would lead to many other points of helpful contact between trustees and faculty and would discover, I think, unsuspected avenues of mutual help. And by these or some like methods trustees and faculties must be brought more closely together unless we wish to see the growing alienation of the administrative and teaching staffs develop into a real and fatal breach. Separation involves mutual misunderstanding and that, even among educated men, leads, as in industrial enterprises, to arrogance on the part of the employer, to suspicion and dislike on the side of the employed. If cooperation seems imperative—as I think it does—to the solution of the problems of industrialism, how much more necessary is it if we are to solve the educational riddle. Cooperation would teach the trustees the antipodal difference between the problems of a university and those of a business corporation, and, at the same time, would show the faculty the importance of business methods and thorough organization. Cooperation would get things done without compelling our universities to take refuge in an autocracy which, harmful in itself, is breeding a race of youth who scorn the slow methods of democracy. It would develop trustees who actually, instead of fictitiously, comprehend and apprehend their trust; it would unite faculties which, under the strain of departmental complexity, are fast disintegrating; it would double the educational efficiency of our colleges; and, most important of all, it would make our universities, as they ought to be, supreme preservers, instead of conspicuous destroyers, of that genuine spirit of democracy which, more than schools, more than churches, more than any other human agency, has uplifted mankind and builded civilization.

JAMES P. MUNROE.

THE BIOLOGICAL LABORATORY OF THE BUREAU OF FISHERIES AT WOODS HOLE, MASS.: REPORT OF WORK FOR THE SUMMER OF 1905.

I. STAFF EQUIPMENT, ETC.

THE laboratory was in service for purposes of investigation during a period of somewhat over three months, commencing June 15. In addition to the crews of the vessels and the permanent force of the station, forty-three persons were directly or indirectly engaged in the furtherance of scientific research. Of this number, thirty are to be classed as investigators, their individual work being detailed below. Of these thirty, fifteen received a salary from the bureau, the remaining fifteen being unpaid. The staff of the laboratory consisted of a director, together with twenty-two others officially listed as 'temporary assistants'; and a librarian, clerk and janitor detailed from the office force at Washington. Of those classed as 'temporary assistants' six were occupied primarily in connection with the biological survey; five others in individual investigations conducted on behalf of the bureau; the remainder being engaged in miscellaneous work in laboratory, residence or field. Those who devoted the whole or part of their time to biological work requiring previous training have been included among the investigators.

The steam vessels *Fish Hawk, Phalarope* and *Blue Wing* were, as usual, in service during a large part of the season, and the much valued collection of biological works belonging to Brown University was again placed at the disposal of the laboratory.

Material for research was furnished by the dredging operations of the *Fish Hawk* and *Phalarope,* by the laboratory fish trap in Buzzards Bay, and by the large group of traps at Menemsha Bight, Marthas Vineyard, where a camp was established for

about six weeks. Special collecting trips for particular sorts of material were, of course, frequently made.

The plan was continued of holding informal weekly meetings devoted for the most part to reports upon researches in progress at the laboratory. Papers were presented by Messrs. Bigelow, Cushman, Gulick, Hargitt, Linton, McClendon, Stockard, Sullivan, Sumner and Thompson. These meetings were as a rule well attended by outsiders as well as by the investigators of this laboratory.

II. BIOLOGICAL SURVEY.

This was brought to such a point that a preliminary report upon the fauna and flora of the sea-bottom of this region might be profitably undertaken without further dredging work. It is hoped that the publication of such a report will be possible within a year or two.

The *Fish Hawk,* under command of Lieut. Franklin Swift, U.S.N., was engaged during a part of July in reestablishing the former coast survey tripods upon Marthas Vineyard and the Elizabeth Islands. Following this, a considerable portion of the bottom of Vineyard Sound, already dredged during the summer of 1903, was once more explored. The new dredging stations, being located by the aid of the coast survey signals, could be charted with far greater accuracy than had hitherto been possible. The extreme eastern portion of the sound, which had previously been left out of consideration, was likewise covered by the dredge. In all 101 'stations' were established by the *Fish Hawk* during a period of about six weeks. The dredging work of this vessel, together with the cataloguing of material thus obtained were under the supervision of Mr. L. J. Cole.

The *Phalarope,* under the direction of Mr. R. C. Osburn, worked in the shallower waters of Buzzards Bay, completing the entire eastern shore-line, from Cuttyhunk northward to Wareham.

Most of the material obtained by the dredge was identified in the laboratory by those in immediate charge of the work, with the voluntary cooperation of a number of systematists who were engaged in studies at the station. Thus the Foraminifera were determined by Mr. B. A. Cushman, who has likewise undertaken the identification of the sponges; the hydroids were referred to Professor C. W. Hargitt, the annelids to Dr. J. P. Moore, and the decapod crustaceans to Miss M. J. Rathbun. Considerable other material, however, still awaits disposal.

A camp was maintained at Menemsha Bight, Marthas Vineyard, for a period of about six weeks in July and August, three assistants at a time being detailed for this work. The numerous fish traps of this region were visited, and a daily record was kept of the species therein taken. Much material of value was likewise supplied to the laboratory for the use of various investigators, and several species of especial interest were taken, including a small specimen of the great blue shark (*Prionace glauca*), the only one recorded for this region within twenty-eight years. The torpedo (*Tetranarce occidentalis*) and the goose fish (*Lophius piscatorius*) were at one time rather common, and large specimens of the former species were kept on exhibition in the aquaria tanks.

An account of the collecting work at this station is never complete without mention of the labors of Mr. Vinal Edwards, whose well-directed search for fishes, fish parasites, plankton, etc., has made possible many of the most important contributions from the laboratory.

III. INDIVIDUAL INVESTIGATIONS.

The investigators were thirty in number,

representing eighteen educational and scientific institutions, ranging from Boston to the Pacific Coast, and from Florida to Montreal. Of these Harvard furnished eight, Columbia five, the University of Pennsylvania and the College of the City of New York two each.

The subjects of research may be somewhat arbitrarily classified as follows, allowing for the fact that certain investigators devoted their time to more than one subject:

Reactions to stimuli, animal behavior, etc.	9
Faunal and floral distribution (including survey work)	7
Taxonomy	6
Embryology	3
Ecology (exclusive of distribution)	2
General Physiology (exclusive of 'behavior')	2
Regeneration	2
Miscellaneous	6
	37

While much of this work is calculated to be of ultimate value in the solution of practical fisheries questions, it is true that little of it has in view immediate and obvious economic results. The most notable exception is a study of the potential food value of various unused or little-used marine organisms. This liberal attitude toward biological investigation is one of the traditions of the United States Fish Commission and its successor, the Bureau of Fisheries, which have never failed to recognize the vast indebtedness of industry to pure science.

In addition to those who have been listed as investigators, two painters of animal life, Messrs. Chas. R. Knight and S. F. Denton, made use of the facilities of the laboratory for a part of the season.

Robert P. Bigelow, Ph.D., instructor in biology, Massachusetts Institute of Technology: systematic study of the stomatopods collected by the steamer *Albatross* (continued).

Leon J. Cole, assistant in zoology, Harvard University: Biological survey of local waters. Mr. Cole had immediate supervision of the dredging work of the steamer *Fish Hawk,* and of the preservation and identification of material incidental thereto (salaried assistant).

Joseph A. Cushman, assistant curator, Boston Society of Natural History: Systematic study of the Foraminifera collected during the dredging operations of the steamers *Fish Hawk* and *Phalarope;* likewise collection of local marine ostracods for future identification.

Bradley M. Davis, Ph.D., assistant professor of botany, University of Chicago: Local marine flora. Dr. Davis continued his services in the capacity of botanist of the biological survey (salaried assistant).

Donald W. Davis, Harvard University: Dredging work of biological survey; also at Menemsha Camp (salaried assistant).

Pauline H. Dederer, lecturer in zoology, Barnard College, Columbia University: Studies upon the larval development of *Amaræcium.*

Irving A. Feld, Austin teaching fellow in zoology, Harvard University: (1) Further investigations of the food of certain fishes (principally *Raja erinacea*); (2) the food value of some hitherto unused or little used marine animals (fishes, crustacea and molluscs), tested by various cooking methods (*e. g.,* steam, under pressure); (3) experiments to determine the effect of concussions caused by gun-fire upon fishes (salaried assistant).

Alexander Forbes, A.M., graduate student, Harvard University: Experiments upon the attachment of oysters.

William K. Gregory, A.M., assistant at American Museum of Natural History: Comparative anatomy of local teleost fishes.

Addison Gulick, A.M., graduate student, Harvard University: (1) Experiments upon chemical sense of *Sycotypus canalic-*

ulatus, together with inquiry into the functions of the osphradium; (2) collection of material for future study of the glandular organs of molluscs.

Chas. W. Hargitt, Ph.D., professor of zoology, Syracuse University: Preparation of a synopsis of the Anthozoa of the Woods Hole region. This work will form one of the series of reports upon special groups of local fauna, issued at intervals by the Bureau of Fisheries (salaried assistant).

Trevor Kincaid, A.M., professor of zoology, University of Washington: Sporozoa of local marine invertebrates.

Edwin Linton, Ph.D., professor of biology, Washington and Jefferson College: The parasites of fishes, chiefly entozoa (salaried assistant).

J. F. McClendon, M.S., fellow in zoology, University of Pennsylvania: The early stages in the development of various parasitic copepods.

Hanford McCurdy, graduate student, Harvard University, instructor in biology, Manual Training School, Kansas City, Mo.: The reactions of *Pennaria tiarella* and *Eudendrium ramosum* to various stimuli; also experimental studies upon the nervous systems of local crabs.

A. G. Mayer, Ph.D., director research laboratory of Carnegie Institution, Dry Tortugas, Fla.: Experimental studies upon medusae.

J. Percy Moore, Ph.D., instructor in zoology, University of Pennsylvania: Synopsis of local annelids (for the bureau) (salaried assistant).

Chas. V. Morrill, graduate student, Columbia University: Dredging work of biological survey, likewise experiments upon regeneration of fishes (salaried assistant).

Max Morse, graduate student, Columbia University: (1) Dredging work, etc., (2) experiments upon autotomy of 'head' in *Tubularia crocea* (salaried assistant).

Raymond C. Osburn, instructor in zoology, New York High School of Commerce; graduate student, Columbia University: Biological survey of local waters. Mr. Osburn had direct supervision of the dredging work of the steamer *Phalarope* (salaried assistant).

A. S. Pearse, A.M., graduate student, Harvard University: The reactions of *Tubularia crocea* to various stimuli.

Mary J. Rathbun, assistant curator U. S. National Museum: Studies of habits of local decapod crustacea.

Carl D. Sawyer, medical student, McGill University: Studies of fish parasites (assisting Professor Linton) (salaried assistant).

G. G. Scott, A.M., tutor in anatomy and physiology, College of the City of New York: (1) Morphology of the tracheal system of a dragon-fly nymph; (2) relation of the central nervous system to regeneration in *Fundulus heteroclitus* (salaried assistant).

A. B. Seymour, Cambridge, Mass.: Studies of marine algæ of Woods Hole.

Chas. R. Stockard, M.S., graduate student, Columbia University: The effects of lithium chloride upon the development of the egg of *Fundulus heteroclitus.*

Michael X. Sullivan, Ph.D., instructor in chemical physiology, Brown University: (1) The physiology of the digestive tract in certain fishes; (2) the rectal gland in certain fishes (salaried assistant).

Francis B. Sumner, Ph.D., instructor in zoology, College of the City of New York; director of the laboratory: (1) Biological survey of local waters; (2) the physiological effects of changes in water density and salinity upon fishes. (Last shortly to be issued by the bureau.)

Millett T. Thompson, Ph.D., instructor in zoology, Collegiate Department, Clark University: The decorating instinct of

spider crabs (*Libinia emarginata* and *L. dubia*).

Herbert E. Walter, A.M., assistant in comparative anatomy, Harvard University: (1) Reactions of a triclad worm (*Bdelloura candida*) to light; (2) statistical study of the variability of the gastropod *Urosalpinx cinerea* from various points in the vicinity of Woods Hole.

FRANCIS B. SUMNER.

CONVENTION OF THE ASSOCIATION OF AMERICAN AGRICULTURAL COLLEGES AND EXPERIMENT STATIONS.

THE association met at Washington for its nineteenth annual convention, November 14–16, 1905. Being preceded and followed by a number of other conventions, among which were those of the Associations of State Universities, of Farmers' Institute Workers, of Horticultural Inspectors and of Official Agricultural Chemists, an unusually large number of persons interested in industrial education and agricultural experimentation was brought together in Washington, and this tended to make the convention of agricultural colleges and experiment stations one of the largest ever held. The association was addressed by the Hon. James Wilson, secretary of agriculture, who declared his deep interest in the work carried on by the institutions represented in the association, and indorsed the movement to secure an increase in the appropriation for the experiment stations, to which he pledged his support.

The annual address of the president of the association, delivered by Dr. E. B. Voorhees, director of the New Jersey experiment stations, related in the main to some of the duties and responsibilities of the agricultural colleges and experiment stations. Dr. Voorhees held the colleges primarily responsible for the character of work done by the experiment stations, because the working staff is the first determining factor in station work, and the colleges must be depended on to furnish the fundamental training for this work. He urged the need of more research work on the part of the stations, and declared that the present limitations were largely due to the insufficient supply of broadly trained men competent to conduct highly scientific investigations in agriculture.

A memorial address upon the life and services of President Henry H. Goodell, of the Massachusetts Agricultural College, and for many years a prominent worker in the association, was delivered by President W. E. Stone. President Goodell's death occurred last spring.

There were the usual reports of officers of the association and of standing committees. The executive committee reported that it had succeeded during the year in securing modification of the orders of the War Department with reference to military instruction in the land-grant colleges. The same committee suggested a reorganization of the standing committees of the association, which was taken up later and was one of the important actions of the association. Four standing committees were provided for, viz., (1) instruction in agriculture, (2) graduate study, (3) extension work and (4) experiment station organization and policy. The committees consist of six members each, and there is provision for a gradual rotation in the membership, the terms of only two members expiring each year.

Dr. A. C. True presented the report of the committee on indexing agricultural literature, describing the progress which has been made by the library of the Department of Agriculture in indexing scientific periodicals relating to agricultural investigations. The index is printed on cards. This undertaking has grown out of the efforts of the committee. Dr. True also presented the report of the committee on