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Condition of the Sasaki/Albatross Cephalopod Collection at the U.S. National Museum of Natural History

JAMES F. PEYLA, CLYDE F. E. ROPER, MICHAEL J. SWEENEY, and MICHAEL VECCHIONE

Introduction

The Sasaki collection considered here consists of cephalopods examined by Madoka Sasaki following the 1906 expedition of the U.S. Fish Commission Steamer *Albatross* in the northwest Pacific Ocean (Dunn, 1996). This collection was entrusted to Sasaki (Fig. 1), who at the time had begun a monograph on the Japanese Cephalopoda (Sasaki, 1929). Over the next 14 years, he went through the specimens, classifying them and describing new taxa. These specimens, because they were collected on an American ship, were sent to the United States National Museum (USNM; hence catalog num-

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ABSTRACT—The Sasaki collection at the United States National Museum of Natural History (USNM) comprises cephalopods examined by Madoka Sasaki following the 1906 expedition in the northwest Pacific Ocean of the U.S. Fisheries Steamer *Albatross*. Over a century after this expedition, the specimens in this collection were re-curated, their condition was assessed, and the type specimens were photographed. This collection nominally includes 58 type specimens in 21 taxa (species or subspecies). In the type collection, there was 1 specimen in Very Good condition, 24 Good specimens, 19 Fair specimens, 4 Poor specimens, 2 Very Poor specimens, 6 lots On Loan, and 2 lots known previously not to be extant. Therefore, of the types, 43% are in Good or bet-

ters begin with USNM) at the Smithsonian Institution, now known as the National Museum of Natural History (NMNH).

In 2015, the triennial meeting of the Cephalopod International Advisory Council (CIAC) included a workshop on the taxonomic work of Sasaki. In preparation for the workshop, this project re-curated and assessed the condition of the specimens in the Sasaki collection at NMNH and photographically documented the type specimens from this collection, in accordance with the Smithsonian's goal of digitizing large portions of the NMNH Invertebrate Zoology collection.

Materials and Methods

All of the Sasaki specimens from the wet and dry mollusk collections at NMNH and its Museum Support Center were examined, as were loan records. The Sasaki wet specimens are preserved in 50% isopropyl alcohol; the alcohol in jars was topped off or changed out completely in jars where the alcohol had become discolored.

ter condition, and less than a 20% are in Poor condition or worse. In addition to the type specimens, Sasaki identified 323 non-type specimens in 42 taxa. In the non-type collection, there were 42 Very Good specimens, 196 Good specimens, 37 Fair specimens, 10 Poor specimens, 9 Very Poor specimens, 3 Empty Jar lots, 19 Missing lots, 1 Not Extant lot, and 6 Not Cataloged lots. Therefore, the majority of the specimens (61%) in the Sasaki non-type collection are in Good condition and less than 15% are Poor, Very Poor, Empty Jars, Missing, Not Extant, or Not Cataloged. These final four categories, explained in the paper, comprise 29 non-type specimens in 16 taxa listed in Sasaki's taxonomic publications but not currently found in the USNM collections.

Gaskets and jars were replaced if the lots were losing (or at risk of losing) alcohol through evaporation. All type specimens were photographed (along with a few lots containing non-type specimens). For each lot, photographs were taken of the labels, of all of the specimens and removed structures together, and of each specimen individually (from two different angles). Figure 2 compares some of these recent photographs (taken in 2015) with original photographs of the same specimens taken in the early twentieth century.



Figure 1.—Madoka Sasaki, who first identified the cephalopod specimens of the 1906 expedition of the U.S. Steamer *Albatross* in the northwestern Pacific Ocean; his identifications, published in 1917, 1920, and 1929, included newly-described species. (Undated image, courtesy of Tsunemi Kubodera, Ian Gleadall, and Yasunori Sakurai).

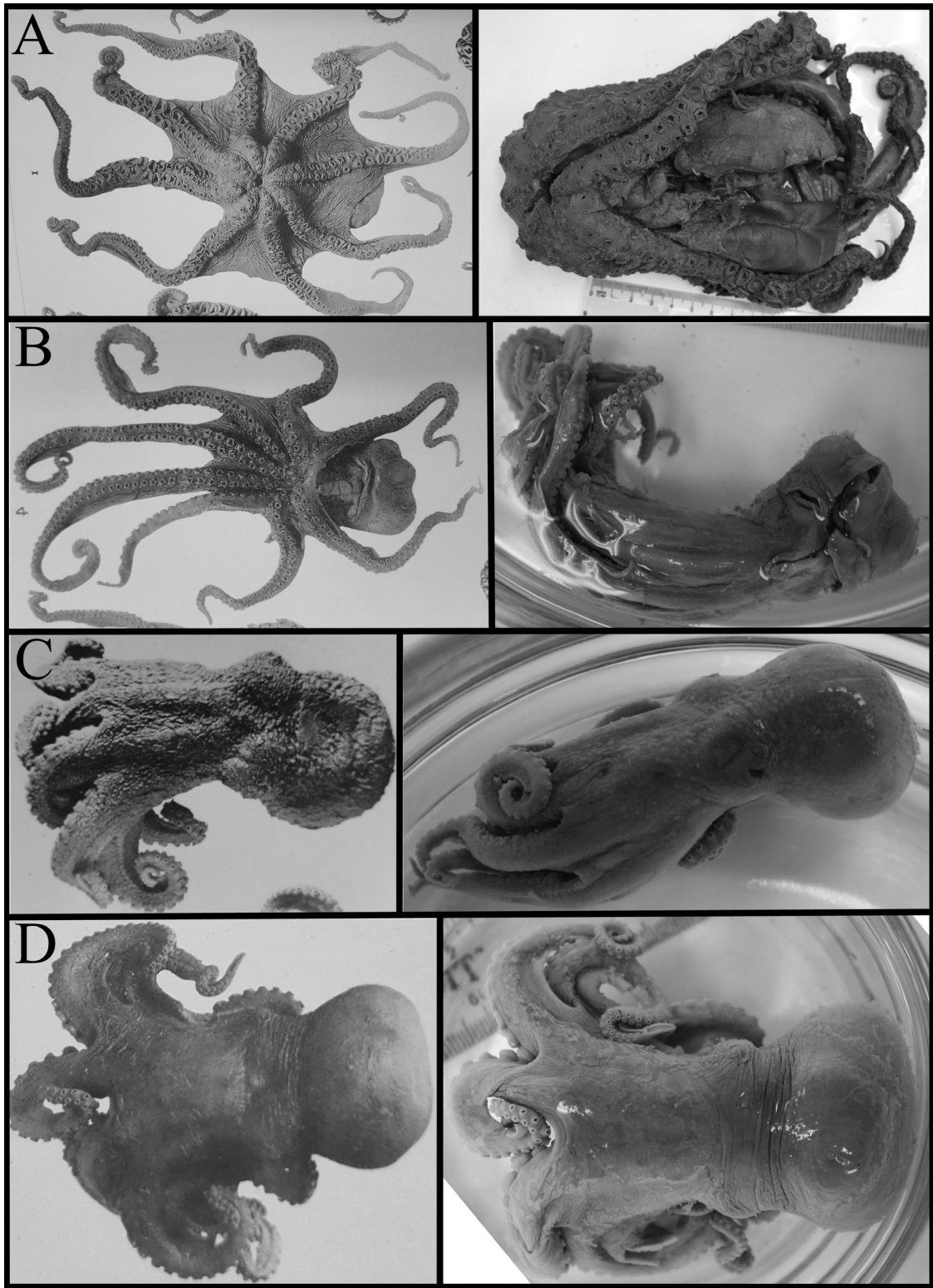


Figure 2.—Paired photographs of select Sasaki type specimens in the early twentieth and twenty-first centuries. This figure presents pairs of photographs of four select Sasaki type specimens. The left column contains photographs taken of

Figure 2 Caption Continued

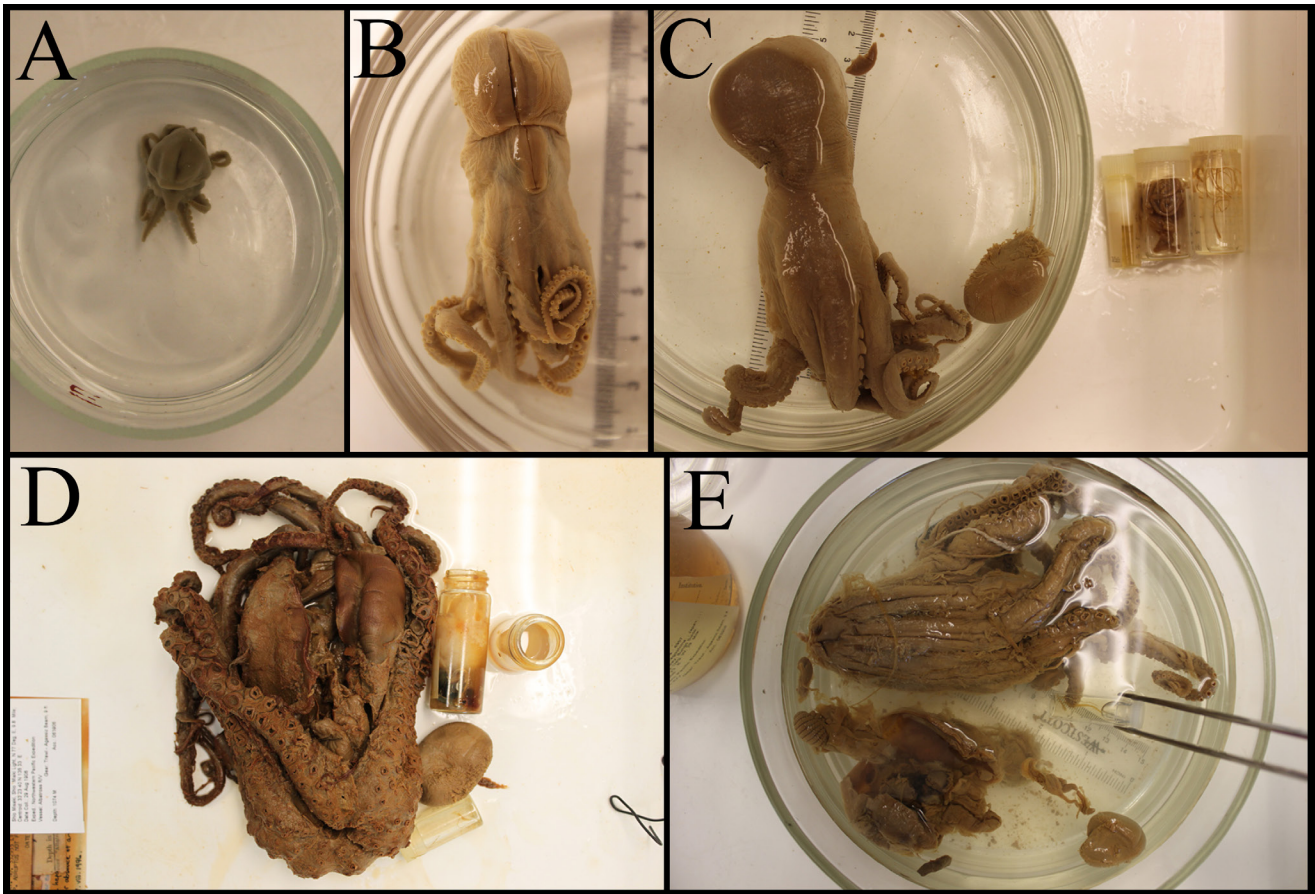


Figure 3.—Representative photographs for the five possible conditions of present specimens. This figure shows examples of specimens in the Very Good (A), Good (B), Fair (C), Poor (D), and Very Poor (E) conditions (see Table 1). All pictured specimens are in the order Octopoda: *Argonauta hians*, USNM 332952 (A); *Polypus yendoii*, USNM 332991 (B); *Polypus yendoii*, USNM 332987 (C); *Polypus abruptus*, USNM 332935 (D); and *Polypus alatus*, USNM 332978 (E).

The condition of every specimen was assessed using a five-tier scale (summarized in Table 1). If the specimen was not dissected, it was rated as “Very Good” (Fig. 3A). If the specimen was minimally dissected, with only a single (usually ventral) incision in the mantle, it was considered “Good” (Fig. 3B). If the specimen

was somewhat dissected (perhaps with some parts separated and in vials of their own) yet still in decent condition, it was considered “Fair” (Fig. 3C). If the specimen was dissected dramatically (often with many parts removed or barely attached) and in poor condition, it was considered “Poor” (Fig. 3D). Finally, if the specimen was com-

pletely torn apart and in very poor condition, it was considered “Very Poor” (Fig. 3E).

Some lots were not present; these fell into five categories. If the specimens were on a long-term loan, they were considered “On Loan.” If the labeled jar was present but only parts of or small bits of tissue from the speci-

Figure 2 Caption Continued

each specimen in the early twentieth century and published in Sasaki’s 1929 “A Monograph of the Dibranchiate Cephalopods of the Japanese and Adjacent Waters”; the right column contains photographs of the specimens taken in 2015. Row A features the *Polypus abruptus* holotype (USNM 332935), which is currently in Poor condition (see Table 1). Row B features a *Polypus alatus* paratype (USNM 332979) which is currently in Good condition. Row C features a *Polypus spinosus* paratype (USNM 332967) which is currently in Good condition. Row D features the *Polypus tsugarensis* holotype (USNM 332972), which is currently in Fair condition. The photographs in the left column are reflections (about the anterior-posterior axis of the octopods) of how they appear in the Monograph for proper comparison (the original photographs were reflections, so flipping them about the horizontal returns the true image). The figures from the monograph from which the earlier images are taken are as follows: the *P. abruptus* photograph came from Figure 1 of Plate VI, the *P. alatus* photograph came from Figure 4 of Plate VI, the *P. spinosus* photograph came from Figure 5 of Plate V, and the *P. tsugarensis* photograph came from Figure 8 of Plate IV.

Table 1.—Summary of the criteria used to assign a condition to each specimen in Sasaki’s 1906 Albatross collection at the U.S. National Museum of Natural History.

Condition	Definition
Very Good	Undissected
Good	Minimally dissected
Fair	Dissected, good condition
Poor	Dissected dramatically, poor condition
Very Poor	Completely torn apart
On Loan	Currently on loan
Empty Jar	Labeled jar with no whole specimens (only small parts)
Missing	Absent from correct location in collection
Not Extant	Lost with little hope of finding
Not Cataloged	Although catalog number present in literature (Sasaki, 1917; 1920; 1929), not listed in current USNM catalog and likely never actually cataloged

Table 2.—Sasaki type specimens from the 1906 Albatross cruise deposited in the U.S. National Museum of Natural History. Original species names, USNM catalog numbers, and total numbers of specimens per species (“Total”) are listed. The specimen in lot 332946 was originally identified by Sasaki as *Taonius pavo* but was designated to be the holotype of *Belonella pacifica pacifica* by Nesis (1972). The species *Polypus hokkaidensis*, Berry 1921, and *P. madokai*, Berry 1921, are replacement names for Sasaki’s *P. glaber* and *P. pustulosus*, respectively, which were preoccupied names. The catalog number of the paratype of *Polypus macropus minor* was originally 332963b. The lots 332831, 332990, and 332991 contain two specimens each, and the lot 577268 contains 10 specimens.

Genus	Species	Holotype	Paratype(s)	Total
<i>Belonella</i>	<i>pacifica pacifica</i>	332946 ¹	(None)	1
<i>Crystalloteuthis</i>	<i>behringiana</i>	332921 ¹	332919 ¹ , 332920 ¹ , 332922 ¹ , 332923 ¹	5
<i>Gonatopsis</i>	<i>octopedatus</i>	332918	(None)	1
<i>Polypus</i>	<i>abruptus</i>	332935	332935b ²	1
<i>Polypus</i>	<i>alatus</i>	332978	332979	2
<i>Polypus</i>	<i>glaber</i> [=hokkaidensis]	332981	332980, 332982, 332983	4
<i>Polypus</i>	<i>macropus minor</i>	332963	577540	2
<i>Polypus</i>	<i>ochotensis</i>	332955	332956	2
<i>Polypus</i>	<i>pustulosus</i> [=madokai]	332976	(None)	1
<i>Polypus</i>	<i>salebrosus</i>	332969	332970 ²	2
<i>Polypus</i>	<i>spinus</i>	332968 ²	332967	2
<i>Polypus</i>	<i>tenuipulvinus</i>	332977	(None)	1
<i>Polypus</i>	<i>tsugarensis</i>	332972	(None)	1
<i>Polypus</i>	<i>validus</i>	332971	(None)	1
<i>Polypus</i>	<i>yendoi</i>	332987	332989–332991, 577268	16
<i>Rossia</i>	<i>bipapillata</i>	332830	(None)	1
<i>Rossia</i>	<i>mollicella</i>	332833	332831, 332832	4
<i>Sepia</i>	<i>carinata</i>	332849	332848	2
<i>Sepia</i>	<i>kobienis albatrossi</i>	332862	332861, 332863, 577551	4
<i>Stauroteuthis</i>	<i>albatrossi</i>	332949	332948, 332950, 332951	4
<i>Watasella</i>	<i>nigra</i>	332892	(None)	1

¹Specimens that are on a long-term loan.

²Specimens that are no longer extant.

men were inside of it, it was considered an “Empty Jar.” If the lot was absent from its correct location in the collection (and not on nearby shelves) and if no record of its being on loan was found, the lot was considered “Missing.” If the lot was listed in the type catalog (Roper and Sweeney, 1978) as no longer extant or if notes in the jar stated that it had been lost for many years, it was considered “Not Extant.” Lastly, if a catalog number was printed in Sasaki’s publications but was not in the NMNH catalog, it was considered “Not Cataloged.”

Results

The specimens in the NMNH Sasaki/Albatross collection represent numerous cephalopod taxa (some of which are no longer considered to be valid), spanning 5 orders, 17 families, 30 genera, and 61 species. Lists of the species in the Sasaki type collection and of the species currently present in non-type collection are found in Tables 2 and 3, respectively.

In the type collection (Fig. 4A), there was 1 Very Good specimen, 24 Good specimens, 19 Fair specimens, 4 Poor specimens, 2 Very Poor specimens, 6 lots On Loan, zero Empty Jar lots, zero Missing lots, 2 Not Extant lots, and zero Not Cataloged lots. Therefore, of the types, 41% are in Good condition and less than 20%

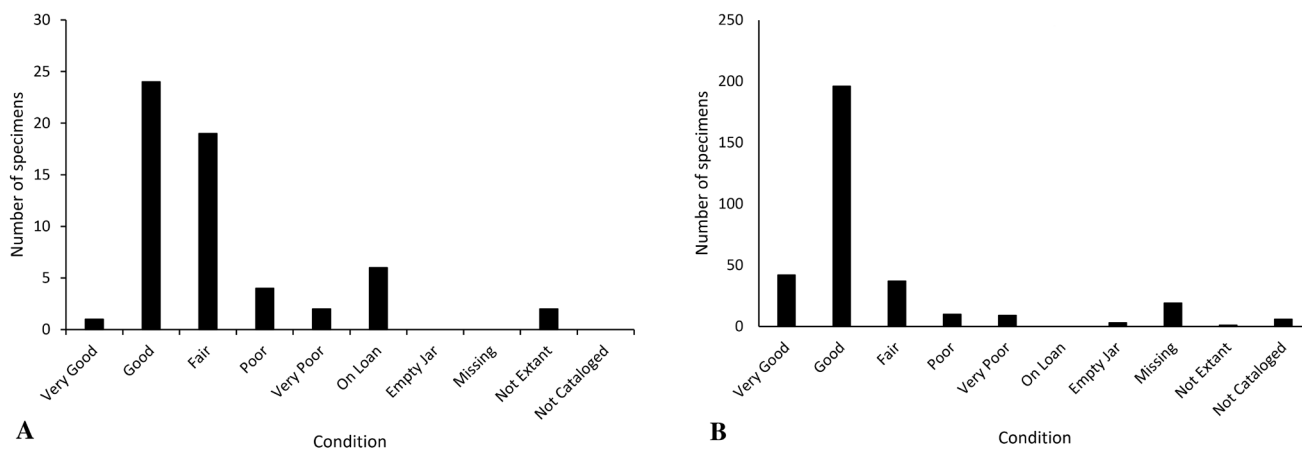


Figure 4.—Frequency of conditions of Sasaki specimens. These graphs show the current distribution of the specimens in the type (A) and non-type (B) collections across the 10 different condition categories. Note that the majority of specimens are in either Good or Fair condition.

are in Poor condition or worse. Included in these type specimens is the holotype of *Belonella pacifica pacifica*: this specimen was collected on the 1906 expedition of the *Albatross* and identified by Sasaki as *Taonius pavo*, but it was later designated a type specimen by Nesis (1972); this specimen is currently on loan to Nancy Voss at the University of Miami and is “in good condition” (Nancy Voss, personal commun.). The five other lots on loan are the type specimens of *Crystalloteuthis behringiana* (Sasaki, 1920); they were loaned to Gil Voss in 1974 and currently remain at the University of Miami “in good condition” (Nancy Voss, personal commun.). Unfortunately, one of the lots that are Not Extant is a holotype for *Polypus spinosus* (Sasaki, 1920).

In the non-type collection (Figure 4B), there were 42 Very Good specimens, 196 Good specimens, 37 Fair specimens, 10 Poor specimens, 9 Very Poor specimens, zero lots On Loan, 3 Empty Jar lots, 19 Missing lots, 1 Not Extant lot, and 6 Not Cataloged lots. Therefore, the majority of the specimens (61%) in the Sasaki non-type collection are in Good condition and less than 15% are Poor, Very Poor, Empty Jars, Missing, Not Extant, or Not Cataloged.

Table 4 lists non-type specimens currently not present in the NMNH collection that were at some time part of the museum’s catalog or Sasaki’s (1929) monograph and preliminary publications (e.g., Sasaki, 1917, 1920).

Discussion

The categories Very Poor, Empty Jar, Missing, Not Extant, and Not Cataloged are the most disturbing. We have no evidence of the reason(s) that some lots were in these conditions. It is likely that specimens “Not Cataloged” were catalog numbers assigned to Sasaki as he was drafting his publications and that these specimens were never returned to NMNH, although other explanations are possible. Some of the “Missing” lots may have been loaned to other researchers and the records misplaced or lost. Furthermore,

Table 3.—Sasaki non-type specimens from the 1906 *Albatross* cruise currently present in the U.S. National Museum of Natural History. Sasaki’s taxonomic names, USNM catalog numbers, and total numbers of specimens per species (“Total”) are listed. Only one of the four *Gonatus fabricii* specimens in the lot 332917 remains; the other three are missing.

Genus	Species	Catalog number(s)	Total
<i>Argonauta</i>	<i>bottgeri</i>	332953	2
<i>Argonauta</i>	<i>hians</i>	332952	1
<i>Chiroteuthis</i>	<i>imperator</i>	332938	1
<i>Chunella</i>	<i>diaphana</i>	332924	1
<i>Enoploteuthis</i>	<i>chuni</i>	332945	2
<i>Euprymna</i>	<i>morsei</i>	332876	1
<i>Euprymna</i>	<i>simillis</i>	332872-332875	18
<i>Gonatus</i>	<i>fabricii</i>	332910-332914, 332916, 332917	11
<i>Gonatus</i>	<i>magister</i>	332907, 332909	2
<i>Loligo</i>	<i>bleekeri</i>	332905, 332906	29
<i>Loligo</i>	<i>edulis</i>	332902	2
<i>Loligo</i>	<i>japonica</i>	332903, 332904	7
<i>Mastigoteuthis</i>	<i>cordiformis</i>	332947	1
<i>Ommastrephes</i>	<i>sloani pacificus</i>	332930-332934	10
<i>Opisthoteuthis</i>	<i>depressa</i>	332940-332943	5
<i>Polypus</i>	<i>conispadiceus</i>	332986	2
<i>Polypus</i>	<i>fangsiao</i>	332966	2
<i>Polypus</i>	<i>hongkongensis</i>	332992, 332993, 332995, 332996, 332998	11
<i>Polypus</i>	<i>longispadiceus</i>	332984, 332985	2
<i>Polypus</i>	<i>macropus</i>	332957-332962	6
<i>Polypus</i>	<i>parvus</i>	332965	4
<i>Rossia</i>	<i>pacifica</i>	332801-332808, 332810-332829	95
<i>Scaevurgus</i>	<i>patagius</i>	332954	1
<i>Sepia</i>	<i>adreaana</i>	332835, 332837	8
<i>Sepia</i>	<i>appellofi</i>	332839, 332840	3
<i>Sepia</i>	<i>esculenta</i>	332834	1
<i>Sepia</i>	<i>kobiensis</i>	332850, 332851, 332857, 332860	5
<i>Sepia</i>	<i>misakiensis</i>	332838	1
<i>Sepia</i>	<i>peterseni</i>	332845, 332846	4
<i>Sepiolla</i>	<i>birostrata</i>	332877-332884, 332886-332891	34
<i>Sepiolina</i>	<i>nipponensis</i>	332865, 332868, 332869, 332871	6
<i>Sepioteuthis</i>	<i>lessoniana</i>	332944	1
<i>Stigmatoteuthis</i>	<i>dofleini</i>	332939	1
<i>Thelidioteuthis</i>	<i>alessandrini</i>	332936	1
<i>Watasenia</i>	<i>scintillans</i>	332895-332901	13

Table 4.—Sasaki non-types from the 1906 *Albatross* cruise not currently present in the U.S. National Museum of Natural History; these specimens are either Empty Jars, Missing, Not Extant, or Not Cataloged (see Table 1). Sasaki’s taxonomic names, USNM catalog numbers of absent lots, and total numbers of absent lots per species (“Total”) are listed. While the *Sepia kobiensis* specimen in lot 332858 is missing from the wet collection, its cuttlebone is present in the dry collection. The specimen in lot 729953 was removed from its original lot (332946) when the other specimen in the lot was designated as the *Belonella pacifica pacifica* holotype by Nesis (1972).

Genus	Species	Catalog number(s)	Total
<i>Chiroteuthis</i>	<i>imperator</i>	332937	1
<i>Galiteuthis</i>	<i>armata</i>	332926, 332927	2
<i>Gonatus</i>	<i>fabricii</i>	332915	1
<i>Gonatus</i>	<i>magister</i>	332908	1
<i>Idiosepius</i>	<i>pygmaeus</i>	332893, 332894	2
<i>Liocranchia</i>	<i>validiviae</i>	332925	1
<i>Megalocranchia</i>	<i>maxima</i>	332928	1
<i>Ommastrephes</i>	<i>sloani pacificus</i>	332929	1
<i>Polypus</i>	<i>hongkongensis</i>	332994, 332997	2
<i>Polypus</i>	<i>januarii</i>	332973-332975	3
<i>Polypus</i>	<i>parvus</i>	332964	1
<i>Sepia</i>	<i>adreaana</i>	332836	1
<i>Sepia</i>	<i>appellofi</i>	332841, 332842	2
<i>Sepia</i>	<i>elliptica</i>	332844, 332847	2
<i>Sepia</i>	<i>kobiensis</i>	332853-332856, 332858, 332859, 332864	7
<i>Taonius</i>	<i>pavo</i>	729953	1

the NMNH collections and associated records have been moved repeatedly over the past century; this may have resulted in misplacement of some lots.

The research conducted aboard the *Albatross* is of substantial historical importance (Allard, 1999). Moreover, this collection is still important

for ongoing taxonomic and systematic research, although it is over a century old. Standard methods for fixation and preservation of cephalopods have changed greatly since 1906. Following this re-curation, assessment, and photography, the Sasaki/*Albatross* collection of cephalopods appears still to be

mostly in good overall condition, despite its age.

Acknowledgments

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