

Philippine Brittlestars
(Echinodermata: Ophiuroidea)
Described by R. Koehler (1922):
A Corrected and Annotated
List of Type Specimens

CYNTHIA AHEARN

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ABSTRACT

Ahearn, Cynthia. Philippine Brittlestars (Echinodermata: Ophiuroidea) Described by R. Koehler (1922): A Corrected and Annotated List of Type Specimens. *Smithsonian Contributions to Zoology*, number 537, 15 pages, 31 tables, 1992.—The status of the type specimens of the 68 new species described in R. Koehler's (1922) publication titled, "Ophiurans of the Philippine Seas and Adjacent Waters" is reviewed. Koehler designated type specimens in only a few new species. A.H. Clark translated Koehler's manuscript from French to English, and he attempted to make up for deficiencies in designation of types by adding to the paper a list of types "designated by the museum" (USNM). Clark was inconsistent in selecting specimens that he had designated as types, and the problems were compounded by an abundance of clerical errors, unnecessary recataloging of specimens, and inclusion of the same specimens in more than one species description. An attempt is made here to resolve discrepancies, and correct the status of the types of Koehler's new species. Tables are provided to demonstrate how Koehler's original text was corrected. Two taxonomic actions are included herein; new lectotype specimens are designated for *Ophiothrix cumulata* Koehler and *Ophiomusium facundum* Koehler.

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Philippine Brittlestars (Echinodermata: Ophiuroidea) Described by R. Koehler (1922): A Corrected and Annotated List of Type Specimens

Cynthia Ahearn

Introduction

A comprehensive study of Indo-Pacific ophiuroids by R. Koehler (1922) was based largely on material collected by the United States Fisheries Steamer *Albatross* during the years 1907–1910. A total of 227 species, 68 of them new, were described, and deposited in the United States National Museum (USNM), now the National Museum of Natural History (NMNH). For convenience, the collections and catalogs are still referred to by the prefix, USNM. While verifying bibliographic citations for the computer inventory of type specimen collections, I noticed discrepancies between the information on specimen labels and that presented in Koehler's (1922) report. Closer study revealed numerous problems surrounding the status of Koehler's types. All of the type material was then re-examined and compared with the designations in his paper.

In most of his descriptions, Koehler did not clearly select types. A note on the title page of the publication states that A.H. Clark translated the manuscript from French to English and, during the translation, Clark must have noted that Koehler had been less than consistent in designating types! For many species, no types at all had been designated. In an attempt to rectify this situation, Clark added a list of specimens "designated by the Museum" as holotypes or lectotypes of Koehler's new species (p. 452–453).

Clark's authorship of this list is inferred from the fact that he translated the manuscript and, in addition, he entered all the ophiuroids in Koehler's publication into the USNM catalogs, including the designated type specimens (his handwriting in the

USNM catalogs was verified against many examples in NMNH). This list of Clark's has apparently been overlooked or ignored by subsequent authors. For example, Downey (1969), in her "Catalog of Recent Ophiuroid Type Specimens in Major Collections in the United States," listed as syntypes most of Koehler's new species based on multiple specimens, and did not address the clerical problems in his report, such as including type specimens in the material examined section of more than one species or in an incorrect species. In addition, the types of eight of the new species in Koehler's report (1922) were not included in her type catalog. According to knowledgeable authorities at the NMNH, and the relevant articles (72–74) of the 1985 edition of the International Code of Zoological Nomenclature (ICZN), particularly Article 74, Clark's lectotype designations are valid.

Of the sixty-eight new species in Koehler's publication, 40 are described from single specimens which are holotypes, thereby presenting no problem with type status. However, in four of these "single specimen" new species, some confusion exists relating to their descriptions and/or localities, and these are discussed individually below.

Twenty-eight species are based on multiple specimens. Whenever it is possible to determine Koehler's intent, the status of type specimens of these species is determined from his text. In other cases, Clark's lectotype designations are used, except where he was in error, for example, where he contradicted Koehler, or designated a type but did not select a specimen. Both Koehler and Clark inadvertently created other problems as well, by making clerical errors, assigning a second USNM catalog number to some type specimens, and including individual specimens in more than one species description. The situation for each species is unique and is discussed in detail below.

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A list of species with unequivocal holotypes all based on single specimens, extracted from Clark's list (Koehler, 1922:452-453) is given (Table 1). The types of Koehler's new species that were not explicitly stated are discussed, and for each species a table of material listed in Koehler (1922) is provided, along with a discussion supporting decisions concerning the status of type specimens. The first three columns of each table are taken directly from Koehler's text and the remaining two columns resolve the errors found in the text and formally establishes the type status of each specimen.

An appendix of *Albatross* locality information for each type specimen in this report follows. According to the *Albatross* log records USBF (1907; 1910) a "dash" in latitude or longitude means that a seconds reading was not recorded in the *Albatross* station logs. This is contrary to Koehler's "List Of Stations, With Species Found At Each" (1922:442-447) in which either Koehler or Clark interpreted a latitude or longitude with no seconds as meaning "zero" seconds. This gives a degree of precision to the coordinates that was not intended in the *Albatross* station logs. Some specimen labels did not have station numbers although they were collected on the *Albatross* Philippines Expedition, and, in a few instances, the specimens came from collections other than the *Albatross*. In both of these cases, locality information is provided in the tables that are associated with each species.

Traditionally, the "Echinoderm and Coelenterate" collections of the USNM were documented into a single catalog number series. In 1920, A.H. Clark, curator of Echinoderms at the USNM, devised a numbering system unique to the Echinoderms, which is still used today. He began with the number one and each catalog number was prefixed with the letter E. This change occurred during the cataloging of the ophiuroids collected by the *Albatross*, so that both numbering systems for assigning the USNM catalog number are reflected in Koehler's text.

Complex problems were caused by the inconsistencies of Koehler in designation of types, and then of Clark in selection or designation of type specimens. Resolution of some problems involved extensive consultation with recognized experts in the principles and practice of zoological nomenclature. This work was, of course, necessary to correct the types of the species and to determine once and for all the status of various specimens in the USNM collections of types.

LIST OF ABBREVIATIONS.—The following is a list of abbreviations of types that are used in the tables.

H	Holotype
P	Paratype(s)
L	Lectotype
PL	Paralectotype(s)
S	Syntypes

ACKNOWLEDGMENTS.—I am grateful to David L. Pawson who convinced me from the outset that this was indeed a necessary project and who along with Frederick M. Bayer,

TABLE 1.—New species named by Koehler (1922) that have a designated holotype.

Name	Koehler, 1922 page number	USNM number	<i>Albatross</i> locality
<i>Amphilepis remittens</i>	202	41112	Station 5637
<i>Amphiophiura canaliculata</i>	357	41341	Station 5356
<i>Amphiophiura fastigiata</i>	359	41344	Station 5259
<i>Amphioplus conductus</i>	172	41161	Station 5410
<i>Amphioplus legatus</i>	169	41179	Station 5119
<i>Amphipholis loripes</i>	164	41190	Station 5375
<i>Amphiura dejecta</i>	154	E1047	Station 5592
<i>Amphiura demissa</i>	156	41177	Station 5492
<i>Astrothamnus deficiens</i>	35	E158	Station 5605
<i>Cryptopelta tecta</i>	350	41391	Station 5174
<i>Neoplax crassipes</i>	22	E193	Station 5108
<i>Ophiacantha benigna</i>	45	41235	Station 5592
<i>Ophiacantha graphica</i>	51	41233	No locality
<i>Ophiacantha legata</i>	53	41373	Station 5536
<i>Ophiacantha pacata</i>	57	41234	Station 5589
<i>Ophiarachna quinquespinosa</i>	331	E128	Station 5172
<i>Ophiobryella intorta</i>	27	E331	Station 5491
<i>Ophiocanops fugiens</i>	26	41080	Station 5174
<i>Ophiodictys uncinatus</i>	42	41017	Station 5668
<i>Ophiomaza fusca</i>	299	41167	Station 5145
<i>Ophiomedeia discrepans</i>	95	41196	Station 5359
<i>Ophiomitrella exilis</i> *	110	40949	Station 5637
<i>Ophiomusium fimbriatum</i>	403	E188	Station 5614
<i>Ophiomusium impotens</i>	406	40920	Station 5605
<i>Ophiomusium morio</i>	413	40993	Station 5392
<i>Ophiopallas valens</i>	437	41354	Station 5178
<i>Ophiophthalmus suspectus</i>	127	41164	No locality
<i>Ophiopteron gratum</i>	302	41307	Station 5152
<i>Ophiopyrgus planulatus</i>	355	40928	Station 5613
<i>Ophioripa marginata</i>	118	41129	Station 4781
<i>Ophioripa nugator</i>	119	41128	Station 4781
<i>Ophiotrix bellax</i>	211	41026	No locality
<i>Ophiotrix deceptor</i>	225	E13	Station 5414
<i>Ophiotrix pavidata</i>	252	41018	Station 5179
<i>Ophiotrix prostrata</i>	257	41023	Station 5342
<i>Ophiotrix signata</i>	263	41069	Station 5140
<i>Ophiotrema tertium</i>	88	41150	Station 5349
<i>Ophiotreta spatulifera</i>	81	41197	Station 5629
<i>Ophiozonoida obscura</i>	431	41155	Station 5255
<i>Ophiura mutescens</i>	383	41200	Hakodate, Japan

*Specimen can no longer be found.

Gordon Hendler (Los Angeles County Museum, Los Angeles, California), and Anne Hoggett (Lizard Island Research Station, Queensland, Australia) kindly reviewed the manuscript and made many useful suggestions for improvement. I wish also to thank Frederick M. Bayer, Fenner A. Chace, Stephen D. Cairns, and David L. Pawson, all of the Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution, for giving me many hours of their time for consultation, and interpretation of the International Code of Zoological Nomenclature. I would also like to acknowledge the help of Curtis W. Sabrosky, President of the ICZN and former Chairman of the Editorial Committee of the 1985 edition of the ICZN, who confirmed our interpretations of the Code.

Species with Corrections in Locality or Type Status

Neoplax crassipes Koehler

TABLE 2

Neoplax crassipes Koehler, 1922:22.

Koehler recorded *Neoplax crassipes* as collected from a depth of 13 fm (24 m) off southern Luzon in the Philippines. Contrary to Koehler's publication, the original ledger entry and label indicate station 5587, which was at a locality in Malaysia in a depth of 415 fm (759 m). Although Clark's ledger entry was made in May of 1920, two years prior to Koehler's publication, it is now impossible to determine which locality is correct.

TABLE 2.—*Neoplax crassipes*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5108 ¹	1	E193	No change	H

¹The original label and original entry in the USNM ledger, handwritten by A.H. Clark, indicate station 5587.

Ophiophrix confinis Koehler

TABLE 3

Ophiophrix confinis Koehler, 1922:30.

The description of *Ophiophrix confinis* was based on two specimens. Clark selected as the lectotype (p. 452) the specimen that Koehler mentioned first in his description, "The specimen from station 5123 is of large size, the diameter of the disk reaching 23 mm and the length of the arms 160 mm; unfortunately, the disk is in poor condition, the dorsal surface has been partially torn away and is more or less out of place." The specimen from station 5592 (USNM E332) is the paralectotype.

TABLE 3.—*Ophiophrix confinis*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5123	1	E333	No change	L
5592	1	E332	No change	PL

Ophiacantha severa Koehler

TABLE 4

Ophiacantha severa Koehler, 1922:61.

In the second paragraph of his description, Koehler stated, "I shall describe the species with special reference to the specimen from station 5629, which is the larger and which is represented

in figures 1-3 on plate 17." Clark (p. 452) designated the specimen catalogued as USNM 41238 as the lectotype, although he incorrectly cited the station number as 5645 instead of the correct station 5629. The specimen from station 5645 (USNM 41237) is the paralectotype.

TABLE 4.—*Ophiacantha severa*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5629	1	41238	No change	L
5645	1	41237	No change	PL

Ophiogema punctata Koehler

TABLE 5

Ophiogema punctata Koehler, 1922:67.

Koehler described this species very generally from all specimens. Clark selected the only photographed specimen (pl. 29: figs. 7-9), USNM 40989 from station 5166, as the lectotype (p. 452). He unnecessarily recataloged this specimen as USNM E1040 which is canceled. The original record, USNM 40989, is therefore retained for the lectotype. All remaining specimens in Table 5 are paralectotypes.

TABLE 5.—*Ophiogema punctata*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5166	numerous	40989 E219	40989, 1 spec. E219, 173 spec.	L PL
5167	5	40990	No change	PL
5168	4	40991	No change	PL

Ophiocopa singularis Koehler

TABLE 6

Ophiocopa singularis Koehler, 1922:98.

Koehler began his description, "The specimen from station 5348 is in good condition. The diameter of the disk is 8 mm; the arms are incomplete, but two of them are preserved for almost their entire length and must have been about 25 mm long. . . ." Koehler did not designate a type for this species. Clark selected the specimen from station 5348 (USNM 41280) as the lectotype, which is larger and in better condition than the other (p. 452). The specimen from station 5173 (USNM 41283), which Koehler regarded in poor condition is the paralectotype.

TABLE 6.—*Ophiocopa singularis*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5173	1	41283	No change	PL
5348	1	41280	No change	L

Ophiurothamnus excavatus Koehler

TABLE 7

Ophiurothamnus excavatus Koehler, 1922:105.

Koehler clearly designated a holotype in the first sentence of the description, "In the larger specimen, which I have taken as the type, the diameter of the disk is 5.5 mm; the arms are incomplete, broken off at 15 mm from the base; they must have been about 25 mm long. ..." Clark separated the two specimens and recataloged the holotype as USNM E1041 (p. 453). The smaller specimen from station 5428 (USNM 41195) is the paratype.

TABLE 7.—*Ophiurothamnus excavatus*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5428	2	41195	41195, 1 spec. E1041, 1 spec.	P H

Ophiomitra dives Koehler

TABLE 8

Ophiomitra dives Koehler, 1922:107.

Koehler considered the two individuals to be in very good condition with the larger being quite complete and he described *Ophiomitra dives* from both specimens. Clark designated the larger, photographed specimen as the lectotype and recataloged it as USNM E1042 (p. 452). The smaller specimen (USNM E22) is the paralectotype.

TABLE 8.—*Ophiomitra dives*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5543	2	E22	E22, 1 spec. E1042, 1 spec.	PL L

Ophiomitrella sagittata Koehler

TABLE 9

Ophiomitrella sagittata Koehler, 1922:111.

In the second paragraph of his description, Koehler stated, "I

shall describe the species more especially from the two specimens from station 5629, of which the larger is shown in figures 1, 2, and 3 on pl. 27. ..." Clark separated the two specimens from station 5629 and recataloged the larger as the lectotype, USNM E1043 (p. 452). All remaining specimens in Table 9 are paralectotypes.

TABLE 9.—*Ophiomitrella sagittata*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5621	1	41009	No change	PL
5623	1	41010	No change	PL
5629	2	41008	41008, 1 spec. E1043, 1 spec.	PL L

Ophiomitrella subjecta Koehler

TABLE 10

Ophiomitrella subjecta Koehler, 1922:114.

Koehler included all specimens in describing this species. Clark designated as lectotype the specimen first mentioned by Koehler in his description, "In the largest specimen, which is one of the two from station 5325, the diameter of the disk is 9 mm; the arms are incomplete." Clark separated the two specimens from station 5325 and recataloged the largest one shown in figure 8 on plate 26 as the lectotype, USNM E1044 (p. 452). The remaining five specimens are paralectotypes.

TABLE 10.—*Ophiomitrella subjecta*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5280	3	41287	No change	PL
5300	1	41286	No change	PL
5325	2	41288	41288, 1 spec. E1044, 1 spec.	PL L

Ophioripa marginata Koehler*Ophioripa marginata* Koehler, 1922:118.

Koehler created the new genus *Ophioripa* for two species, *O. marginata* and *O. nugator*, and gives only the station number 4781 without a discussion of the locality or depth. In his introduction, Koehler included a synopsis of localities of all the ophiuroids sent to him for identification. He mentioned the Philippines, Japan, and the Samoan Islands as the only localities represented in the collection. According to USBF, 1906, both of the new species of *Ophioripa* were taken from station 4781, which is in the Bering Sea, off the Aleutian Islands at a depth of 482 fm (882 m).

Ophioripa nugator Koehler*Ophioripa nugator* Koehler, 1922:119.See *Ophioripa marginata* for discussion.*Ophioplinthaca globata* Koehler

TABLE 11

Ophioplinthaca globata Koehler, 1922:132.

Koehler referred to many specimens in his description of *Ophioplinthaca globata* and did not select a type. Clark segregated one specimen from the 20 specimens listed from station 5123 (Table 11, Footnote 1.) and catalogued it as USNM E1045. He designated this specimen the lectotype (p. 453) based on the opening sentence of Koehler's description; "I shall describe this species on the basis of one of the specimens from station 5123, which is represented in figure 8 on plate 25...." All remaining specimens in Table 11 are paralectotypes.

TABLE 11.—*Ophioplinthaca globata*; material listed in Koehler 1922 (- = no catalog number given in Koehler's text).

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5119	8	E71	No change	PL
5123	some	-	E1045 E4883, E4885 ¹	L PL
5187	1	E78	No change	PL
5201	1	E79	No change	PL
5219	1	-	E4884 ²	PL
5348	1	E69	No change	PL
5374	1	E70	No change	PL
5377	1	E73	No change	PL
5423	1	E76	No change ³	PL
5424	1	-	E4902 ⁴	PL
5444	6	E72	E72, 5 spec.	PL
		E77	E77, 1 spec.	PL
5510	1	E74	No change	PL
5511	1	E68	No change	PL
5656	1	E75	No change	PL

¹There are 20 specimens from station 5123, which were cataloged as USNM E1045, (USNM E4883 and USNM E4885 were assigned after publication of Koehler's text). USNM E1045 has one specimen and is the lectotype. Both USNM E4883 (18 specimens) and USNM E4885 (one specimen) are paralectotype lots.

²The specimen from station 5219 was cataloged as USNM E4884 after publication of Koehler's text.

³In the first paragraph of Koehler's text, the specimen from station 5423 (USNM E76) was incorrectly cited from station 4523.

⁴The specimen from station 5424 was cataloged as USNM E4902 after publication of Koehler's text.

Ophioplinthaca hastata Koehler

TABLE 12

Ophioplinthaca hastata Koehler, 1922:137.

Koehler designated the type of *Ophioplinthaca hastata* for he began his description, "I shall describe this species from the specimen from station 5586, in which the diameter of the disk is 7 mm and the arms are about 30 mm long, only two being preserved entire." He does not specifically refer to this specimen (USNM 41002) being the type until the last paragraph of the description section. There, in discussing characters of the specimen from station 5280, he stated, "It differs from the type specimen which I have just described...." The specimen from station 5280 (USNM 41003) is the paratype.

TABLE 12.—*Ophioplinthaca hastata*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5281	1	41003	sta 5280 ¹	P
5586	1	41002	No change	H

¹The original specimen label and Koehler's text indicate USNM 41003 to be from station 5280, not station 5281, as recorded in Koehler's list of specimens examined.

Amphiura commutata Koehler

TABLE 13

Amphiura commutata Koehler, 1922:152.

Koehler designated USNM 41174 as the holotype of *Amphiura commutata*, although his statement (p. 152), "One hundred and sixty-two specimens (Cat. No. 41174; type, Cat. 41175, USNM)" is misleading. The assumption of type designation is based on the fact that Koehler himself segregated the one specimen (USNM 41174) from the remaining specimens, all of which originated from the same lot. Unfortunately, the holotype is now in too poor a condition to permit comparison with the other large specimen in Koehler's statement; "In the two larger specimens the diameter of the disk is 6mm; the arms are from 35 mm to 38 mm in length." USNM 41174 contains only two small arm fragments and a few separated arm plates. Either this is what remains of the holotype, or quite possibly, the holotype was inadvertently placed in the bottle of the 159 remaining paratypes (USNM 41175) during a subsequent examination of the type specimens.

Clark unnecessarily assigned a new catalog number, USNM E1046, to the holotype (p. 452); this is declared a voided entry.

TABLE 13.—*Amphiura commutata*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
Hakodate, Japan	162	41174, 41175	41174, 1 spec. ¹ 41175, 159 spec. ²	H P

¹Only fragments of the holotype (USNM 41174) remain.

²Two specimens are missing from the paratype lot (USNM 41175). Koehler's text (p. 152) and Clark's USNM catalog entry indicate that there should be 161 specimens.

Amphiura dejecta Koehler

TABLE 14

Amphiura dejecta Koehler, 1922:154.

Koehler described this species from a single specimen without mention of a USNM catalog number. In fact, there was no specimen labelled *Amphiura dejecta* in the USNM collections. However, Koehler's description of *Amphiura dejecta* and the corresponding photographs (pl. 66: figs. 4, 5) exactly match the specimen identified by him as *Amphiura agitata* Koehler, 1904 (p. 79), and labelled USNM 41166, also from station 5592 (p. 151). Koehler (1922) himself stated that this particular specimen differed in many of the typical characters from *A. agitata* (p. 151). Even the most obvious characters, such as size of dorsal plates and number of spines per arm plate, disagree with those of typical *A. agitata*. Interestingly, he did not photograph this specimen under the name *A. agitata*. Koehler used the same specimen to describe his new species *A. dejecta* (p. 154) and to report the occurrence of *A. agitata* in the *Albatross* material. He mistakenly reported this specimen as *Amphiura agitata*, and it is the type of his new species, *Amphiura dejecta*.

Clark assigned a USNM catalog number, E1047, to the holotype of *Amphiura dejecta* (p. 452) without actually selecting the specimen. This number is retained for the holotype of *Amphiura dejecta* to avoid confusion with Koehler's (1922) record of *Amphiura agitata*. Since it has been determined that Koehler did not have a specimen of *A. agitata* in the *Albatross* collection, USNM 41166 is declared a voided entry.

TABLE 14.—*Amphiura dejecta*; material listed in Koehler 1922 (= no catalog number given in Koehler's text).

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5592	1	-	E1047	H

Amphiodia debita Koehler

TABLE 15

Amphiodia debita Koehler, 1922:168.

In the first paragraph of his description, Koehler stated, "All the specimens are incomplete; the dorsal surface of the disk is torn off, and none of the arms is preserved for the full length; the largest is 40 mm long." He did not select a type from these poorly preserved specimens. Clark assigned catalog number USNM E1048 for the lectotype (p. 452) but failed to segregate a specimen from USNM 41199. Koehler did not photograph an entire specimen with arms intact (pl. 69: figs. 3, 4). Clark may have intended the photographed specimen to be the lectotype, but all three specimens are now fragmented so it is not possible to recognize the photographed specimen. Therefore, the three specimens must remain a syntypic series, and USNM E1048 is declared a voided entry.

TABLE 15.—*Amphiodia debita*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
Otaru, Japan	3	41199	No change	S

Amphioplus lucidus Koehler

TABLE 16

Amphioplus lucidus Koehler, 1922:176.

In the first paragraph of his description, Koehler stated, "I shall describe this species more especially from this specimen [station 5371], but as the radial shields have not quite the same form as in those from station 5161, I shall also give the characters of these as found in the latter." As Koehler did not designate a type, Clark selected as lectotype (USNM 41126) the largest specimen from station 5371 (p. 452). The two specimens from station 5161 (USNM 41127) are paralectotypes.

TABLE 16.—*Amphioplus lucidus*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5161	2	41127	41127, 1 spec. ¹	PL
5371	1	41126	No change	L

¹One specimen from station 5161 is missing.

Amphioplus luctator Koehler

TABLE 17

Amphioplus luctator Koehler, 1922:178.

Koehler stated that both specimens are similar in size and in the damaged condition of the disks and arms. He based the description on both specimens and did not designate a type. Koehler reported that all the arms of both specimens are incomplete; however, one arm is preserved for a length greater than 80 mm. Clark selected this specimen with the greatest arm length from station 5339 (USNM 41157) as the lectotype (p. 452). USNM 41158 from station 5358 is the paralectotype.

TABLE 17.—*Amphioplus luctator*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5339	1	41157	No change	L
5358	1	41158	No change	PL

Amphilimna multispina Koehler

TABLE 18

Amphilimna multispina Koehler, 1922:183.

Koehler stated (p. 184), "I shall describe this species from one of the specimens, from station 5375 (pl. 61, figs. 5, 6, 7), which is the largest." Clark separated and recataloged the largest specimen and designated it as lectotype, USNM E1049 (p. 452). All other specimens in Table 18 are thus considered as paralectotypes.

TABLE 18.—*Amphilimna multispina*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5220	1	E23	No change	PL
5221	13	E26, E27	E26, 6 spec. E27, 7 spec.	PL PL
5222	4	E25	No change	PL
5223	1	E24	No change	PL
5375	4	E4	E4, 3 spec. E1049, 1 spec.	PL L

Ophiocentrus vexator Koehler

TABLE 19

Ophiocentrus vexator Koehler, 1922:200.

Koehler clearly designated a holotype in the first sentence of the text, "The larger specimen, which I have taken as the type, is almost complete." Clark unnecessarily recataloged this specimen as USNM E1051 (p. 452). The original record,

USNM E10, is therefore retained for the holotype and USNM E1051 is canceled. The smaller specimen from station 5181 (USNM E11) is the paratype.

TABLE 19.—*Ophiocentrus vexator*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5181	2	E10, E11	E10, 1 spec. E11, 1 spec.	H P

Ophiactis definita Koehler

TABLE 20

Ophiactis definita Koehler, 1922:187.

Koehler began his description, "I shall describe the species more especially on the basis of the two specimens from station 5119, of which I give photographs (pl. 64, figs. 1, 2, 7)." Koehler's caption for figure 7 of plate 64 (p. 466) is incorrect. It reads "dorsal surface of the specimen represented in fig. 1." Figure 7 is actually the dorsal surface of the specimen represented in figure 2. Clark selected the specimen with photographs of the ventral and dorsal surface (pl. 64: figs. 2, 7), recataloged it as USNM E1050, and designated it the lectotype of *Ophiactis definita* (p. 452). The remaining eighteen specimens in Table 20 are paralectotypes.

TABLE 20.—*Ophiactis definita*; material listed in Koehler 1922 (= no catalog number given in Koehler's text).

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5119	2	E49	E49, 1 spec. E1050, 1 spec.	PL L
5598 ¹	2	-		
5587	few	E51 (part) ² , E52		PL PL
5589	2	E51 (part) ³ , E48		PL PL
5619	1	E46	No change	PL
5637	1	E47	No change	PL
Philippines	3	E45, E50	E45, 1 spec. E50, 2 spec.	PL PL

¹Station 5598 is listed out of sequence in Koehler's report and there is no assigned catalog number. It is possible that there were no *Ophiactis definita* from station 5598. In the "List Of Stations, With The Species Found At Each" (p. 447), Koehler listed no ophiuroids from station 5598. In addition, there is no USNM catalog entry for *Ophiactis definita* from station 5598.

²Station 5587 was assigned to two lots. USNM E51 [part] consists of nine specimens and USNM E52 of one specimen.

³Station 5589 was assigned to two lots. USNM E48 consists of one specimen and USNM E51 [part] of one specimen.

Ophiothrix cumulata Koehler

TABLE 21

Ophiothrix cumulata Koehler, 1922:220.

Koehler described this species based on many specimens. Of the 56 specimens listed in the material examined, only 25 are actually *Ophiothrix cumulata*. Conflicting labels (both *O. cumulata* and *O. koreana* Duncan) were associated with the specimens USNM E14, E15, and E16. Koehler stated in the first paragraph of his description, "The diameter of the disk varies between 10 mm and 13 mm in the majority of the specimens..." The majority of *O. koreana* in this collection have disk diameters less than 10 mm. Also, the disk spination in *O. koreana* is clearly different from that of *O. cumulata*. Koehler described the disk spination of *Ophiothrix cumulata*, "The dorsal surface between the large radial shields is covered with small and very short club spines, which are almost as long as broad and to which might well be given the name of elongated granules..." In *O. koreana*, club spines terminating in usually three long divergent spinules, cover the dorsal surface of the disk. Anne Hoggett in 1987, while researching the USNM holdings of the family Ophiotrichidae, indicated (notes with specimens) that these 31 specimens (USNM E14, E15, and E16) were not Koehler's new species *Ophiothrix cumulata* but rather, *Ophiothrix koreana* Duncan as Koehler's other handwritten label indicates.

In the second paragraph (p. 222), Koehler, referring to the number of specimens of *Ophiothrix cumulata* collected by the *Albatross* said, "In the 20 [specimens] which the collection contains..." In fact, he had 25 specimens of *O. cumulata* on which to base his species description. It is fairly certain in light of these differences that Koehler did not use the 31 specimens of *O. koreana* in describing *O. cumulata*.

Once the specimens of *Ophiothrix koreana* are eliminated from the material examined, the only locality at which *O. cumulata* was collected is station 5212. Clark assigned the USNM number E1052, from station 5212, to be the lectotype, but did not select a specimen (p. 453).

The five specimens Koehler photographed for plates 50–52 are catalogued as USNM E21. In referring to the arm spines being cylindrical, rather slender, with the tip rounded, Koehler stated, "These are the characters of the spines seen on individuals which may be considered as typical, as those of which I include photographs on plate 51, as figures 1, 2, and on plate 52, as figure 1." Plate 51, figure 2 and plate 52, figure 1 are incorrectly captioned on page 463. The young specimen with a disk 7 mm in diameter is on plate 51, figure 2, and vice versa. Since there is no confusion over the specimen represented in figure 1 of plate 51, it is hereby designated the lectotype of *Ophiothrix cumulata*. However, the ventral view of the lectotype is actually figure 4 of plate 51 and not figure 3 as the caption indicates. Rather than introduce another catalog

number, it is given the USNM number Clark had intended to use, USNM E1052. All remaining specimens of *Ophiothrix cumulata* in Table 21 are paralectotypes.

TABLE 21.—*Ophiothrix cumulata*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5112	3	E15	<i>O. koreana</i>	
5212	26	41068	41068, 20 spec.	PL
		E14	<i>O. koreana</i> , 1 spec.	
		E21	E21, 4 spec. E1052, 1 spec.	PL L
5265	27	E16	<i>O. koreana</i>	

Ophiogymna funesta Koehler

TABLE 22

Ophiogymna funesta Koehler, 1922:292.

Koehler described this species from many specimens and did not designate a type. Clark selected a specimen as the lectotype, catalogued the entry as USNM E1053 (p. 452), but did not segregate a specimen from USNM E187 or USNM E374. USNM E1053 is therefore canceled. Three specimens were photographed (pl. 44: figs. 1–7). It is impossible to determine which one of the three specimens Clark intended to designate as the lectotype. In fact, Koehler's photographed specimens show three distinct variations of disk armature on the dorsal surface within the species (figs. 3, 6, 7). In addition, figures 3–7 show an extreme variability in the fragmentation of the dorsal surface of the upper arm plates in regards to form, dimensions, and the number of fragments. The variability of both the disk armature and the fragmentation of the upper arm plates does not seem to be a function of size or age of the specimens, rather, it is a variable character of the species. It would thus seem appropriate to retain syntypic status for all 66 specimens mentioned in Table 22.

TABLE 22.—*Ophiogymna funesta*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5213	66	E187	E187, 63 spec.	S
		E374	E374, 3 spec. ¹	S

¹Clark cataloged USNM E374 as having no given locality. The three specimens in question are Koehler's photographed specimens. Most likely, Koehler had separated them from the others to distinguish them as photographed, but failed to note it on the label.

Amphiophiura spatulifera Koehler

TABLE 23

Amphiophiura spatulifera Koehler, 1922:365.

Koehler described the two specimens individually because he noted that the plates of the dorsal surface of the disk showed a different arrangement, presumably due to a difference in age. Clark selected the larger specimen (USNM 41074), from station 5274, with a disk diameter of 9 mm, to be the lectotype (p. 452). The smaller specimen (USNM 41075), which is the paralectotype, is from station 5425. The station number of this specimen is correctly cited in the material examined (p. 365) but is incorrectly referred to in the text (p. 366), "I shall consider them individually, designating the one from station 5245 by the letter A and that from station 5274 by the letter B."

TABLE 23.—*Amphiophiura spatulifera*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5274	1	41074	No change	L
5425	1	41075	No change	PL

Ophiura fluctuans Koehler

TABLE 24

Ophiura fluctuans Koehler, 1922:377.

Koehler described the species on the basis of both specimens. Clark designated as lectotype the specimen Koehler first mentioned in his statement, "In one of the specimens the diameter of the disk is 19 mm; the arm which is best preserved reaches a length of 80 mm and it must have had a total length of about 100 mm." Clark separated the specimens and recataloged the larger specimen (USNM E1055) photographed in figures 3, 4, and 5 of plate 85, as the lectotype (p. 453). The smaller specimen (USNM 41356) is the paralectotype.

TABLE 24.—*Ophiura fluctuans*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5652	2	41356	41356, 1 spec. E1055, 1 spec.	PL L

Stegophiura sterilis Koehler

TABLE 25

Stegophiura sterilis Koehler, 1922:370.

The description of *Stegophiura sterilis* was based on a single

specimen identified in the first paragraph, when Koehler stated, "In the specimen of which I give photographs (pl. 83, figs. 8-11) the diameter of the disk is 15 mm, and the arms are from 45 mm to 50 mm in length." Clark designated this specimen the lectotype of the species (p. 453), but unnecessarily assigned it a new catalog number, USNM E1054. The original record, USNM 41379 is retained for the lectotype and USNM E1054 is canceled. The 31 specimens of USNM 41378 are paralectotypes.

TABLE 25.—*Stegophiura sterilis*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5301	32	41379	41379, 1 spec. 41378, 31 spec. ¹	L PL

¹The original record in the USNM catalog shows that Clark catalogued 31 specimens as USNM 41378 and one specimen as USNM 41379 in October, 1919; three years prior to Koehler's publication.

Ophiomusium armatum Koehler

TABLE 26

Ophiomusium armatum Koehler, 1922:389.

Koehler began his description, "The diameter of the disk is 14 mm; the arms are all incomplete." He proceeded to describe *Ophiomusium armatum* from this single specimen without any reference to the smaller individual, although he never actually designated it the type. Clark selected this specimen (USNM 40923) as the lectotype (p. 452). The smaller specimen (USNM 40924) is the paralectotype.

TABLE 26.—*Ophiomusium armatum*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5428	2	40923, 40924	40923, 1 spec. 40924, 1 spec.	L PL

Ophiomusium facetum Koehler

TABLE 27

Ophiomusium facetum Koehler, 1922:394.

Koehler began his description, "I shall describe the species especially from the specimen from station 5127, of which I show the ventral surface on plate 91 as figure 2, and from the largest specimen from station 5423, the dorsal surface of which is shown in figure 3." Clark selected the first specimen that Koehler mentioned, USNM 41370 from station 5127, as the

lectotype (p. 452). The five remaining specimens of *Ophiomusium facundum* in Table 27 are paralectotypes.

It should be noted that, although a specimen of *Ophiomusium facundum* from station 5124 was included in the list of specimens examined, it was never directly referred to in the text, and probably was not used in the general description of *Ophiomusium facundum*.

TABLE 27.—*Ophiomusium facundum*; material listed in Koehler 1922 (= no catalog number given in Koehler's text).

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5114	1	41371	No change	PL
5124	1	41355	<i>O. facundum</i> ¹	
5127	1	41370	No change	L
5263	1	-	41369 ²	PL
5423	2	41372	No change	PL
5429	1	-	41368 ³	PL

¹There are no specimens of *O. facundum* from station 5124. USNM 41358 is the correct catalog number for the specimen from station 5124, which actually is *Ophiomusium facundum* (p. 398). USNM 41355 is *Ophiozonella media* from station 5601 (p. 424).

²This specimen of *O. facundum* from station 5263 was incorrectly listed under material examined of *Ophiomusium facundum* (p. 398).

³This specimen of *O. facundum* from station 5429 was incorrectly listed under material examined of *Ophiomusium facundum* (p. 399).

Ophiomusium facundum Koehler

TABLE 28

Ophiomusium facundum Koehler, 1922:398.

Koehler based his description of *Ophiomusium facundum* on several specimens. Clark selected USNM 41369 from station 5623 as the lectotype of this species (p. 452). The table shows this specimen to be *Ophiomusium facundum* from station 5263. Article 74(a)(i) of the International Code of Zoological Nomenclature specifies that the *valid* designation of a lectotype fixes the status of the specimen. Since Clark's lectotype designation is clearly not valid, a new lectotype is selected here. In the second paragraph of his description, Koehler stated, "I shall describe the species especially from the specimen from station 5378, in which the diameter of the disk is 18 mm; its arms are not complete; I include two photographs of it (pl. 89, figs. 1, 2)." The specimen from station 5378, USNM 41360, was inadvertently left out of the list of specimens examined (p. 398-399), but Koehler primarily based the description of *Ophiomusium facundum* on this specimen. Therefore USNM 41360 is hereby designated the lectotype of the species. The 16 remaining specimens of *Ophiomusium facundum* in Table 28 are paralectotypes.

Although two specimens of *Ophiomusium facundum*, one from station 5429 and one from station 5263, were included in the

list of specimens examined, they were never directly referred to in the text, and probably were not used in the general description of *Ophiomusium facundum*.

TABLE 28.—*Ophiomusium facundum*; material listed in Koehler 1922 (= no catalog number given in Koehler's text).

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5114	2	41361	No change	PL
5123	3	-	41367 ¹ , 2 spec.	PL
5124	1	-	41358 ²	PL
5202	1	41366	No change	PL
5259	2	41359	41359, 1 spec.	PL
		41363	41363, 1 spec.	PL
5263	2	41369	<i>O. facundum</i> ³	
		E58	sta 5623 ³	
5282	1	41362	No change	PL
5373	1	41357	No change	PL
5429	1	41368	<i>O. facundum</i> ⁴	
5527	4	41365	No change	PL
5538	1	41364	No change	PL
5623	1	-	E58 ⁵	PL
No locality	2	41367	sta 5123 ⁶	
5378 ⁷			41360, 1 spec.	L

¹In the first paragraph of his description, Koehler stated, "... in one of the two from station 5123 the diameter of the disk is only 10 mm..." USNM 41367 is the only lot with two specimens of which one has a disk diameter of 10 mm. Station 5123 has two specimens, not three as Koehler recorded.

²The specimen from station 5124 is *O. facundum* (USNM 41358). It was incorrectly listed under *Ophiomusium facundum* (p. 394). Also, under *O. facundum*, it was listed as USNM 41355, which is *Ophiozonella media* (p. 424).

³There are no specimens of *Ophiomusium facundum* from station 5263. USNM 41369 is *Ophiomusium facundum* from station 5263 (p. 395) and USNM E58 is *Ophiomusium facundum* from station 5623.

⁴There are no specimens of *Ophiomusium facundum* from station 5429. USNM 41368 is *Ophiomusium facundum* (p. 395).

⁵The specimen of *Ophiomusium facundum* from station 5623 is USNM E58, which was incorrectly listed under station 5263 (see 3 above).

⁶The specimens of *Ophiomusium facundum* (USNM 41367) are from station 5123 (see 1 above).

⁷Station 5378 was mentioned only in the text (p. 399, second paragraph) as it was omitted from the list of specimens examined by Koehler. The specimen from this station is USNM 41360.

Ophiomusium ligatum Koehler

TABLE 29

Ophiomusium ligatum Koehler, 1922:408.

Although Koehler did not designate a type in his description of *Ophiomusium ligatum*, he especially emphasized the specimen from station 5445 in comparing it with another known species of *Ophiomusium*. Clark selected this individual, USNM E80 from station 5445, which is the only photographed specimen for the species represented in figures 3-5 on plate 90

as the lectotype (p. 452). The two specimens from station 5650 (USNM E81) are paralectotypes.

TABLE 29.—*Ophiomusium ligatum*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5445	1	E80	No change	L
5650	2	E81	No change	PL

Ophiomusium spinulosum Koehler

TABLE 30

Ophiomusium spinulosum Koehler, 1922:418.

Koehler stated in the second paragraph of his description, "I shall describe the species more especially from the specimen from station 5651, which is a little larger than the others." Clark designated USNM E190 from station 5651 which is photographed in figures 2-4 and 6-7 on plate 87 as the lectotype (p. 452). The two specimens from station 5650 (USNM E189) are paralectotypes.

TABLE 30.—*Ophiomusium spinulosum*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5650	2	E189	No change	PL
5651	1	E190	No change	L

Ophiozonella subtilis Koehler

TABLE 31

Ophiozonella subtilis Koehler, 1922:428.

Koehler began his description, "I shall describe this species from the two specimens from station 5371; in the larger the diameter of the disk reaches 10 mm, but the arms are all incomplete; in the smaller the diameter of the disk is 8 mm and the arms are 30 mm long..." Clark separated the two specimens from station 5371 and designated the larger individual, photographed in figures 3, 4, and 9 on plate 79 as the lectotype, USNM E1056 (p. 453). The remaining 15 specimens in Table 31 are paralectotypes.

TABLE 31.—*Ophiozonella subtilis*; material listed in Koehler 1922.

Station number	Number of specimens	Original catalog number	Changes or comments	Type status
5371	2	41346	41346, 1 spec. E1056, 1 spec.	PL L
5420	13	40931	No change	PL
5423	1	41345	No change	PL

Appendix

Albatross Station List

(n.r. = depth not recorded in log; -- = no seconds reading for latitudes or longitudes provided in *Albatross* station log.)

Station	Latitude	Longitude	Depth		Date
			(fm)	(m)	
4781	52 14 30N	174 13 -E	482	882	07 Jun 1906
5108	14 05 05N	120 19 45E	13-16	24-29	15 Jan 1908
5114	13 36 11N	120 45 26E	340	622	20 Jan 1908
5119	13 45 05N	120 30 30E	394	721	21 Jan 1908
5123	13 12 45N	121 38 45E	283	518	02 Feb 1908
5124	12 52 -N	121 48 30E	281	514	02 Feb 1908
5127	10 02 45N	121 48 15E	958	1752	04 Feb 1908
5140	06 08 45N	121 03 -E	76	139	14 Feb 1908
5145	06 04 30N	120 59 30E	23	42	15 Feb 1908
5152	05 22 55N	120 15 45E	34	62	18 Feb 1908
5161	05 10 15N	119 53 -E	16	29	22 Feb 1908
5166	04 56 10N	119 46 -E	97	177	24 Feb 1908
5167	04 55 10N	119 45 30E	110	201	24 Feb 1908
5168	04 56 30N	119 45 40E	80	146	25 Feb 1908
5172	06 03 15N	120 35 30E	318	582	05 Mar 1908
5173	06 02 55N	120 53 -E	186	340	05 Mar 1908
5174	06 03 45N	120 57 -E	20	37	05 Mar 1908
5178	12 43 -N	122 06 15E	78	143	25 Mar 1908
5179	12 38 15N	122 12 30E	37	68	25 Mar 1908
5181	11 36 40N	123 26 35E	26	48	27 Mar 1908
5187	09 16 45N	123 21 15E	225	412	31 Mar 1908
5201	10 10 -N	125 04 15E	554	1013	10 Apr 1908
5202	10 12 -N	125 04 10E	502	918	10 Apr 1908
5212	12 04 15N	124 04 36E	108	198	20 Apr 1908
5213	12 15 -N	123 57 30E	80	146	20 Apr 1908
5219	13 21 -N	122 18 45E	530	969	23 Apr 1908
5220	13 38 -N	121 58 -E	50	91	24 Apr 1908
5221	13 38 15N	121 48 15E	193	353	24 Apr 1908
5222	13 38 30N	121 42 45E	195	357	24 Apr 1908
5223	13 36 -N	121 25 30E	n.r. ¹	n.r.	24 Apr 1908
5255	07 03 -N	125 39 -E	100	183	18 May 1908
5259	11 57 30N	121 42 15E	312	571	03 Jun 1908
5263	12 38 30N	121 37 30E	n.r.	n.r.	04 Jun 1908
5274	13 57 30N	120 03 25E	525	960	16 Jul 1908
5280	13 55 20N	120 25 55E	193	353	17 Jul 1908
5282	13 53 -N	120 26 45E	248	454	18 Jul 1908
5300	20 31 -N	115 49 -E	265	485	08 Aug 1908
5301	20 37 -N	115 43 -E	208	380	08 Aug 1908
5325	18 34 15N	121 51 15E	224	410	12 Nov 1908
5339	11 22 -N	119 12 -E	52	95	20 Dec 1908
5342	10 56 55N	119 17 24E	14-25	26-46	23 Dec 1908
5348	10 57 45N	118 38 15E	375	686	27 Dec 1908
5349	10 54 -N	118 26 20E	730	1335	27 Dec 1908
5356	08 06 40N	117 18 45E	58	106	05 Jan 1909
5358	06 06 40N	118 18 15E	39	71	07 Jan 1909
5359	08 12 45N	120 37 15E	2275	4161	09 Jan 1909
5371	13 49 40N	121 40 15E	83	152	24 Feb 1909

¹Koehler mistakenly recorded a depth of 195 fm for station 5223 in his list of "List Of Stations, With The Species Found At Each" (p. 444).

Station	Latitude	Longitude	Depth		Date
			(fm)	(m)	
5373	13 40 -N	121 31 10E	338	618	02 Mar 1909
5374	13 46 45N	121 35 08E	190	348	02 Mar 1909
5375	13 42 15N	121 50 15E	107	196	02 Mar 1909
5377	13 26 -N	122 19 -E	400	732	04 Mar 1909
5378	13 17 45N	122 22 -E	395	722	04 Mar 1909
5392	12 12 35N	124 02 48E	135	247	13 Mar 1909
5410	10 28 45N	124 05 30E	385	704	18 Mar 1909
5414	10 10 40N	124 02 45E	n.r.	n.r.	24 Mar 1909
5420	09 49 35N	123 45 -E	127	232	25 Mar 1909
5423	09 38 30N	121 11 -E	508	929	31 Mar 1909
5424	09 37 05N	121 12 37E	340	622	31 Mar 1909
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5511	08 15 20N	123 57 -E	410	750	07 Aug 1909
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5621	00 15 00N	127 24 35E	298	545	28 Nov 1909
5623	00 16 30N	127 30 00E	272	497	29 Nov 1909
5629	00 50 00S	128 12 00E	205	375	02 Dec 1909
5637	03 53 20S	126 48 00E	700	1280	10 Dec 1909
5645	05 29 06S	122 36 06E	206	377	16 Dec 1909
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5651	04 43 50S	121 23 24E	700	1280	17 Dec 1909
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