concerned, also by Hubrecht and by Regan. Doubtless a similar view is held by other ichthyologists at the present time.

The arrangement of the fishes continued to exercise Agassiz during succeeding years. In 1858[5] he read a communication before the American Academy of Arts and Sciences advocating the classification of fishes by the structures of the mouth as related to the facial bones. And as late as 1867 he again occupied himself with fishes, reading, in that year,[6] a paper on the classification of the catfishes.

In the light of present knowledge this classification of the catfishes was not a happy one. He regarded the group as "an order of ganoid fishes which should be placed between the sturgeons and the garpikes." He based this view, he tells us, on resemblances in the brains of the catfish and the sturgeon; but he seems to have been unduly impressed by the South American armored catfishes. To be sure such forms as *Loricaria* and *Plecostomus* are in some regards suggestive of the sturgeon; but the resemblances are now looked upon as mere parallelisms and not as signs of relationship.

In conclusion: Louis Agassiz deserves greater credit for his later than for his earlier classification of the fishes. He sought to base it on facts of anatomy and embryology and not, as with the earlier classification, on a single superficial character. And in ranking the groups as classes and in raising the selachians, cyclostomes and fishes proper, to equivalent rank, he was the forerunner of our modern views.

L. Hussakof

[5] *Proceedings Academy Arts and Sciences*, IV., p. 108.

[6] *Proceedings Boston Society Natural History*, XI., p. 354.

THE SYNTHESIS OF FORMALDEHYDE BY LIGHT WITHOUT CHLOROPHYLL

Readers of Science will be interested in the achievement by chemists of the duplication of the first step in the synthesis of carbohydrates by plants. Many years ago it was found that formaldehyde, when made slightly alkaline, transformed itself spontaneously by a series of condensations into a mixture of sugars called "formose," but the first step in the process of the synthesis of the sugars, namely, the synthesis of formaldehyde from carbon dioxide and water with the liberation of oxygen it has been impossible to achieve under conditions at all comparable to those prevailing in plants. This synthesis has now been obtained by Berthelot and Gaudechon[1] by means of ultraviolet light.

A mixture of carbonic anhydride and water under the influence of these rays liberates oxygen and produces carbon monoxide and formaldehyde. Carbon monoxide and water so illuminated produce carbon dioxide, carbon monoxide, hydrogen and formaldehyde.

Moreover, glucose under similar conditions gives rise, among other things, to marsh gas, hydrogen and carbon dioxide.

It seems not impossible, in view of these facts, that the rôle of the chlorophyll may be the transformation of the longer wave-lengths of light to shorter more active ones, thus acting in a photodynamic way, as frequently suggested.

A. P. Mathews

[1] "Synthése photochemique des hydrates de carbone aux dépens des elements de l'anhydre carbonique et de la vapeur de l'eau en l'absence de chlorophyll, etc.," *Comptes Rendus de l'Acad. de Sci.*, 150, 1910, p. 169.

SPECIAL ARTICLES

NOTE ON THE DISTRIBUTION OF SOME PENNSYLVANIA FISHES

While angling at Valley Forge, on September 27, 1910, I caught a number of small fishes in Valley Creek, a tributary of the Schuylkill River. As several of these have not been found before so far to the east in Pennsylvania, I take this opportunity of recording them. These are *Pimephales notatus* and *Exoglossum maxillingua*. Along sloping shores in shallow water were very numerous large schools of small fishes, which I found to be mainly the young of the preceding, though *Abramis crysoleucas, Notropis bifrenatus, N. cornutus, Fundulus diaphanus, Lepomis au-*

ritus, Eupomotis gibbosus and *Boleosoma nigrum olmstedi* were also common.

I have received a collection of the following from a stream draining Lakemont Park Lake at Altoona, in Blair Co., on August 5, 1910, sent by Mr. H. L. Mather, Jr. *Pimephales notatus, Semotilus atromaculatus, Notropis whipplii analostanus, N. cornutus, Rhinichthys cataractæ, R. atronasus, Exoglossum maxillingua, Catostomus nigricans, Erimyzon sucetta oblongus, Schilbeodes insignis, Eupomotis gibbosus* and *Boleosoma nigrum olmstedi.* The occurrence of *R. cataractæ* is of interest, and although locally abundant, I have met with it in but few and widely separated localities. Another instance was on August 27, 1910, in the Bushkill Creek at Easton, where I also found *Anguilla chrisypa, Semotilus atromaculatus, Abramis crysoleucas, Notropis bifrenatus, N. cornutus, Rhinichthys atronasus, Catostomus commersonnii, Erimyzon sucetta oblongus, Boleosoma nigrum olmstedi* and *Cottus gracilis.*

HENRY W. FOWLER
ACADEMY OF NATURAL SCIENCES,
PHILADELPHIA, PA.,
October 31, 1910

THE CONVOCATION WEEK MEETINGS OF SCIENTIFIC SOCIETIES

THE American Association for the Advancement of Science and the national scientific societies named below will meet at Minneapolis, during convocation week, beginning on December 27, 1910.

American Association for the Advancement of Science.—Retiring president, Dr. David Starr Jordan, of Stanford University; president, Professor A. A. Michelson, University of Chicago; permanent secretary, Dr. L. O. Howard, Smithsonian Institution, Washington, D. C.

Local Executive Committee.—Wilbur F. Decker, chairman; Frederic E. Clements, secretary; Leroy J. Boughner, Frederic B. Chute, James F. Corbett, James F. Ells, Wallace G. Nye, Henry F. Nachtrieb, Edward E. Nicholson, Francis C. Shenehon, Albert F. Woods, Frederick J. Wulling.

Section A—Mathematics and Astronomy—Vice-president, Professor E. H. Moore, University of Chicago; secretary, Professor G. A. Miller, University of Illinois, Urbana, Ill.

Section B—Physics.—Vice-president, Dr. E. B. Rosa, Bureau of Standards, Washington, D. C.; secretary, Professor A. D. Cole, Ohio State University, Columbus, O.

Section C—Chemistry.—Vice-president, Professor G. B. Frankforter, University of Minnesota; secretary, Professor C. H. Herty, University of North Carolina, Chapel Hill, N. C.

Section D—Mechanical Science and Engineering—Vice-president, Professor A. L. Rotch, Blue Hill Meteorological Observatory; secretary, G. W. Bissell, Michigan Agricultural College, East Lansing, Mich.

Section E—Geology and Geography.—Vice-president, Dr. John M. Clarke, state geologist of New York, Albany, N. Y.; secretary, F. P. Gulliver, Norwich, Conn.

Section F—Zoology.—Vice-president, Professor Jacob Reighard, University of Michigan; secretary, Maurice A. Bigelow, Columbia University, New York, N. Y.

Section G—Botany.—Vice-president, Professor R. A. Harper, University of Wisconsin; secretary, H. C. Cowles, University of Chicago, Chicago, Ill.

Section H—Anthropology and Psychology.—Vice-president, Professor Roland B. Dixon, Harvard University; secretary, George Grant MacCurdy, Yale University, New Haven, Conn.

Section I—Social and Economic Science.—Vice-president, the Hon. T. E. Burton, Cleveland, Ohio; secretary, Fred. C. Croxton, 1229 Girard Street, Washington, D. C.

Section K—Physiology and Experimental Medicine.—Vice-president, Professor F. G. Novy, University of Michigan; secretary, George T. Kemp, Hotel Beardsley, Champaign, Ill.

Section L—Education.—Vice-president, President A. Ross Hill, University of Missouri; secretary, Charles Riborg Mann, University of Chicago, Chicago, Ill.

Permanent Secretary (for five years)—Dr. L. O. Howard, Washington, D. C.

General Secretary—Professor Frederic E. Clements, University of Minnesota.

Secretary of the Council—Professor John Zeleny, University of Minnesota.

American Mathematical Society (Chicago Section).—December 28–30.

American Federation of Teachers of the Mathematical and Natural Sciences.—December 28–29. President, Professor C. R. Mann, University of Chicago; secretary, Eugene R. Smith, Polytechnic Preparatory School, Brooklyn, N. Y.