We fully agree with the author when he states:

> Proportion is a principle in nature which is a purely mathematical one and to be rightly interpreted by man through the means of geometry; therefore geometry (?) (mathematics) is not only the gateway to science but is also a noble portal opening wide into the realms of art. Still to a great majority of artists, and to the world at large, the effort to relate science with art is now looked upon with the greatest disfavor and even repugnance, and this accounts in a measure for the overwhelming percentage of immature work which characterizes all branches of art in our times.

It would be another extreme, however, to try to explain all natural forms and everything in art by stereotype mathematical laws. This would soon lead to barren formalism and sterility. True art in many of its phases must conform with mathematical, or, more generally, scientific principles. But it can not live without the inspiration derived from physiological and psychological factors.

Colman's book on "Nature's Harmonic Unity" serves a very noble purpose: a rational appreciation of beautiful natural forms and, based upon it, the cultivation of a truly artistic spirit.

It is for this reason that, in spite of its defects, we wish a large circle of readers for it.

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A Revision of the Amphibia and Pisces of the Permian of North America. By E. C. Case. Washington, Carnegie Institution, Publication No. 146. 1911. Pp. 179, text figs. 56, plates 32.

This monograph is the third of a series by Dr. Case on the Permian vertebrates of North America. The work is divided into five parts: an historical review, a systematic revision, and a morphological revision of the Amphibia, a description of some Permian insects by Dr. E. H. Sellards, and a review of the Permian fishes of North America by Dr. Louis Hussakof. The historical review shows the development of the taxonomy and nomenclature of the Permian vertebrates from the earliest descriptions by Cope in 1875 to the time of publication.

In the systematic review the author has been very conservative and has rejected the more recently proposed classifications of the Amphibia. The one adopted is, in general, that most commonly in use for the Stegocephalia. Under this order two suborders are recognized, the Microsauria and the Temnospondyli. The author has used the term Microsauria (with question) in the sense commonly employed and has made no attempt to define this sadly mixed group. To it are referred the family Diplocaulidæ and genus *Diplocaulus*. The suborder Temnospondyli is divided into two groups, the rhachitomous and the embolomerous. Under the first division are placed 12 genera arranged in five families: family, Eryopidæ, genera, *Eryops, Parioxys, Anisodexis* (?), and *Acheloma;* family, Trimerorhachidæ; genera, *Trimerorhachis, Tersomius* and *Zatrachys;* family, Dissorhophidæ, genera, *Dissorhophus, Cacops* and *Alegeinosaurus;* family, Aspidosauridæ, genus, *Aspidosaurus;* family, Trematopsidæ (not Trematosauridæ), genus, *Trematops* (not *Trematosaurus*). The embolomerous division is represented by the family Cricotidæ and genera *Cricotillus* and *Cricotus*. Under the heading, "Incerte sedis," are placed, family, Crossotilidæ, genus, *Crossotelos;* family, Gymnarthridæ, genera, *Cardiocephalus* and *Gymnarthrus;* all referred to the suborder, Gymnarthria. Under the second order represented, the Urodela, is placed the family Lysorophidæ and genus *Lysorophus*. In this Dr. Case agrees with the majority in considering *Lysorophus* an amphibian in opposition to the few that still believe it a reptilian form. At the end of this section is a set of tables showing the characteristics of the various families, genera and species. These are so arranged that the related forms can readily be compared.

In the morphological revision the following genera are treated in detail: *Diplocaulus, Eryops, Acheloma, Trimerorhachis, Zatrachys, Dissorophus, Cacops, Gymnarthrus* and *Lysorophus,* genera which, till recently at least, were but little known. In an attempt to bring the publication up to date the author

has drawn freely from Williston, Broili and others in this part of the work.

The description of two new cockroaches by Dr. Sellards is of special interest, as these are the first insects to be described from the Permian of Texas.

In the discussion of the Permian fishes of North America, Dr. Hussakof points out that Cope, in a series of papers between 1875 and 1894, created several species without justification because of too fragmentary material or the failure to allow for individual variation. Through a restudy of Cope's types in the American Museum, the Gurley Collection at the University of Chicago, and with the addition of new material, Dr. Hussakof has added four new genera, which makes 14 in all. Curiously enough, however, because of subtractions and additions, the number of species is 22, the same as was given by Cope. In an appended table of comparisons some interesting things are brought out; it is pointed out that the Illinois fish fauna, with the exception of one group, the Petalodontidæ, is duplicated in the Texas fauna, a condition that indicates a close relation between the faunas of these two remote regions. A comparison of the Texas fauna with that of Bohemia shows a marked difference in the genera of the two localities, although, with one exception, the groups represented in each are the same. From this the author draws the conclusion that although the faunas must have arisen from a common stock, the two regions had long been separated before Permian times.

Through oversight, most likely, a few mistakes, of minor importance, perhaps, have been made to which attention should be called. The statement is made that *Ophiacodon mirus* Marsh and *O. grandis* Marsh, which Marsh considered reptiles, "are clearly amphibians of uncertain relationships." Williston has recently shown that *O. mirus* is a reptile and that *O. grandis* belongs with *Eryops*.

Pleuristion, which is evidently considered an amphibian and is placed under the Gymnarthria without comment, was treated by Dr. Case in his "Revision of the Pelycosauria" (p. 27). Here he is in doubt as to whether the genus is more closely allied to the Pelycosaurs or the Cotylosaurs. From evidence furnished by the humerus, as described and figured by Williston, as well as the vertebræ, *Pleuristion* is, in all probability, a cotylosaur and probably a member of the Captorhinidæ.

In the description of the humerus of *Diplocaulus* (p. 90) Dr. Case expresses the opinion that it may be reptilian. To quote:

"This [*Diplocaulus*] is the single case among the *Amphibia* of the Texas Red Beds, or their equivalent elsewhere, in which the entepicondylar foramen has been found in the humerus. The opening in the humerus of *Acheloma cumminsi* is purely accidental in the opinion of Williston, Broom and the author. For this reason it is possible that the humerus may be reptilian and in accidental association."

This hardly seems possible as these humeri are found associated with many specimens of *Diplocaulus* in the University of Chicago collection. And, furthermore, according to Broili, *Cochleosaurus*, an Upper Carboniferous Temnospondyl, has the entepicondylar foramen present in the humerus.

The present work will be of great interest to all paleontologists and of inestimable value to the student of Permian vertebrates. The compilation is so complete that it will no longer be necessary to turn to the original papers on these groups for the information desired. The text is illustrated with a great many new figures as well as copies after Broili, Williston and others. The plates, too, are worthy of special mention.

MAURICE G. MEHL

NOTES ON INFECTIOUS ABORTION IN CATTLE

IN recent numbers of SCIENCE Dr. Russell[1] and Dr. MacNeil have called attention to the fact that infectious abortion of cattle in this country is undoubtedly caused by the same organism as that found in Europe. It may

[1] Russell, H. L., SCIENCE, N. S., Vol. XXXIV., October 13, 1911, p. 494. MacNeil, W. J., SCIENCE, N. S., Vol., XXXIV., December 22, 1911, p. 874.