further conclusion that the present distribution of the litoral fauna was completed before the Amazon bore its present geographical relations. If it were otherwise the vast mass of the river waters would have formed an insurmountable barrier to the southward extension of marine forms living in shallow water.

The main body of the paper consists in an anatomical study of two species of *Tethys* and the new species above referred to. The investigation is carried out in great detail, the most noticeable feature in the genus *Tethys* being the determination of nerves issuing from the pleural ganglion and anastomosing with pedal nerves in each case, contrary to the results announced by some investigators from studies of Mediterranean species of *Tethys*. Excellent figures are given of the anatomy, especially of the nervous and alimentary tracts, and comparisons instituted with the results of other investigators. On the whole the paper is creditable to the author and to the university under whose auspices it appears, and will prove, we hope, the forerunner of other contributions to a subject which has hardly received hitherto its proper meed of attention. WM. H. DALL

SUMMARIES OF FOUR OPINIONS (6, 7, 8, 12) BY THE INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE

THE following summaries of recent opinions by the International Commission on Zoological Nomenclature are published for the information of persons interested in the points in question. It is expected that the full details of the arguments will be published later in connection with certain other cases now under consideration. These summaries do not give the reservations made by certain commissioners, but these reservations will be presented in the final publication.

6. *Genus* A *Linnæus, 1758, with two species* Ab *and Ac.*—When a later author divides the genus *A*, species *Ab* and *Ac*, leaving genus *A*, only species *Ab*, and genus *C*, monotypic, with species *Cc*:

The second author is to be construed as having fixed the type of the genus A. [See Article 30.]

Vote: Affirmative 14; negative 0; not voting 1.

7. *The interpretation of the expression* "n. g., n. sp." *under Article 30* (*a*).—The expression "n. g., n. sp." used in publication of a new genus for which no other species is otherwise designated as genotype, is to be accepted as designation under Article 30 (a).

Vote: Affirmative 9; negative 4; not voting 2. [As the vote on this case is not unanimous, the point in question may possibly come up for consideration at the next meeting of the commission.]

8. *The retention of* ii *or* i *in specific patronymic names, under Article 14* (c) *and Article 19.*—Specific patronymics originally published as ending in *ii* (as *schrankii, ebbesbornii*) are, according to Article 19, to be retained in their original form, despite the provision of Article 14 (c) which provides that they should have been formed with only one *i*.

Vote: Affirmative 11; negative 2; not voting 2. [As the vote on this case is not unanimous, the point in question may possibly come up for discussion at the next meeting of the commission.]

12. *Stephanoceros fimbriatus* (*Goldfuss, 1820*) *vs.* S. eichhornii *Ehrenberg, 1832.*—The generic name *Stephanoceros,* 1832, is to be used in preference to *Coronella,* 1820 (preoccupied, 1768); the specific name *fimbriatus,* 1820, takes precedence over *eichhornii,* 1832, which is admittedly (Ehrenberg, 1832b, 125, and 1838a, 400–401) *fimbriatus,* 1820, renamed. Ehrenberg was right in rejecting *Coronella,* 1820, but in error in rejecting *fimbriatus,* 1820; no reason is apparent for perpetuating his error.

Vote: Affirmative 14; negative 0; not voting 1.

C. W. STILES,
Secretary of Commission

SPECIAL ARTICLES

CARBON DIOXIDE AS A FACTOR IN HEART BEAT

CARBON dioxide when distributed uniformly in the blood in large quantities exerts a definite injurious effect on the heart. In the normal circulation, however. the right heart

contains about eight volumes per cent. more CO_2 than the left heart. It seemed to us that the electromotive force resulting from the difference in potential might exert an influence differing from the ordinary pharmacological action of the carbonates and be, at least, a factor in the maintenance of heart beat.

The exact condition of the CO_2 in the blood is not known. The fact that part is in solution and part is in combination renders a mathematical presentation only approximate.

Eight volumes per cent. CO_2 equals 80 volumes per liter. Calculated from H as 0.0896 grams this would equal 1.9712 grams CO_2 and equal 2.7777 grams of H_2CO_3, or approximately the equivalent of $N/10$ H_2CO_3 between the left and the right sides of the heart. Assuming this to be ionized we should have an electromotive force represented by the formula below.

$$\text{(Jones)} \qquad \pi = .0002 \frac{u - v}{u + v} T \log \frac{C_1}{C_2}$$

at 25° C. or since the valence of the positive negative ions may vary

$$\text{(Jones)} \qquad \pi = \frac{\frac{c}{v} - \frac{a}{v'}}{c + a} 0.0002 T \log \frac{P_1}{P_2}.$$

To test the theory we perfused several mammalian hearts (cats') with blood oxygenated on one side and carbonated on the other. The technical difficulties of keeping the two separate were not completely overcome, but sufficiently so to convince us that there was no effect aside from the usual carbonate action.

Parts of the turtle ventricle or the whole heart was split so that each end could be immersed in a separate saline bath through which CO_2 and O could be forced. One end was bathed in CO_2 and the other in O. The whole was so arranged that a tracing could be recorded.

The results obtained were no different from those with the mammalian heart. The addition of $NaHCO_3$ gave the same action irrespective of whether it was added to either or both sides of the heart. Our results would indicate that the difference in CO_2 between the left and right sides of the heart has no influence on the rate or strength of the beat of the isolated organ.

This does not preclude the probability that CO_2 has an influence direct or indirect on the heart beat of the intact animal. Its known action on the dissociation of hemoglobin and the probable similar action on other salts renders the view highly probable that carbon dioxide is a factor in the automatism of the heart.

Hugh McGuigan,
R. H. Nicholl

St. Louis,
October 6, 1909

The Influence of Chemicals in Stimulating the Ripening of Fruits

Various chemical and physical methods of bringing on latent physiological processes in plants have long been known. Buds have been brought into full blossom for commercial purposes weeks before their natural time by the application of anesthetics, and Molisch has lately accomplished the same result by the use of hot water. The Arabs have also applied cloths moistened with vinegar to bunches of dates in order to "sweeten up" retarded fruits.

Following this lead, the writer has succeeded in ripening the fruit of a seedling date into a perfect commercial product in less than three days. The flavor of the chemically stimulated fruit is fully equal to that of the best naturally ripened, and a much greater evenness of ripening is obtained than when left on the tree. The sprays of fruit are subjected to the vapor of acetic acid for twelve or fifteen hours. At the end of this time they have become transparent nearly to the seed and will then ripen naturally without further treatment. The process can be accelerated by exposing them to sunshine, or more rapidly by heating for some hours to forty-five degrees centigrade. The process, it is anticipated, will permit the shipping of dates green and ripening them at their destination as bananas are now handled.

The fresh ripe date is very soft and prone to sour quickly, while the unripe fruit is very firm and not easily bruised. Furthermore, the