



A History of Marine Exploration:

Expeditions and Contributors to the Marine Invertebrate Collections at the American Museum of Natural History

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The Division of Invertebrate Zoology (DIZ) at the American Museum of Natural History (AMNH) is custodian to an estimated 25 million objects. Collected from every ocean on earth, an estimated 5-7 million of these are marine invertebrates.

The practice of cataloging the marine invertebrate holdings has been in place since the museum's founding in 1869, however only in the past few decades have those records become digital, and only in the past few years has this digital data been available online.

In Fall 2020, DIZ began participating in Documenting Marine Biodiversity Through Digitization of Invertebrate Collections (DigIn award), a National Science Foundation (NSF)-funded Thematic Collections Network (TCN). Due to the efforts of this grant, it is now easier than ever to examine the history of these collections.

Here we highlight a few of the expeditions and donors that have contributed to the collection's growth over the past 155 years and present an overview of the history of the non-molluscan marine invertebrate collections at the AMNH.

● **NYZS-** The Department of Tropical Research at the New York Zoological Society (NYZS; now the Wildlife Conservation Society), headed by William Beebe made research cruises and collections over much of the northern Pacific and Atlantic oceans.

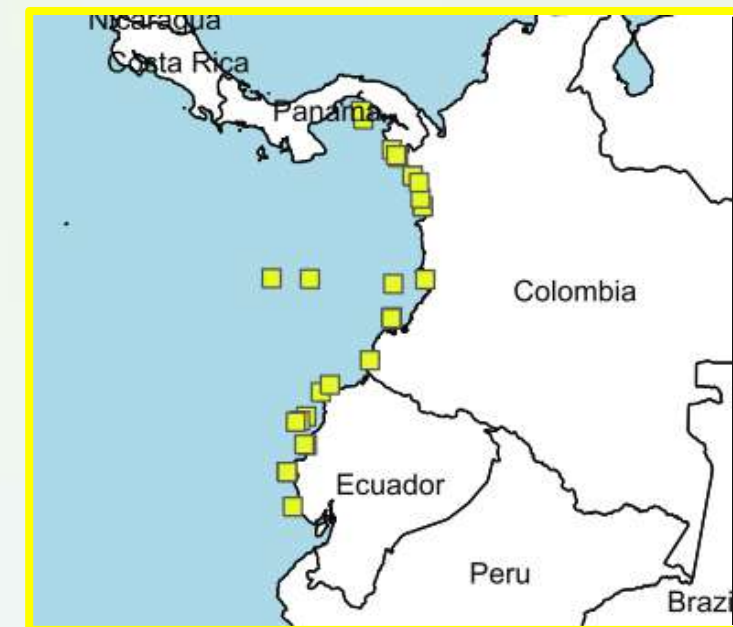


Material from these cruises was deposited at the AMNH between 1912 and 1979, and totals over 6,800 lots (>38,000 specimens).

Much of this material was collected off the coast of Bermuda, from a single locality returned to for more than 10 years and sampled over 1,000 times, at depths up to 3,600 m (the Bermuda Oceanographic Expeditions). In 2023, this unique collection formed the basis of a Research Experience for Undergraduates (REU) project examining the abundance and diversity of crustacea from the site, the results of which are in preparation¹.

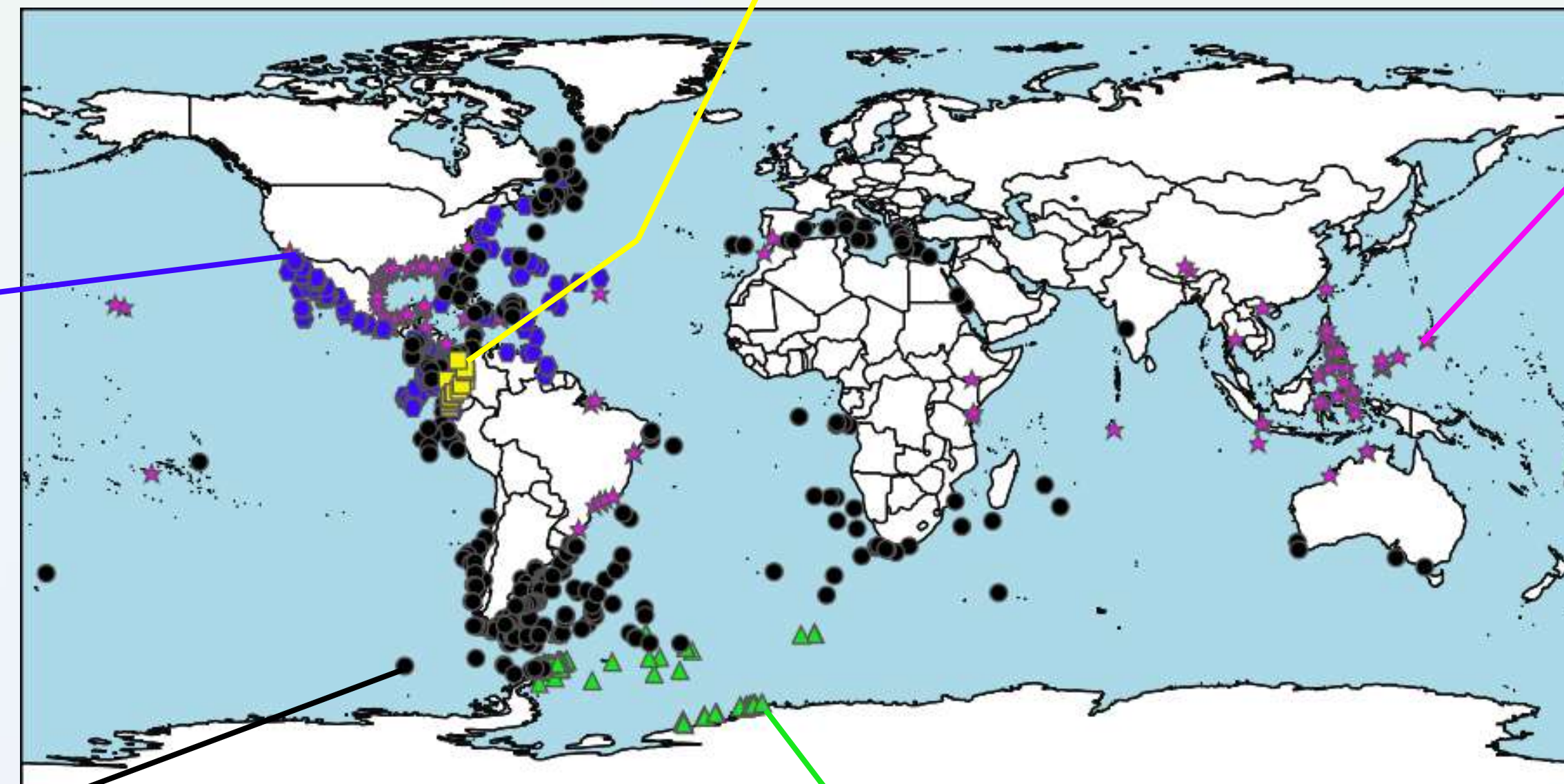
● **R/V Vema-** For almost 30 years (1953-1981) the R/V Vema, operated by Columbia University's Lamont Geological Observatory (now the Lamont-Doherty Earth Observatory), conducted research cruises around the world, making physical and chemical observations, taking core samples and collecting biological samples².

In 1960, the AMNH entered into collaboration with the observatory, participating in the cruises and acting as a repository and clearing house for the biological samples- cleaning, sorting and distributing them to experts around the world. Much of the material collected between 1953 and 1963 remains at the AMNH today. To date, more than 2,500 lots have been cataloged across 12 phyla (>7,000 specimens), including ~500 lots of type material.



■ **The Askoy Expedition-** For four months (Feb-May 1941) the diesel schooner Askoy explored the Pacific coastal regions of Panama, Colombia & Ecuador, from the Bay of Panama in the north to Guayaquil in the south, and the Pacific waters up to 300 miles offshore.

More than 5,700 invertebrates were collected at 113 stations, as well as birds, reptiles, fish, water samples, and meteorological and water temperature data. Non-molluscan invertebrates were collected from 53 stations, most of them crustaceans (508 of 568 cataloged lots).



▲ **Rodríguez-** Due to Curator Estefanía Rodríguez' research on sea anemones (Cnidaria: Anthozoa: Actiniaria), the Cnidaria are one of the fastest growing subsets in the collection (>9,000 lots with >20,000 specimens).

When Dr. Rodríguez joined the AMNH in 2009 she brought with her cnidarians collected during seven research cruises to Antarctica. These cruises of the R/V Polarstern were conducted between 1998 and 2007 and were collaborations between the Alfred Wegener Institute for Polar and Marine Research (Germany), the Universidad de Sevilla (Spain) and the Institut de Ciències del Mar (Spain). More than 700 lots (>2,000 specimens) were donated to the AMNH to continue Dr. Rodríguez' research into polar and deep-sea anemones.



★ **Barnwell-** A more recent acquisition, the Frank H. Barnwell collection of fiddler crabs represents more than 40 years' worth of research. Dr. Barnwell, now Professor Emeritus at the University of Minnesota, studied the behavior and circadian rhythms of fiddler crabs, work which took him collecting around the world³.

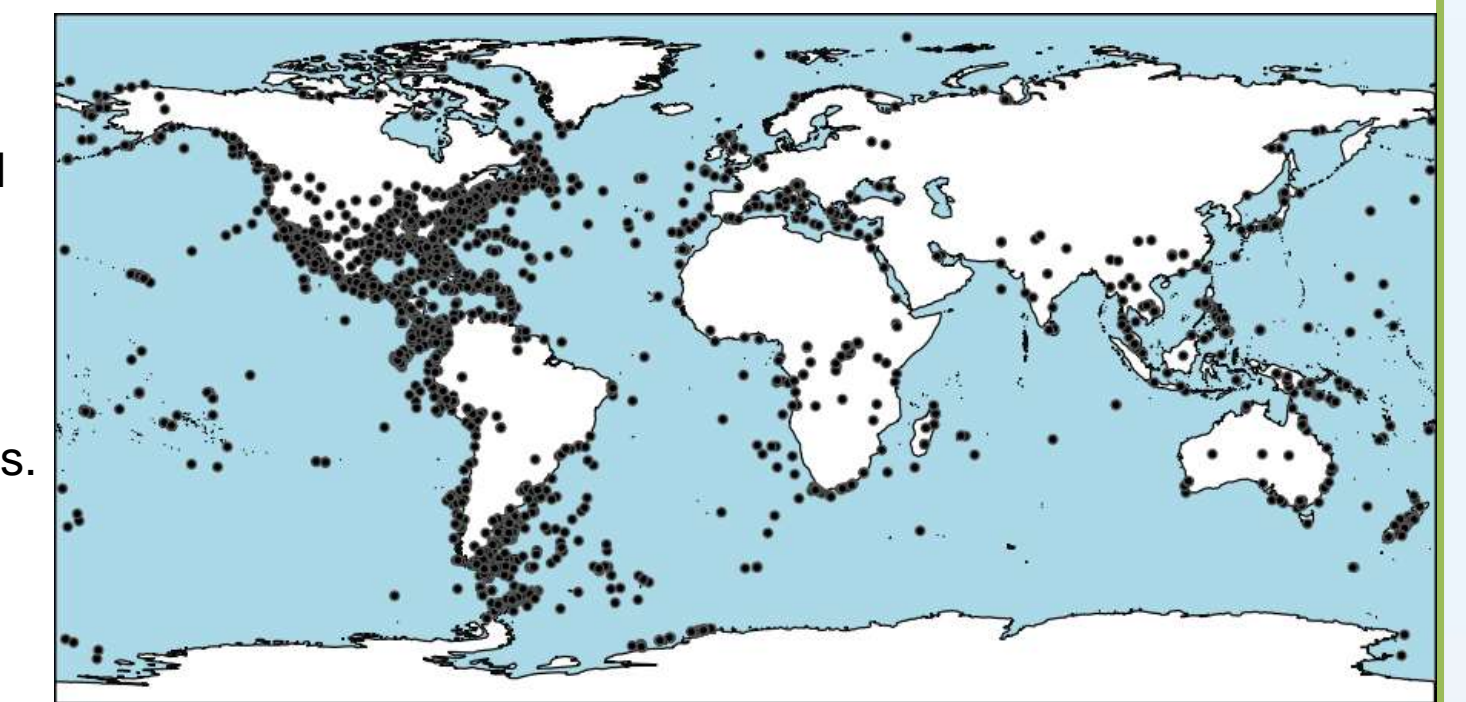
In 2022, his collection of more than 1,200 lots (>14,000 individuals) was donated to the AMNH, where the specimens have been photographed, databased and made available for study.



Summary- Examination of the history of the collection is made easier due to the increased digital records. While digitization of the collections has been ongoing for years, the DigIn grant has greatly increased the rate of digitization and has led to the digitization of not only catalog records, but also expedition records, station logs and accession records, as well as allowed for specimen and label imaging and georeferencing of collection localities.

Prior to DigIn, DIZ's specimen database contained ~35,000 non-molluscan catalog records. We now have more than 56,000 catalog records (out of an estimated 100,000), >10,000 specimen and label images, ~ 5,000 georeferenced localities (see map) and >1,000 digitized accession records.

As more and more of the collection is digitized, and thus becomes easier to search and examine, we will continue to have a fuller picture of the history of these collections.



Collection localities of all georeferenced non-molluscan invertebrates in the AMNH

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Resources
AMNH DIZ <https://www.amnh.org/research/invertebrate-zoology>
AMNH DIZ Specimen Database <https://emu-prod.amnh.org/imulive/iz/iz.html>
DigIn <https://www.digin-tcn.org/>

References
1. Wilkinson et al. (in prep) <https://www.biorxiv.org/content/10.1101/2023.12.14.571719v1>
2. <https://lamont.columbia.edu/about/history-of-lamont> (Accessed 8/9/2024)
3. <https://cbs.umn.edu/blog-posts/quest-collect-crabs> (Accessed 8/12/2024)