since St. Paul if not since Moses, and George Owen the greatest all around athlete since young Hercules went to school, and Henry Ford introducing the only fundamental change in personal transportation since we first got up on our hind legs, not to mention Bernard Shaw, who mentions himself well up in front of Shakespeare, we may well fear that our headline ridden and billboard laden civilization is getting into that unstable condition of tension found in the frog who would be as big as an ox and that like him we may suddenly explode; however, we should not overlook the stabilizing and cohering tendency of the great fundamental advance in social responsibility from Cain to Wayne B. Wheeler, *μηδὲν ἄγαν*.

There are two trivial things about this book that I might criticize adversely. First, there are far too many centenarians in some of the tables; it would have been better to curtail the tabulation with an (obvious) explanation of why the method broke down at advanced ages. Second, in the introductory remarks we are told that Archimedes had laid the essential foundation for an integral calculus about 500 B. C.; even with modern mechanistic theories of heredity, it is doubtful if one can really establish a priority dating from the fifth (ca.) ancestral generation. It should be mentioned that the first 104 pages of the book are practically a verbatim reprint of those parts (pp. 188–277) of the author's "Mathematical Theory of Probabilities" which deal with frequency functions.

EDWIN B. WILSON
HARVARD SCHOOL OF PUBLIC HEALTH

A Check List of North American Amphibians and Reptiles. By LEONHARD STEJNEGER and THOMAS BARBOUR. Second Edition. Cambridge, Massachusetts, Harvard University Press, 1923. 171 pages.

SINCE the first edition of the check list, in 1917, there has been considerable activity in the study of North American reptiles and amphibians. Just how much of the interest in this subject has been due to the first edition can not, of course, be determined, but it scarcely needs to be said that the first list has at least been of great assistance to students. The second edition should be as valuable as the first, since it not only brings together the results that have been obtained in the intervening period but also corrects most of the mistakes and many of the imperfections which marred the first volume.

The progress in North American herpetology since 1917 is shown in part by the larger size of the second edition. One hundred forms have been added to the list, of which 71 have been described since the first list, 26 were previously described, two are introduced forms, and one—a Mexican species—has had its range extended into North America. Three species or subspecies have been relegated to the synonymy and eleven have been dropped. The total number of species and subspecies recognized in 1923 is thus larger by 86 than the number occurring in the 1917 list. It may be added that the check list recognizes 591 forms in the region covered: "North America, north of the Rio Grande, and in Lower California, Mexico."

The increase in the number of recognized forms during the past five years is evidently, at least to the herpetologist, not due in any large part to an epidemic of splitting. Students of North American reptiles and amphibians continue—and for this let us return thanks—to be sane (conservative) in their analytical work, although signs are not wanting that investigators in this field are not uninfluenced by the activities of their colleagues in ornithology. The additions to the 1917 check list recorded in the second edition are mostly the result of monographic revisions of hitherto neglected groups and the study of collections from regions only recently explored.

As was to be expected from the reputation of the authors, the second edition has been carefully revised. Several slips in the alphabetical arrangement of species in the first volume have been corrected; a serious attempt has been made to remedy the imperfections in the descriptions of ranges in the earlier edition; and a table of contents and index have been added. The book is carefully edited, and the excellent typography and arrangement of the first edition have been used. Particularly to be commended is the care which has been exercised in the spelling and accenting of Spanish place names.

While it is not to be expected that no fault is to be found with the revised edition, students will be loath to criticize it. The preparation of such a list is a time-consuming and tedious work, and this one will be so useful and is on the whole so well prepared that to hint a fault is to appear ungrateful for the disinterested efforts of the authors. The very excellence of the work, however, makes it imperative that its imperfections be recognized, for, even though no other editions are issued—and this would be regrettable—it will serve as a foundation and model for future lists.

There is still room for improvement in the matter of recording distribution. Reference is not made to such obvious errors as the extension of the range of *Lampropeltis getulus getulus* to include southern New England, which will not confuse herpetologists, but to the inadequacy of many of the descriptions. The authors are here confronted with difficulties. They must secure brevity; and the delineation of ranges often means the looking up of literature and the verifying of references in proportion to the thoroughness desired. The reviewer notes several ranges, however, which could be recorded in as few words, and more

perfectly, by taking the descriptions from recent monographs.

No attempt is made to give synonyms, the references being mostly to original descriptions and to the first use of the name in the approved form, as in the first edition. If this plan were followed consistently, all the 17 names dropped from the first edition would disappear. As it is, six are given as synonyms and eleven are not referred to. The inference is that names which have disappeared have been placed in synonymy by the last reviser, but in some cases names have been omitted on the basis of revisions which are still in manuscript form. This is certain to cause some confusion. Either the names omitted should have been only those relegated to synonymy in published papers, or, and we believe preferably, all names placed in synonymy since the 1917 list should appear as synonyms in the second edition.

The authors of a work of this kind face a difficult task. Either they must attempt to evaluate every form and group proposed, which, if possible, would inject the personal element into the work; accept the word of the latest reviser, no matter how questionable this may appear; or steer a middle course, which lays them open to a charge of inconsistency. Anticipating criticism, the authors have kept fairly well to the middle of the road. They have been conservative in accepting changes in the genera and higher categories, and have refrained from accepting some of the most questionable of the new subspecies. They have, in general, however, adopted species and subspecies without question, and, while this is a necessary procedure in a list compiled by only two men, the results are not entirely happy. The acceptance of forms without careful scrutiny gives chief importance to lateness of publication, and the last word is not always the best word. Students differ in their evaluations of characters and variations, and to accept all or even most of the forms proposed is to represent no one's opinions of the composition of some genera. Perhaps no harm is done by this procedure, but one may venture the suggestion that the list would be of even more value if the names were more authoritative. This could be accomplished by a committee on nomenclature of the American Society of Ichthyologists and Herpetologists.

The second edition is quite free from typographical and other minor errors. We note a misprint in the footnote reference to *Natrix fasiata confluens* Blanchard: the type locality is in Missouri, not Michigan, as stated. A subspecies which was apparently missed is *Diadophis amabilis modestus*. In the case of *Chrysemys marginata bellii* the variety name antedates the specific name, so that the two forms should be known as *Chrysemys bellii bellii* and *Chrysemys bellii marginata*.

Herpetologists will be pleased that such a necessary work has been so well done and will not be slow to acknowledge their debt to the authors.

ALEXANDER G. RUTHVEN
MUSEUM OF ZOOLOGY,
UNIVERSITY OF MICHIGAN

LABORATORY APPARATUS AND METHODS

THE EMANATION METHOD FOR RADIUM

IN order to make accurate radium analyses or to calibrate a beta-ray electroscope, it is customary to use the emanation method as developed by Schlundt and Moore,[1] and Lind.[2] This involves a boiling off of the emanation from the radium solution, after which it is sealed and allowed to stand from several days to a month in order to allow the emanation to grow. Various methods of sealing have been used in the past with more or less success. If great accuracy is not desired, and the sample is only allowed to stand several days, fairly good results can be obtained by using a one-holed rubber stopper carrying a glass tube. The glass tube is surmounted by a short piece of pressure tubing which can be closed by a Hoffmann pinchcock. It is somewhat safer to draw out and seal off the glass tube, but best of all if the glass tube is sealed directly to the flask and then drawn out and sealed off.

An alternative method which might be suggested would be to seal a large bore stopcock to the flask directly, and keep the stopcock well seated by means of a special stopcock clamp. A heavy saturated stopcock grease would have to be used to prevent the formation of striations and resultant leaks. This method would have the advantage of requiring no glass blowing, once the flask with stopcock was made. It would have all the disadvantages ordinarily encountered with stopcocks.

When using sealed glass tips, the tip must be broken off after the flask has been connected by means of tubing to the emanation gas burette. The flask is usually warmed slightly, after which the tip is broken off and the gas boiled over into the burette. Experience has shown that the small end of glass is frequently projected toward the burette and lodges in the lower stopcock, thus preventing further operations, causing the loss of a sample, and even resulting in a serious explosion in case the operator fails to observe that the path has been obstructed.

Dr. Lind[3] suggested placing a plug of platinum

[1] *J. Phys. Chem.*, 9, 320 (1905); Trans. Am. Elect. Chem. Soc., 21, 471 (1912).

[2] *J. Ind. and Eng. Chem.*, 7, 1024 (1915).

[3] *L. c.* 7, 1027 (1915).