

**COMPREHENSIVE REVISION OF  
A WORLDWIDE COLLECTION  
OF FRESHWATER SPONGES  
(PORIFERA: SPONGILLIDAE)**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649004744

Comprehensive Revision of a Worldwide collection of Freshwater Sponges (Porifera: Spongillidae) by J. T. Penney & A. A. Racek

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**J. T. PENNEY & A. A. RACEK**

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SMITHSONIAN  
INSTITUTION

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MUSEUM  
OF  
NATURAL  
HISTORY

Comprehensive Revision of a  
Worldwide Collection  
of Freshwater Sponges  
(Porifera: Spongillidae)

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SMITHSONIAN INSTITUTION PRESS

WASHINGTON, D.C.

1968

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FRANK A. TAYLOR  
*Director, United States National Museum*

U.S. GOVERNMENT PRINTING OFFICE  
WASHINGTON : 1968

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# Comprehensive Revision of a Worldwide Collection of Freshwater Sponges (Porifera-Spongillidae)

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## Introduction

In spite of the fact that serious scientific efforts in the taxonomic study of freshwater sponges were begun in the mid-19th century, and that a great number of subsequent investigators have contributed a massive amount of additional descriptive information, the taxonomy of this group has remained in a most chaotic state. Following Bowerbank's (1863) initial revision of all species of *Spongilla*, Gray (1867) was first to establish useful criteria for their generic differentiation and to erect six new genera in addition to *Spongilla* Lamarek. Unfortunately, this system was criticized and its validity questioned by Carter (1881a), who claimed that Gray established his new genera without having seen Bowerbank's material upon which they were erected. Although fully unjustified in doing so, Carter (1881a) altogether ignored Gray's existing generic names and devised his own system for the inclusion of Bowerbank's species and subsequently collected material. Thus it happened that Gray's well-established genera fell into complete obscurity for many decades, and Carter's system became firmly established, without being seriously challenged by any subsequent taxonomist.

From the turn of this century, several attempts were made to revise comprehensively the status of the ever increasing numbers of species. After the publication of the first bibliography of all freshwater sponges by Weltner (1893), it was chiefly Annandale (1906-1919) who began to build the foundations to an improved and modernized knowledge of spongillid taxonomy. Annandale reestablished some of Gray's generic names, at least at a subgeneric level, and added a number of well-defined new genera to the conglomerate systems of Gray and Carter. Additional revisions were subsequently undertaken by Gee (1926-1937), Schröder (1926-1942), and Arndt (1923-1938), to name just the most important contributors. Generic revisions were attempted by De Laubenfels (1936) and Jewell (1952). However, in spite of the fact that all these investigations have certainly helped to overcome a number of taxonomic difficulties, they seemed to have little effect on the stability of taxonomic nomenclature.

Nathaniel Gist Gee was the first investigator to realize that only a renewed thorough study of all types and syntypes ever deposited and a detailed examination of all genera and species would help in cutting this Gordian knot of taxonomic chaos. Already in possession of a huge collection of freshwater sponges from China and other parts of southeastern Asia, Gee began with systematic collections of data pertaining to almost all spongillids of the world and secured type or syntype material of a great number of species. However, his untimely death brought this promising project to a standstill. His giant collection and comprehensive catalog of species, now in the possession of the Smithsonian Institution, remain mute witnesses of his untiring efforts.

In the mid-fifties another American spongillid investigator, James T. Penney, decided that a thorough revision of all genera and species of freshwater sponges could no longer be delayed. His systematic efforts in securing and studying all the existing type species, his tenacity in requesting and obtaining spongillid material from all major and minor institutions of the world, and finally his discovery of Gee's giant though untapped collection in the Smithsonian Institution, all resulted in the accumulation of data unavailable to any previous investigator. In view of this ever increasing information, Penney faced various difficulties in dealing with all genera simultaneously, and finally decided to approach this problem by a revision of natural groups of genera. His first choice was the Meyeninae, a former subfamily comprising all species with bicotulate gemmoscleres, for which he outlined the necessary data for subsequent publication. Unfortunately, Penney's sudden death in 1964 once again halted the progress of spongillid taxonomy, and his comprehensive and untiring efforts seemed to have been made in vain.

Realizing the great importance of Penney's huge collection of material and unpublished data, upon the recommendation of Dr. B. Theodore Cole, the University of South Carolina finally entrusted the writer of this paper with its study and review. Beginning in August 1965, this task consisted of the examination of several thousands of slides, their comparison with existing type or syntype specimens, their correlation with various handwritten notes and photographs by the late author, and finally, to attempt a thoroughly revised taxonomic system. In view of the voluminous material available, the writer considered it imperative to revise all true gemmule-producing species, instead of merely elaborating Penney's outlined account of the Meyeninae. As the result of these additional studies, it was possible to review the status of 18 genera, including 95 fully revised species, and to demonstrate the fallacy of a subdivision of the family Spongillidae by using gem-