

It can readily be seen that this scheme would synchronize the days of the week, the month, and the year, throughout.

The international commission above referred to seems to have faded out with the advent of the war.

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SCIENTIFIC BOOKS

A Check List of North American Amphibians and Reptiles. By LEONHARD STEJNEGER and THOMAS BARBOUR. Cambridge, Massachusetts, Harvard University Press. 1917. 125 pages.

The check list of North American reptiles and amphibians which has recently been published will undoubtedly initiate a new period in the herpetology of the continent, for it appears opportunely and has been carefully prepared by the two foremost students of the subject.

There has long existed an urgent need for such a work. The last check list (Garman, 1884) was superseded by Cope's monographs on "The Batrachia of North America" (1889) and "The Crocodilians, Lizards and Snakes of North America" (1900) which have remained the most recent attempts toward complete lists. Cope's books contain many inaccuracies, and since their appearance the field work of a number of museums and the studies of several investigators have materially increased our knowledge of the subject. The results of recent studies have appeared in excellent monographs, such as Dickerson's "The Frog Book," Van Denburgh's "The Reptiles of the Pacific Coast and Great Basin," and Stejneger's "The Poisonous Snakes of North America," and in numerous, small, widely scattered papers, many of which are only to be found in the large libraries. The result of the unorganized condition of the subject was that only the herpetologist knew what forms were to be recognized, and, owing to the chaotic condition of the nomenclature, only the specialists who had access to the large and older collections were in position to decide upon the names that should be used.

The check list evidently is not a mere list of described forms, but represents an attempt at a rather thorough reorganization of the systematic herpetology of the area which it covers. As stated in the introduction, it "has been prepared generally upon the lines of the American Ornithologists Union Check List of Birds, and, following that example, it has included the species and subspecies which the authors deem valid and of certain occurrence in North America, north of the Rio Grande, and in Lower California, Mexico." Certainly a painstaking attempt has been made to rectify the nomenclature, and just as certainly no two investigators were better qualified for the task than Dr. Stejneger and Dr. Barbour. Their ability, experience and knowledge of the subject, evidenced in their contributions to the field of systematic herpetology, and the fact that they are curators of the two largest and oldest collections of amphibians and reptiles in America are generally known, and their names on the title page will at the same time give herpetologists confidence in the work and give the book an authority that it would not have otherwise. This is very fortunate not only because the check list was needed, but also because it was time that an authoritative work appeared which could by emendations be perpetuated as has been the check list of the American Ornithologists Union.

The arrangement of the subject-matter is excellent. It may be described as follows: The genera and higher groups are in systematic sequence; the species are in alphabetic order and only those believed to be valid are included; the names are followed by citations of their original appearance except in the case of family names, which are formed automatically; the reference to the original description is followed in the case of genera by the type species, in the case of species by a reference to the first appearance of the name in the combination adopted; under each species a reference is then given to Cope's "North American Batrachia" or "The Crocodilians, Lizards and Snakes of North America"; and finally the type locality and the range of each species or subspecies is given.

One of the features of the work that will command attention is the nomenclatural changes. Such old friends as *Diemyctilus*, *Ambystoma punctatum*, *Spelerpes*, *Bufo lentiginosus*, *Eumeces* and *Elaps*, are supplanted respectively by *Notophthalmus*, *Ambystoma maculatum*, *Eurycea*, *Bufo terrestris*, *Plestiodon* and *Micrurus*. That much abused name *Coluber*, which has probably been attributed to more groups of snakes than any other and was finally (1907) given by Stejneger to the old-world vipers of the genus usually known as *Vipera*, is now given to the racers (*Zamenis*). Perhaps the most curious changes are in the names of the northeastern hognosed snake, hitherto *Heterodon platyrhinus*, and the copperhead, generally known as *Agkistrodon contortrix*. The former becomes *Heterodon contortrix*, the latter *Agkistrodon mokasin*. It is unfortunate that it has been found necessary to make so many changes in the names, but it can not be denied that the nomenclature in these groups was in need of revision and that the only way to secure stability in nomenclature is to adhere to the rules which have been adopted for determining the names which shall be used.

The stand which the authors have taken on the question of trinomials is commendable. "As for the admission of subspecies—or rather trinomial designation—for certain forms no special attempt has been made at consistency, the authors on principle leaning towards binomials in all cases where the need of trinomials has not been clearly established." This is precisely the method which if followed will permit advancement in our knowledge of relationships in these groups. To conceal the fact that a form is a true species by the use of a binomial designation is quite as bad practise as to use trinomials loosely and thus destroy their significance.

There is abundant evidence that the writers have made a critical study of the status of the species which have been described. There will be differences in opinion here, and more particularly as our knowledge increases, but the rejection of a considerable number of forms which are not valid and which have been a

source of confusion will be of distinct advantage to the student. With good judgment the authors have been conservative in this matter. They could not be expected to examine the status of all of the more recently described forms nor to make detailed studies of the genera which are notoriously difficult, and they have adopted the rule of accepting "the judgment of reliable workers . . . where no special reason appeared to contraindicate the validity of the form."

The geographic data will appeal to the student who has had to search through an extensive literature to determine the range of a form, and who has frequently encountered difficulties in determining type localities. Too often the type localities have been omitted or only generally stated in the original descriptions, and it is fortunate that in this book "The type localities are as exact as it is possible to determine." The authors admit that this can not be said of the ranges. "Many are obviously faulty, but a sincere attempt has been made to collect records of authentic captures; however, with a literature so extensive and so scattered, records have almost surely been overlooked. In many cases, our knowledge does not warrant drawing hard and fast lines delimiting a form's occurrence, and we often state ranges in purposely general terms." A perusal of the work will show that the ranges are fairly well defined. There are, however, a number of inaccuracies in the summaries, and the subject has received unequal treatment. Thus *Rana sylvatica* does not extend westward to the Great Plains, *Rana cantabrigensis* extends eastward to Wisconsin and Michigan, *Eumeces skiltonianus* is not confined to California but ranges eastward through Nevada to Utah, and the ranges as given for *Pituophis sayi* and *Natrix sipedon* are too general to be of much use. One may grant the difficulties in gathering all of the records and in drawing definite boundaries, and recognize that too much detail would make the check list cumbersome, but it is suggested that the value of the book would have been greater if the ranges of the amphibians, lizards and snakes had been as uniformly well defined

as have been the ranges of the turtles. A knowledge of the distribution is of assistance to the herpetologist for the clues to relationships which it gives, it aids the student who is not an expert herpetologist to identify his specimens, and it encourages geographical studies and the publication of local lists. In view of its importance in systematic work the subject may well receive careful attention in lists of this kind.

It should not be concluded that the value of the check list is seriously impaired by the shortcoming just mentioned. The criticism is meant to be constructive, for it must be the hope of all herpetologists that this very useful book will be the first edition of a permanent check list. That it may be, the reviewer suggests that it be officially adopted by the American Society of Ichthyologists and Herpetologists, and that the authors be appointed permanent editors.

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SPECIAL ARTICLES

IDENTITY OF ATOMIC WEIGHT AMONG DIFFERENT ELEMENTS

AUGUSTE PICCARD has recently suggested¹ that the "element" uranium may be composed of three isotopes, there being in addition to uranium I. and its descendant uranium II. a long-lived element of atomic weight "about 240" which is the parent of the actinium series of elements, but has no genetic connection with the uranium series. This "actino-uranium" is supposed to undergo an alpha ray change to form uranium Y, which through uranium Z gives rise to the actinium elements. The hypothesis is attractive for three reasons. It establishes the actinium series as a wholly independent series, as the Geiger-Nuttall relationships between the half-life periods and the alpha ray ranges seem to demand. It gives a plausible origin for the puzzling uranium Y. Finally, it accounts for the fact that the atomic weight of uranium, instead of being, as would be expected, just

twelve units higher than that of radium, *i. e.*, 238.0, is 238.167 according to Hönigschmid's authoritative work; for Piccard assumes that the atomic weight of uranium I. itself, the chief constituent of the uranium pleiad, is 238.0 and that the admixture of the heavier actino-uranium is responsible for the higher value from the analytical determination.

This hypothesis is so attractive that Wolfke² has already issued a copy of the periodic table of the elements in which the actinium elements are given atomic weights which follow from the assumption that the weight of actino-uranium is 240.0. It should be pointed out, however, that this assumption tacitly involves the statement that two elements may occupy the same position in the periodic table, as is commonly accepted for the isotopes, and may in addition have identical atomic weights and yet be different elements. This is a new type of isotopism. In the lead pleiad there are seven elements with atomic weights ranging from 206 to 214, all with identical chemical properties though differing in stability and in their radiations. According to Wolfke's table not only is the range of atomic weights in this pleiad extended to 216 (for actinium B) so that it covers fully ten units of atomic weight, but there are two elements, actinium D and thorium B, both of which have an atomic weight of 212 and which are therefore identical in atomic number and atomic weight, and yet the former is apparently stable while the latter has a half-life period of 10.6 hours and emits beta rays. Actinium C¹ and thorium A form another such a pair of elements, actinium X and mesothorium 1 still another, while the identity between radio-actinium and thorium itself is perhaps even more striking. With the same atomic number and atomic weight, they are chemically inseparable, they both give alpha rays, yet their periods are 18.9 days and 1.5×10^{10} years, respectively, and their descendants are quite distinctive.

According to this hypothesis, then, the atomic weight is almost wholly devoid of in-

¹ *Archives des Sciences Physiques et Naturelles*, 44, 161-64, 1917.

² "Ueber den inneren Bau der Atome," Zurich, 1917.