

**THE ZOOLOGICAL BULLETIN OF THE  
DEVISION OF ZOOLOGY. OF THE  
PENNSYLVANIA  
DEPARTMENT OF AGRICULTURE, VOL.  
VI, NO. 4 AND 5 (FOR AUGUST AND  
SEMTEMBER), PP. 106-195**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649440139

The Zoological Bulletin of the Division of Zoology. Of the Pennsylvania Department of Agriculture, Vol. VI, No. 4 and 5 (for August and September), pp. 106-195 by H. A. Surface

Except for use in any review, the reproduction or utilisation of this work in whole or in part in any form by any electronic, mechanical or other means, now known or hereafter invented, including xerography, photocopying and recording, or in any information storage or retrieval system, is forbidden without the permission of the publisher, Trieste Publishing Pty Ltd, PO Box 1576 Collingwood, Victoria 3066 Australia.

All rights reserved.

Edited by Trieste Publishing Pty Ltd.  
Cover @ 2017

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

[www.triestepublishing.com](http://www.triestepublishing.com)

**H. A. SURFACE**

**THE ZOOLOGICAL BULLETIN OF THE  
DEVISION OF ZOOLOGY. OF THE  
PENNSYLVANIA  
DEPARTMENT OF AGRICULTURE, VOL.  
VI, NO. 4 AND 5 (FOR AUGUST AND  
SEMTEMBER), PP. 106-195**



Science Library

QL  
666  
.C5  
S96

THE  
ZOOLOGICAL BULLETIN

OF THE

DIVISION OF ZOOLOGY.

OF THE

PENNSYLVANIA DEPARTMENT OF AGRICULTURE.

VOL. VI, No. 4 and 5 (For August and September).

SUBJECTS: { First Report on the  
Economic Features of Turtles of Pennsylvania.

September 1, 1908.

<sup>arucy</sup>  
<sub>dom</sub>  
H. A. SURFACE, M. S., *Economic Zoologist, Editor.*

ENTERED MAY 1, 1908, AT HARRISBURG, PA., AS SECOND CLASS MATTER, UNDER  
ACT OF CONGRESS OF JUNE 6, 1900.

Copyrighted 1908, by H. A. Surface, Author. Permission to publish extracts, with proper  
credit, is given.

HARRISBURG, PA.:  
HARRISBURG PUBLISHING CO., STATE PRINTER.  
1908.

THE MONTHLY BULLETIN OF THE DIVISION OF ZOOLOGY  
FOR AUGUST AND SEPTEMBER, 1908.

VOLUME VI, Nos. 4 and 5.

Established in April, 1903, at the office of the Economic Zoologist  
Edited by H. A. Surface, Economic Zoologist, Harrisburg, Pa.

CONTENTS OF THE AUGUST-SEPTEMBER BULLETIN.

FIRST REPORT ON THE ECONOMIC FEATURES OF THE TURTLES OF  
PENNSYLVANIA.

	Page.
Preface, .....	107
The Meaning of Classification, Orders, Families, Genera and Species, Common Names, .....	107
The Authority for This Classification and Nomenclature, .....	107
Acknowledgments, .....	108
General Remarks on the Turtles of Pennsylvania, .....	109
What is a Turtle? .....	110
Habits of Pennsylvania Turtles, .....	111
Eggs and Reproduction, .....	112
Hibernation and Capture, .....	113
Notes on Turtles, .....	115
Enemies, .....	115
Protection, .....	116
Economy, .....	117
Families and Species of Pennsylvania Turtles, .....	117
Family I. Trionychidae. The Soft-shelled Turtles, .....	119
Species 1. <i>Amyda mutica</i> (Le Sueur). Leather Turtle, .....	119
Sp. 2. <i>Aspdonectes spinifer</i> (Le Sueur). Common Soft-shelled Turtle, .....	121
Sp. 3. <i>Aspdonectes agassizi</i> Baur. Agassiz's Turtle, .....	123
Family II. Chelydridae. The Snapping Turtles, .....	124
Sp. 4. <i>Chelydra serpentina</i> (L.). Common Snapping Turtle, .....	124
Family III. Kinosternidae. The Box Turtles, .....	122
Sp. 5. <i>Kinosternon pennsylvanicum</i> (Bosc). Mud Turtle, .....	124
Sp. 6. <i>Arochelys odoratus</i> (Latreille). Musk Turtle, .....	125
Family IV. Emydidae. The Pond Turtles, .....	129
Sp. 7. <i>Graptemys geographicus</i> (LeSueur). Map Turtle, .....	140
Sp. 8. <i>Graptemys pseudogeographicus</i> (Holbr.). False Map Turtle, .....	142
Sp. 9. <i>Malaclemmys centrata</i> (Latr.). Diamond-back, .....	143
Sp. 10. <i>Pseudemys rubriventris</i> (Lec.). Red-bellied Terrapin, ..	145
Sp. 11. <i>Pseudemys hieroglyphica</i> (Holbrook). Hieroglyphic Tur- tle, .....	146
Sp. 12. <i>Chrysemys picta</i> (Hermann). Painted Turtle, .....	146
Sp. 13. <i>Chrysemys marginata</i> (Agassiz). Margined Turtle, .....	154
Sp. 14. <i>Clemmys mühlenbergi</i> (Schweigger). Mühlenberg's Turtle, Sp. 15. <i>Clemmys insculptus</i> (Le Conte). Wood Turtle, .....	156
Sp. 16. <i>Clemmys guttatus</i> (Schneider). Speckled Turtle, .....	164
Sp. 17. <i>Emydoidea blandingi</i> (Holbr.). Blanding's Turtle, .....	169
Sp. 18. <i>Terrapene carolina</i> (L.). Common Box Turtle, .....	170
Egg Figures, .....	175
Food of Young Turtles, .....	179
Economic Features of Food of Turtles, .....	180
Plants, .....	181
Flowerless Plants, .....	181
Flowering Plants, .....	182
Animal Material Eaten by Turtles, .....	184
Condensed Food-charts, .....	190
Glossary, .....	193
Bibliography, .....	194
Index, .....	195

# FIRST REPORT ON THE ECONOMY OF PENNSYLVANIA TURTLES.

## PREFACE.

Classification or system is the most remarkable feature in the study of Nature. All living things are to be classified in certain larger and smaller groups, which are again divided and subdivided in regular systematic order until we come to the lowest or most remote group called the "species." This has been regarded as the unit in Nature. Thus, that great Class of Vertebrate animals which always breathe by means of lungs, and are called cold-blooded, have the body covered with scales or plates instead of feathers or hair, and have certain other anatomical characters in common, is called Reptilia or the Reptiles. This great Class is divided into four Orders, three of which are represented in the State of Pennsylvania: The Serpents, the Lizards and the Turtles. Thus it is correct to say that a Turtle is a Reptile.

Our Turtles belong to the Order Testudinata, so named from the Latin word meaning "a tortoise." The Pennsylvania species are included in four Families or major groups of this Order, while these Families are again composed of Genera or smaller groups, and Species, or the last group in the scheme of classification. The scientific name is that of the Genus and Species. Discussions of the individual kinds or species found in this State are here given under the respective scientific names, each of which is given its proper place in the scheme of classification.

There are a great many common names of Turtles, many of which are used for more than one species and are therefore confusing. For this reason we recommend that the first common name here given be used as the real common name for each respective species. However, others that are used in various parts of this State are given in order that readers may recognize the kind to which reference is made.

The authority for the classification here used is the Ninth Edition of the "Manual of the Vertebrate Animals of the Northern United States," by Dr. David Starr Jordan, President of Leland Stanford Junior University, Ninth Edition, 1904, by A. C. McClurg and Co., Chicago, Ill., which has been our standard of authority for the classification and nomenclature of the Bulletins on Vertebrate Zoology

previously issued by this office. However, a recent and undoubtedly more acceptable and proper series of scientific names of Turtles, has recently been published in the proceedings of the Philadelphia Academy of Sciences, by Dr. Arthur E. Brown, Director of the Philadelphia Zoological Garden. If it were not for our established plan to adopt Jordan's Manual as the authority on Vertebrates for our classification of names and Analytic Keys (because this is a book to be found in practically all zoological laboratories and libraries), we should here use the names given by Dr. Brown, but in order to bring these into general use for students, we publish them in brackets, after each of the synonymous names which Dr. Brown regards as needing to be changed.

We offer this Bulletin as a First or Preliminary Report on the Turtles of Pennsylvania, with the hope that it will aid in disseminating some knowledge upon this greatly neglected subject and in creating an interest that may lead to closer observations and further studies and collections, which may be the basis of a second and more extensive, useful and accurate Report on the same topic. Notes and specimens are earnestly solicited by the Economic Zoologist. Even slight observations upon such topics should be recorded in writing and sent to the office of the Economic Zoologist at Harrisburg, Pa. Specimens are greatly desired, particularly of those species which are indicated as being at present regarded as rare in this State. It is preferred that all specimens be killed as soon as collected, in order that the natural food may remain in the stomach and dissections may show something concerning their feeding habits. They can easily be killed by putting them into tightly closed vessels with cotton well saturated with chloroform and let them remain until entirely dead, or where that is impossible, the head of the Turtle can be drawn from the body and cut off at once. Both head and body should then be shipped by express to our office, at our expense. Persons who are willing to volunteer their services in making collections, in the different parts of this State, and also in making observations to aid in the preparation of a Second Report, should write to this office for further directions. Such persons will be the first to receive our further publication and otherwise be aided as much as is possible from this office. We hope to have many volunteers in different parts of this great State.

The acknowledgment and thanks of the Economic Zoologist are due to the various observers and contributors in different portions of this State and to his assistants and employes in the office, who have been faithful in their efforts to aid in collections, dissections, determinations, and otherwise have obtained facts for this Bulletin. Our thanks are also to be expressed to Dr. H. C. Bumpus, Director of the American Museum of Natural History, of New York City, for the



loan of plates previously used in their publication on "The Reptiles in the Vicinity of New York City," by Raymond L. Ditmars, from the American Museum Journal, Vol. V, No. 3, July, 1905.

H. A. SURFACE, Economic Zoologist,  
Harrisburg, Pa.

---

#### GENERAL REMARKS ON THE TURTLES OF PENNSYLVANIA.

---

In consideration of the increasing numbers of insect pests destructive to forest, fruit and shade trees in this State, it becomes necessary to make a careful study of the economic features of all residents of woodland, field and orchard. According to what is doubtless correct theory, such pests were previously held in check in the balance of Nature by their natural enemies, but, due to the influence of man, either intentionally or thoughtlessly, the balance has been disturbed and the pests are increasing greatly, showing evidence that through one or more causes the enemies of such pests have decreased in number.

It is regrettable how few persons know which are really friends and which foes, not only in the insect world, but throughout the entire realm of the lower forms of animal life. Tens of thousands of individuals of various kinds inhabiting our forests, fields and gardens are placed under the general suspicion of being obnoxious or destructive to personal interests or property of mankind, which by a little investigation are shown to be beneficial in the extreme and which play an important part in the Plan of the Universe. It behooves the student of such subjects to look carefully along this line, prevent error, and see that truths are emphasized concerning such neglected and despised creatures.

Such students are forced to exclaim with Stillingsfleet:

"Each moss, each shell, each crawling insect in the dust  
Holds a rank important in the plans of Him who fram'd  
their being;—

Holds a rank, which, lost, would break the chain,  
And leave behind a gap that Nature's self would rue."

The study of the Turtles of Pennsylvania has been undertaken for the purpose of emphasizing the economic features of those species of which uninformed persons know so little, and which are consequently despised, neglected and often destroyed. The study is attended with unusual difficulties, such as (1) the lack of popular knowledge concerning it, in consequence of which it is almost impossible to secure by correspondence, notes and observations of the

occurrence of different species in various parts of this State; (2) the inaccessible places which are the haunts of most varieties of our turtles, and (3) the deplorable and almost entire absence of popular literature upon this subject.

**What is a Turtle?** Dr. David Starr Jordan, in his *Manual of Vertebrates*, has described the turtle as being "A reptile with the body enclosed between two more or less developed bony shields, which are usually covered by horny epidermal plates, but sometimes by a leathery skin. Upper shield (carapace) and lower shield (plastron) more or less united along the sides. Neck and tail the only flexible parts of the spinal column; these, together with the legs, usually retractile within the box made by the two shields. The bony part of the carapace is formed by the dorsal and sacral vertebræ, and the ribs co-ossified with a series of overlying bony plates, usually accompanied by a marginal row. The dorsal vertebræ have their

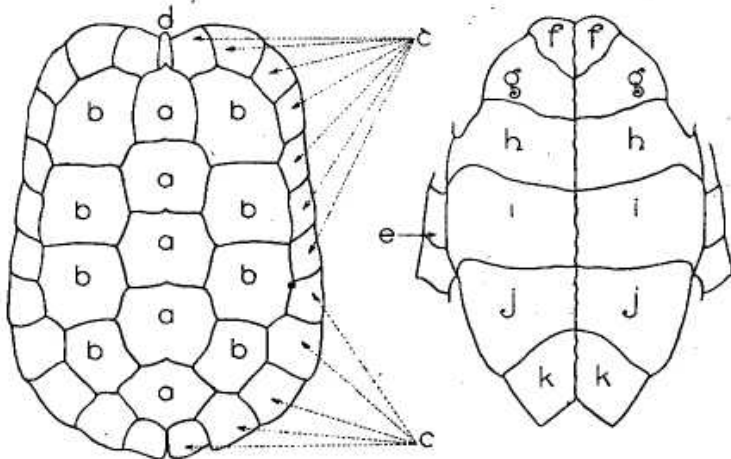


Fig. 1. A diagram of the upper shell or carapace, and under shell or plastron, with index to names of the dermal plates: Carapace, (a), Vertebral plates; (b), Costal plates; (c), Marginal plates; (d), Nuchal plate; Plastron, (e), Bridge; (f), Gular plates; (g), Humeral plates; (h), Pectoral plates; (i), Abdominal plates; (j), Femoral plates; (k), Anal plates.

ends flattened and immovably united by cartilage, and all of them, except the first and last, have their neural spines flattened horizontally so as to form the median line of plates. On either side of this series is a single row of ossified dermal plates, overlying the ribs and corresponding in number to the developed ribs, of which there are usually 8 pairs. No true sternum; plastron consisting of membrane bones, of which there are usually 9 pieces,—4 pairs and a single symmetrical median piece. The osseous plates, both above and below, correspond neither in number nor position with the overlying dermal plates.

"The skull is more compact than in the other reptiles. There are no teeth, but the jaws are encased in horny sheaths, usually with sharp cutting edges; the eye is furnished with two lids and a nictitating membrane as in the birds; the tympanic membrane is always present, although sometimes hidden by the skin. Respiration is effected by swallowing air."

**Turtle, Tortoise or Terrapin?** There has been an effort made by some writers to distinguish between Land and Water Turtles by using the word "Tortoise" for the former and "Turtle" for the latter, while the word "Terrapin" has been more or less generally used for small Turtles, without regard to definite reason for application. Among our Pennsylvania species we can find no line of demarcation between terrestrial or land and aquatic or water Turtles; neither can we find justification for applying the term "Tortoise" to one species in a Family, "Turtle" to another, and "Terrapin" to another of the same Family. We consider the use of these terms as confusing, misleading and unjustifiable. No attempt is made in this Report to confine their application within certain limits. They are therefore to be regarded as synonyms, and consequently no justifiable reason is to be found for discarding the word "Turtle" for any of our species that belong to the Order Testudinata. It would be very nice, indeed, if all writers and speakers should agree to apply the word "Terrapin" to those species of Turtles which live on really dry land, far away from the water, "Tortoise" to those which live mostly on land, near water, and "Turtle" to those which live in water, but there is really no sharp demarcation between the habits of these different species, and consequently it would in many cases be a very debatable point as to whether a certain kind of creature should be called a "Terrapin," a "Tortoise," or a "Turtle." To avoid this, the last term is preferred and here used generally.

**Habits of Pennsylvania Turtles:** Pennsylvania may have at least eighteen (18) different species of turtles within her borders, some of which, such as the famous Diamond-Back, are confined to the eastern margin of the State, and others, such as Agassiz's Turtle, are to be found only in the extreme western part of the Commonwealth. These turtles would represent the two distinct faunal areas of the Eastern Atlantic slope and the Mississippi Valley, separated by the Allegheny mountains. There are some species, such as the Painted Turtle and the Margined species, that are closely allied in appearance and habits, and yet almost sharply separated in distribution by the mountain system.

The turtles live in damp places such as swamps and ponds, except the common Box Turtle, which prefers hills and dry slopes. In