graphical essays were opened with a brief general statement, giving the essence of the whole story in terms of structure, process and stage of development; and if the later pages then proceeded, following the scheme and the sequence thus outlined at the beginning, to present the details. The Istrian peninsula would seem to lend itself admirably to such treatment. Its larger structures are reducible to a very simple statement, upon which all sorts of details as to pitching folds and overthrusts may be afterwards embroidered. The deformed mass without question reached well-advanced old age in the first recognizable cycle of erosion, as is clearly indicated by the even surfaces which transect the folded strata over large areas. It is equally evident that irregular movements of faulting and tilting interrupted the first cycle before the more resistant strata were completely worn down. In the new cycle thus introduced revived erosion gained a good advance, with characteristic development of karst features on the limestones, before a moderate submergence drowned the borders of the dissected block at so recent a date that the present shore line is still very young. Upon the framework of such a statement all details can be most conveniently placed in good order for easy understanding; but if no general framework is presented at the beginning, the reader must be embarrassed as he comes on page after page of unrelated details.

There is, however, a certain unevenness of treatment in Krebs' essay on the Istrian peninsula which seems to indicate that the author is perhaps not yet ready to adopt the concise scheme of "structure, process and stage," above suggested. The even uplands are repeatedly spoken of as the work of "abrasion," thus implying that the first cycle of erosion was accomplished chiefly by marine processes; yet there is no discussion of this debatable point; it appears to be accepted as a traditional truth; and this in spite of the frequent occurrence of rounded residual reliefs which surmount the uplands and which are much more suggestive of subaerial than of marine erosion in the first cycle. Furthermore, while no sufficient space is given to an adequate discussion of the origin of the chief features of the peninsula, space is allowed (p. 66) for a brief refutation of the obsolete ideas that the typical drowned valleys on the west and south (Canali di Leme and dell' Arsa) are due to (marine) abrasion or to faulting. There is no need of such a refutation; but there is much need of a critical consideration of the postulated marine planation of the district.

W. M. D.

THE TWENTY-FIRST SESSION OF THE MARINE BIOLOGICAL LABORATORY, JUNE 1 TO OCTOBER 1, 1908. PRELIMINARY ANNOUNCEMENT

ON account of considerable changes proposed for the season of 1908, the following preliminary announcement is made. Attention is directed particularly to the statements concerning the addition of the Wistar Institute of Anatomy and Biology to the list of cooperating institutions, to the change of personnel in the staff of instruction in zoology, to the reinstatement of the course in embryology and to the introduction of a new course in the general morphology of plants. The final announcement will be ready in March or April, 1908, and will be sent on request to all desiring it.

The Marine Biological Laboratory is an institution for the promotion of research in biology by the cooperative endeavors of biologists from all parts of the country. The laboratory is a national institution on an absolutely independent foundation, and it solicits the cooperation of all students of biology.

I. *Research.*—The laboratory will be open for research from June 1 to October 1, 1908. Facilities for research are offered in zoology, embryology, physiology and botany. Fifty-five private rooms are reserved for investigators, and those assigned to such rooms are supplied with reagents, glassware and service in the collection of material. The majority of these rooms are reserved for members of the staff and for subscribing institutions. The charge for the remaining rooms is $100 per season and applicants should state the time of desired occupancy and any special needs;

application should be sent to the assistant director (Frank R. Lillie, University of Chicago) before May 1.

Subscribing institutions for the year 1907 were as follows:

Academy of Natural Sciences, Philadelphia.
Bryn Mawr College.
Mount Holyoke College.
Rochester University.
Smith College.
Syracuse University.
University of Chicago.
Columbia University.
University of Pennsylvania.
University of Cincinnati.
Vassar College.
Wellesley College.
Woman's College of Baltimore.
Kansas University Woman's Table supported by Mrs. Robinson.
Vassar Brothers' Institute.
University of Michigan, Bryant Walker Scholarship.
United States Department of Agriculture.

It is hoped that this list may be increased. The laboratory carries out work of interest and importance to all biological departments, and provides facilities for marine work that would cost such departments acting independently many times the rental of a room at the Marine Biological Laboratory. Institutions that favor this cooperative plan are requested to aid by subscribing for rooms, prices for which are $100 per season. The subscription carries with it the right of nomination of the occupant of the room, who receives services and supplies as stated above.

An important addition to the list of cooperating institutions for 1908 is the Wistar Institute of Anatomy and Biology, which subscribes for five rooms. Four of these are available for qualified investigators in anatomy and zoology. Applications may be sent directly to the Wistar Institute of Anatomy and Biology, Philadelphia, Pa., or to the assistant director of the Marine Biological Laboratory.

The staffs of the various departments constitute a permanent nucleus of investigators and center of interest for research in all departments. It is expected that the research staffs in zoology and physiology will be substantially the same as in 1907, viz.:

ZOOLOGY

E. G. Conklin, professor of zoology, University of Pennsylvania.

C. W. Hargitt, professor of zoology, Syracuse University.

George Lefevre, professor of zoology, University of Missouri.

Warren H. Lewis, associate professor of anatomy, Johns Hopkins University.

Frank R. Lillie, professor of embryology, University of Chicago.

T. H. Morgan, professor of experimental zoology, Columbia University.

C. O. Whitman, professor of zoology, University of Chicago.

E. B. Wilson, professor of zoology, Columbia University.

PHYSIOLOGY

Albert P. Mathews, professor of physiological chemistry, University of Chicago.

E. P. Lyon, professor of physiology, University of St. Louis.

Ida H. Hyde, professor of physiology, University of Kansas.

R. S. Lillie, instructor in comparative physiology, University of Pennsylvania.

A. J. Carlson, assistant professor of physiology, University of Chicago.

Edward G. Spaulding, assistant professor of philosophy, Princeton University.

Oliver P. Terry, instructor in physiology, Purdue University.

Horatio H. Newman, instructor in zoology, University of Michigan.

BOTANY

The research staff in botany for 1908 will include the following:

John M. Coulter, professor of botany, University of Chicago.

B. M. Duggar, professor of plant physiology, Cornell University.

Henry Kraemer, professor of botany, Philadelphia College of Pharmacy.

George T. Moore, Water Mill, New York.

Hermann von Schrenk, pathologist, Missouri Botanical Garden.

Erwin F. Smith, in charge of Laboratory of Plant Pathology, United States Department of Agriculture.

M. B. Thomas, professor of botany, Wabash College.

A limited number of private rooms is available for other investigators in botany. Applications for use of these rooms should be made to Dr. George T. Moore, Water Mill, New York.

Subjects for investigation in zoology, physiology or botany will be assigned to those whose previous training qualifies them to begin research. The student may select his teacher in investigation, subject to the approval of the latter.

II. *Instruction.*—The courses of instruction are six weeks each, including about four weeks in July and two in August. Each course requires the full time of a student. They are so graded that the student may supplement his college instruction by courses leading up to research, or he may take the more elementary courses in zoology or general morphology of plants. Credit for courses taken in the Marine Biological Laboratory is generally given by colleges and universities and also by boards of education of various cities, on certificate of the instructor in charge. It has been decided to add two courses to those given in recent years, viz., a course in embryology and one in general morphology of plants (see below).

1. Zoological instruction, season of 1908, will be in charge of Winterton C. Curtis, assistant professor of zoology, University of Missouri, assisted by Paul M. Rea, professor of biology, College of Charleston, and director of the Charleston Museum; Max Morse, tutor in natural history, College of the City of New York; Lawrence E. Griffin, professor of biology, Missouri Valley College; Edward E. Wildman, instructor in biology, Central High School, Philadelphia, and John W. Scott, Westport High School, Kansas City.

Although Dr. L. L. Woodruff, instructor in biology, Yale University, is leaving the staff in zoology for that in embryology, he has consented to give the lectures on protozoa in 1908.

The conduct of the work in this subject will not differ substantially from the plan which has proved successful in recent years. Lectures and laboratory work are supplemented by extensive collecting trips, during which the student has opportunity to observe the methods of marine collecting and to study a wide range of marine forms in their natural surroundings.

2. The course in embryology will be in charge of Professor Gilman A. Drew, of the University of Maine, Orono, Maine, assisted by Dr. L. L. Woodruff, instructor in biology, Yale University, and Dr. W. E. Kellicott, professor of biology in the Woman's College of Baltimore.

It is the aim of this course to meet the needs of those who desire to get an insight into fundamental problems, and to serve as a basis for those who desire to begin independent investigation. It will supplement the usual college course in embryology, laying special weight on questions of general importance that can best be approached by the study of living marine material.

The work will include the study of organization, maturation and fertilization in the egg, the early development, types of gastrulation, and the effects of different conditions on development. The advantage of following the actual process of development in the living egg, instead of comparing a few preserved stages of development, can not be overestimated.

The course will be accompanied by lectures delivered by members of the staff and by other investigators working at the laboratory. For the course in embryology, the course in zoology or its equivalent is a prerequisite.

3. The course in comparative physiology will be in charge of members of the same staff as in 1907, viz.:

Albert P. Mathews, professor of physiological chemistry, University of Chicago.

E. P. Lyon, professor of physiology, University of St. Louis.

Ida H. Hyde, professor of physiology, University of Kansas.

R. S. Lillie, instructor in comparative physiology, University of Pennsylvania.

A. J. Carlson, assistant professor of physiology, University of Chicago.

Edward G. Spaulding, assistant professor of philosophy, Princeton University.

Oliver P. Terry, instructor in physiology, Purdue University.

Horatio H. Newman, instructor in zoology, University of Michigan.

Changes in the staff for 1908 will be announced later. The course will include study of the physico-chemical constitution of protoplasm, physics of cell-division and contractility, phenomena of inheritance from a physico-chemical standpoint, the physical basis of conduct, comparative physiology of the heart and circulation and comparative physiology of the central nervous system. Lectures will be given by members of the staff and others.

IV. The following courses will be offered in botany:

1. Morphology and Taxonomy of the Algæ, conducted by Dr. George T. Moore, assisted by George R. Lyman, assistant professor of botany, Dartmouth College, and R. R. Gates, fellow in botany, University of Chicago.

A general course upon the algæ, designed to give a detailed knowledge of the habits, structures and life histories of this group.

2. Morphology and Taxonomy of the Fungi, conducted by Dr. Lyman and Mr. Gates. A general course upon the fungi similar to that outlined for the algæ.

3. General Morphology of Plants.

No prerequisites are stated for this course, which will be conducted either by Professor John M. Coulter or Professor C. J. Chamberlain, of the University of Chicago, with assistants: an outline of the plant kingdom, based upon the study of selected types. Emphasis will be placed upon the facts connected with the evolution of plants, such as the origin of sex, alternation of generations, heterospory, origin of the flower, origin of the seed, etc. The general relationships and classification of the flower groups will also be discussed, including the history of the groups as developed by paleobotany.

It is expected that Mr. W. R. Maxon, of the United States National Museum, will act as collector in botany. The usual lectures and seminars will be offered.

Frank R. Lillie

University of Chicago

Charles P. Matthews

Charles P. Matthews, professor of electrical engineering at Purdue University, died at Phoenix, Arizona, on Saturday, November 23, 1907. Professor Matthews was of Vermont stock, his family going from that state to New York in 1852, where, at Fort Covington, he was born September 18, 1867. At the time of his death he was, therefore, a little more than forty years of age.

He attended the St. Johnsbury Academy at St. Johnsbury, Vermont, graduating there in 1887. He then entered Cornell University, graduating from Sibley College with the degree of mechanical engineer in 1892. In 1901 he received the degree of doctor of philosophy from his alma mater.

Immediately after graduation he became instructor in physics and applied electricity at Cornell, serving in that capacity four years, until 1896. At that time he was called to Purdue and was appointed associate professor of electrical engineering. In 1905 he succeeded Professor Goldsborough as head of the School of Electrical Engineering and from this time until his death he was continuously a member of the Purdue faculty.

During Professor Matthews's connection with the School of Electrical Engineering, it has grown to be the largest in the country in point of numbers. In this development he has had a large share. His instruction was of the highest order not only on account of his professional ability and training, but quite as much on account of his exceptional personality and gifts.

He made valuable contributions to his science, his chief work being an investigation of photometric standards for arc lamps. This was done in connection with the National Electric Light Association. In this, he directed all the experimental work, designed the apparatus and prepared four reports aggregating about two hundred pages. In this connection he devised and patented an integrating photometer. This instrument received a gold medal at the Louisiana Purchase Exposition. He was also collaborator in the production of text-books in physics and elec-