

Paraphysis in Amia, by A. C. Eycleshymer and B. M. Davis. This paper describes and fully illustrates the early development of the same structures treated in the preceding article; each, therefore, supplements the other. The first vesicle of Hill (*i. e.*, the smaller more cephalic vesicle and the one termed 'secondary vesicle' by Eycleshymer and Davis) arises as an evagination from the dorsal wall of the other vesicle and some four or five days later.

It then shifts to the left side (occasionally to the right) and in one instance was seen to receive nerve fibers from the superior commissure. A critical review of the theories of the relation of the epiphysial outgrowths to the segmental sense organs follows.

The editor-in-chief gives a few aphorisms on 'The Ethics of Criticism,' which, though trite, are not, perhaps, wholly unnecessary.

SOCIETIES AND ACADEMIES.

CHEMICAL SOCIETY OF WASHINGTON; THE 94TH REGULAR MEETING, MARCH 11.

The first paper, 'Some Theories of Crystal Structure,' was by Mr. Wirt Tassin. After reviewing earlier hypothesis the author took up the more recent structural theory of Federow and Schonflies, which requires only that the structure of the crystal consist of similar molecules and allows the chemist and the physicist to decide the character of these molecules. It was pointed out that the essential difference between the Sohnckian hypothesis and that of Schonflies was that Sohncke requires that, in a system of points which is to have the characters required by a crystal structure, around every point the arrangement of the remainder is the same as around every other point; and all of his structures are derived by moving one point to another by sliding, rotating and screw motions. Schonflies, on the other hand, defines a crystal as 'consisting of absolutely similar molecules, so arranged that each molecule is environed in the same way by all the other molecules,' so that one part of the system may be derived from the other by reflection. Mention was made of Harlow's work and examples given, and the paper closed with a list of predictions of new compounds which have been

verified and which were based upon theories treating of the relations between form, structure and composition.

As a supplement to Mr. Tassin's paper, Dr. F. K. Cameron read a short résumé on 'The Effect of Substitution on Isomorphism and Crystal Structure in Organic Compounds.' Substitution may cause the system to increase or diminish in symmetry or may cause the lengthening or shortening of axes. With the substitution of one or a few atoms by other atoms or groups the system generally changes and to one of less symmetry. If all, or nearly all, the equivalent atoms or groups are placed alike the derivative generally regains the symmetry of the original substance. The effect of substitution on crystal structure was illustrated by a comparison of the benzol and of the ammonium platino-chloride compounds. Neither (OH) nor (NO₂) seem to have much morphotropic value. Repeated substitution in the platino-chlorides often restores the symmetry of the mother substance, but the substitution of ethyl brings about a complete change.

Messrs. Wm. H. Krug and J. E. Blomen presented a paper, entitled 'A Recalculation of Wein's Table of Starch Equivalent to Copper Found Based on the Factor 0.92.' Starch or dextrine can be directly obtained from the copper found by converting the starch into dextrine and determining the latter with Allihn's solution. This table is based on the factor 0.90, which assumes that the formula of starch is (C₆H₁₀O₅)_n and that it is all converted into dextrose. Nægelli determined the formula of starch to be C₃₆H₆₂O₃₁, and if this is correct the factor becomes 0.918. Ost, working with the Sacchse method, decided upon the factor 0.925. In view of all these conflicting data Wiley recommends the factor 0.92, a man between the two last cited, which will give the analyst fairly accurate results. This factor has been used in the recalculation of the table.

The last paper, entitled 'Malt Wine,' was read by Dr. D. J. Kelly. He pointed out how Ordonneau, Jacquemin, Tettelin, Rommier and Sauer recognized the profound changes produced in the fermentation of a sweet liquid according to the kind of ferment employed. They found that when the juice of

a poorer variety of grape was fermented by the aid of the ferment peculiar to a choicer kind it became a wine having many of the characteristic properties of the better kind; a solution of sugar and water, to which appropriate yeast food and then wine ferment was added, was fermented and submitted to distillation; the result resembled brandy. When ordinary malt-wort is sterilized, and then, instead of being fermented with the usual *saccharomyces cerevisiæ*, or brewers' yeast, is fermented with the *saccharomyces ellipsoideus*, or fruit yeast, the resulting liquid resembles a fruit wine, and the liquid distilled therefrom a brandy. In his recently patented process Sauer ferments a sterilized malt-wort by a pure culture of a ferment derived from the bloom of the sherry or the Tokay grape, modifying the old process in certain important details, and obtains wine specimens of which were submitted to the audience and pronounced to be scarcely distinguishable, if at all, from the genuine articles. Dr. Kelly suggested that possibly the substitution of a properly selected grape or other wine yeast for that now employed in the process of bread making might be found to modify very agreeably this article of daily consumption.

V. K. CHESNUT,
Secretary.

ZOOLOGICAL CLUB, UNIVERSITY OF CHICAGO—
MEETING OF APRIL 14, 1897.

THE results of a study of the marine fauna of San Diego Bay, Cal., during January, February and March of the current year were presented. Specimens of most of the forms alluded to in the lecture were exhibited, among others *Renilla amethystina*, five new species of Polyclads, specimens of the Annelids *Phyllodoce*, *Polyophthalmus* and a huge *Amphitrite*, with its giant commensal *Polynoë*, specimens of several Crustaceans (two species of *Callinassa*, *Limnoria terebrans*, with wood showing its borings, *Pollicipes polymerus* and its egg masses, etc.). Several species of Polyplacophora, Opisthobranchs and specimens of *Octopus punctatus* were exhibited. Special attention was devoted to the Dicyemidæ, collected from the kidneys of over 100 *Octopus*. It was shown that three species of this peculiar group of parasites may be recog-

nized on the Pacific coast, each belonging to a different genus and all new to science. There is a species of *Dicyema* to which the name *D. coluber* may be given and which, like its European congeners, has four metapolar cells in its calotte. A species of Professor Whitman's genus *Dicyemene* and named *D. Whitmanii* has five metapolars. The third species belongs to a new genus which will be called *Dicyemodoca* (*D. sceptrum*, n. sp.). It has six metapolars and the parapolars are very short and broad, clasping the bases of the inflated metapolars like a collar. All the Pacific Dicyemidæ observed have orthotropical calottes. Some new facts concerning the sequence of the two peculiar forms of embryo during the life of the parent *Dicyema* were presented. In its youth *Dicyema* produces only the so-called vermiform embryos, but later only infusoriform embryos are developed within the axial cell. This is the reverse of the sequence formerly advocated by Professor Whitman, and would seem to indicate a relationship of the Dicyemidæ to certain Plathelminths; the series of vermiform embryos being perhaps comparable to the sporocyst and redia generations, the infusoriform embryo to the cercarian stage of the Trematodes. According to this view the adult of *Dicyema* is still to be found.

Of the Chordata several forms were exhibited—specimens of a huge red *Cynthia* and masses of *Ciona intestinalis* from the piles at Coronado, also several specimens of *Branchiostoma* (*Amphioxus*) *elongatum* (one measuring 90 mm.), dredged near the entrance to San Diego Bay. Considerable attention was paid to the viviparous Teleosts, more than forty species of which (Scorpenidæ and Embiotocidæ) occur at San Diego. These are all shore fishes and have become viviparous in adaptation to their littoral habitat. If the eggs were laid loosely in the water and allowed to float like the pelagic fish eggs they would readily drift ashore and perish; if attached to the rocks or bottom they would easily be destroyed by predaceous members of the very rich littoral fauna, unless guarded by the parent fish, as in the case of *Porichthys*, or hidden away under stones, as in the case of some of the Pacific shore fishes. When it is remembered that many of the viviparous Teleosts (especially the Embiotocidæ) live in

the surf on sandy beaches it will be seen that viviparity is a necessary condition of existence with these forms. A full series of the eggs and embryos of *Cymatogaster aggregatus* and the adults of this and five other species of Embiotocidæ were exhibited. Attention was also called to a number of specimens of the singular little blind fish (*Typhlogobius californiensis*, which lives in the burrows of *Callianassa* under rocks at Point Loma, near San Diego.

WILLIAM MORTON WHEELER.

NEW YORK ACADEMY OF SCIENCES—SUB-SECTION
OF PSYCHOLOGY AND ANTHROPOLOGY,
APRIL 26, 1897.

THE Academy met with Professor Thomas R. Price in the chair. The following papers were presented: 'Mental Imagery,' by Mr. W. Lay. The paper was a brief report of the result of two years' study and research. Of one hundred and twenty-five New York artists, the speaker found but three or four who exhibited the extraordinary degree of the power of visualizing which might be looked for in individuals trained to observe things from a purely pictorial standpoint. One hundred and fifty college students gave the same result. The speaker described the methods and gave the results of his experiments on himself to determine in terms of what sense the content of his own train of thought was chiefly composed. He has studied also the elements of mental imagery to be discovered in language and the visual, auditory and other imagery in poetry.

'Visual After-images,' by Mr. S. I. Franz. The speaker first described a typical after-image and referred to the interest the phenomena had aroused, as shown by the number of prominent scientists that had discussed them. Their importance was shown both for a correct theory of color vision and epistemologically as connecting links between sensation and memory and imagination. Experiments on the production (*i. e.*, the threshold) and on the duration were then described, and curves showing the results obtained were exhibited. The psychic relations of the different physical variables (*viz.* time, area and intensity) were discussed. The great individual variations, particularly in the coloration, showed that the after-image is not

simple but exceedingly complex, and that the present theories to explain the phenomena are inadequate.

LIVINGSTON FARRAND,
Secretary *pro tem.*

THE ACADEMY OF SCIENCES OF ST. LOUIS.

At the meeting of the Academy of Science of St. Louis, held on the evening of May 3, 1897, 21 persons present, Mr. H. Von Schrenk spoke of the respiration of plants, with special reference to the modification of those growing with their roots submerged in water. The lecture was illustrated by a demonstration of the liberation of carbon dioxide in respiration, from the roots of an ordinary flowering plant and freshly gathered fungi, and the more usual ærenchyma structures were made clear by the use of lantern slides.

Professor F. E. Nipher described a simple means of measuring the resistance of a tube to the flow of a current of air, when compared with an accepted standard, by the use of a tubular device similar in principle to the Wheatstone bridge, used in electrical instruments; the apparatus, in the present instance, consisting of parallel tubes filled with air, connected by a tubular bridge, in the middle of which a drop of water was placed, so as to change position with the variations in the flow of air on the one hand or on the other.

WILLIAM TRELEASE,
Secretary.

NEW BOOKS.

- The Development of the Frog's Eggs; an Introduction to Experimental Embryology.* THOMAS HUNT MORGAN. New York and London, The Macmillan Company. 1897. Pp. x+192.
- Navahoe Legends, collected and translated by* WASHINGTON MATTHEWS. Boston and New York, Houghton, Mifflin & Co. 1897. Pp. viii+299.
- Introductory Course in Differential Equations.* D. A. MURRAY. New York, London and Bombay, Longmans, Green & Co. 1897. Pp. xv+234.
- The Science of Speech.* ALEXANDER MELVILLE BELL. Washington, D. C., The Volta Bureau. 1897. Pp. 56.