrs. George S. Franklin, President; Mrs. Van Santvoord Merle-Smith, Vice-President; Mrs. Alvin Devereux, Secretary; Mrs. Gordon Rentschler, Treasurer; Mrs. Percy H. Jennings, Chairman of the House Committee; and Mrs. John C. Hughes, Chairman of the Membership Committee, contributed $1,060 to the work of the Laboratory and also made many valuable gifts of furnishings for the houses on the grounds.

The Wawepex Society continued its annual grant, this year of $1,250 plus $250 for the John D. Jones Scholarship. Officers of the Wawepex Society are: Charles M. Bleecker, Governor; Jesse Knight, Scribe; and T. Bache Bleecker, Custodian. In addition to its annual financial support, the Wawepex Society leases certain lands and buildings to the Association, free of rent, and carries the insurance on these buildings.

The balance sheet and income-and-expense accounts of the Association follow herewith:

### ASSETS

| | | |
|---|---|---|
| Current: | | |
| Cash in Banks | 5,592.67 | |
| Accounts Receivable | 538.06 | |
| | | 6,130.73 |
| Securities held by Bankers Trust Co.: | | |
| U. S. Savings Bonds Series G | 14,000.00 | |
| Other Securities | 8,856.00 | |
| | | 22,856.00 |
| Securities held by N. Y. Community Trust: | | |
| Walter B. James bequest | | 5,000.00 |
| Land: | | |
| Land Purchased | 69,630.52 | |
| Land on 50-year lease | 13,500.00 | |
| Henry W. de Forest Gift | 12,000.00 | |
| Land (improvements) | 2,898.01 | |
| | | 98,028.53 |

| | | |
|---|---|---|
| Buildings: | | |
| Blackford Hall* | 19,000.00 | |
| Jones Laboratory* | 10,000.00 | |
| Davenport Laboratory | 8,500.00 | |
| George Lane Nichols Memorial Laboratory | 13,700.00 | |
| Williams House | 11,300.00 | |
| Stewart Cottage | 3,000.00 | |
| Hooper House* | 13,200.00 | |
| Wawepex Laboratory* | 7,500.00 | |
| Osterhout Cottage* | 5,500.00 | |
| Dr. Walter B. James Laboratory | 13,500.00 | |
| Reginald G. Harris House | 8,500.00 | |
| Urey & Cole Cottages | 4,765.00 | |
| Henry W. de Forest Cottage | 15,000.00 | |
| Machine Shop and Garage | 2,000.00 | |
| | | 135,465.00 |
| Equipment: | | |
| General | 38,527.01 | |
| Biophysics | 16,849.90 | |
| Physiology | 2,513.15 | |
| | | 57,890.06 |
| | | 325,370.32 |

* Situated on property on 50 years' lease from Wawepex Society.

LIABILITIES

| | | |
|---|---|---|
| Current: | | |
| Accounts Payable | | 2,628.19 |
| War Research Project | | 616.53 |
| Special Funds: | | |
| Blackford Memorial Fund | 5,000.00 | |
| Temple Prime Scholarship Fund | 2,500.00 | |
| Dorothy Frances Rice Fund | 2,000.00 | |
| Dr. William J. Matheson Fund | 20,000.00 | |
| Rockefeller Symposia Fund | 12,000.00 | |
| | | 41,500.00 |
| Special Fund—in trust: | | |
| Dr. Walter B. James Fund | | 5,000.00 |
| Balance: | | |
| Long Island Biological Association | 142,950.32 | |
| Value of Leasehold—Wawepex Society | 39,153.74 | |
| January 1, 1942 | 81,230.27 | |
| Gain in Capital - December 31, 1942 | 12,291.27 | |
| | | 275,625.60 |
| | | 325,370.32 |

# INCOME AND OUTGO

January 1, 1942—December 31, 1942

| | TOTAL | | NET | |
|---|---|---|---|---|
| | Received (or receivable) | Paid (or payable) | Received (or receivable) | Paid (or payable) |
| Balance forward from 1941: | | | | |
| Cash in Banks | 5,693.41 | | | |
| Payables and Receivables | 43.46 | 3,459.92 | | |
| | 5,736.87 | 3,459.92 | 2,276.95 | |
| Current Accounts: | | | | |
| Income (1942) | | | | |
| Dues and Contributions | 3,190.50 | | 3,190.50 | |
| Women's Auxiliary Board | 1,060.00 | | 1,060.00 | |
| Wawepex Society | 1,250.00 | | 1,250.00 | |
| Walter B. James Bequest | 198.90 | | 198.90 | |
| W. J. Matheson Bequest | 325.00 | | 325.00 | |
| Research and War Project (1) | 850.00 | 245.56 | 604.44 | |
| Sale of Books | 3,087.36 | 75.00 | 3,012.36 | |
| Scholarships | | | | |
| John D. Jones | 250.00 | 250.00 | | |
| Dorothy F. Rice | 75.00 | 75.00 | | |
| Temple Prime | 75.00 | 75.00 | | |
| Summer Course | 373.00 | 226.40 | 146.60 | |
| Dining Hall[1] | 4,344.78 | 4,380.63 | | 35.85 |
| Insurance | | 719.21 | | 719.21 |
| Residences and Dormitories | | | | |
| Blackford Hall | 361.00 | 336.25 | 24.75 | |
| Reginald G. Harris House | 596.72 | 330.86 | 265.86 | |
| Hooper House | 385.00 | 237.15 | 147.85 | |
| Williams House | 624.51 | 416.76 | 207.75 | |
| Osterhout Cottage[2] | 295.51 | 1,130.19 | | 834.68 |
| Urey Cottage[2] | 303.21 | 285.65 | 17.56 | |
| Cole Cottage[2] | 267.34 | 750.11 | | 482.77 |

| | | | | |
|---|---|---|---|---|
| Stewart Cottage | 359.90 | 91.63 | 268.27 | |
| Henry W. de Forest Cottage[2] | 208.34 | 3,219.67 | | 3,011.33 |
| Allocated to D. F. Rice and Temple Prime Scholarships | | 150.00 | | 150.00 |
| Laboratory Buildings and Grounds | 68.31 | 2,290.42 | | 2,222.11 |
| General Expenses | | | | |
| Administration Expense | | 298.40 | | 298.40 |
| Administration Salaries | | 1,767.00 | | 1,767.00 |
| Telephone and Stamps | | 213.79 | | 213.79 |
| Stationery and Printing | | 352.64 | | 352.64 |
| Symposia | | 2,973.35 | | 2,973.35 |
| Capital and Special Accounts: | | | | |
| New Shop and Garage | 1,655.95 | 1,955.60 | | 299.65 |
| The Rockefeller Foundation | 15,000.00 | | 15,000.00 | |
| Securities Purchased | 2,000.00 | 14,000.00 | | 12,000.00 |
| Land Sold (first payment) | 250.00 | | 250.00 | |
| War Research Project (2) | 1,750.00 | 1,133.47 | 616.53 | |
| | 39,205.33 | 37,979.74 | 26,586.37 | 25,360.78 |
| Deduct—Payments (and Payables) | | | 25,360.78 | |
| Excess Receipts over Payments | | | 1,225.59 | |
| Add—Balance, January 1, 1942 | | | 2,276.95 | |
| Balance December 31, 1942: | | | | |
| Cash in Banks | 5,592.67 | | | |
| Payables and Receivables | 538.06 | 2,628.19 | | |
| | 6,130.73 | 2,628.19 | 3,502.54 | |

[1] $376 worth of supplies are carried in stock.

[2] Expended on major repairs and improvements: Osterhout Cottage, $1,000; Urey Cottage, $150; Cole Cottage, $500; Henry W. de Forest Cottage, $3,100.

## SPECIAL FUNDS

### TEMPLE PRIME SCHOLARSHIP FUND

Donor: Cornelia Prime. Original Principal, $2,500. (1913)

"In memory of my brother, Temple Prime, the entire annual income to be expended each year for the payment of the tuition and other expenses of a male, or female, student in biology, who is working at the Laboratory at Cold Spring Harbor, New York, during that year."

| | |
|---|---|
| Allocated, 1942 | $75.00 |
| Scholarship, support of research of Dr. S. Rosenblum | 75.00 |

### BLACKFORD MEMORIAL FUND

Bequest of Frances L. Blackford. Principal, $5,000. (1924)

" . . . to be used in the maintenance of the Blackford Memorial at Cold Spring Harbor, Long Island, as the trustees may deem to be for the best interest of said Memorial."

| | |
|---|---|
| Income, 1942 | $361.00 |
| Transferred to Income Account | 361.00 |

### DOROTHY FRANCES RICE FUND

Donor: Oran W. Rice. Original Principal, $2,000. (1926)

Income to be applied as follows: (1) one-sixth to be added annually to principal of fund, (2) remaining five-sixths to be paid over each year to a woman student, preference of selection being given to students working in the botanical sciences and particularly worthy of such recognition.

| | |
|---|---|
| Allocated, 1942 | $75.00 |
| Scholarship, support of research of Dorothy J. Longacre | 75.00 |

### DR. WALTER B. JAMES FUND

Bequest, in trust, of Dr. Walter B. James. Principal, $5,000. (1927)

"I give and bequeath Five Thousand Dollars ($5,000) to the Equitable Trust Company, in trust. . . I desire the net income thereof to be devoted to the support of Long Island Biological Association of Cold Spring Harbor, Long Island."

Invested by Trustee, Equitable Trust Company, New York.

| | |
|---|---|
| Received, 1942 | $198.90 |
| Transferred to Income Account | 198.90 |

### DR. WILLIAM J. MATHESON FUND

Bequest of Dr. William J. Matheson. Bequest, $20.000.
Cost of securities, $20,116.18. (1931)

"I give and bequeath to Biological Laboratory, of Cold Spring Harbor, Long Island, for its endowment fund, the sum of Twenty Thousand Dollars."

| | |
|---|---|
| Interest, 1942 | $325.00 |
| Transferred to Income Account | 325.00 |

**Marshall Field,** Treasurer
**William F. Dean,** Assistant Treasurer and Auditor

SUSAN COOPER