

tobacco fields in Kentucky, but an occasional field was found which was entirely free. In each of the latter cases investigated the grower did not use chewing tobacco. The writer has a considerable amount of other evidence indicating the importance of chewing tobacco as a source of plant-bed infection.

Although nearly all the evidence gathered so far points to chewing tobacco made from the natural leaf of the previous crop as the chief source of plant-bed infection, it is possible that commercial tobacco, either raw or manufactured, may have played an important part in the rapid world distribution of the wildfire organism.¹

By properly protecting the seed heads from infection by the use of paper bags, pouring the seed from clipped seed pods, and proper sanitary precautions with respect to the seed beds, it should be possible to control these two destructive tobacco diseases without the use of either seed treatment or dusting and spraying.

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MERCURIC CHLORIDE AS A PREVENTIVE OF CERTAIN DAMPING-OFF FUNGI

In the course of a series of experiments for the control of the root maggot in cabbage seed-beds, a clear-cut relation has appeared between certain of the treatments applied for the maggot and the amount of damage done by soil-infesting fungi, as the *Rhizoctonia* and *Plasmodiophora*.

For the last three years it has been repeatedly observed that the plants in different plats showed a marked difference in susceptibility to such diseases. Some of the treatments used, while thoroughly effective in maggot control, actually increased the liability to loss from such fungous troubles, while others, notably mercuric chloride, very largely prevented the diseases.

In these experiments the mercuric chloride was commonly used at the rate of 1-1200, although dilutions considerably greater than this appear to have distinct value. A series of from one to six applications was ordinarily made in each plat, at intervals of a week or ten days, beginning shortly after the plants appeared through the ground.

Careful examination of such plats showed that while one application gave but little protection, two, and especially three, gave excellent control for *Rhizoctonia*. Under the existing conditions nothing ap-

¹ Since writing the above, the writer has been informed by Mr. Temple Smith, of Victoria, Australia, that these two diseases are unknown there and that he has rarely if ever seen an Australian tobacco grower chew tobacco. He stated that every three or four years they obtain a new supply of seed from the United States.

peared to be gained by a greater number of applications.

This treatment is being tried out on a number of soil-infesting fungi and on different crops, and it seems probable that this method may have a much wider application in controlling diseases of this character on other crops than cabbage.

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SCIENTIFIC BOOKS

An Elementary Treatise on Frequency Curves and their Application in the Analysis of Death Curves and Life Tables. By ARNE FISHER. Translated from the Danish by E. A. Vigfusson. With an introduction by Raymond Pearl. New York, The Macmillan Co., 1922. XV + 240 pp.

NOT many readers of SCIENCE will read Fisher's book; it is not the kind that is read. It is original and arithmetical—two items against it, particularly when taken in conjunction. It has been received both with enthusiasm and with contempt by specialists in its line—two items in its favor. The book undertakes to show that one can construct a life table from a record of deaths at attained ages without knowing the numbers alive. In a variety of worked illustrations of the method, in some of which the author could not have known the numbers living, he has set up a life table that has been shown to be good in so far as the numbers of the living could be ascertained and a computation made in the ordinary way. The working hypothesis is biological in the sense that it is assumed that the different causes of death or groups of causes take their toll of life in a regular or lawful way—that we have diseases and deaths of early, middle and late life. This is not any foolish hypothesis; everybody knows it. But it remained for Fisher to show that what all know he can use in a strictly quantitative way to set up a life table. The technical method of analysis is the Charlier system of frequency curves for handling statistical material, except that Fisher determines the coefficients of the expansions by the method of least squares instead of by the method of moments.

The best review of the book is Pearl's *Introduction* in which the relation of Fisher's work to biological and actuarial science and their intimate relation to each other is exhibited leading to the conclusion that this is *fundamentally* the most significant advance in actuarial theory since Halley. True, doubtless, but how terrifying. What with Einstein making the first fundamental advances in mechanics since Newton, and Mrs. Eddy the greatest religious leader and organizer

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.

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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 unflinching 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