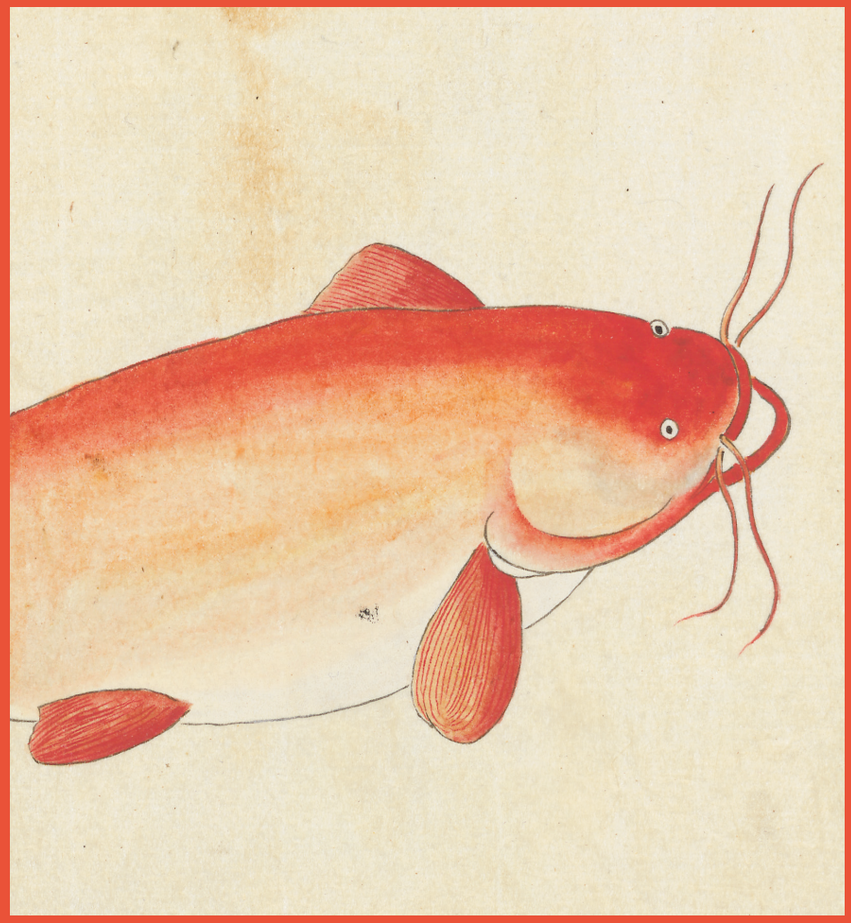

Fish & Fiction

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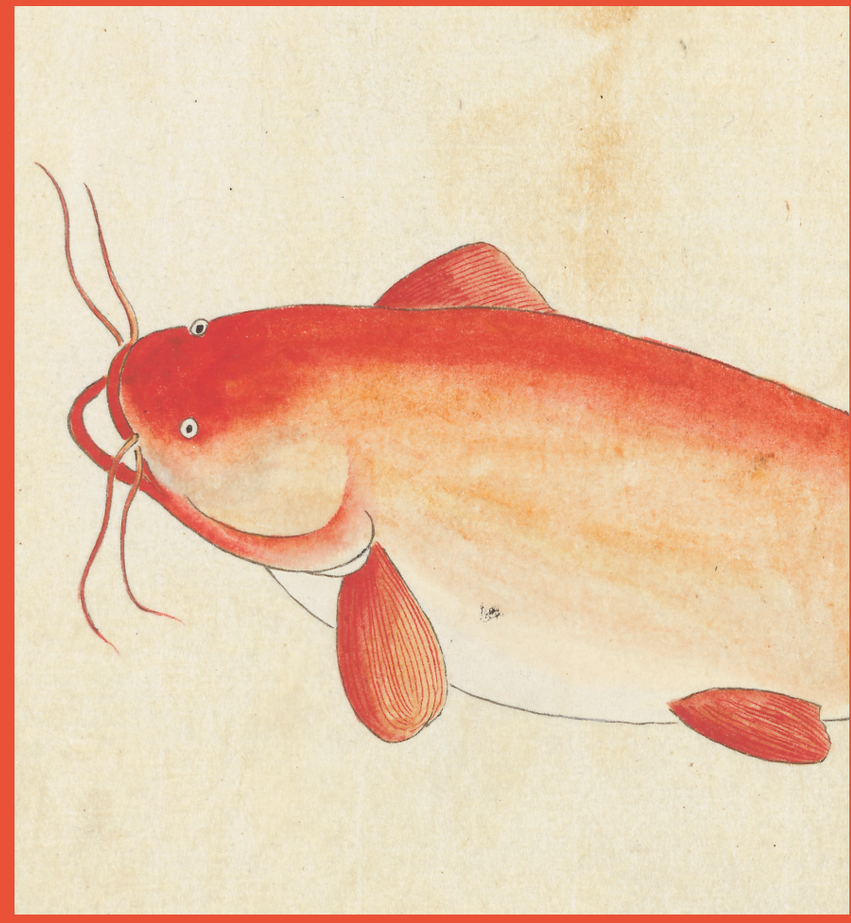
Aquatic Animals between Science and Imagination (1500–1900)

Marlise Rijks, Paul J. Smith & Florike Egmond (editors)



Fish & Fiction

Aquatic Animals between Science and Imagination (1500–1900)

Marlise Rijks, Paul J. Smith & Florike Egmond (editors)

Leiden University 2018

This catalogue was also published as a online exhibition (pdf) in the image database of Leiden University Libraries in 2018 (exhubl052).

Cover front: Udagawa Yoan, Red Catfish (*Aka Namazu*). In: *Ocean Fish Drawn from Life (Kaigyo Shashin)*, c. 1830-1840. [Ser. 1012]

Designed by Daatje Noot
Printed by Drukkerij Mostert & Van Onderen!
Photographs by Leiden University Libraries, Naturalis Biodiversity Centre, and Museum Boerhaave Leiden

Introduction

Fish have always been part and parcel of human civilisation. In a material sense, they have always been omnipresent in the everyday lives of human beings - from fishery to kitchen. At the same time, fish lead a hidden life, underwater, invisible to man. That combination helps to explain their enduring fascination, which is manifest not only in fish symbolism, both religious and secular, but also in the European imagery of remote worlds from the Nordic seas to the Far East and tropical West, and in the development of science, from early modern natural history to modern marine biology.

Using material from the rich collection of Leiden University Library, this exhibition aims to provide a panorama of the human fascination with the aquatic fauna, from 1500 to 1900. It looks at fish in the early modern sense of the term, as aquatilia: all aquatic animals, including sea mammals and crustaceans. The exhibition opens with their role in the early modern imagination, often characterised as an emblematic worldview. The first chapter addresses fish as a theme in biblical illustrations and emblem books that present nature as a vast fund of symbols to be deciphered and interpreted. The next chapter presents the fluid shifts between early modern imagery and natural science. Fish and other aquatic creatures are important objects of wonder in Renaissance books on monsters, but they are in vestigated as well in the principal published works of the sixteenth century on life under water. Which strange sea creatures were real and which were figments of the human imagination? As shown in the third chapter, aquatic creatures became highly

sought-after collectables, in particular in the so-called collections of curiosities (or *Kunst- und Wunderkammern*) that emerged and spread in sixteenth- and seventeenth-century Europe. During these same centuries, explorations of the world far beyond Europe combined a search for commercial profit with an interest in living nature in exotic countries and seas. Exotic aquatilia entered European collections and began to figure in works on natural history – and in some cases local knowledge travelled with them. Such collections and the influx of new naturalia from far-off parts of the world did more than just inspire amazement and wonder: they stimulated naturalists to envisage order in nature, on land, in the air and under water. The fourth and fifth chapters of the exhibition show how naturalists of the seventeenth and especially eighteenth century (Linnaeus) devised new systems to classify living creatures. Notoriously difficult cases were sea mermaids and whales! The final two chapters take the viewer into new directions and the more recent past. One is devoted to the virtually unknown richness of Japanese ichthyological material in the University Library's collections, and shows some fascinating parallels between Japanese and European practices. While natural history in Japan showed signs of 'Western' influence in the course of the nineteenth century, it influenced Dutch views of nature in turn, as can be seen in the works of Siebold. The final chapter is devoted to the exploration of the deep seas, an underwater world that had seemed completely out of human reach in previous centuries. The nineteenth-century imagination of human exploration of life at depth became a reality in the early twentieth century, and its results still continue to defy imagination.

This exhibition is an initiative of Leiden University Libraries in collaboration with the research project A New History of Fishes. A long-term approach to fishes in science and culture, 1550-1880, co-financed by NWO (Netherlands Organisation for Scientific Research), LUCAS (Leiden University Centre for the Arts in Society) and Naturalis Biodiversity Centre. We thank Jef Schaeps for his help in organising the exhibition, and André Bouwman for his advice in matters typographical.

Florike Egmond & Paul J. Smith

I

‘All Creatures of the Sea’

Fish in Bible and Emblem Books

‘All Creatures of the Sea’
Fish in Bible and Emblem Books

Paul J. Smith

Bible Illustrations — Fish are frequently mentioned in the Holy Scriptures. Well-known Old Testament references to fish include God’s creation of ‘all creatures of the sea’ on the Fifth Day of the First Week, the sea monster Leviathan, and the large fish, sent by God, which swallowed, and regurgitated, the Prophet Jonah. The New Testament tells us the tales of the Miraculous Catch of Fish and the Miraculous Multiplication of Bread and Fish. Because the Bible gives no precise description of the fish in question, it was up to the artist to implement, at his sole discretion, the depiction of the fish motif. Therefore, Biblical paintings often say more about the artists or the intended audience than about the Bible text itself. Thus, while depicting the Miraculous Catch of Fish, the baroque painter Peter Paul Rubens (1577–1640) shows that he was more interested in the dramatic rendering of the astonished fishermen – the future apostles – than in the true-to-life representation of the caught fish (1.1). Likewise, in his two-part depiction of the story of Jonah (1.2 and 1.3), the painter Dirck Barendsz (1534–1592) didn’t opt for a realistic rendering of the giant fish, but was probably inspired by the stylised fish, dolphins and sea monsters that populate the ornamental fountain sculptures of the Renaissance.

This was not the case for the Antwerp painter Maerten de Vos (1532–1603) in his detailed rendering of the Creation (1.4). Like his colleagues Joris Hoefnagel, Jan Brueghel the

Elder, and Roeland Savery, De Vos aimed to give a pictorial 'up-dating' of the knowledge about Nature around 1600. De Vos's blowfish, sawfish and sea turtles featured regularly in contemporary cabinets of curiosities (see chapter 3). His other animals were inspired by the illustrations from some authoritative natural history works of that time, such as the *Historia piscium* (1558) by the Swiss scholar and physician Conrad Gessner, and the cosmographic works by Olaus Magnus on the subject of unknown Scandinavia, haunted by fearful marine monsters. Another source were the popular print series on fish and other animals executed by several Flemish artists who had specialised in animal printmaking, such as Abraham de Bruyn, Nicolaes de Bruyn (3.3), Marcus Gheeraerts de Oude, and Adriaen Collaert – series reissued until far into the seventeenth century. But not everything in De Vos's engraving expresses scientific topicality: we also see traditional elements: the represented whale is not dissimilar to Dirck Barendsz's classical giant fish, and the depicted griffin originates from a long classical and medieval tradition.

Emblem Books — Just like contemporary Biblical illustrations and paintings, the popular genre of the emblem book offers a good impression of the various ways in which fish were seen in the Early Modern Period. In the bi-medial genre of the emblem, word and image are joined together to make a three parted unite, consisting of a *motto* (often in the form of a proverb), a *pictura* (illustration) and a *subscriptio* (usually in the form of an epigram). Animals, including the aquatic fauna, are recurrent in emblem books. They were derived from classical mythology and natural history (especially Pliny the Elder's *Historia naturalis*) and from dai-

ly life as well, where fish and fishery were most common. In the world's first emblem book, the *Emblematum liber* (1538), composed by the Italian scholar Andrea Alciato (1492–1550), numerous aquatic animals are addressed: remora, eel, moray eel, sea bream, oyster, crayfish, and several other aquatic creatures. One of Alciato's best-known aquatic animals is the dolphin curled around an anchor (1.5). This emblem is inspired by the printer's mark of the Venetian printer Aldus Manutius, expressing the Latin adage *Festina lente* (Hasten slowly – the dolphin symbolising urgency and vigour, the anchor diligence and thoughtfulness). It was to this adage that Erasmus devoted one of his most read *Adagia*, published by the same Manutius. Another example of Alciato's aquatic fauna can be found in the two consecutive emblems on marine creatures (1.6): the first one tells the fable about a rat wanting to eat an oyster, found on the shoreline (the rat must pay for his gluttony with death, for he is caught by the oyster); the other refers to the mythological tale of Phrixus and the Golden Fleece. The epigram (in translation) reads:

> Phrixus traverses the waters astride the precious fleece and fearlessly rides the golden sheep across the sea. - Whatever can this be? - A man dull of sense, but with rich coffers, whom the whim of wife or servant rules. (transl. Glasgow Emblem Project)

For the Dutch, fish and fishing were first and foremost essential in their daily life. This can be seen in the emblem books by 'father' Jacob Cats (1577–1660) and Roemer Visscher (1547–1620), the two most popular Dutch emblematists. Whereas Cats's emblem *Kunst voor kracht* (Art above strength; Who is not

strong must be clever) alludes to the Dutch practice of whaling (1.7), his emblem *Groote visschen scheuren 't net* (Big fish tear up the net) is taken from the daily practice of inland fishing (1.8).

Fish symbolism in emblem books is extremely diverse. Indeed, fish can denote, positively, intelligence and force among many other virtues, and, negatively, vices such as gluttony, lust and stupidity. It is noteworthy that the deeply religious interpretation of fish as a symbol for Christ (*Ichthus*) is not thematised in emblem books. In his emblem *Dom is driest* (Stupid is malapert) (1.9) Roemer Visscher gives an example of negative fish symbolism, without, however, denying the animal's symbolic polyvalence – in paraphrase:

> I would not dare say if this emblem does justice to nature. If it did, it would imply that all fish are stupid. I take the liberty to symbolise by the fish a brutal man, an old fashioned-boorish Hollander.

From an ichthyological perspective the most interesting emblem book is the fourth century (a century is a volume of hundred emblems) of the four-part emblem series *Symbolorum et Emblematum centuriae quatuor* by the German scholar and physician Joachim Camerarius the Younger (1534–1598). In these emblematic volumes, Camerarius's motto, illustration and epigram on the right hand page are completed by a very learned commentary on the opposing left hand page, often based on information from the zoological works of his Swiss colleague Conrad Gessner, and from several other works, ancient and contemporary. The fourth century of this series is almost exclusively devoted to fish and other aquatil-

ia, Emblem XXVI of this century addresses the barbel (1.10). Its motto *Non illaudata senectus* (A not unpraiseworthy old age) is taken from Ausonius's poem on fish (*Mosella*, 4th century AD), to which the epigram also alludes. Camerarius's illustration depicts a very recognizable barbel, with its typical whiskerlike organs at the corners of its mouth. Camerarius's barbel is copied from Gessner's illustration of this fish. Camerarius's commentary presents a page full of quotations on the advantages of old age, which, in the case of the barbel, implies that old barbels taste better than young ones.

It is possible that Camerarius's emblematic centuries were inspired by the general sixteenth-century model of print series. Among these are the series by the above-mentioned Flemish animalists, such as Gheeraerts, and Collaert. In France, this printing tradition was continued by Albert Flamen (c. 1620-after 1669). His album of naturalist fish prints (1.11) is preceded by a frontispiece typical for this period (1.12). Within an ornamental frame formed by eels and two undefinable large fish, figures a realistic depiction of some fishing boats in action. Ichthyological and other zoological works from the seventeenth and eighteenth centuries are using similar combinations of classical ornament and zoological realism for their frontispieces.

In his emblematic volumes Camerarius is also in line with the demand for print albums that were composed from the illustrations taken from the zoological works by Pierre Belon, Guillaume Rondelet, and Conrad Gessner. The publishers of these works sought to make money out of these illustrations by reissuing them in handsome volumes and thus focussing

on a different readership. An example of this tendency is a booklet entitled *De natura aquatilium carmen* (1558), published by the Lyonnais printer Macé Bonhomme. In this work, all fish illustrations by Guillaume Rondelet are re-issued, and completed with Latin epigrams, written by the physician François Boussuet (1.13). Boussuet's epigrams address the fish's culinary qualities, praising for instance the mackerel:

> As mackerels begin to grow fat in the early spring, when the spring comes, they will be suitable for the gullet. Because they do not hurt the mouth, nor hit the throat with sharp bones, this dish is free from harmful bones. And they are praised for their sweet and pleasant taste in the month of April, only a fool rejects them. So if the cook serves them to me around that time, moderately roasted with butter, I will prefer them to all others. To everyone his own judgement, and may everyone decide for himself, but mackerel will always be a friend to me. (transl. Sophia Hendrikx)

But, about the fish on the next page, the colias, a much rarer species, probably the Atlantic chub mackerel (*Scomber colias*), Boussuet notes wittingly:

> The colias is inferior to the mackerel, because mackerel has more firm, fat and better meat. That's why no one is about to eat colias, when a soft abundance of mackerel is available.

Boussuet's fish book makes once again clear that the fish

theme in emblem books and related works appealed to a very wide audience, from readers of father Cats to scholarly humanists, who did not refuse an appetising fish.

1.1 | Pieter Soutman after Peter Paul Rubens, The Miraculous Catch of Fish, s.l., s.d. [PK-P-111.573]

— This engraving was made after a painting by Rubens from ca. 1610, now in the Wallraf-Richartz-Museum and Foundation Croboud at Cologne.

1.2 | Johannes Sadeler after Dirk Barendsz, Jonah is thrown overboard, and swallowed by a large fish, s.l., s.d. [PK-P-120.566]

1.3 | Johannes Sadeler after Dirk Barendsz, The fish regurgitates Jonah onto dry land, s.l., s.d. [PK-P-120.567]

1.4 | Johannes Sadeler after Maerten de Vos, The Fifth Day of the Creation, s.l., C.J. Visscher, s.d. [UL PK-P-120.521]

— Claes Jansz Visscher removed the depiction of the Divine Creator from Sadeler's original copper plate, and replaced it by a tetragrammaton (God's name in Hebrew characters), in accordance to Calvinist ideology. One notes the remarkable attention to element-crossing animals: next to the 'normal' swimming fish and flying birds, flying fish are seen, as well as aquatic and terrestrial birds, an aquatic mammal (beaver) and a marine reptile (sea turtle).

EMBL. LIB. I. 35

Princeps ſubditorum incolumitatem procurans. XXI.

Titanij quoties conturbant æquora fratres,
Tum miſeros nautas anchora iacta iuuat.
Hanc pius erga homines Delphin complectitur,
Tutius vt poſſit figier illa vadis. (imis
Quàm decet hæc memores geſtare inſignia Reges,
Anchora quod nautis, ſe populo eſſe ſuo!

COMMENTARIA.

Titanij fratres, gigantes fuere ex Titane & Terra nati, & à poëtis pro ventis ponuntur. Quotieſcunque igitur ventorum procellis ac tempeſtatibus mare commouetur & æuit, mox trepidi nautæ ad anchoram confugiunt, eamq. in mare proiectã ſtatim Delphin (piſcis maris celerrimus, ac præcipuus hominum

1.5 | 'Princeps subditorum incolumitatem procurans' (The Prince caring for the safety of his subjects). In: Andrea Alciato, *Emblematum [...] libri II*, Antwerp, C. Plantin, 1565, p. 35. [764 G 5:1]

— The epigram varies significantly from the traditional adage and motto *Festina lente*. It reads: 'Whenever the brothers of Titan race churn up the seas, then the dropped anchor aids the wretched sailors. The dolphin that cares for man wraps itself round the anchor so that it may grip more securely at the bottom of the sea. – How appropriate it is for kings to bear this symbol, mindful that what the anchor is to sailors, they are to their people.' (transl. Glasgow Emblem Project).

156 AND. ALCIATI

Captiuus ob gulam. LXXXVI.

Regnator penus, & menſe corroſor herilis
Oſtrea mus ſummis vidit hiulca labris.
Queis tenerâ apponens barbam ſalſa oſſa momor-
Illa recluſerunt tacta repente domum: (dit:
Deprenſum & tetro tenuerunt carcere furem,
Semet in obſcurum qui dederat tumulum.

COMMENTARIA.

Mus quidam penum inhabitans, vbi victus variarum domini ferculorum conſeruabantur, ſingula corrodens, vtque nihil intactum relinqueret, vidit, inter alia, oſtrea hiulca, fiſſâ, teſtisque apertis, accurrit gulæ ſectator auide ac momordit. Oſtrea vero læſa repente domum ſeu concham occludit, capto & ſtrangulato fure, qui ſemetipſum in illo obſcuro ſepeliuit tumulo, & de merito deprehẽſis, pœnaque

EMBL. LIB. I. 157

pœnaque dignis, dicitur prouerbialiter illud: Decipula mutem cepit. de Oſtreis autem Plin. lib. 32. cap. 6. Epigramma eſt Antiphili de mure mordente Oſtrea, lib. 1. epigramm.

Diues indoctus. LXXXVII.

Tranat aquas reſidẽs pretioſo in vellere Phryxus,
Et flauam impauidus per mare ſcandit ouem.
Ecquid id eſt? vir ſenſu hebeti, ſed diuite gaza:
Coniugis aut ſerui quem regit arbitrium.

COMMENTARIA.

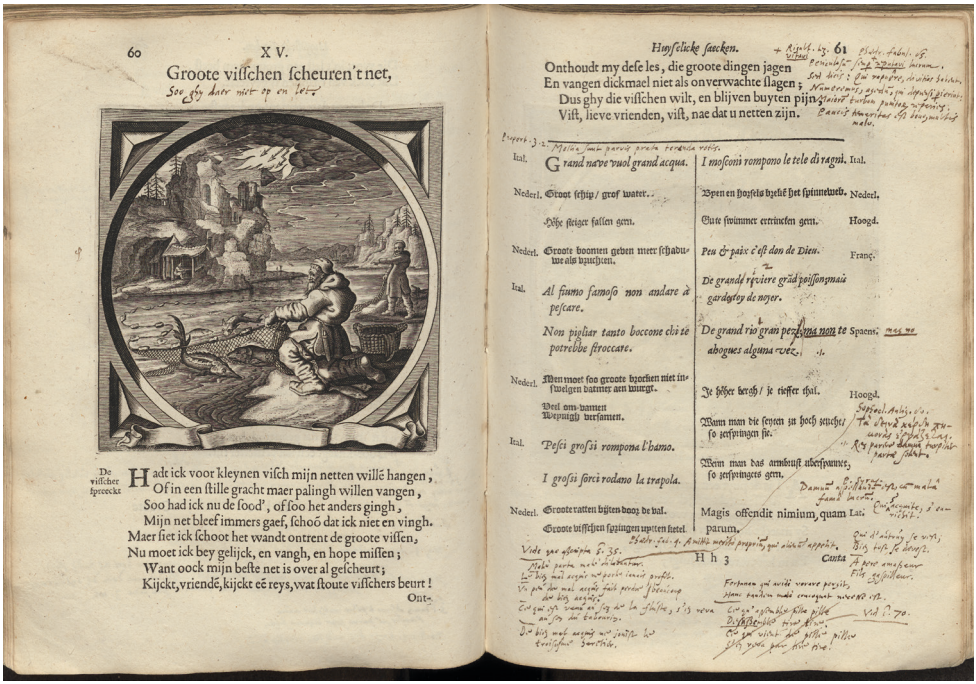
Phryxus filius fuit Athamãtis regis Thebarum, ex priore vxore, qui nouercæ minas & inſidias timens, cum ſorore ſua Helle, fugam parauit: acceptoq. à patre Ariete aurei velleris, eius dorſum ambo aſcenderunt, vt Pontum Euxinum, mare illud Orientale tranarent. Helle vero magnitudine maris

L 3 perter-

1.6 | 'Captivus ob gulam' (Caught by greed) and 'Dives indoctus' (The stupid rich man). In: Andrea Alciato, *Emblematum [...] libri II*, Antwerp, C. Plantin, 1565, p. 156-157. [764 G 5:1]

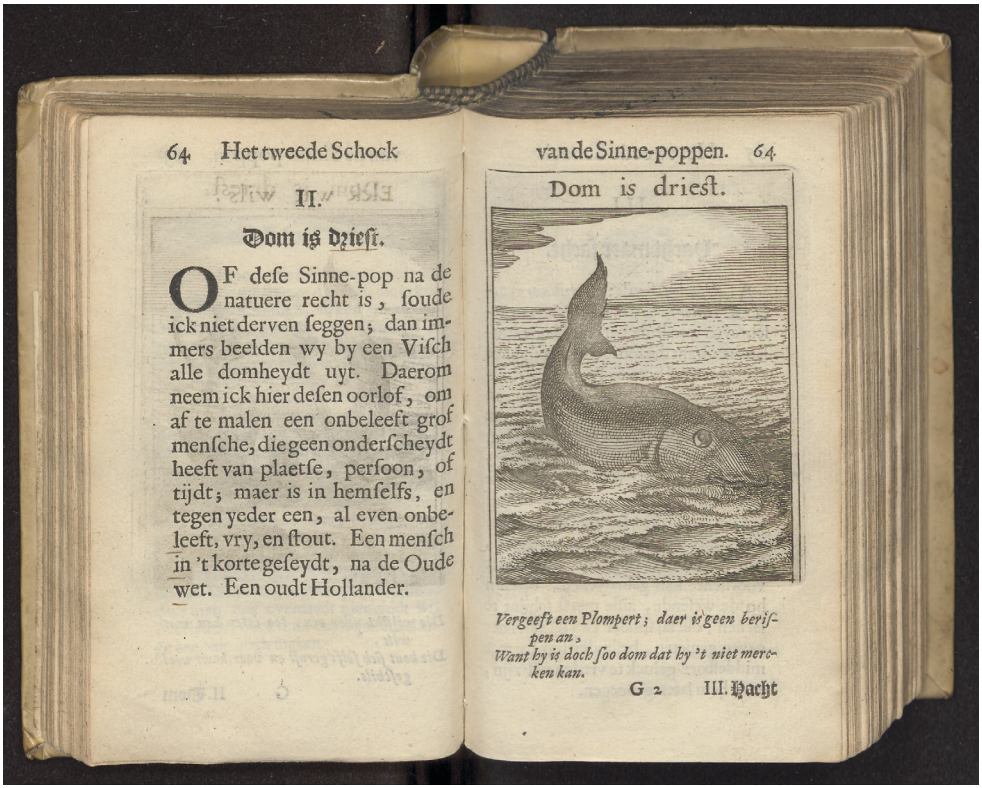
1.7 | J. Swelinck after A. van der Venne, 'Kunst voor kracht' (Art above power). In: Jacob Cats, *Proteus ofte mine-beelden verandert in sinne-beelden [...]*, Rotterdam, P. van Waesberge, 1627, p. 14. [1018 B 5]

— Copperplate illustration by J. Swelinck after A. van der Venne, and coloured by F.H. vander Ley. The emblem's motto learns that, thanks to his ingenuity, man is able to overpower brute Nature.



1.8 | 'Grootte visschen scheuren 't net' (Big fish tear up the net). In: *Jacob Cats, Groote Spiegel van den ouden ende nieuwe tijdt*, The Hague, I. Burghoorn, 1632, p. 60-61. [1018 B 3]

— This copy contains manuscript notes and corrections by Cats himself. To the motto 'Big fish tear up the net', Cats adds: 'soo ghy daer niet op en let' (if you are not careful). This addition was incorporated into later editions of the book.



64 Het tweede Schock

II.

Dom is driest.

OF dese Sinne-pop na de natuere recht is, soude ick niet derven seggen; dan immers beelden wy by een Visch alle domheydt uyt. Daerom neem ick hier desen oorlof, om af te malen een onbeleeft grof mensche, die geen onderscheydt heeft van plaetse, persoon, of tijdt; maer is in hemselfs, en tegen yeder een, al even onbeleeft, vry, en stout. Een mensch in 't korte geseydt, na de Oude wet. Een oudt Hollander.

van de Sinne-poppen. 64

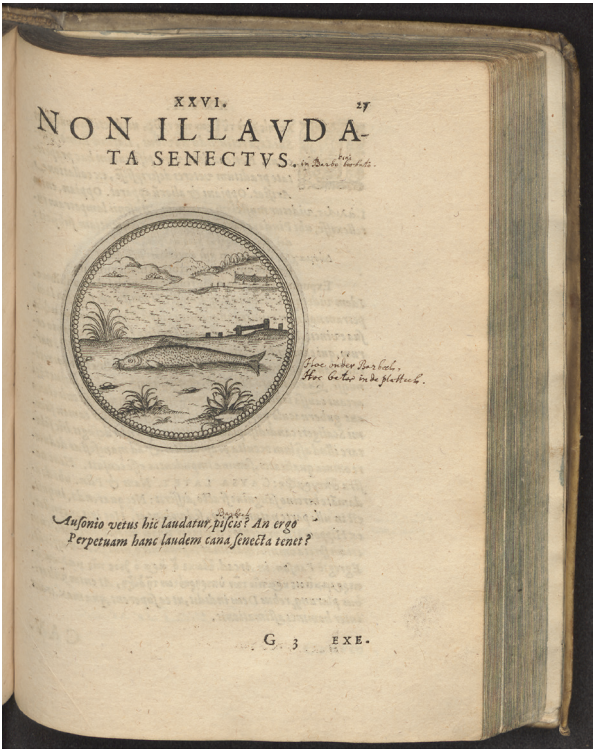
Dom is driest.

Vergeeft een Plompert; daer is geen berispen an,
Want hy is doch soo dom dat hy 't niet merken kan.

G 2 III. Hacht

1.9 | 'Dom is driest' (Stupid is malapert). In: *Roemer Visscher, Zinne-poppen; alle verciert met rijmen, en sommighe met proze*, Amsterdam, S. Wybrants and A. Vinck, 1678 [first ed. 1614], p. 63. [1019 G 6: 1]

— Fish symbolise stupidity and brutality, but Visscher underlines also the symbolic polyvalence of fish.

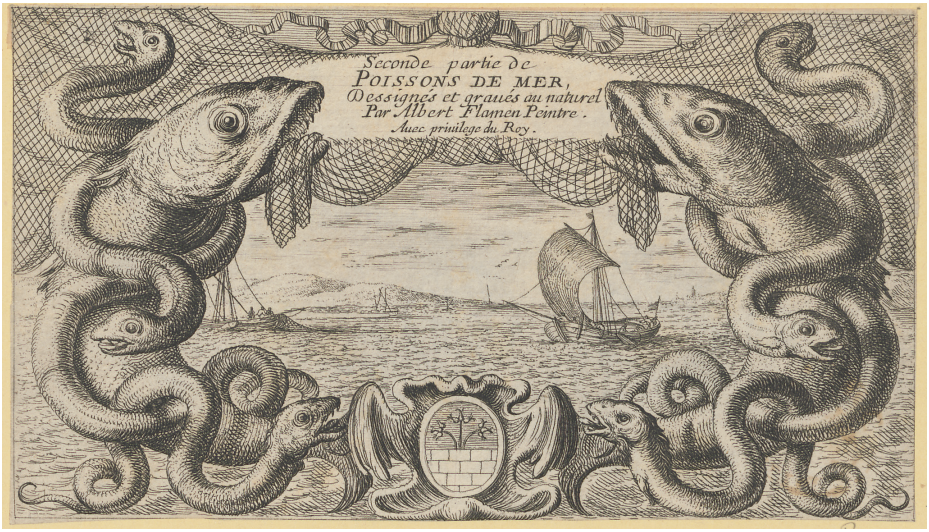


1.10 | Johann Siebmacher, 'Non illaudata senectus' (A not unpraiseworthy old age). In: Joachim Camerarius the Younger, *Symbola et emblemata*, book IV, *Ex aquatilibus et reptilibus*, Nuremberg, Gotthard and Philipp Vögelin, 1604, p. 27. [575 G 3]

— This copy contains many manuscript notes and comments by several anonymous readers. One of them adds to the motto: 'in Barbo bene barbato' (in a wellbearded barbel), and in Dutch to the illustration: 'Hoe ouder barbeels / Hoe beter in de platteels' (The elder the barbels / The better [they are] on the plate).

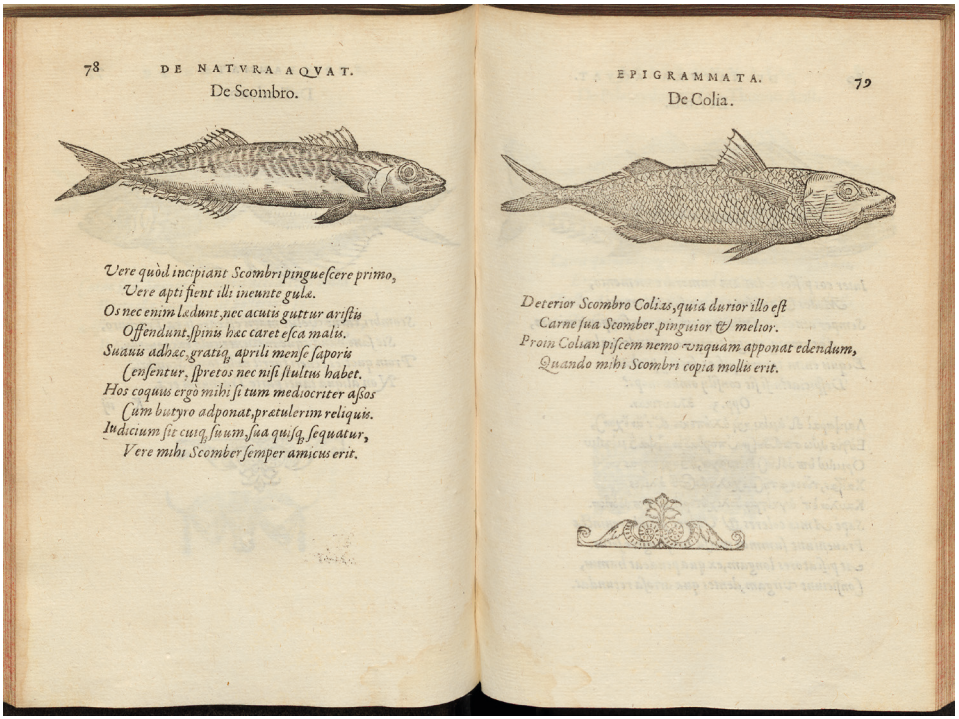
I.II | Albert Flamen, 'Halec, Le Harang' (Herring), Paris, s.n., 1664. [PKP-114.923]

— Albert Flamen was a Flemish engraver, working in France. He depicted common marine and freshwater fish in the naturalistic ('au naturel') tradition of Adriaen Collaert, mostly in the context of fishery. In doing so, he highlighted the importance of fish for the economy of France. Flamen's etchings were issued separately and in albums.



1.12 | Albert Flamen, Frontispiece of *Seconde partie de poissons de mer*, Paris, s.n., 1664. [PK-P-114.919]

— In this title page illustration Flamen combines ornamental fish decoration with the depiction of the daily life reality of fish and fishing.



1.13 | Two mackerel species. In: François Boussuet, *De natura aquatilum carmen*, Lyon, Macé Bonhomme, 1558, p. 78-79. [THYSIA 2185]

— In this book, the printer Macé Bonhomme re-issued the woodcut illustrations from Guillaume Rondelet's *Libri de piscibus marinis* (1554). The physician François Boussuet wrote witty epigrams on the culinary qualities of the represented fish.

2

Monsters, Sea-Monks, and Mermaids

Strange Creatures from the Sea from Antiquity to the Modern Age

Monsters, Sea-Monks, and Mermaids
Strange Creatures from the Sea from Antiquity to the Modern Age

Sophia Hendrikx

Throughout the centuries, sea-monsters have featured not only in stories, legend and art, but also in the study of nature. In Antiquity, scholars theorised that water generated more monstrosities than any other environment. Medieval and Early Modern scholars did not exclude the possibility that sea-monsters exist, and collected rather than contradicted reported sightings. As a consequence they helped spread stories about monstrosities from the sea and contributed to a culture in which such monsters were omnipresent. Medieval and Early Modern depictions of strange creatures from the sea can be found as decorative elements on maps and in works recording folklore, man-made monsters were included in Early Modern collections of naturalia (see chapter 3), and sea-monsters were described in scholarly works, even up until the Modern period. Many of these creatures and their characteristics were based on descriptions from Antiquity, while at the same time new monsters were introduced.

The Nature of Monsters — In Antiquity nature in general was seen as flexible and capable of producing any variety of creatures. This was believed to be particularly true for aquatic environments. The Roman naturalist Pliny the Elder stated that monstrosities form most easily in water, due to its liquid nature and the amount of nutrients it contains. Later on, Christian authors presented this plasticity of na-

ture as the consequence of divine omnipotence. As a result, monsters were on the one hand seen as natural phenomena and on the other often interpreted as divine signs. For example, several sixteenth-century scholars describe a 'sea-monk', a creature with a tonsured head and scaly robes (2.1). This was interpreted by the religious author and counter-reformer Aegidius Albertinus (1560–1620) as a divine expression of dissatisfaction with the hypocrisy of the clergy, while the scholar Paracelsus (1493–1541) provided a natural explanation for its existence by stating the creature must be the offspring of a fish and a drowned monk.

Terrestrial Counterparts — Like the sea-monk, many aquatic monsters resembled something or someone we might find on land. Since Antiquity it had been assumed that aquatic creatures often took the form of a, natural or artificial, terrestrial counterpart. As evidence of this principle, classical authors referred to creatures such as the sea-cucumber, the swordfish, and the sawfish. Classical mythology also featured a range of aquatic deities with human upper bodies and the lower body of a fish, such as Nereids, as well as creatures which were part terrestrial animal, such as the hippocampus, with the upper body of a horse and lower body of a fish. Descriptions and depictions of sea-monsters from the Middle Ages and the Early Modern era show us similar mixtures of aquatic and terrestrial features. The popular late fifteenth-century natural history encyclopedia Hortus Sanitatis for example, presents to us a range of seacreatures with terrestrial characteristics. The illustration shows a page from a 1536 German edition, *Gart der Gesundheit*, which bears depictions of a sea-cow with the upper body

of a cow and lower body of a fish, a bird with a fishtail, and several Nereids (2.2).

Mermaids — While there was much continuity in the way sea-monsters were portrayed and perceived, new developments also took place. While mermaids were unknown in Antiquity, sightings of these creatures were reported with some regularity by Medieval and Early Modern authors. A page-wide depiction in a work on monstrosities, *Monstrorum historia* (1642) (2.3) by the first professor of natural sciences at the University of Bologna and founder of its botanical garden, Ulysse Aldrovandi (1522–1605), shows us what such creatures were believed to look like. In appearance these much resemble the Nereids from Antiquity, which were believed to be friendly and keen to help sailors in distress. In this, they resemble the benevolent aquatic fairies native to western European folklore. By contrast, mermaids were believed to be dangerous and seductive creatures that shipwreck vessels and lead sailors to their doom. In this, they resemble another creature from classical mythology, the siren. These birdlike creatures with human faces were believed to enchant sailors with their singing in order to cause them harm. During the Middle Ages, elements of sirens, sea nymphs, and aquatic fairies, were combined in popular imagination to form the mermaid.

Monstrous Whales — While monstrous whales had been described since Antiquity, the sixteenth century generated an unprecedented variety of such creatures. Little knowledge on whales had been gathered during Antiquity and the Middle Ages, and often monstrous proportions

and strength were attributed to these animals. For unknown reasons, in the second half of the sixteenth century whales beached more frequently than usual on European shores. Around the same time whaling increased. As a result, knowledge expanded, but up until then accurate depictions and descriptions were scarce and the line between whale and monster remained difficult to draw. The Swedish chronicler Olaus Magnus published depictions of monstrous whales based on folklore on his 1539 map of Scandinavia *Carta marina et descriptio septentrionalium terrarium* and in his 1555 chronic of Scandinavia *Historia de gentibus septentrionalibus*, which became instantly popular. The creatures shown on the map of Iceland from the Antwerp cartographer Abraham Ortelius's atlas *Theatrum orbis terrarum* (1570) (2.4) are based on Magnus's monsters. The map shows ten monstrous whales, with claws that resemble those of terrestrial animals.

Man-Made Monsters — Basilisks were first described in Antiquity as dangerous serpents and acquired new characteristics in later centuries. By the late Middle Ages they had become winged monsters, born as the result of a bizarre sequence of events, which could kill anyone by looking at them. During the Early Modern Period basilisk-like monsters were manufactured out of rays. The scholar Ulysse Aldrovandi describes two such creations as basilisks, while others are described as winged snakes or dragons. In 1558 the Swiss scholar Conrad Gessner (1516–1565) explained, in his encyclopaedia of animals *Historia animalium*, how these were made, by twisting, cutting and drying a ray (2.5). He complains that the man-made monsters were passed off as real to impress the masses and were often exhibited in apothecary shops.

However, they were also part of scholarly naturalia collections. Aldrovandi collected several and described no fewer than five in his *Serpentum et draconum historiae* (1640) and *De piscibus et de cetis* (1623) (2.6). One of these depictions is very similar to a specimen kept at the Naturalis Biodiversity Center (2.7).

The Sea-Unicorn and the Narwhal — First reports of the unicorn date back to the fourth century BC, when the scholar Ctesias described a one-horned horse which he had heard about. The legend subsequently spread through the work of Aristotle and other scholars. In addition, a mistranslation in the Bible gave the impression that the unicorn was mentioned in the Old Testament (3.5). Scholars of the Middle Ages and first half of the Early Modern Period consequently had good reason to believe in unicorns. The assumption that animals on land have aquatic counterparts, meant that the existence of a sea-unicorn was also widely accepted. Believed to neutralise poison, what was sold as unicorn horn fetched exorbitant prices. In the sixteenth century scholars began to suspect that these 'horns' were in fact narwhal teeth. The collector Ole Worm (3.4) published a treaty on this subject in 1638. The discovery quickly became common knowledge and inspired the depiction from Pierre Pomet's *Histoire generale des drogues*, published in 1694 (2.8), of a sea-unicorn and narwhal side by side. However, rather than diminishing belief in the medical properties of the horns, this led many to believe that the narwhal was in fact the sea-unicorn. The last recorded use of unicorn horn in folk medicine took place in the nineteenth century.

Modern Sea-Monsters — Certain sea-monsters have proved

surprisingly durable. The depiction of a giant sea serpent published by the Dutch zoologist Anthonie Oudemans in 1892 (2.9), is not unlike many depicted in mosaics from Antiquity or in books from the Middle Ages and Early Modern Period. Towards the end of the nineteenth century sightings of this mythical creature were still reported with such regularity that Oudemans was able to collect nearly two hundred reports over the course of three years. Applying what is known as a crypto-zoological approach, in the absence of empirical evidence, Oudemans used the quantity of sightings as an argument that the giant sea serpent was an existing species. He proposed the scientific name *Megophias megophias* for the yet to be discovered creature. Oudemans received a lukewarm reaction from the academic world, where both cryptozoology and the existence of sea-monsters were considered controversial. Nonetheless, *The Great Sea Serpent* was published by reputable academic publishers. As Oudemans pointed out, the fact that a sea-monster has not yet been discovered does not prove it does not exist.

Sophia Hendrikx


De Hominib. mar. Lib. IIII. 519

DE HOMINIBVS MARINIS, ET PRIMVM DE MONACHO ET EPISCOPO piscibus, ex Rondeletio.

DE PISCE MONACHI HABITV, RONDELETIVS.

2.1 | 'Monachus marinus'. In: Conrad Gessner, *Historiae animalium liber IIII qui est de piscium et aquatilium animantium natura*, Zürich, C. Froschauer, 1558, p. 519. [665 A 7]

— The Swiss scholar Conrad Gessner (1516–1565) produced by far the most extensive encyclopaedia of animals up to that time, the *Historia animalium* (1551–1558). It provides information on nearly everything that was known about a particular animal from classical Antiquity and on every animal that the author had read or heard about or had seen. The sea-monk described in the fourth volume, which discusses fish and other aquatic animals, was reported by several sources around 1500. It was discussed by several scholars including, in addition to Gessner, Pierre Belon and Guillaume Rondelet.

Das drit Buch

Das.LXIIII.Capi.

Das.LXV.Capit.

Das.LXVI.Cap.

Von den Fischen. XCII

Das.LXVII.Capit.

Das.LXVIII.Capit.

2.2 | Various monsters and mythical creatures. In: *Gart der Gesundheit zu latein Hortus Sanitatis : Sagt in vier Bücheren von Vierfüszsigen vnd Krichenden, Vöglen vnd den Fliegenden, Vischen vnd Schwimmenden thieren, dem Edlen Gesteyn vnd allem so in den Aderen der erden wachsen ist*, Strasbourg, M. Apiarius, 1536, fo. XCII. [1370 B 15]

— The late fifteenth-century *Hortus sanitatis*, first published in 1491, is considered the first natural history encyclopaedia. This German edition is one of many subsequent editions in various languages. The work describes species of plants, animals, birds, fish and stones, and their use as medicine. In addition to existing species a range of monsters and mythical creatures are discussed.

2.3 | 'Monstra Niliaca'. In: Ulisse Aldrovandi, *Opera omnia. XI Monstrorum historia cum paralipomenis historiae omnium animalium*, Bologna, N. Tebaldini, 1642, p. 354. [655 A 13]

— Ulisse Aldrovandi (1522–1605) was professor of natural sciences at the University of Bologna and founder of its botanical garden. First and foremost a collector, he acquired naturalia from all over the world, as well as drawings of plants and animals. A portion of his archive of 8000 sheets of paper is preserved in the Bibliotheca Universitaria di Bologna. Showing a variety of monstrosities, his *Monstrorum historia* is by far Aldrovandi's most famous work.

2.4 | 'Islandia'. In: Abraham Ortelius, *Theatrum orbis terrarum*, Antwerp, s.n., 1570. [COLLBN Atlas 43: 1]

— Ortelius's Theatrum orbis terrarum is often considered the first modern atlas. The maps were produced by various cartographers, engraved especially for this publication, and arranged by continent, region, and state. The map of Iceland is decorated with an array of sea monsters, many of which are traceable to Olaus Magnus's *Carta marina* of 1539. The inscription in the lower right corner attributes the map to the Danish chronicler Andreas Sorensen Vedel (1542–1616). However the level of detail suggests it was made by an Icelander, most likely Vedel merely passed it on.

2.5 | Winged snake. In: Conrad Gessner, *Nomenclator aquatilium animantium icones animalium aquitilium in mari et dulcibus aquis degentium*, Zürich, C. Froschauer, 1560, p. 139. [665 A 9]

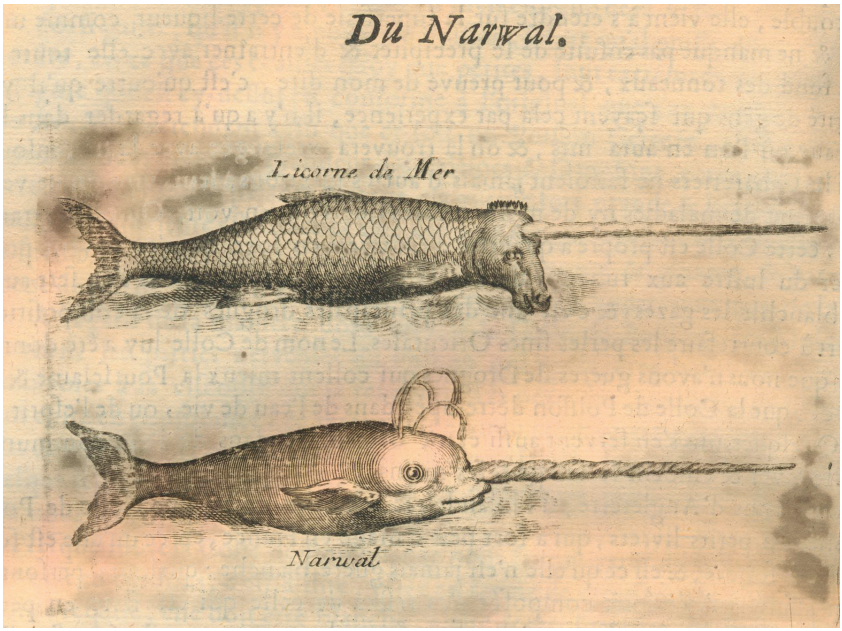
— The illustrations of Gessner's *Historiae animalium* were so attractive that they were reissued in separate volumes, titled *Icones*, except for the volume on fishes, which appeared under the title *Nomenclator aquatilium animantium*. The text describing the depicted basilisk or winged snake describes how such things are made: rays are dried and the body is twisted and parts of the wings cut off. Gessner complains how such creations were exhibited to impress gullible people.

2.6 | 'Draco ex Raia effictus'. In: Ulysse Aldrovandi, *Opera omnia. X: Serpentum et draconum historiae libri duo*, Bologna, N. Tebaldini 1640, p. 315. [655 A 12]

— Aldrovandi's collection of naturalia comprised several monsters made out of dried rays. In his *Serpentum et draconum historiae* (1640) and *De piscibus et de cetis* (1623) he described and depicted five such creatures. These specimens shown all look very different, suggesting that a wide range of monsters factored out of rays circulated, perhaps passed off as different species, or some as basilisks and others as dragons.

2.7 | Dried ray made to look like a dragon, 18th century, origin unknown. [Naturalis Biodiversity Center RMNH .PISC. 29215]

— During the Early Modern Period monsters resembling basilisks, winged snakes, and dragons were manufactured out of rays by twisting, cutting and subsequently drying them. While this was common knowledge among naturalists, such creations still ended up in naturalia collections. Ulysse Aldrovandi described and depicted no fewer than five, one of which, described in his *Serpentum et draconum historiae* (1640), bears a remarkable likeness to the Naturalis specimen.



2.8 | 'Licorne de Mer'. In: Pierre Pomet, *Histoire generale des drogues, traitant des plantes, des animaux, et des mineraux*, Paris, J.-B. Loyson, etc., 1694, p. 78. [Museum Boerhaave Library, BOERH e 2459 a]

— In this seventeenth-century manual of popular medicinal ingredients by the Parisian pharmacist Pierre Pomet, unicorn horn is discussed twice. In the section on land animals five species of unicorn are discussed, the *camphur*, the *pirassoipi* and three unidentified breeds. The section on aquatic creatures discusses the narwhal, and notes that what is known as unicorn horn is in most cases narwhal tusk. Pomet states that the horn was used to counteract poisons.

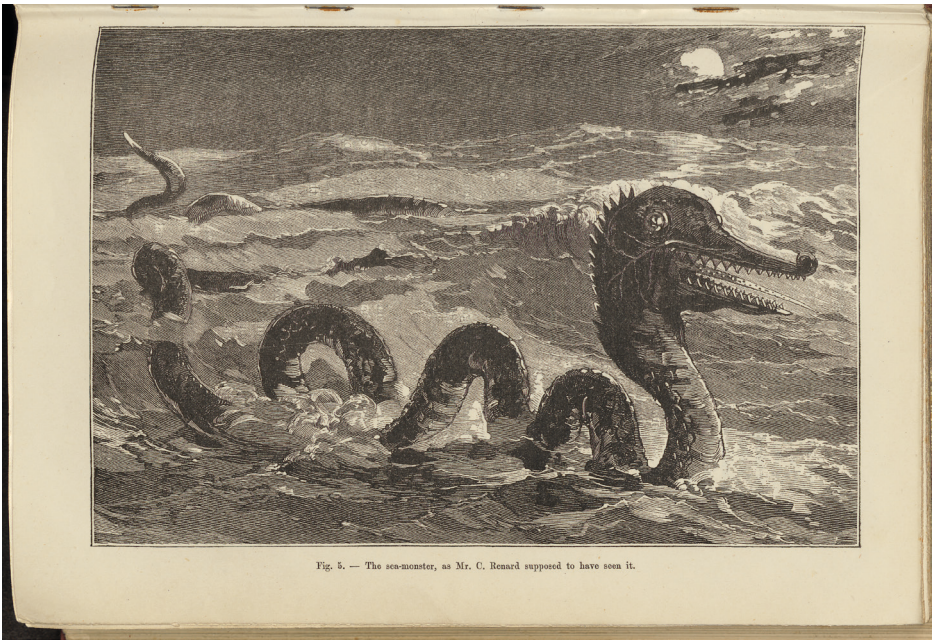


Fig. 5. — The sea-monster, as Mr. C. Renard supposed to have seen it.

2.9 | 'The sea-monster, as Mr. C. Renard supposed to have seen it'. In: Anthonie Cornelis Oudemans, *The great sea-serpent: An historical and critical treatise: With the reports of 187 appearances*, Leiden, Brill etc. – London, Luzac & Co, 1892, p. 56. [290 B 7]

— This work by the Dutch zoologist Anthonie Cornelis Oudemans is still the most extensive study of the mythical great sea serpent ever produced. Oudemans collected 187 unverified reports of sightings and concluded based on the quantity of these testimonies that these most likely described a real species. The work was not met with enthusiasm in the academic community but was published by reputable academic publishers. In addition to over 600 academic articles, Oudemans produced one further cryptozoological publication, on the Loch Ness monster, in 1934.

3 Fish out of Water
Collecting Aquatic Animals in the Early Modern Period

Fish out of Water
Collecting Aquatic Animals in the Early Modern Period

Marlise Rijks

At the turn of the seventeenth century, the Leiden professor Everard Vorstius (1565–1624) acquired a curious dried crab from the Moluccas. Vorstius knew just whom to show it to: his admired colleague and the authority on natural history in Leiden at the time, Carolus Clusius (1526–1609). Clusius came to visit Vorstius at some point in 1603 to study the dried animal and included the new species in his book *Exoticorum libri decem* (1605) (3.2). A clear picture of the crab was added, which leaves no doubt as to which species Clusius described: a horseshoe crab, an animal living in the East Indies and the New World that was virtually unknown in Europe at the time. Vorstius and Clusius must have been excited to see, touch, and investigate the horseshoe crab – a species they saw for the very first time. The anecdote also illuminates the importance of the culture of collecting in the field of natural history, as well as the importance of good images.

Sixteenth- and seventeenth-century Europe had a lively collecting culture. Princes and professors, apothecaries and artists, merchants and physicians: different groups of people became obsessed with collecting. They filled their cabinets (or *Kunst- und Wunderkammern*) with man-made and natural objects: *artificialia* and *naturalia*. Various aquatic naturalia belonged to the most fashionable collectables: think of horseshoe crabs, blowfish, sawfish, narwhal tusks (3.5), and corals and shells (3.7). Particularly fashion-

able were objects from the East- and West-Indies, which reached Europe on an unprecedented scale as a result of the rise of trading companies (see chapter 4). In first instance, collectors were mainly interested in the most curious, rare, or exotic naturalia, but in the course of the seventeenth century, and especially in the eighteenth century, the emphasis shifted towards a greater attention for 'typical' or local nature. At the same time, the interest in and need for classification grew (see chapter 5).

While Clusius seems to have thought he was the first to publish an image of the horseshoe crab, another picture of the animal had been printed over a decade earlier. In 1590, Theodor de Bry (1528–1598) published the first volume of his best-selling *America* series in Frankfurt am Main. This first volume includes an engraving of native people fishing, with a variety of aquatic animals, including two schematic horseshoe crabs (3.1). Another image of a horseshoe crab occurs on the title page of Ole Worm's (1588–1655) *Museum Wormianum* (3.4). This Danish collector acquired large numbers of aquatic naturalia. The horseshoe crab is depicted on the right-side wall amidst the saw of sawfish, some dried fish, a crab, a squid, two small turtles, and two large turtle shells. In the Early Modern Period, all these animals belonged to the broad category of 'fish', which basically referred to the whole aquatic fauna.

The engraver Nicolaes de Bruyn (1571–1656) had a similarly broad notion of the category 'fish'. With the publication of his *Libellius varia genera piscium complectens* around 1594 (3.3), he was probably the first to put on the market such a print series specifically devoted to fish. The pictures are

clear and recognizable, which fitted the early modern turn towards nature in both the arts and sciences. Among the depicted species we find commonly known fish such as cod, sturgeon, carp, ray, haddock, garfish, herring, and sole, but also other aquatic animals such as shrimp, crabs, lobsters, water snakes, frogs and toads, and mussels and shells. De Bruyn even included some *fictitij pisces* (fictitious fish) and the f*abulosus equus Neptuni* (mythical horse of Neptune).

Monsters and mythical creatures long remained an integral part of the fascination for the aquatic fauna (see chapter 2). One aquatic collectable that was related to a mythical (land) creature was the narwhal tusk (3.5; see also 2.7). Narwhal tusks were prized collectables and thought to be the horns of unicorns. In the Early Modern Period a debate arose about the reality of the unicorn. Some suggested the horns actually came from a marine animal. Respected scholars and collectors such as the aforementioned Ole Worm were involved in this debate, which revolved around 'proof' from textual sources, collected objects, and images.

During the sixteenth and seventeenth century, artists started to depict fish in more detail and greater numbers than ever before. Whereas depictions of the Biblical stories of the miraculous draught of fish had long been popular (see chapter 1), now engravers and painters invented new genres with detailed depictions of fish - such as specialised fish series in print (e.g. by De Bruyn), market scenes, allegories, and still lifes. Some collectors amassed beautiful albums of watercolours with images of plants and animals. These functioned as complements to the actual naturalia in their collections, or, when a particu-

lar specimen was missing, as substitute for the actual object. Images and preserved specimens both had their advantages. One could argue that preserved specimens came as close to the living 'actual thing' as one could imagine. But even specimens are representations that would not have existed without human intervention. A popular collectable such as a sea horse, for instance, had to be selected, captured, dried, transported, sold and bought, and then finally put on display in a cabinet. Some things were lost as a result of preservation - in the case of fish the most important thing that got lost was the original colour. Here, coloured images had an obvious advantage over preserved specimens. In the Early Modern Period there were debates about the value of different types of representations. Also, some collectors were experimenting with preservation techniques or gave detailed instructions to their contacts overseas on how-to preserve their desired collectables.

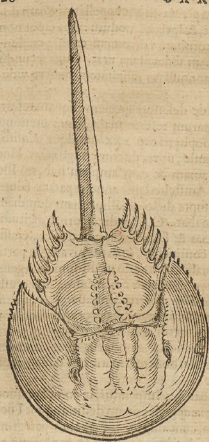
The most common method of preserving fish was drying. When it was relatively easy, fish were dried and kept as a whole, for instance in the case of trunkfish and blowfish. It is no coincidence that those specimens easiest to preserve, were most often found in collections. Another common preservation technique was to skin fish and dry the skin: a process very similar to the preservation of plants in a herbarium. One such method was developed and described by Johan Frederic Gronovius (1690–1762), a physician and botanist based in Leiden. The practice of preserving fish in pots and jars filled with alcohol seems to have been gradually rising during the seventeenth century. In fact, these two techniques for the preservation of fish, drying and keeping

them in alcohol, remained almost unchanged for 300 years. The famous collection of the apothecary Albertus Seba (1665–1736) contained both wet and dry specimens. In Seba's portrait (3.6) we see a large number of jars filled with alcohol and (unrecognizable) animals against the wall behind him. In his right hand, Seba is holding such a jar – with a snake. With his left hand, he points to some shells scattered on the table. Shells were among the most common and fashionable collectables: every self-respecting collector owned some. In Seba's *Thesaurus*, the multi-volume catalogue to his collection, we find images of shells laid in decorative patterns. Curious shells with attractive forms, colours, and patterns were considered as 'art made by nature'. But again, very practical reasons were also important in collecting trends: shells were relatively small, easy to transport, and did not need any preservation technique at all. As with all fashions, shell collecting also had its critics. In his popular emblem book *Zinne-poppen* Roemer Visscher (1547–1620) ridicules the 'geck' (foolish) collector who spends large sums of money on shells – as if it are jewels (3.7).

3.1 | Theodor de Bry, 'The manner of their fishing', in: *America*, part 1, Frankfurt am Main, Theodor de Bry, 1590, plate XIII. [1368 A 8]

— In 1590, the engraver-publisher Theodor de Bry (1528–1598) published the first volume of his best-selling *America* series. The beautiful images made by De Bry and his sons added much to the popularity of the series. The engravings in this first volume were based upon the drawings by the English artist John White (d. ca. 1593). In 'The manner of their fishing', we see native people fishing as well as a variety of aquatic animals. Two rather schematic horseshoe crabs are depicted in the lower right corner. De Bry depicted the horseshoe crab mistakenly with large pincers, perhaps to 'normalise' it, so in order to render it more like the crabs with which he was familiar. This copy in Leiden University Library is beautifully hand coloured.

Cancer Moluccanus.

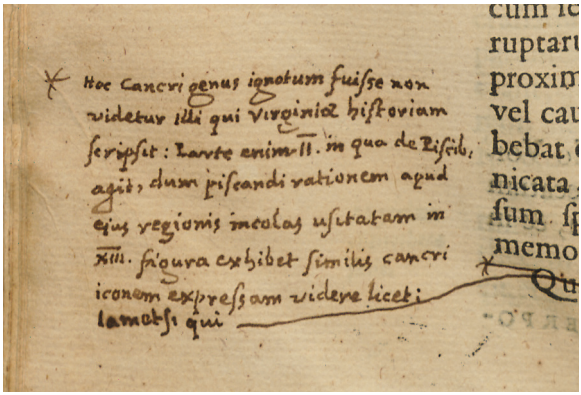


PERPOLITAM autem habebat is teſtam, eamq́ue verſicolorem, in qua lumini oppoſita, obſervarentur in fuſco mixti colores flaveſcens & rubeſcens. Conſtabat verò ea teſta duabus partibus, anteriore & poſteriore, inter ſe quadam cartilagine connexis: anteriore quidem breviore & anguſtiore, ut quæ tres dumtaxat uncias longa, quatuor lata eſſet, ubi ampliſſima: poſteriore autem longè majore, quatuor videlicet uncias cum ſemiſſe longâ, ſeptem cum ſemiſſe latâ. Utraque pars in dorſum inſtar fornicis aſſurgebat, poſterior tamen magis quàm anterior, & veluti in eminentiores tres diviſiones brevibus quibuſdam aculeis præditas diſtincta: quâ etiam anteriori parti connexa erat, magis eminens, & brevibus quibuſdam aculeis munita, deinde in lunata quædam cornua ſe ſpargens, ad longos uſque anterioris partis aculeos pertingentia, dentata utrimque & in firmam ſpinam deſinentia, circa verò connexionem aſperis quibuſdam villis obſita: mediâ quaſi parte teſtæ, in dorſi lateribus orbiculatæ quædam conſpiciebantur eminentiæ, oculorum pænè formam referentes, duræ tamen & teſtaceæ. Anterior porrò teſtæ pars, quâ poſteriori connectebatur, tres uncias lata erat, quatuor autem (ut ſuprà dicebam) ubi ampliſſima, extima binas ſolummodò, eaq́ue in tres breves aculeos, æquali ſpatio inter ſe diſtantes, deſinens: ad medium aculeum, adnexum habebat non exteriori teſtæ adhærens, ſed quadam articulatione ſub ipſa teſta triangulare cornu, ſeptem uncias longum, anguſtum & mucronatum: ſupremus in prona aculei parte angulus, brevibus aculeis inſtar ſerræ erat obſitus; ſupina ejus pars lævis & carinata: anterioris partis teſtæ latera ſeptem aculeis, præter extimum, erant munita, & ſex firmis, planis, & acutis ſpinis unciam longis, ſpadicei coloris & hirſutis inter extimum & ſeptimum aculeum prodeuntibus donata: mediâ pronâ parte ſex anguſtarum lacunarum, quaſi cultri mucrone impreſſarum, bini ordines apparebant, quibus internâ teſtæ parte totidem plana oſſicula, veluti abruptarum coſtarum fragmenta, reſpondebant.

Totum ipſius animalis corpus ſiccitate contractum & vetuſtate magna ex parte corruptum erat: decem autem pedes habuiſſe videbatur; quorum priores, an chelas habuerint, ignoro, nam nulli integri præter poſtremos, qui ſex articulis conſtabant. Omnes oriebantur ex majore ſive poſteriore teſta; atque adeò arctè conjuncti erant, ut cultelli mucronem non admitterent, ſed ſtatim ad primum articulum coaluiſſe viderentur: anteriores pedes, qui an chelæ, ut dicebam, fuerint, ignoro, ſtatim à ſede inferioris articuli, ex ipſa articulatione latam appendicem producebant, fraxini ſemini non valdè diſſimilem; atque ante illos binæ ferè ſimiles appendices exoriebantur: hirtæ, breves, ad primi ſive infimi articuli ſummum vix pertingentes: octo reliqui pedes, ſuperiori infimi articuli parti appendices etiam adnexas habebant, breves, craſſas, aculeatas, utrimque in unum quodammodo coëuntes: ſecundi articuli aliquot ſimiliter aculeis donati: poſtremos pedes ſubſequebantur exiguæ chelæ tribus articulis conſtantes, adeò breves, ut ad tertium poſteriorum pedum articulum vix pertingerent. Quâ anterior teſtæ pars poſteriori connectebatur, ex ipſa connexione ſubhirſuta quædam cartilago oriebatur, unciam cum ſemiſſe longa, binas cum ſemiſſe lata, deinde aliæ paullò minores ad ſingula illa plana oſſicula, veluti abruptarum coſtarum fragmenta: ſed omnes præter primam commemoratam, & huic proximam, adeò corruptæ, ut oſſicula dumtaxat conſpicerentur; nullis vel capitis, vel caudæ veſtigiis apparentibus. Ea autem anterioris teſtæ pars, in qua ortum habebat oblongum illud triangulare & mucronatum cornu, concava erat, & quaſi fornicata, unciamq́ue longa, binis veluti denticulis planis & in extimo acutis introrſum ſpectantibus donata, ad quam uſque pertigiſſe videbantur cartilagines ſuprà memoratæ.

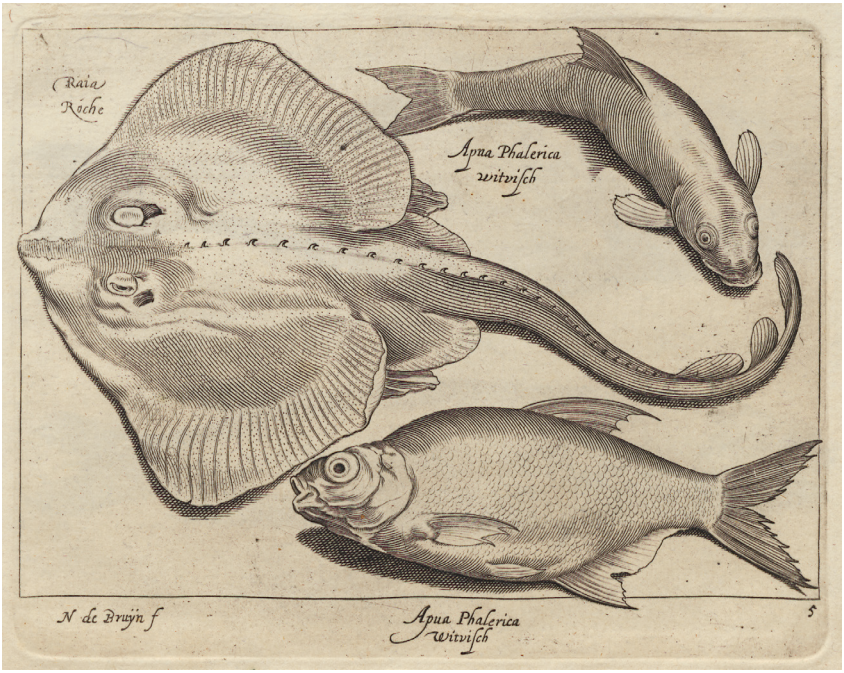
Qui Cancrum iſtum Doctori Vorſtio commodabat, ut mihi oſtenderet, Ioannes à Wolfſ-

Hoc Cancri genus ignotum fuisse non videtur illi qui Virginiæ historiam scripsit: Parte enim II. in qua de Piscib. agit, dum piscandi rationem apud eius regionis incolas usitatam in XIII. figura exhibet similis cancri iconem expressam videre licet: tametsi qui



3.2 | 'Cancer molluccanus'. In: Carolus Clusius, *Exoticorum libri decem*, Leiden, Officinia Plantiniana, 1605, p. 128. [755 A 3: 2]

— This edition (755 A 3: 2) of the *Exoticorum libri decem* was Clusius's own copy. It contains notes in Clusius's own handwriting as well as other hands. Pasted to the pages are also pieces of printed texts and images from other books. The corrections and notes were added as preparation for a new edition of the work, which was never published in the end. On the page with the image of the horseshoe crab we read in Clusius's own clear handwriting that this crab was, in fact, not unknown and that it was described in the 'Virginiae historia' and depicted there on plate XIII. This must be a reference to De Bry's *America*. It seems that Clusius had not associated the specimen he described from the Moluccas with the New World reference, while the image in De Bry is indeed quite different from Clusius's clear image. However, it is remarkable that Clusius only added this note after the publication of the *Exoticorum libri decem*, as he knew De Bry personally and was involved in the preparation of the first volume of the America series.



3.3 | Nicolaes de Bruyn, 'Roch & witvisch'. In: *Libellus varia genera piscium complectens*, s.l., Françoys van Beusekom, s.d. [first ed. ca. 1594]), plate 5. [THYSIA 1316: 2]

— The engraver Nicolaes de Bruyn (1571–1656) was born in Antwerp and trained by his uncle Abraham de Bruyn, who was one of the first artists to produce an animal print series (of four footed animals). Nicolaes's print series of aquatic animals seems to have been the first in its sort and was probably published around 1594 in Antwerp by Assuerus van Londerseel (some years before Adriaen Collaert's well-known *Piscium vivae icones*). The series now in Leiden University Library is the second edition, published by Françoys van Beusekom. Plate 5 (of 13) depicts a ray and two 'white fish' (a bream and another species). As in all the plates, De Bruyn includes the Dutch and Latin names of the species.

3.4 | G. Wingendorp, Cabinet of Ole Worm. In: Ole Worm, *Museum Wormianum*, Amsterdam, Elsevier, 1655, frontispiece. [656 A 8]

— The catalogue of the collection of the Danish scholar Ole Worm (1588– 1655) was published posthumously in 1655. The frontispiece of the *Museum Wormianum* gives a good impression of the wealth and variety of Worm's collection. A large share of the depicted collectables can be categorised as aquatic. Next to the boxes filled with shells and coral, there are impressive large aquatic animals hanging on the ceiling, as well as some of the most curious and popular (parts of) aquatic animals: the saw of sawfish; a horseshoe crab, and a narwhal tusk (including its skull).

3.5 | Narwhal tusk, 17th century, 197 cm. [Museum Boerhaave V25804]
— Narwhal tusks were on display in many a collector's cabinet in the sixteenth and seventeenth century. The tusks were thought to be unicorn horns, but already in the sixteenth century, doubts arose as to the reality of the unicorn. Textual sources seemed to confirm the existence of the animal: the unicorn was described in antique texts, but also in the Bible. The Hebrew text of the Bible included an animal called *re'em*, later translated into Greek as *monokérotos* (in the Septuagint), and in *unicorn* in several vernacular Bible translations. Whereas the discussion was originally about the right interpretation of textual sources, the actual horns in cabinets came to play a decisive role. People now started to suggest that the horns sold as unicorn horns were in fact horns of a marine animal. Around the same time, travel accounts reported of narwhals. The debate about the tusks fascinated collectors throughout Europe: Ole Worm for instance, wrote a disputation about the issue in 1638.

3.6 | Jacob Houbraken (sculp.) and Jan Maurits Quinkhard (pinx.), Portrait of Albertus Seba, in: Albertus Seba, *Thesaurus*, vol. 1, Amsterdam, Janssonius van Waesberge, 1734). [PLANO 47 A 1-2]

— The Amsterdam-based apothecary Albertus Seba (1665–1736) was one of the city's most avid collectors. In 1716 he sold his complete collection to Tsar Peter the Great for the incredible amount of 15,000 gulden. But that was not the end of his collecting-career: he amassed another great collection of naturalia, while he also started to prepare a catalogue of his collection. The monumental *Thesaurus* was published over the course of thirty years (partly after Seba died) and beautifully illustrated with more than four hundred plates. Among the large images are the famous depictions of shells (in decorative patterns), a horseshoe crab, and countless fish. Included was also this portrait of the collector: Seba looks at us amidst part of his collection of wet specimens, shells, corals, minerals, and albums.

3.7 | 'Tis misselijc waer een geck zijn gelt aan leijt' (it is astonishing how a fool spends his money). In: Roemer Visscher, *Zinne-poppen*, *alle verciert met rijmen, en sommighe met proze*, Amsterdam, Johannes van Ravesteyn, 1669 [first ed. 1614]), plate 4. [1174 G 8: 1]

— One can hardly think of a more popular collectable in the Early Modern Period than shells. But as this moralistic emblem by Roemer Visscher (1547– 1620) demonstrates, shell collecting was also criticised as a foolish activity. The image shows a variety of shells on a shore and the subscription tells us that it is wasteful to spend a lot of money on shells; objects that were used to be considered children's toys. Collectors are apen (monkeys), mimicking the collections of emperors and kings. However, those who are active in the shell trade are soo geck niet (not that crazy), as they make good money. Perhaps not coincidentally, the following emblem (5) in *Zinne-poppen* mocks the collecting of tulips (for which incredible prices were also paid, leading to the well-known 'Tulipmania' in the 1630s).

IV.

't Is miſſelijck waer een geck ſijn geldt aen leydt.

HEt is te verwonderen datter treffelijcke lieden zijn die groot gelt beſteeden aen Kinckhorens en Moſſelſchelpen, daer niet fraeys aen en is als de ſeldſaemheydt, en dat, om datſe mercken datter groote Potentaten, ja Keyſers en Koningen zijn, die ſulck gedrocht op doen ſoecken, en wel dier betalen. Ey Heeren Apen, ghy verſtaet het binnen ſpel niet. De Koningh Lodewijck van Vranckrijck de elfde van dier name, dede ſelſame dieren komen uyt ſijn nabuer Koninckrijcken, om hem een naem te maken dat hy noch groote luſt in ſijn leven hadde, nochtans was hy doe ter tijdt van lichaem ſeer ſwack. Ick wil hier niet ſchelden die haer neeringe daer af maken, om hun profijt daer mede te doen, als't ſonder liegen geſchieden mach: die en zijn ſoo geck niet, of ſy ſien een goet eynde voor haer deel.

Tis miſſelijck waer een geck zijn gelt aen leijt.

Verquiſtinghs ſinlijckheydt, koopt duer en voor ſuweelen,
Dit, dat men eertijts gaf de kinders meê to ſpeelen.

From Far

Fish and Marine *exotica* from the East- and West-Indies

4

From Far
Fish and Marine *exotica* from the East- and West-Indies

Didi van Trijp

Marine *exotica* embellished cabinets of curiosities from the fifteenth and sixteenth centuries onwards. Over the course of the seventeenth century, however, collections began to include more and more specimens from faraway places. This was in large part the result of the rise of European trading companies that circumnavigated the globe driven by commercial interests. The acquisition of sugar, spices and slaves was the main objective of these journeys. In the wake of this European expansion came civil servants and physicians who scoured regions hitherto unknown to them to study the natural surroundings and to collect, describe and picture plants and animals. Already on their way to these faraway places, seafarers could spot all kinds of marine creatures that piqued their interest, such as flying fish or gigantic jellyfish.

As we have seen in the previous chapter, aquatic objects were coveted collectables and prized possessions. Objects from faraway places could add extra cachet to a collection. The Delft physician and burgomaster Henrick d'Acquet (1632–1709), for example, boasted an impressive collection that included plants and animals from the East and West-Indies. All the way from Ambon in Indonesia, for example, he received a fair share of marine creatures such as lobsters, sea horses and sea shells (4.1-3). D'Acquet had these and other specimens in his cabinet drawn by artists: the resulting manuscript is a beautiful testimony to his rich collection as well as his wide-ranging connections.

One of d'Acquet's acquaintances overseas was the German naturalist Georg Everhard Rumphius (1627–1702). Rumphius was the son of a construction engineer and signed on with the Dutch East India Company to see more of the world. He soon became a trade overseer in Ambon. Besides performing his official duties, he looked at his natural surroundings attentively. He established an extensive network of informants, on whom he relied to collect and describe natural objects. He took a specific interest in plants and shells (4.4); he praised their providential design, studied possible medicinal uses of plants and made a handsome sum selling shells and fossils.

His research was not without hardships. His wife, who helped him translate his texts from Latin into Dutch, was killed in an earthquake in 1674 and a decade later his library and a part of his manuscripts including illustrations were lost in a fire. Undeterred, Rumphius continued his work and managed to complete a manuscript for publication. After getting his manuscriptsafely to Batavia, the ship that was to carry this manuscript to be printed in The Netherlands was sunk in 1692 – luckily, there were spare copies. Rumphius had by then gone blind (4.5). He continued studying natural history, however, earning him the nickname of 'the blind seer of Ambon' (4.6). His book on shells and crustaceans, entitled *D'Amboinsche rariteitkamer* (Amsterdam, 1705), was eventually published and was dedicated to the aforementioned Henrick d'Acquet.

The West-Indies too were the subject of European investigation. One of the leading works on Brazilian flora and fauna was the *Historia naturalis Brasiliae* (Leiden and Amsterdam,

1648) published by Georg Marcgraf (1610–1644) and Willem Piso (1611–1678). They travelled to the north-eastern provinces of Brazil in the service of Johann Maurits von Nassau-Siegen who had been made the governor-general of this Dutch colony. Marcgraf combined cartographical and mathematical expertise, whereas Piso had been appointed court physician. They embarked on writing a natural history of the Brazilian provinces which they inspected on behalf of Johann Maurits and the resulting book remained an influential account of the natural history of Brazil for a long time.

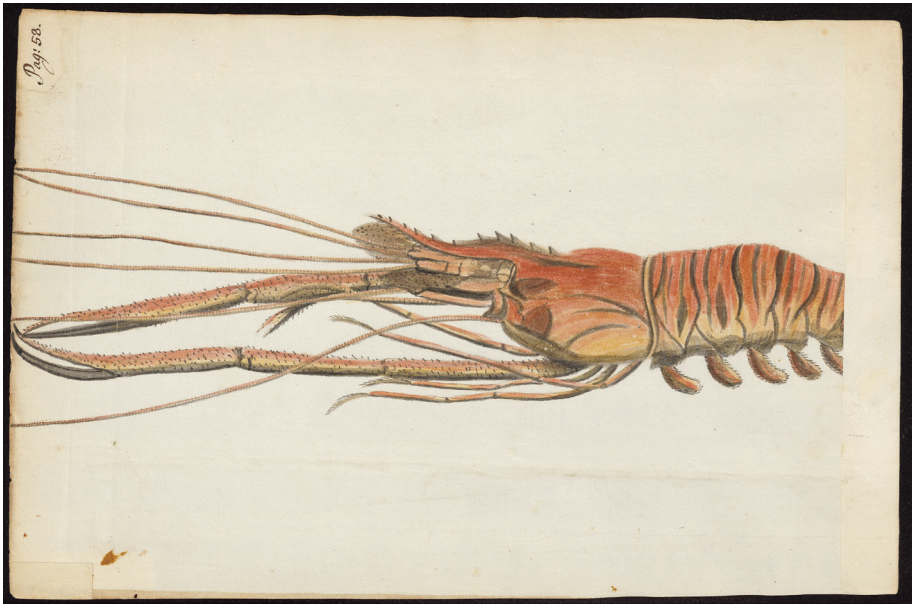
A part of this book was devoted to the fishes that swam in the Brazilian rivers, seas and streams. Marcgraf enlisted the service of fishermen to get their hands on these fishes, and the knowledge of the local Tupi informants proved to be essential in obtaining certain information. The names that the native population gave to these species were included in the book. The knowledge of local informants was also vital in knowing which species were safe to eat or not. Marcgraf, together with Albert Eckhout and Zacharias Wagener, made watercolours, which served as models for woodcuts made later to accompany the species descriptions. Some copies of the *Historia naturalis Brasiliae* were coloured in by artists on the basis of the watercolours made in Brazil, making the dazzling hues of these fish species visible (4.7). Capturing these vibrant colours was not an easy process: in these hot and moist climates, fish decomposed easily so that time was of the essence.

The English physician Hans Sloane (1666–1703) travelled to Jamaica in 1687 in the service of the Duke of Albemarle.

Sloane paid close attention to the island's plants and animals and wondered about their possible medicinal uses. He hoped that he could find ways of bolstering the already blooming British economy. Upon his journey back to London, a rather tense naval journey due to the dangers of pirates lurking and warring European fleets, he indeed had amassed a significant collection of both man-made and natural objects. For the collecting of these items, he had relied on local networks of knowledge consisting among others of enslaved plantation workers that had been taken from Africa. The sea urchins that Sloane collected and had drawn for his *Natural History of Jamaica* (London, 1704 et. al), for example, were probably purchased or taken from slaves with diving skills (4.8). These enslaved divers were coerced by British colonisers to retrieve gold coins and other treasures from sunken ships in the Caribbean Sea.

As these stories indicate, the fascination for marine exotica in the seventeenth and eighteenth centuries is part of a checkered past: one that entailed hardships and fortunes and collaboration as well as exploitation. The influx of new species and specimens also increased the desire for instilling some kind of order, as the next chapter explains.

4.1 | Sea horse. In: *Insecta et animalia coloribus ad vivum picta, anno 1656 et sequentibus: opus magnificentissimum et unicum, nobilissimus dominus Henricus d'Acquet, civitatis Delfensis senator ac consul, ad exemplaria naturalia summo studio ultra quinguaginta annos ex universis terrarum oris quaesita et in sua collectione conservate pingere curavit*, Delft, 1708, fol. 23. [RF-281]



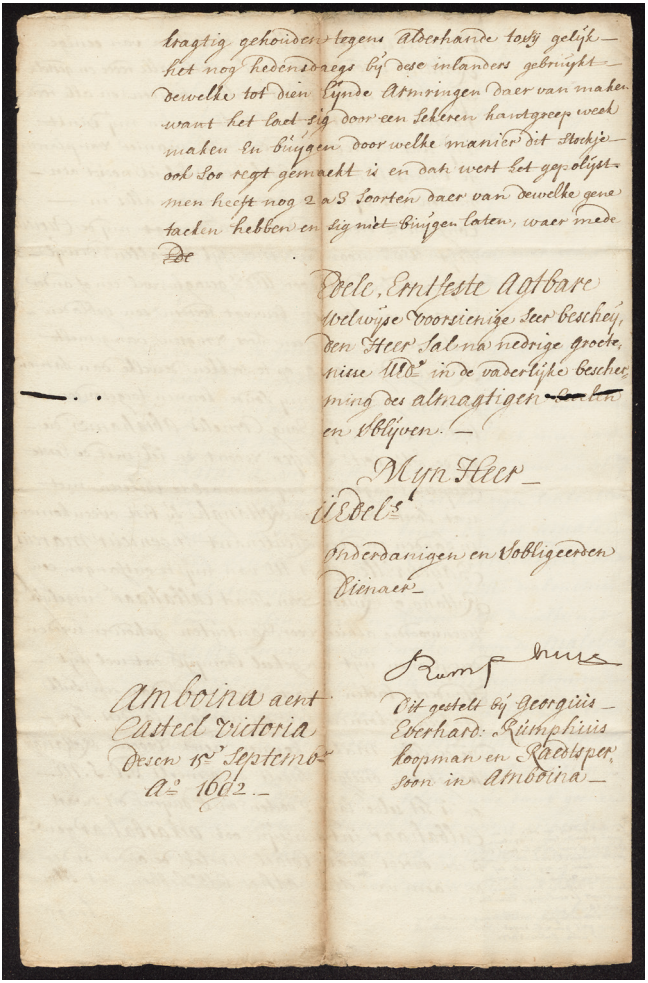
4.2 | Lobster. In: *Insecta et animalia coloribus ad vivum picta, anno 1656 et sequentibus: opus magnificentissimum et unicum, nobilissimus dominus Henricus d'Acquet, civitatis Delfensis senator ac consul, ad exemplaria naturalia summo studio ultra quinguaginta annos ex universis terrarum oris quaesita et in sua collectione conservate pingere curavit*, Delft, 1708, fol. 58. [RF-281]

4.3 | Various sea shells. In: *Insecta et animalia coloribus ad vivum picta, anno 1656 et sequentibus: opus magnificentissimum et unicum, nobilissimus dominus Henricus d'Acquet, civitatis Delfensis senator ac consul, ad exemplaria naturalia summo studio ultra quinguaginta annos ex universis terrarum oris quaesita et in sua collectione conservate pingere curavit*, Delft, 1708, fol. 65. [RF-281]

— These finely coloured drawings (fols. 23, 58, 65) were commissioned by Henrick d'Acquet (1632–1709) and represent specimens from his collection of natural curiosities. The drawings in this album are of insects, amphibians, crustaceans as well as some fish. They contain short handwritten captions in Latin and Dutch. The edges of the manuscript pages are gilt, enhancing its luxurious look.

4.4 | Various shells. In: Georg Eberhard Rumphius, *D'Amboinsche rariteitkamer, behelzende eene beschryvinge van allerhande zoo weeke als harde schaalvisschen, te weeten raare krabben, kreeften, en diergelyke zeedieren, als mede allerhande hoorntjes en schulpen, die men in d'Amboinsche zee vindt: daar benevens zommige mineraalen, gesteenten, en soorten van aarde, die in d'Amboinsche, en zommige omleggende eilanden gevonden worden. Verdeelt in drie boeken, en met nodige printverbeeldingen, alle naar 't leven getekent, voorzien*, Amsterdam, Jan Roman de Jonge, 1741. [Plano 45 D 1]

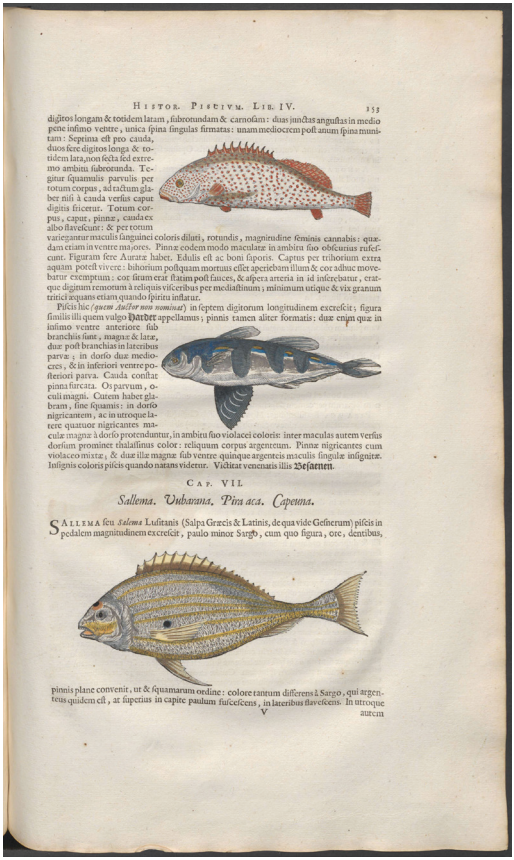
— This coloured picture of shells on a folio format are based on the engravings in the 1705 edition of *D'Amboinsche rariteitkamer*. The book contains no captions, index or page numbers. The shells have been depicted minutely and their visual rhetoric invokes a sense of direct observation. The engraver has added shading to the shells and the colourist has heightened them with a white paint that imitates the reflection of light. Shells were admired for their beauty by a curious public and could yield attractive sums on the market for marine exotica.



4.5 | Georg Eberhard Rumphius, letter dated 15 September 1692. [BPL 246]

— After his eyesight deteriorated, Rumphius dictated his letters to a scribe. He did continue to sign these letters himself, as can be seen on this excerpt containing his autograph.

4.6 | Portrait of Georg Eberhard Rumphius. In: Georg Eberhard Rumphius, *D'Amboinsche rariteitkamer, behelzende eene beschryvinge van allerhande zoo weeke als harde schaalvisschen, te weeten raare krabben, kreeften, en diergelyke zeedieren, als mede allerhande hoorntjes en schulpen, die men in d'Amboinsche zee vindt: daar beneven zommige mineraalen, gesteenten, en soorten van aarde, die in d'Amboinsche, en zommige omleggende eilanden gevonden worden. Verdeelt in drie boeken [...]*, Amsterdam, F. Halma, 1705, frontispiece. [6812 A 1] — This portrait of Rumphius is the frontispiece to his *D'Amboinsche rariteitkamer*. It depicts him in his study while already blind, 'seeing' natural objects with his hands rather than with his eyes. Several marine objects figure on this engraving, such as various types of coral, a blowfish, and an assortment of shells.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digitos longam & totidem latam, subrotundam & carnosam: duas junctas anguillas in medio ipsius infimo ventre, unica spina singulas firmatas: unam mediocrem post anum spina munitam: Septima est pro cauda, duos fere digitos longa & totidem lata, non secta sed extremo ambitu subrotunda. Tegitur squamulis parvulis per totum corpus, ad tactum glaber nisi à cauda versus caput digitis fricetur. Totum corpus, caput, pinnæ, cauda ex albo flavescunt: & per totum variegantur maculis sanguinei coloris diluti, rotundis, magnitudine seminis cannabis: quædam etiam in ventre majores. Pinnæ eodem modo maculatæ in ambitu suo obscurius rufescunt. Figuram fere Auratæ habet. Edulis est ac boni saporis. Captus per trihorium extra aquam potest vivere: bihorium postquam mortuus esset aperiebam illum & cor adhuc movebatur exemptum: cor simum erat statim post fauces, & aspera arteria in id inferebatur, eratque digitum remotum à reliquis visceribus per mediastinum; minimum utique & vix granum tritici æquans etiam quando spiritu inflatur.

Piscis hic (*quem Auctor non nominat*) in septem digitorum longitudinem excrescit; figura similis illi quem vulgo **Dorade** appellamus; pinnis tamen aliter formatis: duæ enim quæ in infimo ventre anteriore sub branchiis sunt, magnæ & latæ, duæ post branchias in lateribus parvæ; in dorso duæ mediocres, & in inferiori ventre posteriori parva. Cauda constat pinna furcata. Os parvum, oculi magni. Cutem habet glabram, sine squamis: in dorso nigricantem, ac in utroque latere quatuor nigricantes maculæ magnæ à dorso protenduntur, in ambitu suo violacei coloris: inter maculas autem versus dorsum prominet thalassinus color: reliquum corpus argenteum. Pinnæ nigricantes cum violaceo mixtæ, & duæ illæ magnæ sub ventre quinque argenteis maculis singulæ insignitæ. Insignis coloris piscis quando natans videtur. Vichtat venenatis illis **Besaemen**.

CAP. VII.

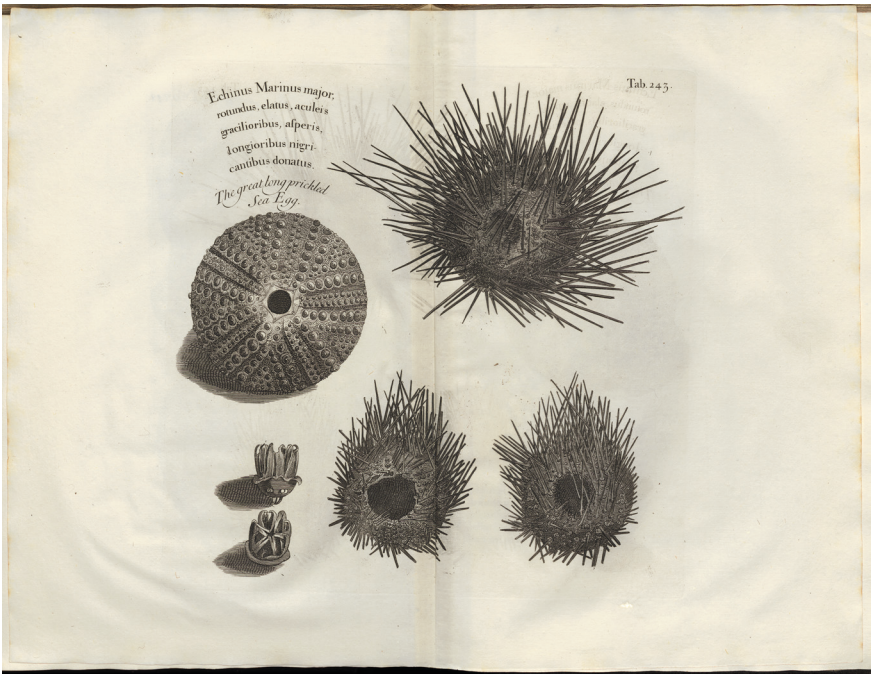
Sallema. Vubarana. Pira aca. Capetuna.

SALLEMA seu *Salema* Lusitanis (Salpa Græcis & Latinis, de qua vide Gesnerum) piscis in pedalem magnitudinem excrescit, paulo minor Sargo, cum quo figura, ore, dentibus, pinnis plane convenit, ut & squamarum ordine: colore tantum differens à Sargo, qui argenteus quidem est, at supercilia in capite paulum fuscescens, in lateribus flavescens. In utroque autem

V

4.7 | Various fish. In: Georg Marcgraf and Willem Piso, *Historia Naturalis Brasiliae*, Leiden, F. Hackius and Amsterdam, L. Elsevier, 1648, p. 153. [1407 B 3]

— Georg Marcgraf (1610–1644) and Willem Piso (1611–1678) travelled to the north-eastern provinces of Brazil and charted the flora and fauna of these regions, and also commented on economic, social and cultural aspects. The resulting book remained a seminal work of natural history of these Brazilian regions for a long time. Leiden University Library holds several copies, with this particular copy being beautifully coloured.



4.8 | Sea urchins. In: Hans Sloane, *A voyage to the islands Madera, Barbados, Nieves, S. Christophers and Jamaica with the natural history ... of the last of those islands; to which is prefix'd an introduction, wherein is an account of the inhabitants, air, waters, diseases, trade, &c. ... Illustrated with the figures of the things describ'd, [...] By Hans Sloane, [...] In two volumes*, London, printed by B.M. for the author, 1704 and 1725, p. 234. [374 A 13]

— Hans Sloane (1666–1703) acted as court physician to the Duke of Albemarle who governed the island of Jamaica in 1687-1688. Upon returning to London Sloane's star rose in the English polite and learned circles as he published his two-part *Natural History of Jamaica*. The immense collection of natural objects, artefacts, drawings and books that Sloane built over his lifetime formed the basis of the British Museum in London.

5

The Murky Waters of Classification

Ordering Fish in Eighteenth-century Europe

The Murky Waters of Classification
Ordering Fish in Eighteenth-century Europe

Didi van Trijp

Fishes had been subject to categorization from the sixteenth century onwards, although in this period various taxonomical principles could co-exist at the same time. Approaches towards ordering nature changed significantly in the late seventeenth and early eighteenth centuries. This can be seen, for example, in the fish book *Historia piscium* (Oxford, 1686) written by the English naturalists Francis Willughby and John Ray. Their book offered a precise definition of a fish: namely an aquatic animal, lacking feet, with either naked skin or scales, swimming by means of fins, living perpetually in the water, and never of its own volition coming out onto dry land. This definition narrowed the scope of what they thought should be included in a fish book – and what should be left out.

This wish to define and demarcate also drove later naturalists. Especially the Swedish naturalists Peter Artedi (1705–1735) and Carolus Linnaeus (1707–1778) seemed to have an insatiable thirst for order. Artedi devised a system in which all fish species could be grouped into genera, families, orders and classes. He stated that an ichthyologist should look for specific characteristics that distinguished certain groups of fish species from others, such as the number of fins, the position of the fins, and the numbers of rays in the fins. By paying close attention to external characteristics a naturalist could unravel the structure and design of the natural world. Artedi

used this new approach to the study of fishes in a book entitled *Ichthyologia* (Leiden, 1738) published posthumously by his close friend Linnaeus.

Although Artedi died prematurely by drowning in an Amsterdam canal, his work effected a lasting change in the way that naturalists organised fish species. Linnaeus's legacy was even greater. He established genera, families, order and classes for the three natural kingdoms of animals, plants and minerals. He also introduced the binomial system still in use today. This meant that species names consisted of a genus and a species name, rather than of the short diagnostic sentences that were used as species names until that time. His *Systema naturae* (Leiden, 1735) offered a first systematic account based on his principles. The classification system also provoked criticism. The Parisian naturalist Comte du Buffon called it arbitrary and artificial, a discourtesy to the diversity and richness of nature. Nonetheless, the standardization of species names facilitated communication between naturalists.

Some aquatic animals, however, resisted clear-cut classification. One of these impervious creatures was the mermaid. Stories of mermaid sightings circulated from Antiquity onwards and surfaced throughout the Early Modern Period. Reports of mermaid sightings also remained quite common in the eighteenth century, often celebrated as the great age of reason. One such report can be found in François Valentijn's account of Ambon: *Oud en Nieuw Oost-Indiën* (Amsterdam, 1727). One could, however, also glimpse sight of a mermaid closer to home. Upon reading reports of mermaid sightings in Stockholm newspapers in 1749, Linnaeus wrote to the

Swedish Academy of Science and urged them to try and catch this creature alive, or else preserve it in spirits. In one of his notebooks, Linnaeus listed the mermaids under the humans and the apes. In the second edition of the *Systema naturae* (1740) he adopted the mermaid into his category of paradoxa, together with other complex beings such as the satyr.

Other naturalists, notably Artedi, grouped mermaids among the whales. But were whales, in turn, even fish? This too was subject to debate. Whales and other cetaceans had long been lumped together with the fishes, and for good reasons. The definition of a fish that Willughby and Ray drafted, for example, also applied to the whale. It was Linnaeus who decided that whales should be grouped with the mammals rather than with fishes on the basis of their internal similarities. This change was published in the tenth edition of the *Systema naturae* (1758), today considered to be the most authoritative version of this work. Linnaeus's decision to divorce the cetaceans from the fishes was adopted by a fair share of naturalists, but in practice whales often continued to be considered fishes, at least outside academic circles.

Despite these ambiguities many naturalists actually took to the Linnaean system. They applied the method to fishes observed in their home region as well as to fish encountered in foreign, faraway regions. The Berlin physician Marcus Élieser Bloch (1723–1799) had a passion for the natural history of fishes. Bloch set out to collect, describe, compile and publish an overview of the fishes of the Prussian states because he found his copy of Linnaeus lacking descriptions of even some of the most common fish species existing in those states. His

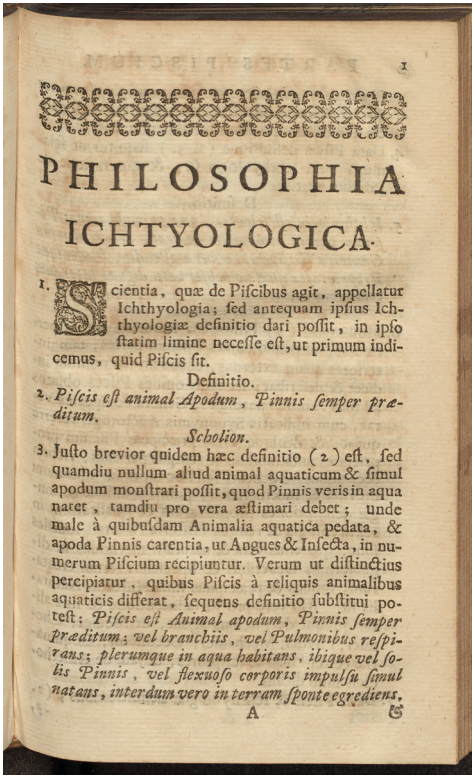
research resulted in the lavishly illustrated twelve-volume *Allgemeine Naturgeschichte der Fische* (Berlin, 1782–1795).

Drawing on his connections with fellow naturalists as well as on contacts with travellers such as missionaries, Bloch managed to amass thousands of fish specimens. His fish collection grew to encompass not only fishes from the German states, but, also what he called 'foreign' fishes. As a result of the ongoing European expansion, he managed to describe fishes from i.a. the Americas, East-Indies, India and Africa. Like many other naturalists, he soon found that he could not fit all these species into the genera that Artedi and Linnaeus had established and therefore needed to create new categories. He also included the porpoise in his ichthyological oeuvre, and thus did not follow all of the taxonomic rules proposed by Linnaeus.

The emergence of classificatory systems resulted in sharply articulated definitions and a standardization in naming practices. Yet also within this seemingly stable system, rules and categories shifted. The *Systema naturae* remained under continuous revision, and naturalists ignored, altered or added rules to the system that this seminal work unfolded. The emphasis on classification also signalled a shift towards increasing specialization, as not only the natural world but also the world of knowledge itself was divided into an increasing number of categories.

5.1 | Table of the animal kingdom. In: Carolus Linnaeus, *Systema naturae, sive regna tria naturae systematice proposita per classes, ordines, genera, et species*, Leiden, T. Haak, 1735. [1372 F 4]

— Carolus Linnaeus ordered the three kingdoms of nature (animals, plants and minerals) in nicely ordered tables in *Systema naturae* (Leiden, 1735). The division of the fishes in this edition of the book was borrowed from the system that Artedi had devised. Linnaeus also included a category of *paradoxa*, for animals of whose existence he was not quite certain. The mermaid was listed here among other dubious creatures.



1

PHILOSOPHIA
ICHTYOLOGICA.

1. Scientia, quæ de Piſcibus agit, appellatur Ichthyologia; ſed antequam ipſius Ichthyologiæ definitio dari poſſit, in ipſo ſtatim limine neceſſe eſt, ut primum indicemus, quid Piſcis ſit.

Definitio.

2. *Piſcis eſt animal Apodum, Pinnis ſemper præditum.*

Scholion.

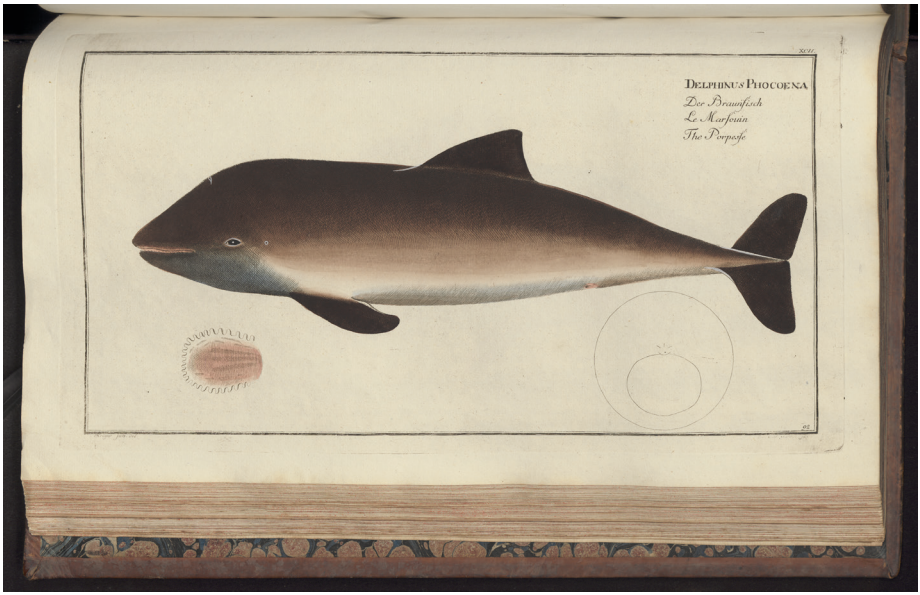
3. Juſto brevior quidem hæc definitio (2) eſt, ſed quamdiu nullum aliud animal aquaticum & ſimul apodum monſtrari poſſit, quod Pinnis veris in aqua natet, tamdiu pro vera æſtimari debet; unde male à quibuſdam Animalia aquatica pedata, & apoda Pinnis carentia, ut Angues & Inſecta, in numerum Piſcium recipiuntur. Verum ut diſtinctius percipiatur, quibus Piſcis à reliquis animalibus aquaticis differat, ſequens definitio ſubſtitui poteſt: *Piſcis eſt Animal apodum, Pinnis ſemper præditum; vel branchiis, vel Pulmonibus reſpirans; plerumque in aqua habitans, ibique vel ſolis Pinnis, vel flexuoſo corporis impulſu ſimul natans, interdum vero in terram ſponte egrediens.*

A &

5.2 | 'Philosophia ichtyologia'. In: Peter Artedi, *Ichthyologia sive opera omnia de piscibus, sc. Bibliotheca ichthyologica, philosophia ichthyologica ... recognavit, coapt. et edidit Car. Linnaeus*, Leiden, C. Wishoff, 1738, p. 1. [2301 C 16]

— In the *Ichthyologia*, Artedi unfolded his philosophy of fish and his rules for the study of those fish. The book contains no images, only short descriptions of the characteristics that Artedi deemed pertinent for classification. As a result, the book is of a manageable octavo format.

5.3 | 'Zeewijf van Buru' (sea-woman of Buru). In: *François Valentijn, Oud en nieuw Oost-Indiën, vervattende een naaukeurige en uitvoerige verhandelinge van Nederlands mogentheyd in die gewesten, benevens eene wydlustige beschryvinge der Moluccos, Amboina, Banda, Timor, en Solor, Java en alle de eylanden onder dezelve landbestieringen behoorende [...]*. Dordrecht, J. van Braam and G. Onder de Linden, 1724–1726, plate 52. [1799 A 9]
— The 'Zeewijf van Buru' (sea-woman of Buru) was described and depicted by the Dordrecht vicar François Valentijn (1666–1727) in this account of Ambon. The original drawing of this mermaid was made by the physician Samuel Fallours. A later, and somewhat altered rendering of this mermaid appears in Louis Renard's *Poissons, Ecrévisses et Crabes* (Amsterdam, 1754).



5.4 | F. Gürsch, Porpoise. In: Marcus Élieser Bloch, *Ichthyologie ou histoire naturelle et particulière des poissons*, Berlin, 'chez l'auteur' and F. de La Garde, (1795–1797), plates parts 1-4, plate 92. [137 A 1-6]

— The twelve-volume *Allgemeine Naturgeschichte der Fische* by Marcus Élieser Bloch (1723–1799) was one of the first wide-ranging ichthyological works based on Linnaean principles. His initial aim was to make an overview of the fish common to the German states. He included the porpoise that could be sighted on the German coasts in this survey, even if Linnaeus has already ruled that it should be classed among the mammals. This illustration comes from the French translation of the work that the author published.

5.5 | J.F. Hennig, Brazilian wrasse. In: Marcus Élieser Bloch, *Ichthyologie ou histoire naturelle et particulière des poisons*, Berlin, 'chez l'auteur' and F. de La Garde, 1795–1797, plates parts 5-8, plate 280. [137 A 1-6]

— Bloch boasted a fish collection that allegedly encompassed over a thousand specimens. Many of these fish came from beyond European borders and were sent to them by his wide-ranging correspondents. This illustration of a Brazilian wrasse, however, is based on a drawing of the species in Marcgraf and Piso. The engraver and artist J.F. Hennig made this image and added the exuberant colouration.

6 Curious and Real

Envisioning Sea Creatures of Tokugawa Japan

Curious and Real
Envisioning Sea Creatures in Tokugawa Japan

Doreen Mueller

The sea marked a boundary both real and imagined in Tokugawa Japan (1615–1868). Having imposed a policy of closed ports in 1635, the Tokugawa Shogunate stopped sending sea-worthy vessels on trade missions and otherwise. Going out to open sea was impossible for the vast majority of Japanese people in the eighteenth century and for much of the first half of the nineteenth century. Apart from fisher folk, people's contact with sea creatures was mainly in the form of food and useful products such as medicine. The popular Illustrated *Guide to the Famous Products of Land and Sea in Japan (Nippon Sankai Meisan Zue)*, reprinted multiple times in the first half of the nineteenth century, depicts whaling as a local famous custom, highlighting the usefulness of whales among other things coming from the sea for the local economy.

However, sea creatures were also envisioned beyond their practical use as curious objects of unusual shape, size and appearance, which captured people's imagination. Money could be made from this. A whale that had stranded in Shinagawa River in the Shogun's capital of Edo, present-day Tokyo, in 1798, was probably presented to the Shogun before being returned to sea. In Osaka, the rotting corpse of a whale was displayed in a curiosity show in 1823. It attracted major attention because few people had encountered a giant sea mammal on land. Well into the Meiji Period (1868–1912), sto-

ries of strange fish washing up on the shores of the Japanese archipelago were circulated in local newspapers. The reports included sketches and later also photographs reproducing their uncanny features resembling snakes orhuman faces.

Apart from eliciting curiosity and some measure of horror, knowledge could be gained from such images, too. Although only remotely based on direct observation, popular prints depicting strange creatures, including foreigners, exotic animals and imported objects, sometimes had labels giving the creature's name, features and place of origin. Makers of popular prints in Nagasaki, the port city where curious things from outside Japan invariably landed first as this was the only port open to selected foreign vessels, produced such images for travellers to take home as souvenirs. Nagasaki was also renowned as a place where painters possessed the technical skills to prove the existence of the strange. Having some training in Western descriptive techniques and some access to Chinese and Western books, these painters were able to capture the actual appearance of objects.

These painters were patronised by Japanese people with an interest in Western and Chinese learning, and by members of the Dutch East India Company. The German physician Philipp Franz von Siebold (1796–1866), responsible for collecting botanical, zoological, and geological specimens of Japan for the company, commissioned painters such as Kawahara Keiga (1786–1860) to faithfully capture aspects of Japanese life, nature and industry. His interest in pictures was mainly as sources of useful information. All the manuscripts and books assembled in this section of the exhibition were

collected or commissioned by him. Despite the practical purpose of these materials, they nevertheless contain vivid images of sea creatures, which give fascinating testimony to the global circulation of knowledge in the first half of the nineteenth century.

The manuscripts entitled *Various Kinds of Crustacean Drawn from Life (Kaikarui Shashin)* (6.1-2 and 6.5-7) and *Various Fish Drawn from Life (Gyorui Shashin)* (6.8) were both illustrated by Kurimoto Zuiken (1756–1834), a Japanese physician specialising in pharmaceutics who was in the service of the Shogun in Edo, present-day Tokyo. Siebold recorded in his diary that Zuiken showed him illustrations of plants, fish and shells in 1826. At the time, Siebold was staying in Edo as a member of the Dutch trade mission visiting the Shogun's court. Both manuscripts render the sea creatures including crustaceans, sharks and selected deep sea fish in bright colours, giving a sense of their threedimensionality. Zuiken also gives the creatures a sense of realness with facial expressions that make them appear alive.

Siebold had each illustration numbered and the Japanese captions translated in a separate manuscript, which is now in an incomplete state. The Japanese captions highlight the ability of the picture to capture the real appearance of the fish. For example, one illustration (6.8) depicts four varieties of shark, including a shark (*tenguzame*) resembling a long-nosed goblin on the top left page. According to the inscription, the image does not capture the actual colours of this shark as it was sketched from a dried specimen in the middle of summer in 1817 in Sesshū Province in Western Japan. Such

attention to linking the picture with historical reality shows a scholarly concern for authenticity. The expression 'capturing the real' (*shashin*), which appears in the manuscript titles, meant that an image was useful as a source of information about real-life objects. It did not specify a single method of production. In practice, painters rarely observed directly from nature but adapted existing pictures or fabricated images.

A 1794 printed edition of *Whale Chronicle (Geishi)* (6.3) describes various whale species based on the author's direct observations of whaling practices in the Kumano region of Kii Domain in Western Japan. The original manuscript was written in 1758 and printed in 1760 by Kandoriya Ji'emon (also called Kajitoriya Ji'emon or Yamase Harumasa), a chemist and scholar of herbalism from Kii Domain. He had directly observed whaling practices and questioned fishermen about their knowledge of whales. While fishermen were the sources of some of the information in the book, they were not the intended audience. The book was more than merely a description of whaling practices. It focused on the whales themselves, providing an overview of their varying forms. When the book was printed in 1794, it was aimed at the scholarly community and written in Sino-Japanese (*kanbun*).

Although printed in monochrome black, the illustrations of whales in this book capture the varying size, forms and shades of different whale species. In fact, the illustrations were detailed enough to leave a legacy in later illustrations of the drawn-from-life variety: The horizontal scroll entitled *Illustrations of Giant Whales Drawn from Life (Shashin Chōgei*

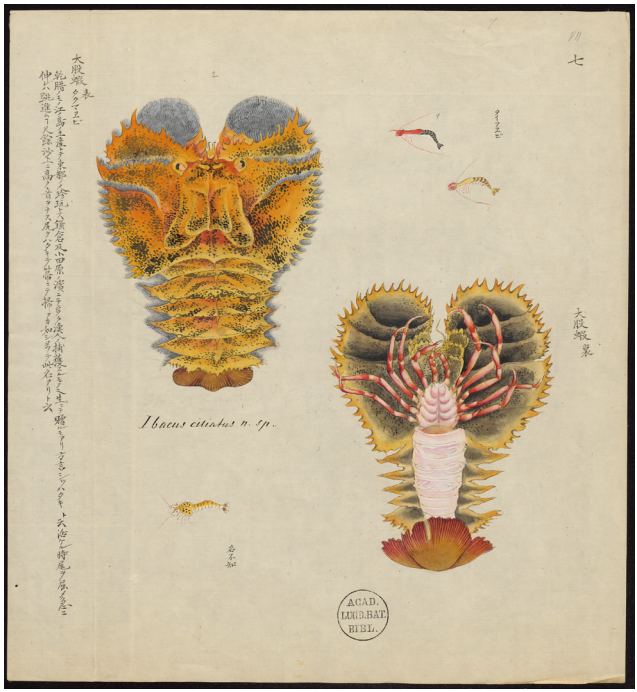
no zu) (6.4) depicts various whale species based on selections from *Geishi*. It is possible that Siebold who purchased a printed edition of *Geishi*, also commissioned this scroll. The whales are depicted alive and moving against a mainly empty background.

The labelling of these images as 'capturing the real' shows that *shashin* was a flexible concept encompassing multiple routes of transmission. However, there was some stylistic distinction between images intended for studying nature and images describing nature as a resource for human industry. The *Illustrated Guide to the Famous Products of Land and See in Japan* belongs to the latter type. It contains illustrations depicting whales being caught by fishermen. The painter, Hasegawa Mitsunobu, wanted to contrast the extraordinary size of the whale with the minute figures of the fishermen. He did this by showing an enormous plume of water emerging from the whale's breathing hole. Apart from this, the whale does not resist capture, allowing the fishermen to display the skills of their trade.

However, even popular illustrated guides did not always fabricate nature in genre scenes celebrating human industry. As the order of the natural world became a focus of enquiry in the nineteenth century, guide books started to include new images that encouraged empirical learning. In addition, nature was not the only target of empirical learning; historical texts were also examined for the origins of common names. The *Illustrated Guide to the Famous Products of Land and See in Japan* shows how diverse scholarly interests intersected. About ten pages of this book are dedicat-

ed to describing fish called *kajika*, literally 'river deer'. Citing historical sources, the text explains how *kajika* came to denote both a river frog and a type of fish with a large head and small fins. The frogs had acquired this name because their calls evoked the sound of deer. The naming of the fish is more complicated, but of interest here is the use of pictures describing various fish by that same name across the Japanese archipelago. The illustrations allow the reader to compare their slightly differing forms together with captions describing their origin and features.

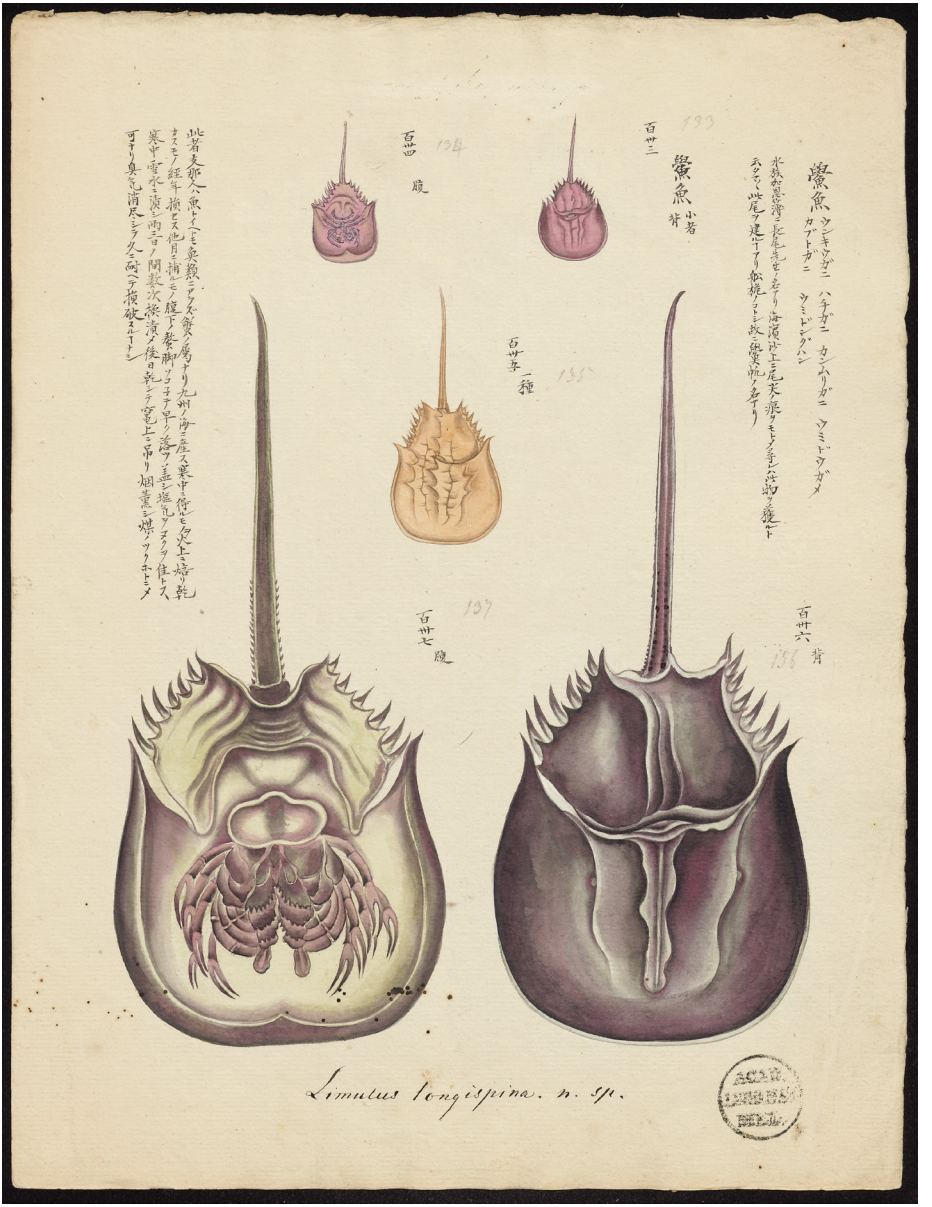
Pictures of fish acquired new meanings as aids to empirical studies of nature and history in nineteenth-century Japan. The methods used to produce these pictures included direct observation, copying and fabrication. This increasing interest in producing knowledge about nature was further encouraged by interactions with the Dutch East India Company, an influential player in the global circulation of knowledge.



6.1 | Kurimoto Zuiken, Fan lobster. In: *Various Kinds of Crustacean Drawn from Life (Kaikarui Shashin)*, c. 1825. [Ser. 1018]
— This illustration depicts the top and the underside of a Japanese fan lobster (*takumaebi)* in vivid colours. Three small shrimps are also shown moving in profile view. The legs and eyes of the lobster are moving. The painter clearly wanted to describe its living form. The caption states that fan lobsters were a delicacy of Enoshima Island and popular as souvenirs with travellers from nearby Edo, the Shogun's capital and present-day Tokyo. This is probably one of the illustrations shown by Kurimoto Zuiken, a physician in the service of the Shogun in Edo, present-day Tokyo, to the German physician Siebold who was staying in Edo as a member of the Dutch trade mission visiting the Shogun`s court in 1826.

6.2 | Kurimoto Zuiken, Horseshoe crab. In: *Various Kinds of Crustacean Drawn from Life (Kaikarui Shashin)*, c. 1825. [Ser. 1018]

— This illustration depicts the top and the underside of an adult and a juvenile horseshoe crab, 'helmet crab' (*kabutogani*) in Japanese. The caption on the left describes how the crab is processed for medicinal purposes. The crabs were caught in mid-winter and then dried. Although this description focuses on the crab's usefulness as a resource, it pays some attention to accurately framing its place in the natural order: 'Although Chinese people call this crab a fish, it is not, in fact, a fish. It is a kind of crab. It lives in the sea around Kyushu.' Siebold had each illustration in this manuscript numbered with corresponding descriptions in Dutch. The incomplete state of the Dutch descriptions makes it difficult to determine if they are direct translations of the Japanese and whether they add new information.

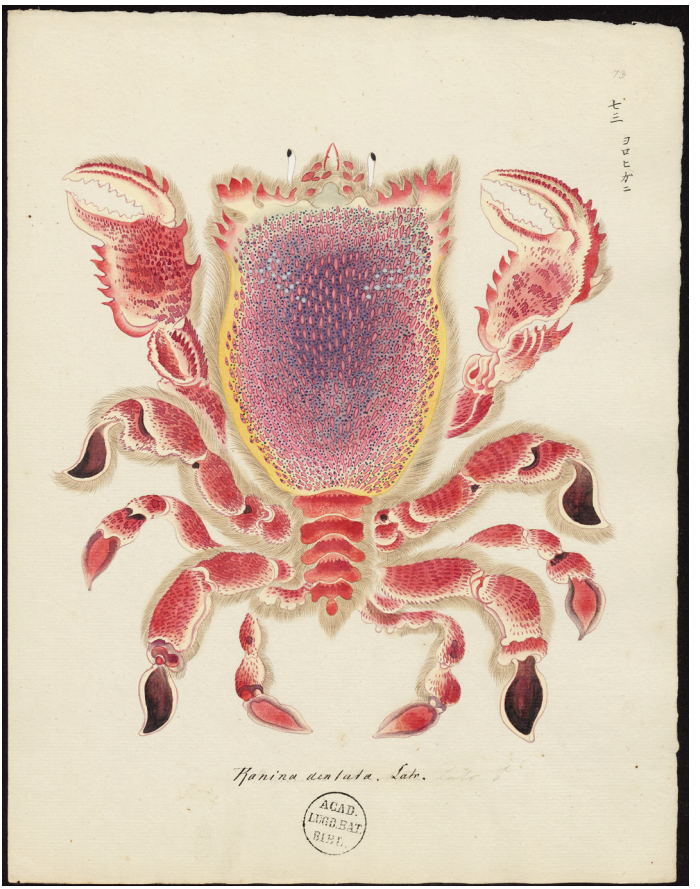

鱟魚 ツシキウガニ ハチガニ カンムリガニ ウミドウガメ カブトガニ ウミビツバシ
百廿二
鱟魚 小者 背
百廿三 腹
百廿四 一種
百廿七 腹
百廿六 背
Limulus longispina. n. sp.

6.3 | Whale. In: *Whale Chronicle (Geishi)*, 1794. [Ser. 1017]
— This 1794 printed edition of *Geishi (Whale Chronicle)* describes various whale species based on the author's direct observations of whaling practices in the Kumano region of Kii Domain in Western Japan. The original manuscript was written in 1758 by the merchant-scholar Kandoriya Ji'emon from Kii Domain. He had directly observed whaling practices and questioned fishermen about their knowledge of whales. While fishermen were the sources of some of the information in the book, they were not the intended audience. The book was aimed at the scholarly community and written in the corresponding academic style of Sino-Japanese (*kanbun*). Siebold purchased the book sometime during his stay in Japan from 1823 to 1829.

6.4 | Whale. In: *Illustrations of Giant Whales Drawn from Life (Shashin Chōgei no zu)*, 1820s. [Ser. 1016]

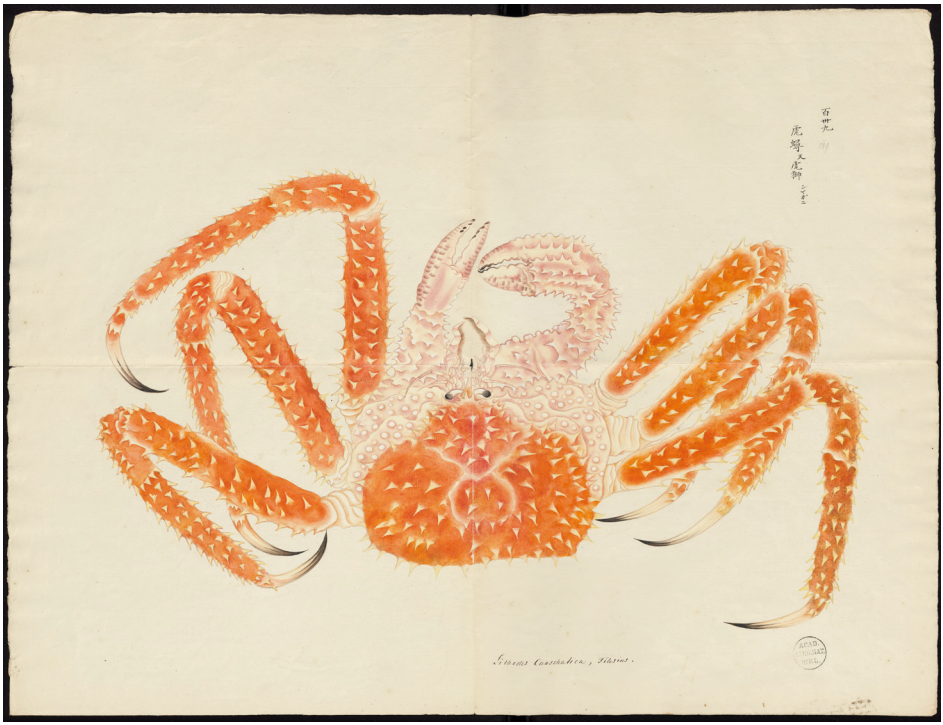
— This horizontal scroll depicts various whale species based on selections from the printed book *Whale Chronicle (Geishi)*, published in 1794. It is possible that Siebold who purchased a printed edition of this book, also commissioned this scroll. The illustrations of whales in this scroll are clearly based on the *Whale Chronicle*. The labelling of these illustrations as 'capturing the real' (*shashin*) in the manuscript's title shows that shashin was a flexible concept encompassing multiple routes of transmission.

6.5 | Kurimoto Zuiken, Hermit crab. In: *Various Kinds of Crustacean Drawn from Life (Kaikarui Shashin)*, c. 1825. [Ser. 1018]
— This illustration of a hermit crab shows stages of its growth from juvenile to adult, indicated by the growing size of the shell in which the crabs hide their soft bodies. The central image depicts the crab in its entirety in profile view, which emphasises the contrast between its large legs and relatively smaller soft body. According to the inscription, the crabs are common in the Kingdom of Ryūkyū, present-day Okinawa. The illustration caters to a combined interest in describing the curious form of the crab while paying attention to accurately rendering its life stages in the same illustration. The caption, on the other hand, shows the limits of the sources of knowledge about sea creatures, which tended to come from people's engagement with the creatures as resources such as food and medicine.



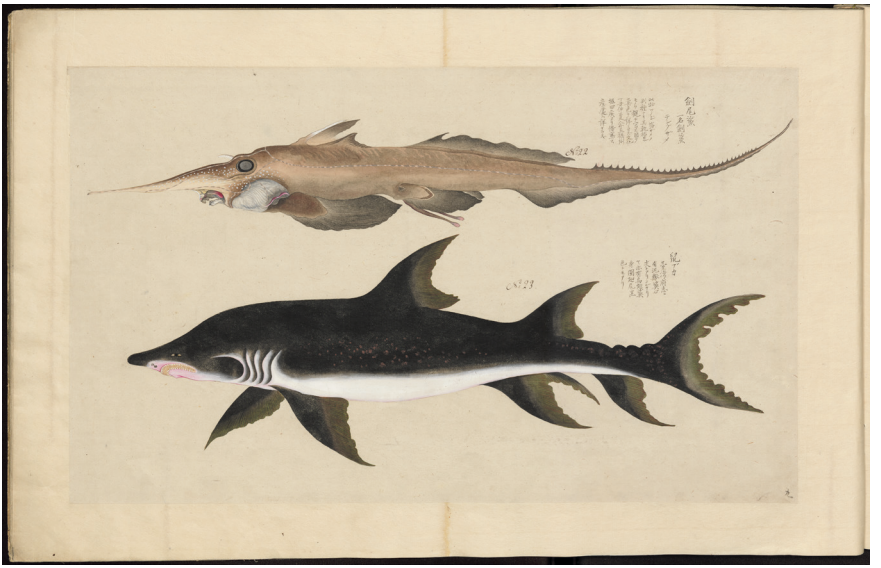
6.6 | Kurimoto Zuiken, Frog crab. In: *Various Kinds of Crustacean Drawn from Life (Kaikarui Shashin)*, c. 1825. [Ser. 1018]

— The Japanese caption beside the image of this crab gives its name as *yoroigani*, literally 'armoured crab'.



6.7 | Kurimoto Zuiken, Spider crab. In: *Various Kinds of Crustacean Drawn from Life (Kaikarui Shashin)*, c. 1825. [Ser. 1018]

— As in the other illustrations by Zuiken, this visual description is in vivid colours and highlights the aliveness of the crab, showing its eyes and long legs moving.



6.8 | Kurimoto Zuiken, Two sharks. In: *Various Kinds of Fish Drawn from Life (Gyorui Shashin)*, c. 1825. [Ser. 1013]
— This page depicts two varieties of shark, including a shark (*tenguzame*) resembling a long-nosed goblin on the top of the page. According to the inscription, the image does not capture the actual colours of this shark as it was sketched from a dried specimen in the middle of summer in 1817 in Sesshū Province in Western Japan. Such attention to linking the picture with historical reality shows a scholarly concern for authenticity. The expression 'capturing the real' (*shashin*), which appears in the title of the manuscript, meant that an image was useful as a source of information about real-life objects.

The Descent into Darkness

Discovering the Deep-Sea Fauna (1800–1930)

7

The Descent into Darkness
Discovering the Deep-Sea Fauna (1800–1930)

Robbert J. Striekwold

The Copenhagen-based naturalist Peder Ascanius travelled the coast of Norway during the late 1760s, studying the animals living in the country's many fjords and further out into the Norwegian sea. There were few surprises – the European seas had been well surveyed by that time – but occasionally less familiar creatures would be brought on board. One such enigmatic animal was the socalled rabbit fish (7.1), which instantly strikes anyone who looks at it as something quite out of the ordinary. Its anatomy is unlike that of well-known fish species, and its eerie, ghostly appearance makes it look like something from another world. Its scientific name – *Chimaera monstrosa* – seems rather fitting.

During the eighteenth century, such encounters with deep-sea fishes were more or less accidental. They included some that swam into shallow waters during the night, dying specimens that drifted to the surface, or sometimes those caught on longlines by fishermen who were trying to catch something else. Nevertheless, by the early nineteenth century these oddities had established an acute awareness among naturalists that only the topmost layer of the seas had been explored, and that deeper waters could house many more of these strange creatures.

Soon enough people began explicitly looking for deep-sea fishes, bringing up nets from ever deeper regions of the

oceans. This did not go unnoticed by the general public: in *Vingt mille lieues sous les mers (Twenty Thousand Leagues Under the Sea)*, published in 1870, the famous French author Jules Verne (1828–1905) imagined an advanced submarine descending to incredible (and in hindsight not entirely possible) depths. The crew even leave the vessel and walk on the ocean floor. Down there, the sea is shown to be populated by a rich variety of creatures, both familiar and strange, which understandably instil both fear and wonder in the hearts of the submarine's crew (7.2).

By the late nineteenth century, the deep sea had firmly seated itself in public consciousness, even though nobody had actually been there, except through imagination. The term 'deep sea' now warranted its own entry in encyclopaedias such as the 1897 edition of the popular German *Meyer's Konversations-Lexicon*. The image accompanying the rather lengthy article shows a reconstruction of what is taken to be a typical deep-sea fauna. In fact, it is a composite of animals from various geographical areas and depths that had been collected during some of the deep-sea expeditions of the previous decades (7.3). Though they're not in the centre of the picture, the two luminescent dragonfishes in the otherwise rather dark image immediately catch our eye. This is no accident – of all the odd and surprising things that were found in the dark depths of the oceans, lightproducing animals left the most lasting impression.

Challenging the Deep Sea — As so often, it was a somewhat mundane technological development that granted access to the deep sea. For decades, fishermen had been catching oys-

ters and other bottom-dwelling organisms by having their boats drag dredging nets across the seafloor. By attaching such nets to steam-powered vessels, which could drag enormous lengths of cable, much greater depths could be reached. Whereas the 1823 edition of the *Encyclopaedia Britannica* held that 'Through want of instruments, the sea beyond a certain depth has been found unfathomable', by the mid-nineteenth century several dredging expeditions had sampled the uppermost regions of the deep sea (all well within the so-called 'twilight zone', which starts at a depth of 200m and is too dark for anything green to grow, but not entirely dark yet. The subsequent 'midnight zone' starts at a depth of 1000m). The British naturalist Edward Forbes (1815–1854) pioneered this technique to great effect, but observed a decrease in animal abundance the deeper he dredged and concluded by extrapolation that there was no life below about 550m.

The idea that there was no life at those depths (with the lack of light and monstrous water pressure) was quite popular, though it by no means went unchallenged. The nail in its coffin came with a series of expeditions in the 1860s and 70s, the most important of which was that of the Challenger. *H.M.S. Challenger* sailed around the world from 1872 to 1876, and made depth measurements and bottom dredges all across the world's oceans. The Scottish naturalist Charles Wyville Thomson (1830–1882), who was chief scientist on the expedition and had been present on several earlier expeditions as well, wrote in 1873 that 'Every haul of the dredge brings to light new and unfamiliar forms – forms which link themselves strangely with the inhabitants of past periods in the earth's history; but as yet we have not the data for generali-

zing the deep-sea fauna, and speculating on its geological and biological relations; for notwithstanding all our strength and will, the area of the bottom of the deep sea which has been fairly dredged may still be reckoned by the square yard.' The forms of deep-sea fishes were unfamiliar indeed, perhaps none more so than the pelican eel (7.4), which uses its gigantic mouth to scoop up prey not necessarily smaller than itself. The material gathered by the Challenger's crew was described in a 50-volume report, edited by Thomson, published during the two decades following the expedition. Apart from physical characteristics of the oceans, such as currents and chemical composition of the water, the report presented to the world several thousand new species, many of which came from greater depths than any known to that date. So rich was the Challenger collection that, for decades, it provided material for other original studies. The famous German naturalist and artist Ernst Haeckel (1834–1919), for one, studied, described and drew the Challenger's jellyfishes, and captured their eerily beautiful shapes in great detail (7.5).

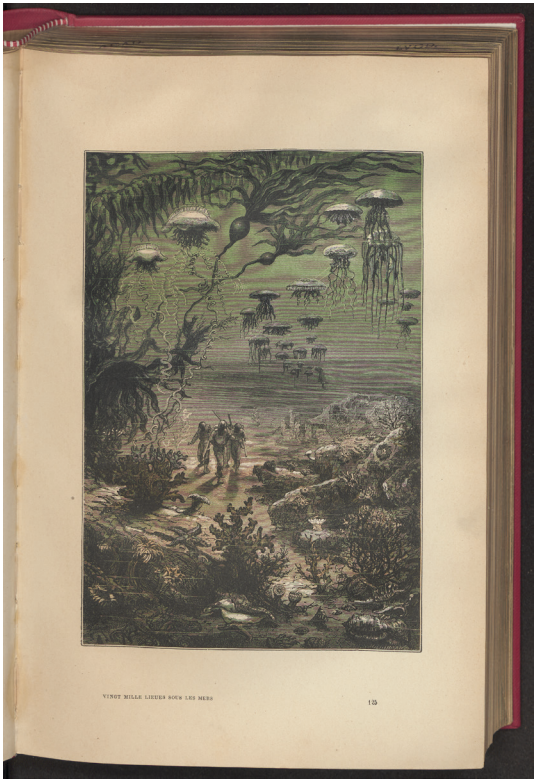
Light in the Darkness — In the decades that followed, many countries wanted their own Challenger expedition. Notable examples include the German Valdivia expedition, which searched the deep regions of the Indian, Antarctic and eastern Atlantic oceans in 1898–99, and the Dutch Siboga expedition, which crisscrossed the seas of the Indonesian archipelago in 1899–1900. By this time the deep sea was beginning to lose some of its mysteriousness, at least to the naturalist, though it was no less strange when compared to other areas of the marine realm. Compare the telescopefish from George Shaw's 1803 *General Zoology* (7.6) with those from Carl Chun's 1900

Aus den Tiefen des Weltmeeres (7.7). Shaw's fish was a single individual, accidentally caught, probably never seen alive, and it was utterly mysterious to him. Chun, as chief scientist on the Valdivia expedition, had seen multiple live specimens, of several species, and though he had never seen them in their natural environment, they had nevertheless become much more real to him. Accordingly, Shaw's illustration is somewhat stale and lifeless, whereas the fishes depicted by Chun might just swim off the page.

One mystery remained, however, for nobody knew what the deep sea actually looked like, and how the animals there lived, despite brave attempts by artists, like the impression from *Meyer's Konversationslexicon* (7.3). It took until the 1930s for Verne's dream of humans descending to the deep sea to come true, when biologist William Beebe (1877–1962) and engineer Otis Barton (1899–1992) descended to a depth of over 900m. They were lowered into the water in a bathysphere, a spherical steel vessel (barely large enough for two passengers) that was suspended from a ship by means of a cable. Thus, they were the first people to actually observe the animals inhabiting the twilight zone in their natural surroundings, going about their daily business. The expedition's artist, Else Bostelmann (1882–1961), rendered the animals beautifully and vividly in *National Geographic Magazine* in 1934 (7.8), bringing to light that which had been hidden in darkness.

7.1 | 'Chimaera monstrosa'. In: *Peder Ascanius, Icones rerum naturalium ou figures enluminées d'histoire naturelle du Nord*, Copenhague, C. Philibert, 1806, vol. 2, plate 15. [656 A 14]

— The travels of Peder Ascanius (1723–1803) brought him into contact with many Nordic sea creatures, including the occasional deep-sea fish. Though Ascanius is mainly remembered for his description of the giant oarfish (which appears in this work also), his *Chimaera monstrosa* is more typical of early depictions of deep-sea fishes. This engraving is from a French re-issue of his Icones rerum naturalium and was originally published in 1772.

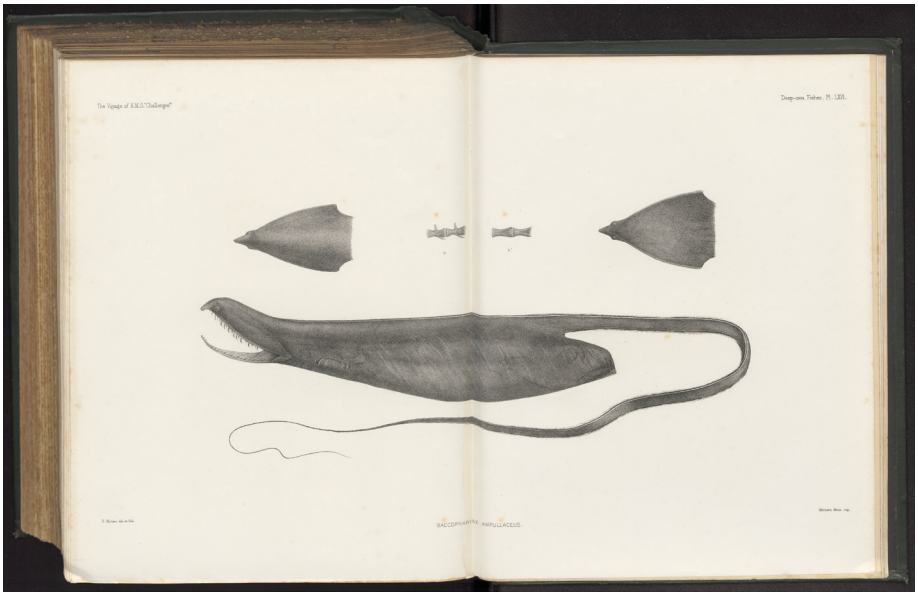


7.2 | Alphonse de Neuville, Crew of the Nautilus. In: *Jules Verne, Vingt mille lieues sous les mers*, Paris, Hetzel, 1872, p. 125. [3117 A 5]

— In Jules Verne's famous novel, captain Nemo takes his submarine *Nautilus* around the world, past a great number of (mostly imagined) underwater landmarks. These illustrations were provided by the French artist Alphonse de Neuville (1835–1885), and show some of the *Nautilus*'s crew in special suits that allow them to leave the submarine and walk across the seafloor at considerable depth.

7.3 | 'Meeresfauna – Tiefseefauna'. In: Hermann Julius Meyer (ed.), *Meyers Konversations-Lexicon. Ein Nachschlagewerk des allgemeinen Wissen*, Leipzig-Vienna, Bibliografisches Institut, 5th edition, 1897, part 12. [Museum Boerhaave Library, BOERH g inst 4065]

— The highly regarded (and richly illustrated) *Meyers Konversations-Lexicon* went through various editions during the nineteenth century. Several earlier versions of the 'Meeresfauna' entry were accompanied by impressive chromolithographs of marine creatures, but only by the fifth edition did the 'Tiefsee' merit its own illustration. The large image is accompanied by a long and detailed article on deep-sea expeditions and creatures, indicating the interest this topic was taken to have for the encyclopaedia's audience.

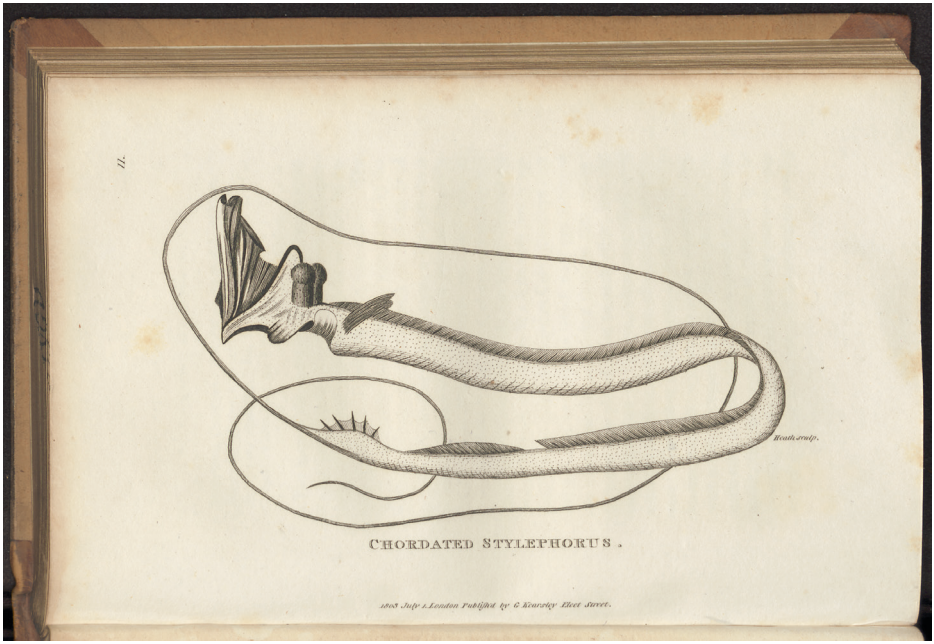


7.4 | R. Mintern, 'Saccopharynx ampullaceus'. In: *Albert Günther, Report on the Scientific Results of the Voyage of HMS Challenger during the years 1873-76*, London-Edinburgh-Dublin, 1887, London etc., Her Majesty's Stationary Office, vol. 22, plate 66. [3496 B12]

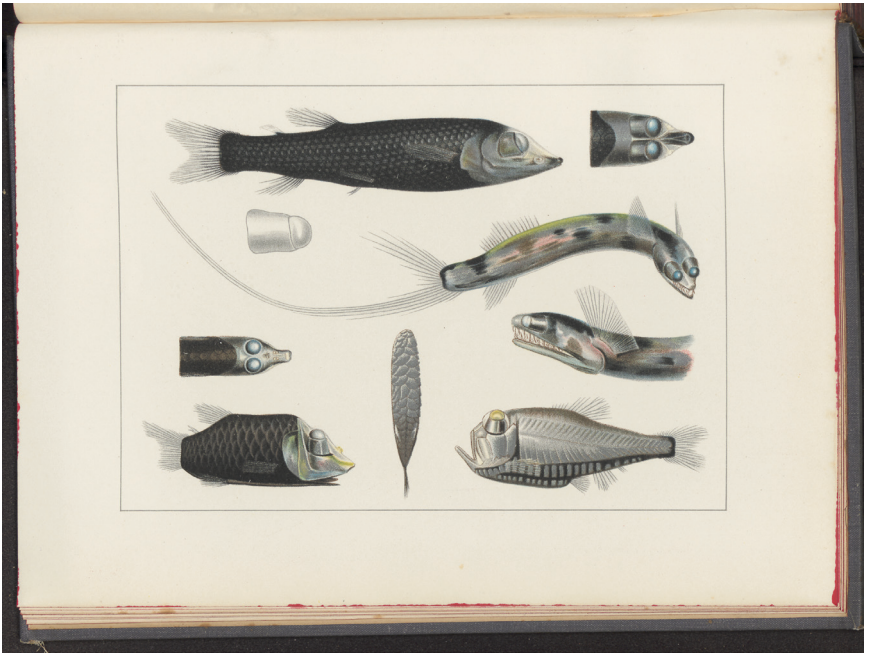
— The *Report on the Scientific Results of the Voyage of HMS Challenger* appeared in 50 volumes over a period of 15 years. Volume 22, on deep-sea fishes, was written by Albert Günther (1830–1914), Keeper of the Department of Zoology at the British Museum of Natural History. This lithograph, made by R. Mintern, depicts a so-called pelican eel, an iconic deep-sea fish. Note the interesting choice of drawing the animal with its last meal still inside its stomach: an excellent illustration of its habit of swallowing large prey whole.

7.5 | Ernst Haeckel, 'Thamnostylus dinema'. In: *Monographie der Medusen*, Jena, Fischer, 1881, vol. 2, plate 1. [429 A9: 2]

— No collection of nineteenth-century natural history illustration is complete without a lithograph by Ernst Haeckel (1834–1919). This famous German artist and naturalist is known for his well-composed, hauntingly beautiful images. He tried his hand at deep-sea organisms in his monograph on the jellyfish from the Challenger expedition. This example showcases how well Haeckel managed to combine the demands scientific conventions placed on his illustrations with his own artistic vision, through devices like the symmetrical arrangement of elements and the use of jellyfish tentacles as a frame.



7.6 | 'Chordated Stylephorus'. In: *George Shaw, General Zoology, or Systematic Natural History*, London, G. Kearsly, 1803, vol. IV: Pisces, part I, plate II. [641 E 8-11]



7.7 | Pelagische Tiefseefische mit Teleskopaugen. In: Carl Chun, *Aus den Tiefen des Weltmeeres: Schilderungen von der deutschen Tiefsee Expedition*, Jena, Fischer, 1903, 2nd expanded edition, opposite p. 576. [KITLV M 30 110]

— George Shaw (1751–1813) and Carl Chun (1852–1914) were about a century apart. Whereas the engraving in Shaw's *General Zoology* is awkward, even cartoonish, Chun's book sports a chromolithograph of a variety of telescopefish in all their splendour. Indeed, Chun explicitly remarks that colour sketches were made from living specimens, something Shaw simply did not have the opportunity to do. Most naturalists strongly preferred basing their drawings on studies of live animals – these two images definitely make one appreciate why.

7.8 | Else Bostelmann, 'A Fish-Eye View of a Microscope Tragedy'. In: *National Geographic Magazine*, 1934, vol. 66, p. 781. [NINO SR k3-4/p1]

— When William Beebe and Otis Barton were lowered into the water in their cramped bathysphere, Else Bostelmann (1882–1961) stayed behind on the ship as the expedition's artist. She had to rely largely on the detailed descriptions Beebe gave through a telephone line from the bathysphere, and discussions with him when he was back on deck. Despite this somewhat indirect method, Bostelmann's gouache paintings remain, to this day, some of the most spectacular depictions of deep-sea animals ever made. This particular illustration shows the greatly magnified head of a viper-fish (*Chauliodus sloani*) chasing the larvae of the ocean sunfish.

 Painting by Else Bostelmann. Sixteen Times Natural Size

A FISH-EYE VIEW OF A MICROSCOPIC TRAGEDY

This drawing is a greatly enlarged close-up of the head of the Saber-toothed Viperfish (*Chauliodus sloanei*; see Plate X). This creature is pictured near the bottom of the opposite plate in the act of attacking the tiny young of the Ocean Sunfish. The latter are mostly eyes and sharp spines, showing no promise of the fleshy bulk that they attain in their adult stage, but the fangs and appetite of the ogre of the depths make light of their protective armor.

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