above the reading room. The fourth floor is used for a conference room, dining room and kitchen. The total cost of the building was approximately 3,050,000 dollars. The equipment is valued at approximately 450,000 dollars.

The Institute is a co-ordinate division of the University, and as director Dr. Waksman is responsible solely to the President and Trustees of the University. The staff includes the following: *Associate Professors*, Dr. V. Groupe (virologist), Dr. W. J. Nickerson (physiologist) and Dr. Ruth E. Gordon (taxonomist); *Assistant Professors*, Dr. H. Lechevalier (microbiologist) and Dr. Waclaw Szybalski (geneticist); and six investigators holding the rank of instructor. In addition to the director, the administrative staff has provision for a vice-director, who has not yet been selected, an executive secretary, an editor-librarian and six secretaries. The technical staff includes several research associates and assistants, and twelve to fifteen laboratory, technical and maintenance workers.

DEDICATION OF THE LABORATORY OF OCEANOGRAPHY, WOODS HOLE

THE new Laboratory of Oceanography at Woods Hole, described in *Nature* of May 29, was opened ceremonially on June 21 by Rear Admiral F. R. Furth, U.S.N., Chief of Naval Research. He said that although most of what the Navy requires from oceanography is too specialized to have much effect on the development of the subject, it is their intention to support oceanographic research in such a way that military requirements would do as little as possible to hinder its systematic progress. Admiral Furth's speech, and that of the Assistant Secretary of the Navy, James H. Smith, who is responsible for research, showed that the U.S. Navy, having demanded such a large share of the potential of the Woods Hole Oceanographic Institution during the War, and now finding itself unable to relinquish its claim, is adding an associated Laboratory of Oceanography large enough to allow the Institution and its work to regain much of its former academic character: there will again be space and facilities for more systematic study of outstanding basic problems and opportunities for visiting scientists.

The Navy speakers emphasized that a greater understanding of the physical processes in the oceans is essential to the solution of some problems bearing on amphibious, surface and submarine warfare, and for the best use of weapons, instruments and methods employed at sea. They regarded the opening of the new laboratory as a major landmark in the Navy's continuing oceanographic programme.

Dr. Detlev W. Bronk, president of the U.S. National Academy of Sciences, stressed the "spiritual value of the oceans which arouse yearning to see and to know". He showed that the action of the Navy Secretary, Gideon Welles, in 1863, in creating a commission on research, had indirectly fostered the National Academy, and that the Office of Naval Research, which is responsible for the new Laboratory of Oceanography, is a lineal descendant of the commission. He maintained that oceanography gives useful emphasis to the unity of all sciences, and that it does much to encourage international unity and amity. The new laboratory, he said, would be a challenge to achievement, fostering the spirit of adventure as well as yielding much of practical value. He believed that the laboratory's contributions in time of war were made possible by its earlier achievements in time of peace, and he thought that the significant time for research is not the time of immediate emergency.

Speeches of welcome to the new laboratory were made by representatives of the State of Massachusetts and the township of Falmouth. A message from the U.S. Naval Chief of Staff expressed high hopes for the continuing alliance of science with the Navy.

The inauguration of the new Laboratory of Oceanography was followed by a convocation on oceanography which proved wide in scope and penetrating in detail. A summary made at this stage can scarcely escape injustice to the many speakers, and the following notes give no more than a rough guide; the papers and discussion will be published by the National Research Council.

On the first day, emphasis was given to the need for team-work between specialists in physics, chemistry and biology, to ensure that those who specialize in one aspect of the subject are aware of the problems and advances in adjacent aspects. One example given was that a knowledge of the physics and chemistry helps to indicate the most productive areas in the oceans: a particular instance quoted was that the distance of the most productive region for cod fisheries off the coast of northern Norway depends on physical conditions which can be forecast. The importance of studying oceanic circulation was urged; its problems have been shown to be increasingly difficult as more observations are made, and it was generally agreed that much more effort than has been available in the past would have to be devoted to direct measurements using ships, telemetering buoys and submerged recorders, as well as to theoretical work and model experiments.

It was pointed out that although the basic principles which govern water movements have been known for more than a century, there are still difficulties such as turbulence, or random movements on various scales, which prevent us from understanding how the basic principles govern water movements in Nature. It was shown that a statistical approach to the theoretical treatment can be made where the analysis is too difficult and the data inadequate. Other speakers showed what oceanography might do for navigation, coastal engineering and other marine industries. It was urged that the efforts spent on using the sea and in protecting lives and human interests against it warrants an understanding of its behaviour as detailed as might be gained with the help of modern discriminating and refined scientific methods and techniques as well as by simple observation and reasoning.

The second day was devoted to the discussion of work bearing on the productivity of the oceans and the distribution of marine organisms. One of the chief contentions, that the amount of organic production in tropical and subtropical parts of the oceans is strictly dependent on the physical conditions, the supply of phosphate and nitrate from below being far more important than the varying illumination from day to day in such regions, had to be continued as an informal discussion in the evening. The main outcome seemed to be a resolution for

wider repetition and extension of the work recently done by pioneers in the quantitative approach to the problem. In the consideration of possible links between climatic changes and oceanic productivity, a mechanism was outlined by which the decline in nutrient resources and fisheries in the western part of the English Channel might be explained by climatic changes over the far northern Atlantic Ocean. The available data indicated that the understanding of variations in a fishery may well require a knowledge of the deep-water circulation of the ocean as well as a study of the shelf on which the fish live.

Oceanographic and fisheries surveys of the subtropical and tropical regions of the central Pacific Ocean were used to show that fisheries exploiting the populations of the high seas could profit by guidance from recognizable features of the water circulation just as fishermen in marginal seas have been guided by topographical features. Bottom-living animals were not neglected: emphasis was laid on the uniformity and small number of species living on level sea bottoms as compared with the fauna of rocks, reefs and vegetation, which afford a greater variety of microclimates to their inhabitants. It was made very clear that team-work used to map the level sea floor communities would be a very profitable way of widening our knowledge of marine ecology. The last paper on this day, by Dr. George Wald, of Harvard University, on "The Ocean and Organic Evolution", had the most appreciative audience of the whole convocation. He discussed the ideas of Oparin[1] and extended them with the help of his own studies of retinal pigments and the muscle chemistry of the vertebrates and invertebrates.

The third day was devoted to submarine geology and the relations between oceanography and meteorology. The geological papers dealt largely with the structure of the ocean basins and sedimentation problems. Evidence of the existence of a sharp change in density in the rock about a mile below the sea bottom was given particular consideration. Other topics were evidence of growth of the oceans and atmosphere during geological time and of the changing conditions for plant and animal growth. The dredging of cretaceous shallow-water fossils from the summits of 6,000-ft. deep sea-mounts in the Pacific Ocean and a marked increase in the deposition of calcium carbonate since the middle of the cretaceous period were used as evidence that some 3,000–4,000 ft. depth of water has been added to the ocean since that time.

The discussions on oceanography and meteorology emphasized the similarity of the theoretical treatment needed for oceanic and atmospheric circulation. Prof. Palmén showed how recent studies of the budget of angular momentum in the atmosphere have suggested a new approach to the whole question of transfer of momentum from the atmosphere to the ocean. He demonstrated that the pressure forces produced by the differences in height of the water-level on the east and west sides of the continents provide a more effective mechanism than that of frictional forces at the bottom and the coasts. He gave numerical values of the sea slopes required to provide the necessary momentum transfer. This and following papers dealing with the role of inertia and stratification in the question of transfer of energy, and other aspects of transfer of energy between the ocean and atmosphere, were so specialized as to cause the convocation to end on a rather sober note, largely due to the conviction that the detailed study of such difficult topics is as essential for oceanography as for meteorology, so that oceanography cannot remain the rather light-hearted subject which it has been for the past hundred and fifty years.

The meetings were held in the lecture theatre of the Marine Biological Laboratory, and there was some pleasantry about what took place "on the other side of the street". Visitors to Woods Hole could not help being greatly impressed by the possibilities which exist in the neighbourliness of the Marine Biological Laboratory, the Oceanographic Institution, the new Laboratory of Oceanography, and the laboratory of the Fish and Wildlife Service, for exchange of ideas and co-operation. It was a remarkable experience to hear so much about marine research and to enjoy the company of so many marine scientists, and like many other visitors from Europe I am grateful to the National Research Council and the Office of Naval Research for making this meeting possible. G. E. R. Deacon

[1] Oparin, A. I., "The Origin of Life" (Macmillan, New York, 1938).

OBITUARIES

Prof. H. Stanley Allen, F.R.S.

Herbert Stanley Allen was born in Bodmin, Cornwall, on December 29, 1873. The fifth son of Rev. Richard Allen, a Methodist minister, he was always proud of being "Cornish by birth". He received his early education at Kingswood School, Bath, where he won various scholarships and prizes, was a senior prefect, and took first place for all England in the London Matriculation and, a year later, in the Cambridge Senior Local Examination. He was a contemporary of Prof. T. M. Lowry and a few years junior to Prof. A. E. Taylor.

In 1893 he entered Trinity College, Cambridge, and in 1897 gained a first class in the second part of the Natural Sciences Tripos. After a short time in a temporary post as assistant lecturer in Aberystwyth, he returned to Cambridge to take up research work under Prof. J. J. Thomson. From Cambridge he went to Renfrew in 1900 to take charge of Lord Blythswood's Physical Laboratory, and it was while living in Renfrew that he met Miss Jessie Macturk, whom he married in 1907. Their family consists of a son and a daughter. He joined the staff of the Physics Department at King's College, London, in 1905 and soon became a senior lecturer in physics. For his work there on the photo-electric effect he received the degree of D.Sc. in 1909.

Allen returned to Scotland in 1920 and served, first as a lecturer and later as a reader, on Prof. C. G. Barkla's staff in the University of Edinburgh. In 1923 he was appointed professor of natural philosophy in the United College of St. Salvator and St. Leonard in the University of St. Andrews. His first activity in St. Andrews was directed towards the reconstruction and enlargement of the Physics Laboratory which, after reconstruction, was formally opened by Sir William Bragg in 1925. His early researches covered a variety of subjects including photo-electricity, X-radiation, radioactivity, the Zeeman effect and spectroscopy. In St. Andrews his main interests were the quantum theory and spectroscopy, particularly the band spectrum of hydrogen.

His first text-book, "Photo-electricity", based on lectures he delivered at King's College, London, and