

CHAPTER 13

From iconic to industrial: The economic life of Philippine sponges, 1841-1908

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Introduction

This paper charts the rise of Philippine sponges in the modern world. It does so through three key moments – 1841, 1887, and 1908. It argues that these moments were central to shaping and structuring the global life of these marine species. Starting with 1841, the paper explores the story of the iconic Venus’s flower basket and how its collection created an age of sponge fever in mid-century Europe. The second moment looks at the *Exposición Filipina* in Madrid in 1887, narrating the ways in which this event exposed the dearth of Spanish knowledge about the colony’s sponges and its marine environment more broadly. The third moment considers the opening of the Philippine sponge industry in the period around 1908.

The paper also suggests that we might think of these three moments and the global life of Philippine sponges through an overlapping set of economies: that is, 1841 as an economy of appearances; 1887 as an economy of scale; and 1908 as an economy of use. It concludes by briefly noting how these particular moments laid the foundation for knowing and valuing today’s Philippine sponges in terms of their biomedical futures and ecosystem services.

On being iconic

In 1841, Richard Owen’s scientific naming of the Venus’s flower basket, *Euplectella aspergillum*, forged a place for the Philippines in the world of sponges, with Victorian collectors paying sizeable sums for prized specimens.¹ Made of needle-like threads of silica, this denizen of the deep resembled what one observer called “a cornucopia of spun glass”.²

Although described and made famous by Owen, the type specimen was actually obtained by Hugh Cuming (1791-1865), a notable conchologist who lived in Manila from 1836 to 1840. Cuming procured his sponge from some Visayans, who in turn secured the *Regadera*, as it was known in the Spanish Philippines, from a place just south of Cebu called Talisay. In 1878, William Chimmo, a naval hydrographer who had extensive experience sounding Southeast Asia’s waters, described Talisay as “the only spot in the world (as yet known) which produces [the] delicate and exquisite sponge *Euplectella aspergillum*”.³ According to Chimmo, the Visayans fished the *Regadera* out of the deep water using a Y-shaped dredge made of bamboo and stone, and dragging it along the ocean’s floor. They fished when the currents were strong, covering considerable ground but also because the strong currents helped the Visayans uproot these living creatures. Once uprooted, the *Regadera* were hung on tree branches to bleach naturally under the sun.⁴ What Cuming sent Owen, and what Owen described in 1841, was a weathered yet intact skeleton that can be found, today, in the collection of the Natural History Museum in London.

As for Owen’s description of the *Regadera*, it marked the beginning of a kind of sponge fever in Europe. In fact, his opening line framed this new Philippine sponge as “one of the most singular and beautiful as well as...rarest...marine productions”.⁵ The

combination of rarity and beauty inspired many individuals and museums to seek these Philippine specimens for their cabinets and collections.

By 1867, observed J.E. Gray, these sponges were “seen in most of the shops of the dealers in objects of Natural History”.⁶ Gray’s observation was not only made as the keeper of zoology at the British Museum, but also as a prolific and passionate commentator on all things spongy. What is more, Gray’s network of correspondents, collectors, and companions kept him abreast of the growing number of Regadera in mid-century Europe. During his time, Regadera were coveted parts of institutional collections in Kent, Leeds, Windsor, Birmingham, Liverpool, and Edinburgh, among other places.

Regadera also constituted a global commerce, with Manila merchants marketing their skeletal sponges to European buyers who were fulfilling orders from London shopkeepers such as Bryce M. Wright.⁷ Located at 90 Great Russell Street, Bloomsbury, Mr. Wright’s shop packed, forwarded, and accompanied each Regadera with a descriptive pamphlet authored by Wyville Thomson, chief scientist of the Challenger Expedition, for 5 pounds sterling in 1873 (or about 500 pounds sterling today). Wright’s advertisements, and others like them, populated the pages of Europe’s presses, feeding this remarkable yet impermanent age of sponge fever.

And yet while the Regadera was seen as “one of the most perfect and fairy specimens to be found”, it was still a sponge absent of any known economic utility.⁸ The global life of this deep-sea sponge was borne out of commerce and collection rather than industry and use. Extirpated from Visayan waters, the Regadera’s existence in Europe was built around an economy of numbers and aesthetics: rarity and beauty were paramount to its prestige.

But by the end of the 1870s, explained George Leslie, demonstrator of zoology at the University of Edinburgh, the Regadera went “from being one of the rarest of zoological treasures” to “becom[ing] a very familiar object in our museums”.⁹ This radical shift led Gray, of the British Museum, to ask: how did these sponges suddenly “become so common”?¹⁰

The answer to Gray’s question lay in the Philippines, where conditions on the ground – far-removed from the shops, cabinets, and museums of London and elsewhere – had been in flux since Owen first described Cuming’s type specimen in 1841. While demand for the Regadera continued to grow across mid-century Europe, fueling an age of sponge fever, so too did the need to supply intact skeletons that met the standards of appearance. They needed to be unblemished and shockingly white. As a result, Manila merchants were known to artificially bleach their Regadera as a way to ensure the proper aesthetic but also, and more importantly, to expedite the process of preparation for the European market.¹¹

Bleaching sponges was a practice that increased the availability of market-ready specimens, but the actual supply of Regadera also grew, somewhat dramatically after 1865, because local knowledge about these deep-sea sponges and their home waters had improved. For instance, Carl Semper, a German naturalist who visited Cebu in 1865 but had lived in the Philippines from 1858 to 1864 and was a resident of Bohol and Cebu from 1862 to 1864, explained that Visayan fishermen had narrowed the vastness of the sea to the Regadera’s “actual locality” (*eigentlichen Fundort*).¹² The combination of artificial bleaching, more precise local knowledge, and a greater number of Visayans engaged in the production of Regadera created the market

conditions that perplexed Gray. Their abundance in the market, recalled Semper in 1867, “was certainly not the case during my residence”.¹³

If we step back from the story, we can see that the rise of the Regadera as a commodity of natural history marked a foundational moment in the global life of Philippine sponges, one that transformed the archipelago into a known place of rare production. This popular view was fashioned through scientific descriptions, anecdotal accounts, dredging reports, and local merchants in Cebu and Manila. Cuming, Owen, Gray, Leslie, and Thomson, among others who built and documented London’s natural history collections, identified the Philippines as the home waters of this iconic deep-sea sponge.

But just as the exceptionally rare Regadera became exceedingly common and abundant by the 1880s, a new moment in the global life of Philippine sponges was on the rise. It is to this new moment, the years around 1887, and the work of making a catalogue on Philippine sponges for the *Exposición Filipina*, that we now turn.

Imperial belongings

We might think of 1887 as a moment built around an economy of scale (rather than appearances as in the case of the Regadera). Whereas beauty and rarity were factors that defined the value and prestige of things within an economy of appearances, an economy of scale was based on enumeration and collation. In this way, scale was achieved through systematically indexing what species were known, where they were found or collected, and who first described them. In the second half of the nineteenth century, an economy of scale framed and informed the work of cataloguing the state of knowledge about Philippine sponges.

One of the most important naturalists involved in this kind of work was Augusto Gonzalez de Linares (1854-1904), who in 1887 was tasked to prepare a catalogue of Philippine sponges for the *Exposición Filipina*. But before moving to the catalogue itself and the content and sentiment it conveyed, I would like to say a few words about Linares (whose life and career established the study of marine fauna in late nineteenth-century Spain).¹⁴

Linares was a free-thinking naturalist from the coastal town of Santander. In 1880, he left Madrid, where he was teaching natural history, for Paris to pursue mycological research at the *Jardin des Plantes* with Phillippe van Tieghem.¹⁵ It was during his time in Paris that Linares helped process the Museum of Natural History’s newest specimens of marine fauna, which had recently been collected by the *Travailleur*, a French oceanographic vessel, from the Bay of Biscay.

Inspired by the ocean’s biological diversity and moved by the immense task of enumeration and classification, Linares returned to Spain in 1881, taking up a position as chair of Natural History at the University of Valladolid, but only for a brief moment. As Salvador Calderon (who was director of mineralogy at the National Museum of Natural Sciences in Madrid) reported in 1904, Linares’s passion and purpose following his year in Paris was “to create in Spain a biological station devoted to the study of organisms that inhabit the sea, not in the way of spoils of animals and plants, as preserved in museums, but in the site where they live and reveal their nature”.¹⁶ From his serendipitous work at the Museum of Natural History in Paris, Linares believed that it was not enough just to observe and enumerate “the beings that waves throw upon the beach or those which, fixed on the rocks, are uncovered at low tide”.¹⁷ The ocean and its fauna commanded more; it was “necessary to separate from the shore”.¹⁸

After leaving his academic post in 1881, Linares was commissioned to study the infrastructure and collections of marine biological stations in Europe. From 1881 to 1883, he visited the Natural History Museum in London as well as laboratories in Concarneau, Marseille, and Roscoff.¹⁹ Most of his time, however, was spent at the Naples Zoological Station.²⁰

Upon his return in 1883, Linares was directed to investigate the possibility of establishing the country's first marine biological station at Santander, his seaside hometown, located on the north coast of Spain near Bilbao. After making the case for some years, Linares's efforts finally resulted in the founding of the Marine Station of Zoology and Experimental Botany at Santander in 1886. Popularly known as the Santander Marine Biological Station, Linares was appointed its director in 1887 – a position he held until his passing in 1904.

It was as director of the station in 1887 that Linares came to know Philippine sponges.²¹ In this new capacity, one of Linares's first and most urgent tasks was to prepare a catalogue of Philippine sponges for the *Exposición Filipina* in 1887. Held in Madrid, the *Exposición* brought into public view, possibly for the first time, the biological diversity of Philippine waters.

Molluscs were a dominant feature of the *Exposición*, with many species on display linked to Hugh Cuming and his residence in the Philippines in the late 1830s. Jose Gogorza y Gonzalez, a noted naturalist who authored a catalogue on molluscs and crustaceans for the *Exposición*, in fact, credited Cuming as the “first person to call the attention of the scientific world to the extraordinary wealth” of molluscs in the archipelago.²² “This lucky English collector,” Gogorza added, “amassed a collection... of more than 2,500 species” during his four years in the Philippines.²³ Carl Semper, our German naturalist who provided a useful, on-the-spot perspective about the economic life of the *Regadera*, was also acknowledged by Gogorza as a central figure in the increased number of known molluscs.

But unlike molluscs, Spanish knowledge on Philippine sponges was wanting and so the *Exposición* provided a timely moment to collate what was known about different species but also to critique the metropole's poor understanding of the colony's so-called “lower fauna”.²⁴ As director of the station and as a specialist in sponges generally, and those of the Bay of Biscay in particular, Linares was fully aware of the dearth of relevant Spanish material, but he saw the *Exposición* as an opportunity to raise both the profile of his newly-founded institution and the Spanish status of Philippine sponges. Underscoring the marginalised subject of sponges within the Spanish study of Philippine natural history, Linares explained that while the collections of molluscs appear arranged according to the Linnaean system of taxonomy, sponges often find themselves either “scattered at random” or “following each other discreetly in rows that occupy, without doubt, the lower part, that is, almost invisible section, of a closet, or serve to fill the angles and forced gaps in a given room”.²⁵ He lamented as well that too many sponges “exist as skeletal objects” rather than as living subjects or jarred specimens.²⁶

Most importantly, Linares was embarrassed, perhaps even troubled, by the shallow state of Spanish knowledge on Philippine sponges. He was self-conscious of the fact that foreigners knew more about the natural history of the archipelago's waters. They knew more about sponges, a point that was inescapable given Linares's task of assembling a catalogue for the *Exposición*. He collated their work, synthesised their descriptions, and realised, in the process, that all but one of the Philippine sponges on display were associated with folks who were not Spanish. The one exception was

Farrea balaguerii, which was named by Linares himself in honour of the Minister of Colonies, Victor Balaguer. But in recognising Balaguer, Linares also explained that it was from him, the minister, that “biological studies in the colonies await more interest than it seems they have received in the past.”²⁷

Given the absence of Spanish naturalists in knowing and describing Philippine sponges, and the embarrassment this caused him, Linares cautioned: “let’s hope, for their own good, that...foreigners do not attend in search of unknown news”.²⁸ Most of all, he worried about Semper, our German naturalist, hoping that he “would not come from Wurzburg with his students as he had in years past to explore the coasts of Spain”.²⁹

For Linares, the Exposición made clear two important realities: “how diverse and how opposite” the colony was but also, and more critically, how little the Spanish produced about its sponges and other forms of aquatic life.³⁰ And so, while Linares’s catalogue brought Philippine sponges into public view in Madrid and beyond, it also communicated a powerful and pointed critique about Spanish knowledge production in the late nineteenth century. “Because, above all,” reflected Linares, somewhat sadly, “our Olympian indifference towards things that seem insignificant” has ceded to “foreign naturalists [who are] determined and interested with enthusiasm and location... everything related to the reproduction and life of the Regadera and other [Philippine] sponges”.³¹

In the end, however, Linares’s urgent call to Spanish naturalists to take interest in the colony’s marine environment was too late. Not more than a decade after the Exposición, the Spanish were out of the archipelago and the Americans were in. It is to our third and last moment in the economic life of Philippine sponges that we now turn.

Becoming industrial

On 2 May 1907, Alvin Seale, an American naturalist, arrived in Manila as the newly-hired fishery expert of the Philippine Bureau of Science. Tasked with organising a fisheries division, Seale quickly sought to document the colony’s marine fauna and assess its commercial viability.³² Passionate about all things aquatic, Seale embodied, more than most, the age of economic zoology.

By the start of 1908, Seale was on a steamer heading south to inspect the fishery resources of the Sulu Sea. While the work was important and unprecedented, the basin itself was restive and still under the influence of the Sulu Sultanate (with its base on Jolo Island). Within this zone, the radials of piracy and marauding shaped the precarity of economic life.

Between 1907 and 1909, one of the more notorious outlaws who challenged both state rule and sultanate authority was an Arab-Samal named Jikiri. Born on Patian Island, a small rock south of Jolo, Jikiri, according to one source, once served as the Sultan of Sulu’s supplier of betel nuts before embracing the business of violence.³³ Jikiri’s terror ebbed and flowed within this increasingly colonial basin, striking port towns, Chinese shops, Moro fishers, and British pearl luggers alike.³⁴ His arc of banditry even crossed paths with out-of-the-way Greek spongers. In April 1908, for instance, a Greek sponge diver named Corpus reportedly fired shots at Jikiri and his band as they fled Siasi and arrived on Latuan, the island where Corpus was working local sponge beds.³⁵

But despite the threat of Jikiri, and others like him who were raiding the shores and waters of the Sulu Sea, Seale and his survey party (consisting of three Filipino

assistants from the Bureau of Science) pushed ahead in 1908, conducting their economic study of the basin's fishery products. In total, Seale spent five months collecting information on the production, distribution, and ecology of local marine resources.³⁶ His work, and the labours of his party, resulted in the formation of new and important knowledge about the economic wealth of Philippine waters. In particular, the figures and specimens collected were used to produce a series of maps that identified where specific resources were found.³⁷ These maps – and the field work that made them possible – were central to transforming the Sulu Sea into a dynamic, pre-war place of economic life and industrial activity. Soon this body of water became home to Greek spongers, Japanese pearlers, German merchants, Straits and Tausug traders, and American capitalists – all mixing and making a living in the wake of the nineteenth century.

Seale's work on sponges was especially significant and transformative in opening up the Sulu Sea during this period. As he traveled from Sitangkai to Basilan and from Tawi-Tawi to Zamboanga, recording the size, depth, and nature of the region's rich beds, Seale determined that there had "been little prospecting for sponges and it [was] probable that many beds remained to be discovered".³⁸

Not only did Seale chart the sponge beds from which new fisheries could develop, but he also identified the diversity of known economic species.³⁹ For instance, from the reef waters around Tawi-Tawi and Siasi, Seale found large quantities of sheep's-wool, reporting that they were "in every respect similar and equal to the well-known sheep's-wool of Florida".⁴⁰ From the shallow sea near Zamboanga, Seale located an abundance of honeycomb sponges. In fact, he learned from Zamboanga's "Greek spongers", including P.I. Pipinos of the Greek Sponge Company, who, according to Seale, was an "experienced Mediterranean sponge dealer", that they maintained a healthy export of honeycombs as well the more profitable elephant's-ear sponge, which went largely to Europe.⁴¹

Drawing on his local interactions, Seale figured that 1908 likely marked, "from a commercial standpoint...the opening of the Philippine sponge fisheries".⁴² In terms of scale and economy, the Philippines shipped more than 30,000 sponges in 1908, with most handled by Straits traders who in turn sold them in Singapore for export to London. Sulu sponges were also sent to Washington, "where they were compared with specimens from Florida, Cuba and the Mediterranean".⁴³ One report even noted that they were shipped to "sponge dealers in New York and San Francisco, who examined them with great interest".⁴⁴ What is more, a curriculum on sponge culture was soon adopted by the public schools of Sulu as a way to address the industry's growing labour needs. This new industrial arts programme sought to improve the methods of production and preparation of sponges for the global market.⁴⁵

And while Seale's study played a key role in casting the Sulu Sea as a vast, untapped zone of sponge beds, rich in commercial species, it is true too that his work built on and was very much part of a global history of Philippine sponges that reached back to the circulations of the Regadera in the decades around 1841.

Conclusion

This paper has tried to trace an intellectual history of Philippine sponges through the people, markets, and institutions that shaped and structured their evolving global and economic life. From iconic to industrial, it has sought to illuminate the rise of these marine species in the modern world.

Starting with 1841, the paper examined the story of the Regadera as a commodity of natural history and how its collection sparked an age of sponge fever in Europe, resulting in the transformation of the Philippines into a valued place within the world of sponges. Prized for its rarity and beauty, the Regadera was a product of what I have called an economy of appearances.

But by the 1880s, the Regadera was no longer a rare commodity but rather a common object of commerce. As the paper shows, this abundance in the market marked the rise of a new moment in the economic life of Philippine sponges. It explored this new moment through the making of a catalogue on Philippine sponges for the Exposición Filipina in 1887. It focused on the catalogue's author, Augusto Linares, and his indictment of the poor state of Spanish knowledge about Philippine sponges and marine fauna more generally. As the founding director of Spain's first marine biological station, Linares was troubled most by the fact that the metropole had effectively ceded the study of the colony's ocean to foreign naturalists.

Finally, turning to 1908 and the rise of an economy of use, the paper followed Alvin Seale and his investigations around the Sulu Sea. It focused on Seale's field visits and local encounters and how this work revealed both the basin's cosmopolitan currents and its expanse of commercially-viable sponge beds.

Yet while each of these moments – 1841, 1887, and 1908 – played a part in shaping the rise of Philippine sponges in the modern world, they have also done something more. They have laid the foundation for knowing and valuing the sponge diversity of Philippine waters in our current age. For today's pharmaceutical industry, for instance, Philippine sponges represent one of the more promising frontiers for biomedical research. And for biologists, conservationists, and others, recent studies have explained why sponges are essential to the life of coral reefs. Sponges, and sponges alone, are able to process organic matter into coral-friendly food; this is an ecological service that matters greatly to the Philippines and its unique place within the Coral Triangle. Indeed, even the Regadera has gained an economic utility since its days as a natural history object. Technologists and programmers have increasingly turned to its intricate, "cornucopia" structure as a model for the development of fibre-optics.

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NOTES

1. Richard Owen, "Description of a new Genus and Species of Sponge (*Euplectella Aspergillum*, 0.)", *Transactions of the Zoological Society of London* III (1849): 203-5. The paper was communicated to the Society in 1841.
2. John Ross Macduff, *The Story of a Shell* (London: James Nisbet & Co., 1882), 210.
3. William Chimmo, *On Euplectella Aspergillum* (London: Taylor and Francis, 1878), 2.
4. Chimmo, *On Euplectella*, 2.
5. Owen, "Description of a new Genus", 203.
6. J.E. Gray, "Venus's Flower-Basket (*Euplectella*)", *Popular Science Review* VI (1867): 239.

7. "The Depths of the Sea", *Nature* 183,8 (May 1, 1873): i.
8. Macduff, *The Story of a Shell*, 211.
9. George Leslie, "On an Abnormal Specimen of *Euplectella aspergillum* (Owen)", *Proceedings of the Royal Physical Society of Edinburgh* V (1878-1880): 75. Leslie read his paper to the Society in 1879.
10. Gray, "Venus's Flower-Basket", 239.
11. Gray, "Venus's Flower-Basket", 245.
12. Carl Semper, "Einige Worte über *Euplectella aspergillum* Owen und seine Bewohner", *Archiv für Naturgeschichte* XXXIII (1867): 85.
13. Semper, "Einige Worte", 85.
14. See Benito Madariaga de la Campa, *Augusto González de Linares y el Estudio del Mar: Ensayo Crítico y Biográfico de un Naturalista* (Santander: Instituto de Estudios Marítimos y Pesqueros Juan de la Cosa, 1972).
15. Benito Madariaga de la Campa, *Augusto González de Linares: Vida y Obra de un Naturalista* (Santander: Instituto Español de Oceanografía, 2004), 79.
16. D. Salvador Calderón, "Noticia Necrológica de D. Augusto Gonzalez de Linares", *Memorias de la Sociedad Española de Historia Natural* II (1904): 439.
17. Calderón, "Noticia Necrológica", 439.
18. Calderón, "Noticia Necrológica", 439.
19. Campa, *Augusto González... Vida y Obra*, 82.
20. Calderón, "Noticia Necrológica", 440.
21. "La Estación de Biología Marina, de Santander", *Por Esos Mundos* 11,186 (July 1910): 76.
22. José Gogorza y González, "La Fauna Marina de Filipinas: Moluscos, Crustaceos, y Peces", *El Globo* (12 September 1887): 1.
23. Gogorza y González, "La Fauna Marina de Filipinas", 1.
24. Augusto González de Linares, "Exposición Filipina: Zoología: La Regadera y Otras Esponjas Afines", *El Globo* (26 August 1887): 1.
25. Linares, "Exposición Filipina...La Regadera", 1.
26. Linares, "Exposición Filipina...La Regadera", 1.
27. Linares, "Exposición Filipina...La Regadera", 1.
28. Linares, "Exposición Filipina...La Regadera", 1.
29. Linares, "Exposición Filipina...La Regadera", 1.
30. Emilio Castelar, "Prologo", in *Exposición de Filipinas* (Madrid: Establecimiento de Tipografico de El Globo, 1887), 7.
31. Augusto González de Linares, "Fauna Marina: Desarrollo de las Esponjas y Estructura del Esqueleto de las Hexactinelidas", in *Exposición de Filipinas* (Madrid: Establecimiento de Tipografico de El Globo, 1887), 55.
32. 18 March 1907, Box 1, Folder 2, Alvin Seale Diaries, M0172, Department of Special Collections and University Archives, Stanford University Libraries (SUL), Stanford, CA.

33. See Stefan Eklöf Amirell, "Pirates and Pearls: Jikiri and the Challenge to Maritime Security and American Sovereignty in the Sulu Archipelago, 1907-1909", *International Journal of Maritime History* 29,1 (2017): 46. See also Victor Hurley, *Swish of the Kris: The Story of the Moros* (Boston: E.P. Dutton & Co., 1936), 105.
34. For traces of Jikiri's violence, see "Annual Report on Tawao District for 1910", in Colonial Office (C.O.) 648/3/80, National Archives of the UK (NA); "Jacht op een Zeerover", *Het Nieuws van den dag voor Nederlandsch-Indië* (17 August 1909): 2; "Brush with Outlaws", *Straits Times* (4 May 1909): 7; "Murder and Looting", *Singapore Free Press and Mercantile Advertiser* (27 February 1909): 10; and "Outlaws kill Trade", *Straits Times* (29 May 1909): 7.
35. For accounts of Corpus's encounter with Jikiri, see "Jikiri's Outlaws", *Straits Times* (14 April 1909): 7 and "De Bandieten van Jikiri", *Het Nieuws van den dag voor Nederlandsch-Indië* (22 April 1909): 2.
36. Alvin Seale, "Sea Products of Mindanao and Sulu, I: Food Fishes and Sharks", *Philippine Journal of Science* 11,3 (May 1916): 235.
37. See Seale, "Sea Products of Mindanao and Sulu, I", 243 (Plate II); Alvin Seale, "Sea Products of Mindanao and Sulu, II: Pearls, Pearl Shells, and Button Shells", *Philippine Journal of Science* 11,4 (July 1916): 265 (Plates I, II, and III); and, Alvin Seale, "Sea Products of Mindanao and Sulu, III: Sponges, Tortoise Shell, Corals, and Trepan", *Philippine Journal of Science* 12,4 (July 1917): 211 (Plates I, II, III, and IV).
38. Seale, "Sea Products of Mindanao and Sulu, III", 191.
39. Alvin J. Cox, *Fifteenth Annual Report of the Director of the Bureau of Science* (Manila: Bureau of Printing, 1917), 27.
40. Seale, "Sea Products of Mindanao and Sulu, III", 193.
41. Seale, "Sea Products of Mindanao and Sulu, III", 195.
42. "Philippine Sponge Fisheries", *Philippine Agricultural Review* 2, 8 (August 1909): 469.
43. "Philippine Sponge Fisheries", 469.
44. "Philippine Sponge Fisheries", 469.
45. H.S. Martin, "Report of the Secretary of Public Instruction", in *Report of the Philippine Commission to the Secretary of War, 1915* (Washington: Bureau of Printing, 2016), 216.



Figure 1: Venus basket sponge [Source : NOAA / CC]

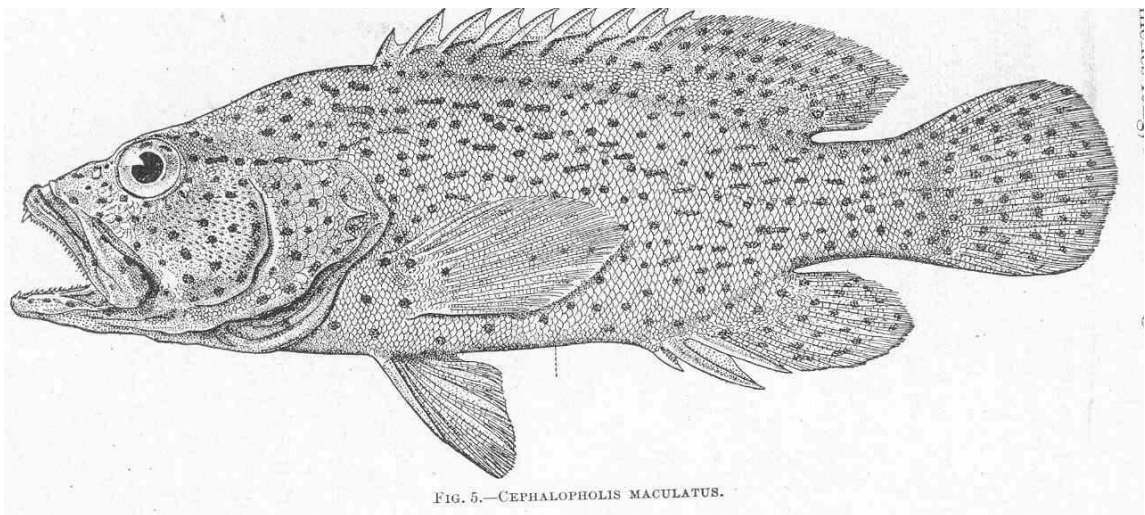


Figure 2: *Cephalopholis maculatus*. [Source: Alvin Seale, Barton A. Bean, (1907) *On a Collection of Fishes from the Philippine Islands, Made by Maj. Edgar A. Mearns, Surgeon, U. S. Army, with Descriptions of Seven New Species*]