

rest. In *Entomological News*, 1908, p. 458, I gave reasons for thinking that *A. californica* deserved subgeneric rank; Mr. Walker's results appear to support this idea, and even suggest the question whether it should not be generically separated, taking with it several related forms.

Certainly Mr. Walker's book should be in every biological laboratory, both as an example of good taxonomy and as a useful work of reference, *Aeshna* being common nearly everywhere.

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SPECIAL ARTICLES

A PRELIMINARY NOTE ON THE COAGULATION OF PROTEINS BY ULTRAVIOLET LIGHT

IN order to gain some insight into the action of ultraviolet light on living cells it became necessary to study its effect on certain constituents of protoplasm. Attention was first given to proteins and a series of experiments were made with egg-white, egg albumin and ox-serum.

1. *Experiments with Egg-white*.—Fresh egg-white was cut up with scissors and placed in a quartz tube, at room temperature, 10 cm. from a quartz mercury-vapor lamp. The tube was completely filled and stoppered. After 1 or 2 hours a feathery coagulum began to form in the tube upon the wall nearest the lamp. This coagulum increased in amount, and after 35 hours the tube was quite full of a flocculent coagulum. There was a peculiar strong odor.

Fresh egg-white was diluted with an equal amount of distilled water. The solution became opalescent from the precipitated globulin. The tube was exposed at room temperature in the same manner as the tube containing the undiluted egg-white. There was a similar coagulation, but it was more abundant. There was also the same peculiar odor. In this case the coagulum slowly settled as it formed. The solution, therefore, was clearer, and there may have been a better penetration of the light. In another experiment the precipitated globulin was filtered out before exposure. Fifteen hours after filtering, the so-

lution was still clear. On exposure to the light a fine sediment was formed which slowly settled to the bottom of the tube. The characteristic odor was present.

In all the experiments described above control preparations in glass tubes, exposed in the same manner, and at the same temperature, gave little or no coagulum, and none of the characteristic odor. The coagulum formed in the quartz tubes, whether they were open or closed. It formed equally well in tubes which had been connected with the air-pump and pumped out so as to remove the dissolved air. No bubbles of gas were formed during the exposure, nor could gases be detected in the solution by pumping with the air pump after the exposure.

2. *Experiments with Crystallized Egg-albumin*.—Crystallized egg-albumin was prepared by the method described by Hopkins and Pinkus. The egg albumin was recrystallized seven times. The ammonium sulfate which came down in the last crystallization was not dialyzed out. Solutions were prepared containing 1, 2, 5, 10 and 20-per-cent. of the albumin. All were exposed in quartz tubes at room temperature. The 5-per-cent. solution gave the most coagulum and in subsequent experiments with crystallized albumin 5 per cent. solutions were used. Coagulation was much more rapid in the crystallized albumin plus the ammonium sulfate, than in the fresh egg-white.

3. *Experiments with Crystallized Egg-albumin Dialyzed Against Tap Water*.—Albumin freed from ammonium sulfate by dialyzing against tap water coagulates very readily when exposed to the light at room temperature. It may be sensitive to longer wavelengths than the fresh egg-white, since considerable coagulum forms in the glass tubes. A quartz and a glass tube were exposed at room temperature for 15 hours. The quartz tube became opalescent and then opaque with a finely divided coagulum which did not settle, but which could be thrown down with a centrifuge. A feathery coagulum formed in the glass tube on the side nearest the lamp. This increased in amount, until the tube was filled

with a feathery coagulum. When the tube was moved, the coagulum separated from wall of the tube and settled to the bottom, leaving the solution in the tube perfectly clear. Further exposure of 20 hours produced only one or two scarcely visible masses of coagulum in the clear solution above the coagulum at the bottom of the tube. The solution contained, however, an abundance of albumin which could be coagulated by heat.

4. *Experiments with Ox-serum*.—The serum was prepared by allowing a clot to form and then decanting off the clear liquid. A portion of this was placed in a quartz test tube and exposed to the light at room temperature. As in the other cases a coagulum formed in the quartz tube while none formed in the glass tube which was exposed at the same time.

The coagulum produced by the light in egg-white and egg-albumin is insoluble in alcohol, hot or cold water and dilute acids. It is soluble in dilute alkalis. In these respects it agrees with the ordinary coagulum which is produced by heat without exposure to ultra-violet light.

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ASTRONOMICAL AND ASTROPHYSICAL SOCIETY OF AMERICA

THE fourteenth meeting of this society was held at the Allegheny Observatory and the Schenley Hotel, Pittsburgh, from Tuesday to Friday, August 27-31, 1912. Sessions were held at the Observatory on Tuesday and Wednesday, the afternoon of Wednesday being occupied by the exercises of dedication of the new observatory. On Thursday and Friday sessions were held at the Schenley Hotel. An excursion to the Homestead Steel Plant of the Carnegie Steel Company, and a visit to the Carnegie Institute added much to the pleasure of the meeting.

The following members were in attendance: A. T. G. Apple, R. H. Baker, L. A. Bauer, B. Boss, J. A. Brashear, Miss Annie J. Cannon, G. C. Comstock, Z. Daniel, H. S. Davis, A. E. Douglass, W. S. Eichelberger, Philip Fox, Edgar Frisby, Miss Caroline Furness, William Gaertner, Miss A. M. Harwood, F. C. Jordan, T. A. Lawes, F. B. Littell, R. J. McDiarmid, J. B. McDowell, D. B.

Marsh, J. A. Miller, O. L. Petitdidier, E. C. Pickering, J. S. Plaskett, A. W. Quimby, H. Raymond, E. D. Roe, Jr., H. B. Rumrill, F. Schlesinger, W. L. Scaife, H. Shapley, A. N. Skinner, F. Slocum, Elliott Smith, C. E. St. John, DeLisle Stewart, R. M. Stewart, Miss Helen M. Swartz, S. D. Thaw, Miss Stella May Udick, C. E. VanOrstrand, Miss Sarah F. Whiting.

Visiting astronomers: Louise S. Smith, A. van Maanen.

The following new members were elected: Miss Stella May Udick, Messrs. Harry Raymond, James Hartness, Arthur Newton, Henry G. Gale, David Rines, E. S. Haynes, William L. Scaife, James B. McDowell.

The constitution of the society was amended to provide for the election of honorary members. In accordance with the provisions of the amendment, nominations were received. Sir David Gill was unanimously elected the first honorary member of the society.

The council voted to hold no meeting in the summer of 1913, because of the probable absence of a number of the members in attendance at the Solar Union meeting at Bonn. The next meeting will be in Cleveland during the holidays, 1912, in connection with the American Association for the Advancement of Science. The council voted to hold the 1914 summer meeting at Northwestern University and the 1915 meeting in San Francisco and at the Lick Observatory.

Officers were elected:

President—E. C. Pickering.

First Vice-president—G. C. Comstock.

Second Vice-president—Frank Schlesinger.

Secretary—Philip Fox.

Treasurer—Miss Annie J. Cannon.

Councillors 1912-1914—W. W. Campbell, E. B. Frost.

The councillors who continue to serve are:

Councillors 1911-1913—W. S. Eichelberger, J. S. Plaskett.

Abstracts of the committee reports and forty-six papers which were read follow:

Irregularities in Atmospheric Refraction: FRANK SCHLESINGER.

This investigation was suggested by the recent work of Nuss and Fric at Prague, who found evidence of irregularities in refraction in a period that is roughly one minute, and having considerable amplitude. At the present author's request Professor Slocum, of the Yerkes Observatory, kindly secured with the 40-inch refractor a number