of the latter groups, illustrated by the scheme,

$$CH_3 \cdot CHNH_2 \cdot COOH \rightleftarrows CH_3 \cdot CO \cdot COOH \rightleftarrows CH_3 \cdot CHOH \cdot COOH,$$

furnishes a text for the discussion of some of the manifold metabolic performances that have only lately found a place in physiological speculations. The oxidation and reduction of amino-acids by microorganisms, with reference to the splendid newer work of F. Ehrlich and of Neuberg in this field, is presented in novel, though brief form. In his treatment of the behavior of the carbohydrates Dakin champions the view that lactic acid must be regarded as one of the most important substances concerned with their intermediate metabolism. There are further chapters on the purines, hydrocarbons, phenols, etc.; and in conformity with the plan of the series of monographs on biochemistry to which this book belongs there is a well-arranged bibliography appended.

The frankness with which open questions are presented, as illustrated in the debated respective rôles of β-ketonic and β-hydroxy acids, is wholesome and marks the unbiased attitude of the book's author, even where his own researches are involved. The reader is impressed with the great advances which have lately been made in the new field covered by this monograph; and whether his interests are primarily those of the physiologist or the chemist, he will be stimulated by the wealth of suggestions—all presented there in a readable form.

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The North American Dragon Flies of the Genus Æshna. By E. M. WALKER. University of Toronto Studies. 1912.

It occasionally happens that some familiar group of animals is investigated by one who is sufficiently skilled and independent to detect characters which have escaped all previous observers. I recall the time, now a quarter of a century ago, when certain common land molluscs were added to the British list. One of these was almost literally in every one's garden, but until its distinctive characters were pointed out, nobody could see it. To-day the merest beginner can recognize it at once. We are forced to conclude that even excellent manuals are not without their disadvantages, when they are blindly followed by naturalists, who will not even look for things unmentioned by them. The same sort of thing has been very evident in botany, and we have in Mr. Walker's work a remarkable exposure of blindness in the field of entomology. Mr. Walker, during the summer of 1906, was at Lake Simcoe, Ontario, where he interested himself in the common large dragon flies of the genus *Æshna.* Most people would have viewed them with languid interest as being among the "familiar objects of the country side," completely exploited by entomologists long ago. Not so Mr. Walker, who with critical eye presently discerned that there were more species than the books called for. His curiosity thus stimulated, he pursued the subject further, and was eventually able to establish the existence of sixteen perfectly valid species in temperate North America, five of them described as new by himself. While doing this he has monographed the genus as represented in this country, and now publishes a most exhaustive treatment, discussing the biology, early stages, geographical distribution and other matters. The work is also fully illustrated, with 28 plates and some good text figures. Only one thing seems lacking: I find no mention of Scudder's *Æshna solida,* which is represented by such beautifully preserved wings in the Miocene shales at Florissant.

The interesting fact is brought out that in addition to "structural" characters, each species has its own color-pattern, which may at once be recognized when known. It is also found that the immature forms, the nymphs, have characters of their own, which are duly set forth in a key. It is thought probable or possible that the genus *Æshna* is of polyphyletic origin, the *californica* group especially having perhaps a different origin from the

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, *Æshna* 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 solution 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