

**BIBLIOGRAPHY AND INDEX OF
PALEOZOIC CRINOIDS,
CORONATES, AND
HEMISTREPTOCRINOIDS,
1758 - 2012**

Compiled by

**G. D. WEBSTER
SCHOOL OF ENVIRONMENT
WASHINGTON STATE UNIVERSITY
PULLMAN, WASHINGTON
99164-2812**

Website by

**D. W. WEBSTER
BELLEVUE, WASHINGTON
98005**

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INTRODUCTION

This bibliography includes more than 4,000 publications between the years 1758 and 2012. An attempt has been made to include all references that illustrate or describe Paleozoic crinoids, coronates and hemistreptocrinids. In addition, numerous papers on morphology, evolution, extinctions, paleocommunities, paleoecology, stratigraphic data, historical developments, review articles, type collections, and new localities are listed in the bibliography because they are significant for the interpretation of some taxa and provide information that may be useful for future taxonomic, paleoecological, and stratigraphic investigations. Some non-taxonomic references in the bibliography provide literature sources while others give repository information of type specimens. No attempt was made to include references which give faunal lists for specific formations or listed "identified" taxa in the descriptions of stratigraphic units, unless the title of the paper is a "list of crinoids or echinoderms" from certain strata. The few papers of this type deal specifically with the indicated taxa and are of historical value if not of stratigraphic value. Although identifications in numerous stratigraphic papers are correct, many are incorrect, and in either case they are difficult to check or compare lacking illustrations, descriptions, and specimens. Often specimens belonged to the collector (author, or loaned to the author) and were never repositied in a museum or other public accessible collection. Unfortunately many have been lost due to various causes.

Illustrated and described taxa are indexed including the appropriate reference citation in the second section. The validity of a description is a subjective judgement and is not always easy to make, as some descriptions are minimal. Unfortunately many of the minimal descriptions are nearly useless for practical applications, but they qualify for available names according to the Code of the International Commission of Zoological Nomenclature (Ride, et al., 1999).

Completeness of a comprehensive bibliography is sought, but seldom attained. As the modern literature sources continue to expand I have found a parallel in the number of references that are not included in citation services for the paleontologic literature. Most new journals that are in the paleontology and zoology fields are added to the citation services as soon as they begin publication. Publications in multidisciplinary fields are also added soon after their initial publication. Papers with a major thrust in non-paleozoology fields, but including paleozoology information, are sometimes, but not always, picked up by the citation services 2 to 5 years after their publication. Paleozoology papers or parts of papers published in guidebooks for field trips or in publication series not normally including paleozoological information are seldom included in the zoological or paleontological citation services. Also, publications in guidebooks are often published in small numbers, not circulated to libraries and copies may be exceedingly difficult to locate. Political conditions have restricted the open flow of scientific literature in local areas or during times of large-scale international conflicts involving many nations, such as World Wars I and II. During such trying times many papers are missed by researchers as well as the citation services for various reasons. Thus, this bibliography includes over 600 pre-1942 papers not included by Bassler and Moodey (1943). Undoubtedly this bibliography will lack a few publications that should be included, but a serious attempt was made to be as complete as possible.

The hours spent digging this information out of the many libraries visited have been exasperating, hot, dusty, and disappointing at times. But overall, they have been most rewarding with the new information and articles found. The most discouraging times occurred when I used libraries that have gone to compact storage systems for older journals and little used publications. Lacking direct access to these stacks required the excess time of filling out and filing request forms, waiting hours or even days to obtain the requested item, and then sometimes finding it is not the volume requested. Closed stacks and compact storage truly hamper research and should be discouraged.

As expected, the number of publications per year was very low for many years. The tabulation of publications per year (Appendix 1) shows that 215 of the 256 publications between 1758 and 1857 were published in the 30-year interval of 1828 through 1857. During the next 100 years, 1858 through 1957, there were 1,597 publications, a 7.38-fold increase over the first 100 years. Between the 53-year interval of 1958 and 2,010 there were 2,096 publications, or 1.12 times the number of publications (1,867) of the previous 200 years. For the 50 year interval 1960-2009 the number of publications has averaged 41.2 per year (Table 1). The greatest number of publications, 63, in one year occurred in 1971. The peak decades of the 1960s and 1970s have 475 publications each.

Years	No. Pubs.	Cum. Pubs.
2010-02	95	4059
2000-09	334	3964
1990-99	396	3630
1980-89	475	3234
1970-79	475	2750
1960-69	375	2279
1950-59	194	1904
1940-49	198	1710
1930-39	169	1512
1920-29	171	1343
1910-19	154	1172
1900-09	163	1018
1890-99	187	855
1880-89	152	668
1870-79	112	516
1860-69	149	404
1850-59	111	284
1840-49	79	173
1830-39	49	94
1820-29	18	45
1810-19	6	27
1800-09	2	21
1790-99	1	19
1780-89	3	18
1770-79	5	15
1760-69	8	10

Table 1. Number of publications per 10-year intervals and cumulative number of publications from 1758 to 2012.

It should be noted that a few publications are listed in more than one year because they were published as several volumes over a span of two or more years. Thus the cumulative number of publications is slightly higher than the actual cited titles of publications. The listings for 2009-2012 are considered incomplete because short articles in field guides, state and federal surveys, museums, geological associations, and other organizations are often one to three years late in being cited in indexing services or brought to my attention.

The species index is a compilation taken from the geologic literature of 1758 through 2012. It is based on the compilations of Bassler and Moodey (1943) and Webster (1973, 1977, 1986, 1988, 1993, and new compilations). Frank Springer started the initial compilation of crinoid species and genera. His card index was then updated and published by Bassler and Moodey (1943). My initial compilation (Webster, 1973) was made as a supplement to Bassler and Moodey and followed by subsequent compilations.

While making my compilations I occasionally found, or a colleague alerted me to, a reference that was unavailable to, or overlooked by, Bassler and Moodey that contained illustrated or described taxa. In 1989 I started an intensive search of the literature to locate all pre-1942 references missed by Bassler and Moodey. Little did I realize the effort that would be required, nor the fascination I would derive from this effort. An initial list of over 1000 references to be checked, resulted in more than 600 publications that include taxa indexed herein. To my pleasant surprise Bassler and Moodey, missed no genera. However, several species not included in earlier compilations or synonymies are herein indexed.

The following comments should be kept in mind when using the indices.

1. Please note that I do not agree with all the combinations or transfer of names that are listed herein. I list each for priority, occupied names, variant spellings, and to show the different combinations that have been used by various authors. The date of publication for each genus and species is the date of the printed paper or preprint if the preprint was circulated. I have not included electronic preprints because they do not meet the ICZN requirements. Most electronic preprints of journal articles lack the pagination that will be in the printed published version.

2. For each entry the sequence is: taxonomic assignment, author, date of publication, page in cited publication, illustrations in cited publication. This is followed by all subsequent citations in chronological order. Where an author has more than one paper in chronological order, all after the first are indicated by the date of publication given in bold face, i.e. **1884**. The illustration abbreviations are: Pl. = plate; fig. = figure on plate; Fig. = text-figure; no. = number on text-figure.

3. For cross-references: after each species that has been transferred are the subsequent combinations unless it is back to the original combination or reuse of an intermediate combination.

4. Occasionally I have listed my own interpretation of what a combination might or might not be. These suggested changes are based on some of my own systematic studies, but may require additional investigation. In some instances I have referred the

specimen to another taxon, simply alerting the reader to a potential problem that will hopefully be resolved in the future.

5. The stratigraphic units listed may be old names that have been subdivided or even discarded. No concerted effort has been made to update the stratigraphic terminology, but a few have been corrected where I am familiar with the changes in local stratigraphic terminology. Interested investigators must refer to the original publication and then to modern stratigraphic units applied to the region from which the specimen is reported to obtain the current stratigraphic terminology.

6. Ages given are taken from the literature and may be incorrect. Old series or stage names may need to be updated. Others will change as new information becomes available for more precise age determination. For a small number of listings I have corrected the stratigraphic age following my own knowledge or communications from others.

7. The geologic age of the genus is based on the named species listed. This includes species that may not belong in the genus, except as noted by me in the index (i.e., not a *Platycrinites*, GDW). It does not include unidentified species or species given with cf. or aff. designations, although they may fall within the given age.

8. The index includes a number of combinations and a few new species in the literature of the 1800s and early 1900s that were missed by Bassler and Moodey (1943).

9. Unless they were new names, the Bassler and Moodey (1943) citations did not list taxa described or illustrated in many of the late 1700 into early 1900 compendium volumes (i.e. Shumard, 1868; Bigsby, 1868; Frech, 1902; among others), from which they did cite new taxa. Many of the other taxa described or illustrated were often copied from earlier papers that were commonly credited. Also, Bassler and Moodey did not list columnals unless they were proposed new taxa. Thus some of the unnamed and named taxa in early illustrations and descriptions have never been cited in modern compilations. Although some of the description and illustration citations are included herein it would require an extensive review of all of the Paleozoic crinoid literature to do all of them and that is beyond the scope of this project. Hopefully efforts in the future, time permitting, will allow correcting these omissions.

10. The correct date of publication is not given for all publications, but has been corrected for cases where I found evidence to support changing the accepted or published date. This is particularly true of the European literature of the 1800s where a date of publication is often the year after the cited date of the volume. Many earlier workers cited the date as that given for the volume, for example the volume for 1875 actually published in 1876. Many of these are quite obvious when the original reference is checked as the publication date is stated on the title page or later in the publication. However, if incorrectly cited by earlier workers, the incorrect date has often been accepted and cited by later workers, who in many cases never checked the original publication.

11. The inclusion of compilation volumes, such as Shumard (1868), Bigsby (1868), Miller (1889), among others, is for completeness. Some of these compilations also included minor to significant taxonomic revisions including new combinations. Thus these combinations alone justify the inclusion of such works.

12. Where columnals were included with the original or a subsequent description of a cup or crown, and I felt there was little question of their belonging with the cup or crown, they are included in the section on crowns or parts of crowns.

Otherwise, columnals are listed in section V. An explanation of problems and geologic ranges of the columnals is given in the introduction to section V.

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This bibliography is compiled from the following sources, which are fully cited herein: Bassler and Moodey (1943), Moore and Teichert (1978), Webster (1973, 1977, 1986, 1993, unpublished data). Each of these sources owe their thanks to previously published bibliographies such as Weller (1898), Nickles (1923), bibliographies within published papers and memorials, the Echinoderm sections of the Zoological Record (1856-1995) and Zoologischer Jahresbericht (1879-1913), and the geological citation service publications of France, Russia, and the United States.

My sincere appreciation is extended to the many echinoderm workers who have sent me notice and often copies of paleontological publications that are not typically cited in the citation service listings or in journals not included in geological citation services. Several individuals have loaned me rarer publications or sent xerox copies of personal copies when the interlibrary loan service was unsuccessful. In particular I would like to thank Yu. A. Arendt, William Ausich, Xiuqin Chen, Mike Foote, Hans Hess, Alan Horowitz, Russell Jeffords, Peter Jell, Gilbert Klapper, V. A. Klikushkin, Yulin Liao, N. Gary Lane, Chris Maples, Jean Le Menn, Tamara Nemirovskaya, R. C. Moore, Vlastav Petr, Rudolf Prokop, H. Remy, Jinxing Wang, John Watkinson, and Pius Weibel. Rudolf Prokop, Alan Horowitz, Gary Lane, Mike Foote, and Georgy Mirantsev made significant corrections and additions to some references. Also, I wish to thank the numerous librarians who have helped in so many ways, including locating libraries holding some of the rarer publications. In particular I wish to thank the library staff of Owen's Science and Engineering Library and the Interlibrary Loan Office of Washington State University for so much invaluable help and encouragement with this project. Special thanks are extended to Eileen Brady for the hours spent locating sources for interlibrary loans or copies of the older literature.

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