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## **Introduction: towards a cultural history of Early Modern Ichthyology (1500-1880)**

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# Introduction: Towards a Cultural History of Early Modern Ichthyology (1500–1880)

*Paul J. Smith*

## 1 A New History of Fish

The present volume stems from the research project *A New History of Fishes. A long-term approach to fishes in science and culture, 1550–1880*. This project, which was funded by the NWO (Dutch Research Council) and carried out at Leiden University and at Naturalis Biodiversity Center, started in 2017 and was concluded in 2022. Here are a few quotes from the project description, published by NWO,<sup>1</sup> which are important for the theme of this volume:

This project proposes a new history of European ichthyological knowledge over three centuries (1550–1880). It is a new history because no long-term history of expert fish knowledge has been written since the early 19th century (Cuvier). Moreover, we argue for long-term continuities rather than Foucauldian epistemological breaks. It is new, furthermore, because our project is aligned with the New History of Science: we look at “science” in context – and, therefore, for the early modern period at expert fish knowledge (manifested in collecting practices and information exchange via texts, objects and images) [...]. Following this approach we hope to answer our central questions: How and where did ichthyology develop as a scientific discipline; how did it take shape as a field of expert knowledge in the cultural context of early modern and modern Europe.

It went without saying that these perspectives could not be realized within a single research project. A scholarly volume was therefore provided, in which not only would several findings arising from the project be presented (these are in this volume the contributions of Florike Egmond, Anne Overduin-de Vries, Marlise Rijks, Paul Smith, Robbert Striekwold, and Didi van Trijp), but a number of researchers from various countries, both starting and established scholars, were also asked to contribute. The expertise present in this volume

<sup>1</sup> <https://www.nwo.nl/en/projects/360-55-090>.

is highly interdisciplinary and transdisciplinary: it includes not only biologists and historians of science but also historians, art historians, literary scholars, and linguists, and thus covers many cultural and social domains in which ichthyology<sup>2</sup> is embedded. The two editors of this volume, Florike Egmond and I, have divided the twenty-four contributions (which vary greatly in subject matter and methodology) into four more or less thematically coherent sections (“Beginnings”, “Depicting”, “Fish and Society in Europe”, and “Ichthyological Knowledge from Afar”), which also do justice to the changing socio-cultural context from a long-term perspective. This “longue durée” spans more than three centuries: it begins with Paolo Giovio’s *De Romanis piscibus* (1524), the first printed monograph devoted to fish, and continues until the mid-19th century, a period in which ichthyology diversified, as happens in all branches of natural history, under the impetus of, among others, Linnaean classification, the comparative anatomy of Cuvier, emerging Darwinism, the narrative natural history of Buffon and Brehm, and, most importantly, the increasing knowledge of exotic, non-European plants and animals. Knowledge about the exotic natural world was gathered with the help of indigenous plant and animal knowledge generated outside Europe, and its transfer was often bilateral, as the present volume will demonstrate. Not only did natural knowledge come to Europe from the East and the West, but it also travelled the other way around, from Europe to far abroad.

In order to give an impression of the scope, the diversity, and the changeability of this context, and the intricate mutual interaction between ichthyology and visual and literal culture, this introduction briefly zooms in on five striking examples from early modern painting, literature, and ichthyology itself: (1) a painting by Jan Brueghel the Elder, *Diana and the Nymphs after the Hunt* (ca. 1621), in which the interaction between ichthyological knowledge and painting is made the main theme; (2) two chapters from the work of François Rabelais: one (1532) seriously celebrating natural history, and within it the knowledge of aquatic life, and the other (1564) satirically expressing the author’s scepticism about natural history, and particularly ichthyology; (3) two passages from the “Foreword to the Reader” of the authoritative *Historia animalium*, Book IV (1558), in which Conrad Gessner positions ichthyology and

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2 In the present introduction (and in several articles of this volume), the term “ichthyology” is used for facility. In fact, this term is anachronistic: if its first occurrence (in Latin) was already encountered occasionally in the 16th century, it came into common use only in the 18th century. The term used more frequently in the 16th and 17th centuries is “(natural) history of fish”, including the study not only of fish, but of all forms of aquatic animal life, such as marine mammals, sea turtles, crustaceans, shellfish, and (nonexistent) sea monsters.

makes a case for the use of illustrations in natural history; (4) a fish market scene by Frans Snyders and Anthonie Van Dyck (ca. 1521) in which realism, exoticism, and religious symbolism come together; and, finally, (5) the frontispiece that the illustrator Paul van Somer (II) engraved for the *Historia piscium* (1686), by Francis Willughby and John Ray. This frontispiece illustrates, through the image, the innovative word-image content of the *Historia piscium*.

## 2 Jan Brueghel and the Fascination for the World of Fish

The painting *Diana and the Nymphs after the Hunt* (ca. 1621) [Fig. 1.1] by Jan Brueghel the Elder (1568–1625) depicts a traditional subject: the goddess Diana and her nymphs resting after their hunt. However, contrary to the pictorial tradition, the women do not rest by sleeping or by bathing in nearby water, but by fishing. In the background are nymphs enthusiastically swimming and fishing, and in the right foreground Diana and two nymphs are excitedly inspecting the freshly caught fish. In doing so, they ignore the piled-up hunting booty of birds and land animals, leaving them literally to the left; all their attention is on the floundering fish being pulled from the net. Even the hunting dogs focus exclusively on the caught fish.



FIGURE 1.1 Jan Brueghel the Elder, *Diana and the Nymphs after the Hunt* (ca. 1621). Neuburg an der Donau, Staatsgalerie. bpk / Bayerische Staatsgemäldesammlungen

This fixation on fish and fishing reflects man's natural, deep-seated fascination with the world of fish and other *aquatilia* – a world with which man is familiar in his daily life, from fishing and the fish trade to the kitchen, but which at the same time remains unknown because it is hidden under water. The spectator watches along with the women. The fish (as well as the pile of hunted animals and birds) are realistically depicted – a number of fish species, especially the larger specimens, are recognizable: the spectator can easily distinguish a pike, eel, carp, and a crayfish. However, the large fish held by the left nymph cannot be identified, as her hand makes identification impossible. The discussion between the three women seems to be about this particular fish. As a spectator we are thus invited to interpret a painting about interpreting characters. Let us accept this invitation, because this multi-layered painting in many ways exemplifies the subject of the present volume.

### 3 Rabelais: Problematizing Ichthyology

Before discussing Brueghel's painting in more detail, it is necessary to take a step back in time. The preference given by Brueghel's nymphs to fish over the other animals reflects a broader general tendency in natural history that was already visible at the beginning of the 16th century. The most striking example of this tendency is the above-mentioned *De Romanis piscibus* (1524; several editions) by Paolo Giovio (1483–1552), which, as the first printed monograph devoted to fish, precedes those devoted to the other animal fields of natural history.

The growing interest in ichthyology at the expense of the other areas of natural history can also be traced from an unexpected corner, namely literature: the French writer François Rabelais (?–1553), physician, Erasmian humanist, and author of a series of comic narratives about the giants Gargantua and Pantagruel. Rabelais can be regarded as a critical witness to the scientific developments of his time. A passage important for our argument is found in his *Pantagruel* (1532), chapter 8, which contains the letter of education that father Gargantua writes to his son Pantagruel, who is going to study in Paris. The idealized educational programme of young Pantagruel mentions ichthyology as the first part of natural history – before the fields that we now call ornithology, botany, and mineralogy:

Et quand à la congnoissance des faitz de nature, je veulx que te y adonne curieusement, qu'il n'y ayt mer, riviere, ny fontaine, dont tu ne congnoisse les poissons, tous les oyseaulx de l'air, tous les arbres, arbustes et

fructices des foretz, toutes les herbes de la terre, tous les metaulx cachez au ventre des abysmes, les pierreries de tout l'Orient et midy, rien ne te soit incongneu.<sup>3</sup>

And as for the knowledge of nature's works, I want you to devote yourself to that with care: let there be no sea, stream, or spring, whose fish you do not know; all the birds of the air, all the trees, shrubs, and bushes of the forests, all the herbs of the earth, all the metal hidden in the bowels of the depths, the precious stones of the entire Orient and Southern Hemisphere: let nothing be unknown to you.<sup>4</sup>

Rabelais' interest in the field of ichthyology is also expressed in his other works, albeit less enthusiastically. For example, his posthumously published *Fifth Book* (1564) contains a satire on the uncertainties of knowledge, especially in the field of natural history. Driven by curiosity, the giant Pantagruel and his travelling companions arrive in the Land of Satin, where they find a great number of extraordinary animals of all kinds. All these animals turn out to be fictional because they are not real, but rather have lifelike depictions in tapestries. These images were created at the instigation of the allegorical character Ouy-Dire (Hearsay). After first seeing land animals and birds (the description of which often goes back to Pliny, whom Rabelais elsewhere calls a 'liar'),<sup>5</sup> the tour group goes to the centre of the land – the core of natural history – which is Aristotelian ichthyology.<sup>6</sup> As Alcofribas, Rabelais's narrator, recounts:

Passans quelque peu avant en ce pays de tapisserie, vismes la mer mediterranee, ouverte et descouverte jusques aux abismes, tout ainsi comme au gouffre Arabic se descouvrit la mer Erithrée, pour faire chemin aux Juifs issans d'Egypte. Là je recongnu Triton sonnant de sa grosse conche, Glaucus, Proteus, Nereus, et mille autres dieux et monstres marins. Vismes aussi nombre infiny de poissons en especes diverses, dansans, volans, voltigeans, combatans, mangeans, respirans, belutans, chassans, dressans escarmouches, faisans embuscades, composans tresves, marchandans, jurans, s'esbatans. En un coing là prés vismes Aristoteles tenant une lanterne, en semblable contenance que l'on peint l'hermite

3 Rabelais François, *Œuvres complètes*, ed. M. Huchon (Paris: 1994) 244–245.

4 Rabelais François, *The Complete Works*, transl. D.M. Frame (Berkeley – Los Angeles: 1991) 161.

5 Rabelais, *Œuvres Complètes* 22.

6 For the importance of ichthyology for Aristotle, see Leroi A.M., *The Lagoon: How Aristotle Invented Science* (New York: 2014).

prés saint Christofle, espiant, considerant, le tout redigeant par escrit. Derriere luy estoient, comme records de sergents, plusieurs autres Philosophes, Appianus, Heliodorus, Atheneus, Porphirius, Pancrates, Archadian, Numenius, Possidonius, Ovidius, Oppianus, Olympius, Seleucus, Leonides, Agathocles, Theophraste, Damostrate, Mutianus, Nymphodorus, Elianus, cinq cens autres gens, aussi de loisir comme fut Chrysippus, ou Aristarchus de Sole, lequel demeura cinquante huit ans à contempler l'estat des abeilles, sans autre chose faire. Entre iceux j'y advisay Pierre Gylles lequel tenoit un urinal en main, considerant en profonde contemplation l'urine de ces beaux poissons.<sup>7</sup>

Pushing on a little farther into the land of tapestry, we saw the Mediterranean Sea opened up and uncovered down to its deepest abysses, even as in the Persian Gulf the Red Sea opened up to make a roadway for the Jews coming out of Egypt. There I recognized Triton sounding his great shell horn, Glaucus, Proteus, Nereus, and myriad other gods and monsters of the sea. We also saw an infinite number of fish of various kinds, dancing, flying, curvetting, [fighting], eating, breathing, screwing, hunting, skirmishing, laying ambushes, arranging truces, bargaining, swearing, disporting.

In a nook nearby I saw Aristotle holding a lantern in a posture like that in which they paint the hermit next to Saint Christopher, closely watching, considering, putting it all down in writing. Behind him, like sergeants' witnesses, were many other philosophers: Appian, Heliodoros, Athenaeus, Porphyrius, Pancrates[, ] Arcadi[us], Numenius[, ] Posidonius, Ovid, Oppian, Olympius, Seleucus, Leonides, Agathocles, Theophrastus, Damostratus, Mutianus, Nymphodorus, Aelian, also five hundred idle folk, as was Chrysippus, or Aristarchus of Sola, who stayed fifty-eight years contemplating the state of the bees, without doing anything else. Among these I noticed Pierre Gilles, who, holding a urinal in his hand, was deeply contemplating the urine of these fine fish.<sup>8</sup>

By including Aristotle and his disciples in the centre of the Land of Satin, Rabelais gives a critical reflection on ichthyology. The question is who and what exactly he is criticizing in this particularly dense episode. Aristotle's position as the figurehead of knowledge does not seem to be up for debate. However,

7 Rabelais, *Œuvres Complètes* 803. For references to existing fish images from antiquity and the Renaissance and to the medieval iconology of Saint Christopher, see Smith P.J., "Rabelais ichtyologue", in Garnier I. et al. (eds.), *Narrations fabuleuses. Mélanges en l'honneur de Mireille Huchon* (Paris: 2022) 439–452.

8 Rabelais, *Complete Works* 681.

this does not apply to his disciples, some of whom are known only by name and others being non-existent, invented by Rabelais. These disciples are reprehensible, for they blindly follow Aristotle without scrutiny and without any attempt at personal observation. Among the ichthyologists gathered around Aristotle, only one contemporary writer is mentioned, namely Pierre Gilles (1490–ca. 1555), author of a French-Latin lexicon of fish names (*De Gallicis et Latinis nominibus piscium*) and translator into Latin of Aelian's *De natura animalium*. His lexicon and translation were printed together in 1535 by Sébastien Gryphe (Gryphius), humanist printer and publisher in Lyon. Gilles' lexicon and translation may have been for correction in the hands of Rabelais, who at the time was working as a proof reader at the printing house of Gryphe. At first glance, Gilles seems to belong to the group of followers of Aristotle in the Land of Satin. But at the same time he distances himself from them because he is the only ichthyologist who does not servilely copy Aristotle, but also works independently through autopsy and experimental observation. The figure of Pierre Gilles is indeed ambiguous: on the one hand, as a publisher and translator of Aelian (whom Rabelais elsewhere calls a 'tiercelet de menterie'<sup>9</sup> ('a tiercel [expert] in lying')),<sup>10</sup> he is a transmitter of ancient ichthyology; on the other hand, he is an innovator because of his lexicon, in which he pays particular attention to the fish of Marseille and their Provençal names. The latter will certainly not be criticized by Rabelais, fond as he is of dialectical lexicography. What is ridiculed by Rabelais through the figure of Gilles is both the practical difficulty, or even impossibility, of certain kinds of experimental research (how do you get fish urine?) and their usefulness.

Essentially, Rabelais' episode is about scientific reliability. The lying, unreliable narrator Alcofribas makes no distinction between really existing animals (elephant, rhinoceros, chameleon), imaginary or doubtful but well-known animals (unicorn, griffin), and impossible, invented animals (Half Lent, and the animal with two backs, also known from Shakespeare's *Othello*). The eyewitness testimony does not concern live animals but images of animals. These images are based solely on textual testimonials, not made *de visu*. In turn, those testimonies are also unreliable because they are not drawn from personal observation but from hearsay and the authority of others. In this dizzying game of truth and fiction, Rabelais does not seem to want to take a stand. Instead, he makes the reader reflect on the usefulness and reliability of natural history writings, whether illustrated or not. Stimulating critical reflection, not through self-positioning but through humour that puts things in perspective, is one of the constants in Rabelais' work.

9 Rabelais, *Œuvres Complètes* 800.

10 Rabelais, *Complete Works* 679.

#### 4 Conrad Gessner and the Visual Turn

Rabelais' latent scepticism about science, which can also be heard elsewhere in his work, would certainly not have been shared by his contemporary, the Swiss physician and naturalist Conrad Gessner (1516–1565), the world's most influential naturalist of that time. For Gessner, it is precisely man's unfamiliarity with the world of fish that constitutes the greatest challenge in natural history. In his authoritative *Historia animalium*, Book IV, devoted to fish (1558), he recounts in retrospective the moment he discovered this area around 1548:

Cæpi enim profecto ante decennium (que maxima ætates humanæ pars est) de omni animalium genere multa subinde observare, et condendis de ipsorum natura voluminibus materiam omni studio præparare. Præ caeteris autem Aquatiliū historia me fatigavit, magis omnino varia et multiplex, difficiliorque (mihi præsertim mediterraneo et pene ad summas alpes undique a mari remote homini) quam reliquorum animalium.<sup>11</sup>

Indeed, a decade ago (which is a very large part of a person's life), I began to make many observations about all kinds of animals and to prepare the material for every kind of study by means of volumes about their nature. Above all other volumes, the history of aquatic animals kept me breathless, which is altogether very diverse and varied and also more difficult than the history of the other animals (especially for me, as someone who lives in the interior of the country near the highest Alps and is cut off from the sea on all sides).<sup>12</sup>

It is therefore not surprising that he waited a long time to publish his book about fish. Only after finishing his three other volumes (on mammals, oviparous quadrupeds (reptiles), and birds, respectively) did he decide to publish this work, which, with its thousand thickly printed folio pages, is the most voluminous and richly illustrated volume in the series. In his "Preface to the Reader" Gessner relates how he discovered the works of Pierre Belon (1517–1564), Guillaume Rondelet (1507–1566), and Ippolyto Salviani (1514–1572) – authors upon whom he would greatly rely.

With Gessner, Belon, Rondelet, and Salviani a new era begins. As Florike Egmond states in her contribution to this volume, we are dealing with a 'visual

11 Gessner Conrad, "Praefatio ad lectorem", in *Historia animalium liber IIII. qui est de piscium et aquatiliū animantium natura* (Zurich, Christoph Froschauer: 1558) fol. b3r.

12 Translation by Holger Funk (personal communication).

turn': 'the interest in *aquatilia* [did not] suddenly exploded [...], but their visual representation [did].' Gessner was well aware of this visual turn, as can be read in this quotation of disarming frankness from the "Preface to the Reader":

Primus nostris temporibus Paulus Iovius, ut Piscium historiam excolere coepit, ita et picturas eorum fieri curavit, ut ipse refert: quas tamen typis publicatas non puto. Inde post multos annos cum ego omnino negligi ab omnibus hoc argumentum putarem, (Rondeletium enim, Bellonium, et Salvianum, idem moliri nondum cognoveram), plurimas in Italia et apud nos piscium picturas mihi comparavi. Sed dum in Quadrupedum Aviumque historia, et aliis quibusdam libris aedendis haero, illi quos iam nominavi, me anteverterunt, quod mihi certe non ingratum fuit. Ab illis enim icones sum mutuatus, quibus vel ipse carebam, vel quae ab ipsis accuratius mihi expresse videbantur. Plurimas quidem e Rondeletii libris, paucas e Bellonii opere, paucissimas, nempe unam aut alteram a Salviani. Non modo quod tardius liber eius ad me pervenisset, sed quia non plures e centum illis, quas dedit deesse mihi videbantur.<sup>13</sup>

The first to care about drawings of fish in our time was Paolo Giovio (Paulus Iovius), when he started elaborating a fish history, as he himself reports. However, I do not believe that these drawings have appeared in print. Because I believed for many years that the pictorial representation [of fish] was generally neglected by all (for I was not yet aware of the fact that Rondelet, Belon, and Salviani were concerned with this subject), I acquired myself a good many fish pictures in Italy and here in our home country. But while those I have already mentioned have forestalled me in publishing the natural history of the quadrupeds and birds and certain other books, this was certainly not unwelcome for me. For I borrowed from them the pictures that I myself lacked or that seemed to me to be printed more carefully in their books; most of them come from Rondelet's books, a few from the work of Belon, least of all, that is, only the stray image, from Salviani. Not only because his book came to me only with a delay, but because I did not seem to lack many of the one hundred he presented.<sup>14</sup>

13 Gessner, "Praefatio ad lectorem", in *Historia animalium liber IIII. qui est de piscium et aquatiliam animantium natura* fol. b3r.

14 Translation by Holger Funk (personal communication).

Whereas the works of Giovio and Gilles were still unillustrated, in the 1550s the frequent and systematic use of illustrations gave a real boost to ichthyology. We see the appearance of a rapid succession of eight significant, richly illustrated publications which epitomize the avant-garde role ichthyology played within early modern zoology: Belon publishes two illustrated ichthyological works in French (1551 and 1555) and one in Latin (1553); Rondelet two in Latin (1554–1555) and one in French (1558); Salviani one in Latin (1558); and Gessner (1516–1565) two in Latin (1558 and 1560).<sup>15</sup> The differences from publications in the other segments of illustrated zoology are also striking. Illustrated ichthyological works not only appeared earlier, but they also exceeded contemporary publications on other animals in number and volume: the 1550s saw the appearance of only one work on mammals (Gessner 1551); two on birds (Belon 1555 and Gessner 1555); and one on reptiles (Gessner 1554). Their many updated editions, reissues of their illustrations, and translations into vernacular languages make it clear that these illustrated books on fish were read widely by a readership far beyond only those who knew Latin. As the title page of Gessner's *Fischbuoch*,<sup>16</sup> the widely read German translation, indicates, the illustrations were intended not only for naturalists, but also 'zum nutz und guten allen Arzeten, Maleren, Weyleuten und Kochen' (for the benefit and good of all doctors, painters, farmers, and cooks). This is how fish illustrations entered en masse into the world of painting.<sup>17</sup>

## 5 Jan Brueghel and Science

Now, back to Brueghel's painting. The painting not only presents a passive reflection of the scientific, specifically ichthyological, interest in the 16th and early 17th centuries, but actively thematizes this interest as a subject. This becomes especially clear when we look at Brueghel's other paintings with

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- 15 Similar observations in Zucker A., "Fonctions des classes dans les traités ichtyologiques de P. Belon et G. Rondelet: empreinte ou alibi antique?" in Gontier T. (ed.), *Animal et animalité dans la philosophie de la Renaissance et de l'Âge classique* (Louvain – Paris: 2005) 7–32 (here: 7–8). See also Glardon P., *L'histoire naturelle au XVI<sup>e</sup> siècle. Introduction, étude et édition critique de La nature et diversité des poissons de Pierre Belon (1555)* (Geneva: 2011) 6–7.
- 16 Gessner Conrad, *Fischbuoch*, transl. Conrad Forrer (Zurich, Christoph Froschauer: 1563), title page.
- 17 For a general historical overview of the entry of natural history into South-Netherlandish painting and printmaking, see Rikken M., *Dieren verbeeld. Diervoorstellingen in tekeningen, prenten en schilderijen door kunstenaars uit de Zuidelijke Nederlanden tussen 1550 en 1630* (PhD dissertation Leiden University: 2016).



FIGURE 1.2 Jan Brueghel the Elder, *The Allegory of Air* (1621). Louvre

PHOTO © RMN-GRAND PALAIS (MUSÉE DU LOUVRE) / FRANCK RAUX

natural history themes from the same period. One can think of his painting *Allegory of the Element Air* (1621) [Fig. 1.2], commissioned by the Milanese Cardinal Federico Borromeo (1564–1631), who was himself fascinated by the advancement of science. As in *Diana and the Nymphs*, scientific knowledge is personified in this painting by characters from classical mythology: The goddess Aurora is assisted by many putti, who are equipped with measuring instruments (including the newly invented telescope) with which they study nature.<sup>18</sup> In this painting, the connection between art and science is particularly present. That is, the painting should be seen as a direct response to Carolus Clusius' *Exoticorum libri decem* (1605) – it incorporates many animals from Clusius' work, depicting them better and more faithfully (especially the cassowary and the penguin), and moreover in colour. In addition, he depicts many more bird species than authoritative books on birds (those by Belon, Gessner, and Aldrovandi, including Clusius) could ever depict or describe. This can be seen in particular in Brueghel's parrots, of which only a few species are described in contemporary ornithological literature. Moreover, he cuts

18 For a detailed analysis of the painting, see Rikken M. – Smith P.J., "Jan Brueghel's *Allegory of air* (1621) from a natural historical perspective", *Netherlands Yearbook for History of Art* 61 (2011) 86–116.



FIGURE 1.3 Jan Brueghel the Elder, *The Allegory of Water* (1614). Milan Ambrosiana  
© VENERANDA BIBLIOTECA AMBROSIANA/MONDADORI PORTFOLIO

corners on points that Clusius has doubts about. For example, he shows that the crowned crane is not a ‘pavo marinis’ (sea peacock), as Clusius assumes, on the basis of a drawing sent to him by Jacques Plateau, one of his correspondents, and he answers the question of whether birds of paradise have or don’t have legs by clearly depicting both birds with legs in the foreground. And, by pontifically depicting a large egg on the soil next to the two birds, he debunks the myth that the egg of the bird of paradise is said to be laid by the female in a hollow in the back of the male. In the painting *Allegory of Water* [Fig. 1.3], which is part of another, but thematically identical series of the four elements, Brueghel depicts a putto aiming with his bow and arrow at a monstrous sea creature [Fig. 1.4] that comes straight out of Pierre Belon’s book of fishes [Fig. 1.5],<sup>19</sup> namely a mantis shrimp (which, by the way, with its actual length of only 20 cm, has a depiction that is much larger and more frightening than the animal actually is).

These examples, including the painting *Diana and the Nymphs*, can be seen as so many pleas for the power of painting, which appears not to be inferior to

19 Belon Pierre, “Cigale de mer”, *La nature et diversité des poissons* (Paris, Charles Estienne: 1555) 353. See also Rondelet Guillaume, *L’histoire entière des poissons. Première partie* (Lyon, Macé Bonhomme: 1558) 397.



FIGURE 1.4 Putto and mantis shrimp (detail of Fig. 1.3)

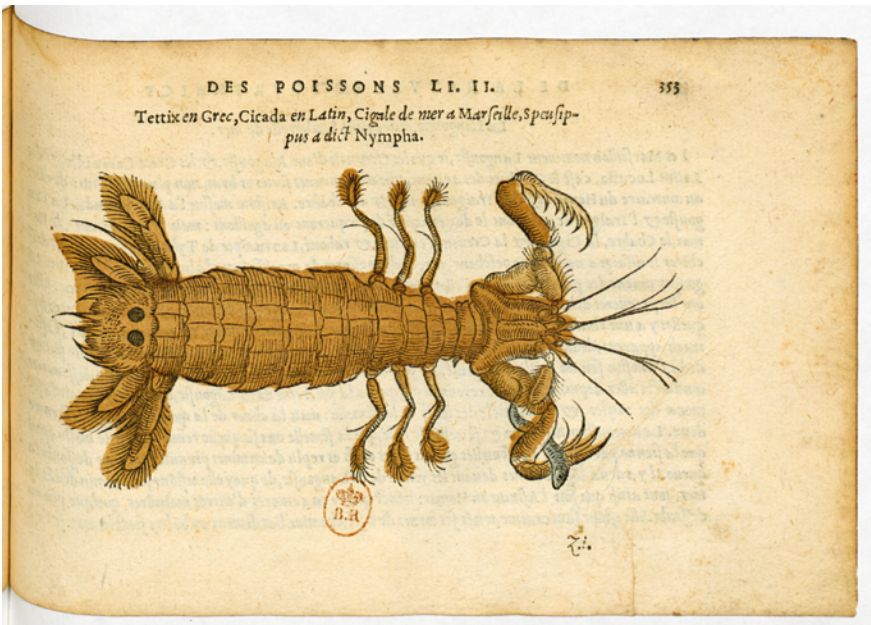


FIGURE 1.5 Belon Pierre, 'Cigale de mer', *La nature et diversité des poissons* (Paris, Charles Estienne: 1555) 353. Bibliothèque nationale de France

natural history writing. Brueghel seems to indicate that painting is capable of depicting nature more quickly and precisely than natural history can. Painting sees itself not as a slavish representation of natural history, but as a stimulating partner that advances knowledge about nature.

From this perspective, a few more striking aspects of the painting can be highlighted, which also play a role in contemporary ichthyology. It is striking, for example, that, in contrast to the aforementioned pictorial allegories on the elements air and water, which show a colourful mixture of animals from all corners of the world, there is a strong regionalism in *Diana and the Nymphs*: all animal species depicted – terrestrial animals, birds, and fish – come from a southern or central European region. It is also remarkable that all the fish depicted are freshwater fish (while the fish of *Allegory of Water* are both marine and freshwater). Here, too, a link can be made with 16th-century ichthyology, which was initially aimed at a specific region: Giovio and Salviani wrote their ichthyological works on fish in Rome and the surrounding area, Pierre Gilles focused upon the fish of Marseille and Provence, and the German historian Gregor Mangolt (1498–1578 (?)) wrote his *Fischbuch* (1557) on the freshwater fishes of Lake Constance (Switzerland). It was only later that attention turned to a more comprehensive and encyclopaedic study of fishes – of which the works of Belon, Rondelet, Gessner, and Aldrovandi are the best examples.

Finally, Brueghel's painting is also meta-pictorial. It indicates what the attention of the modern painter of his time is (or should be) focused on, namely the realistic depiction of nature, in this case of fish. In this, Brueghel joins four new subgenres, which would take off from the end of the 16th century: albums of watercolour drawings, such as the one by Joris Hoefnagel (1542–1600/1601), who still relies heavily on Gessner's illustrations, albums of fish prints, such as those produced by Adriaen Collaert (ca. 1560–1618), fish market scenes, made famous by Joachim Beuckelaer (1534–ca. 1574) among others, and, somewhat later, fish still lifes, traditionally connected to the name of Clara Peeters (fl. 1607–1621).

The realism of these paintings is so great that they provide a possible (and indirect) source of information about the occurrence of certain fish species on the fish market, and therefore in a certain region.<sup>20</sup> However, this realism is often problematic because it can be partial or feigned: in many cases it is demonstrable that the depicted scene could not have been depicted *ad vivum* – for instance when the painter demonstrably makes repeated use of

20 On painting as a tool for the study of historical biodiversity, see the article by Anne Overduin-de Vries and Paul Smith in the present volume.

the same model sketches – and this is the case of the carp in *Diana and the Nymphs*, which is depicted frequently in other paintings by Brueghel.

## 6 The *Fish Market* by Snyder and Van Dyck

With the fish paintings by Frans Snyder (1579–1657) we see a different elaboration of realism – in his paintings realism is not limited to local fish species but extends to foreign, even exotic species, in which he largely surpasses Brueghel's *Allegory of the Element Water*. From this perspective, let us take a look at *The Fish Market* (ca. 1621) by Frans Snyder and Anthony Van Dyck (1599–1641) [Fig. 1.6]. What is striking in this painting is the meticulousness with which the animals are depicted. The fish are at first glance depicted directly from nature (“naar 't leven”, true to life). All species of the huge pile of fish on display can be identified: on the table we see a huge sturgeon, and all kinds of other North Sea fish, as well as a dead otter, and under the table we find a small harbour seal, and a tub with carp. And at the top left, hanging from above, are a whole salmon, a salmon steak, two halibuts, one with the typical binding head to tail, and two bunches of herring, one smoked and the other fresh. All this is very realistic at first glance. But on the round table in the foreground are many exotic shells that are not found in the North Sea and which do not belong in a regular fish market, at least not in Western Europe. There is also an animal depicted that is very special, namely a horseshoe crab. This animal was a collector's item in curiosity cabinets.<sup>21</sup> One can distinguish two specimens lying on their backs, one on top of the pile of fish, the other on the bottom of the pile [Fig. 1.7]. So, whereas the individual fish are realistically rendered (or suggest that they are), the larger whole in which they are depicted is problematic, to say the least.

Perhaps the horseshoe crab and the exotic shells are only intended to suggest a *couleur locale*, a scene from the Mediterranean region – but even then the combination of North Sea fauna and tropical animals remains problematic. It may also be that because of the unusual combination of the fish species, the painters want to indicate that something special is happening here, in the daily life of the fishermen. And for that we have to consider more closely the scene in the background. There is no certainty which event is depicted here, but it is probably a biblical scene, namely Matthew 19, in which Peter finds a coin in the mouth of a fish he caught, with which he can pay his taxes. Here we

21 Rijks M., “A Painter, a Collector, and a Horseshoe Crab: Connoisseurs of Art and Nature in Early Modern Antwerp”, *Journal of the History of Collections* 31.2 (2019) 343–361.



FIGURE 1.6 Frans Snyder and Anthonis van Dyck, *Fishmarket* (ca. 1621). Kunsthistorisches Museum Vienna. Wikimedia Commons



FIGURE 1.7  
Two horseshoe crabs (detail of Fig. 1.6)

see the moment when Peter, traditionally poor and depicted with a wild beard and curly hair, hands the coin to the richly dressed tax collector, who looks very surprised.<sup>22</sup>

22 See Uchtmann D. – Haag S. (eds.), *The Pleasures of the Table in Art: Thirty-Eight Works from the Kunsthistorisches Museum in Vienna* (Vienna: 2011).

The paintings by Brueghel and Snyders/Van Dyck show how differently and also ambivalently the ichthyological knowledge can be used: to position the painter as a *pictor doctus*, capable of competing with the natural historians, or to illustrate his skill, able to depict in a laborious oil painting such a fleeting subject as a fish, in a lifelike manner. Ichthyological knowledge can also be used to depict a mythological or biblical scene, or, as with Beuckelaer and his followers, a realistically depicted fish market, which is at the same time an erotic scene containing the apparent sexual symbolism of the fishmonger holding a salmon steak to his middle finger.<sup>23</sup> In this type of painting it often remains unclear whether the eroticism depicted is intended merely for entertainment, or for edifying rejection of the depicted symbolism.<sup>24</sup>

## 7 The Frontispiece of Willughby and Ray's *Historia piscium*

The *Historia piscium* (1686), written by Francis Willughby and John Ray,<sup>25</sup> reflects the beginnings of a new area in the history of ichthyology. This work has, at the head of its illustrations section [Fig. 1.8], a frontispiece that was made by the Dutch painter and illustrator Paul van Somer (II) (1649–1714/1716). This frontispiece does what ideally every paratextual element should do:<sup>26</sup> It is designed to inform the potential reader of its contents, as well as to entice him to read it. Once it has pulled the reader across the threshold of opening the book, it can serve as a reader's guide, putting it, in the words of Gérard Genette, 'at the service of a better reception for the text and a more pertinent reading of it.'<sup>27</sup> Van Somer's engraving shows a number of fishermen coming ashore and displaying the freshly caught fish in a teeming heap. In the foreground some mythological sea gods are depicted for decoration, which are somewhat reminiscent of Rabelais' fish tapestry: we find Triton with his great conch and

23 See, for instance, the *Fish Market* (not dated) by a follower of Beuckelaer (Bonnefantentmuseum, Maastricht).

24 See for this multifold symbolism and ambivalence Helmus M.H. (ed.), *Vis. Stillevis van Hollandse en Vlaamse meester 1550–1700* (Utrecht: 2004) and Slechte H., *Vis in beeld* (Zwolle: 2019).

25 Willughby Francis – Ray John, *De historia piscium libri quatuor* (Oxford, Sheldonian Theatre: 1686).

26 The next two sentences are partially quoted from my "Title Prints and Paratexts in the Emblematic Fable Books of the Gheeraerts Filiation (1567–1617)", in Bossier P. – Scheffer R. (eds.), *Soglie testuali. Funzioni del paratesto nel secondo Cinquecento e oltre / Textual Thresholds: Function of Paratexts in the Late Sixteenth Century and Beyond* (Rome: 2010) 157–200 (here: 157).

27 Genette G., *Paratexts: Thresholds of Interpretation* (Cambridge: 1997) 1–2.



FIGURE 1.8 Paul van Somer (II), Frontispiece of Willoughby Francis – Ray John, *De historia piscium libri quatuor* (Oxford, e theatro Sheldoniano: 1686)  
COURTESY OF THE BRITISH MUSEUM, LONDON

the Nereids, as well as the mass of living and jumping fish of all species. And we note, just as in Rabelais' Land of Satin, the presence of people who observe. It is here too that the differences between Rabelais' fiction and Van Somer's engraving become apparent. Aristotle and his disciples have disappeared; they are, so to speak, substituted with the goddess Minerva and two observers, who are in modern dress and have individualized features. Just as Pierre Gilles was recognizable in the tapestry described by Rabelais, it is perhaps possible here to recognize the two authors of the book, Willughby and Ray, in their youth, whose portraits are known.<sup>28</sup>

Whoever these two observers may be, the fact is that they, along with Minerva, personify some essential aspects of the *Historia piscium*. These concern, first of all, the acquisition of information, which takes place from autopsy, direct observation, which may also include dissection where possible. The frontispiece seems to give practical advice to the reader wishing to learn about ichthyology: this direct observation, so essential to the knowledge of fish, is ideally done at fish markets, which provide the ichthyologist researcher with a daily supply of fish to study.<sup>29</sup> This good advice is put into practice by Willughby and Ray themselves. It is known that they found much of their information at fish markets. In their travel diaries they describe in detail their visits to the fish markets – those of Rome and Venice especially<sup>30</sup> – so it is perhaps not by chance that the fishermen represented look more Mediterranean than Nordic.

What is also important is that the acquisition of information should be from the common people, i.e. the fishermen themselves. This last aspect is essential for Ray and Willughby: for example, when Ray was travelling through the

28 On this hypothesis, see Smith P.J. – Trijp D. van, “Dynamiques européennes de l’humanisme érudit dans l’histoire naturelle. Le cas de l’ichtyologie, de Belon, Rondelet et Gessner à Willughby et Ray”, in Crouzet D. – Crouzet-Pavan É. – Desan P. – Revest C. (eds.), *L’humanisme à l’épreuve de l’Europe (xv<sup>e</sup>–xvi<sup>e</sup> siècle). Histoire d’une transmutation culturelle* (Ceyzérieu: 2019) 167–181 (here: 177–179).

29 Willughby and Ray were not the first to encourage visits to fishmongers: Belon, Rondelet, Gessner, and Aldrovandi preceded them in this. See Trijp D. van, *Captured on Paper: Fish Books, Natural History and Questions of Demarcation in Eighteenth-Century Europe (ca. 1680–1820)* (PhD dissertation Leiden University: 2021) 80–81, and Egmond F., “On Northern Shores: Sixteenth-Century Observations of Fish and Seabirds (North Sea and North Atlantic)”, in MacGregor A. (ed.), *Naturalists in the Field: Collecting, Recording and Preserving the Natural World from the Fifteenth to the Twenty-First Century* (Leiden – Boston: 2018) 129–148.

30 Greengrass M. – Hildyard D. – Preston C.D. – Smith P.J., “Science on the Move: Francis Willughby’s Expeditions”, in Birkhead T. (ed.), *Virtuoso by Nature: The Scientific Worlds of Francis Willughby FRS (1635–1672)* (Leiden – Boston: 2016) 142–226 (here: 183–184).

British Isles to compile a list of English words and a catalogue of local birds and fish, he consulted ‘one of the ancientest and most experienced fishermen’ in Cornwall.<sup>31</sup> This recourse to indigenous science, both within and outside Europe, is already noticeable in the 16th and early 17th centuries, for example with Gessner when it comes to the Swiss aquatic fauna, or, in the case of Brazilian fauna, with reporters such as Jean de Léry (*Histoire d'un voyage fait en la terre du Bresil* (1578)) and Georg Marcgraf (*Historia Naturalis Brasiliae* (1648)).<sup>32</sup>

The figure of Minerva symbolizes the importance of the visual arts in the context of science communication. The goddess is drawing, from direct observation, a fish which is draped in front of her. Images are an essential aspect of the *Historia piscium*: Although not all the images are unpublished (several having been copied from the works of Gessner, Rondelet, or Salviani), some of the engravings were certainly made especially for this book. These engravings are largely made according to drawings purchased by Willughby and Ray on their journey through Europe, as well as drawings sent to the Royal Society, or directly from specimens in the collection of the Royal Society.<sup>33</sup> The importance of the new illustrations is explicitly stated in the frontispiece: ‘Figurae Novae, quae non paucae sunt, † notantur’ (The new images, of which there are not a few, are marked with a cross).

The frontispiece shows yet another element relating to the images of the book: the garland of depicted fish adorning the sides and top of the frontispiece. These images are striking in their realism. A significant portion of these images correspond directly to the fish illustrations found in the book. Thus, from left to right, we note the following species or genera: an angular roughshark, a boxfish, a unicorn fish, two species of pufferfish, a hammerhead shark,

31 Ray John, *A Collection of English words, not generally used [...]* (London, H. Bruges for Tho. Barell: 1674). 97. See Trijp D. van, “Fresh Fish: Observation up Close in Late Seventeenth-Century England”, *Notes and Records. The Royal Society Journal of the History of Science* 75 (2021) 311–332 (here: 325).

32 See my articles “Léry et les poissons: une lecture rapprochée des stratégies descriptives”, *Le Verger* 25 (December 2022). <http://cornucopia6.com/blog/2023/01/06/bouquet-xxv-lhistoire-dun-voyage-fait-en-la-terre-du-bresil-de-jean-de-leroy/> and “Marcgraf’s Fish in the *Historia Naturalis Brasiliae* and the Rhetorics of Autoptic Testimony”, in De Campos Françaço M. (ed.), *Toward an Intercultural Natural History of Brazil. The Historia Naturalis Brasiliae Reconsidered* (New York: 2023) 122–141.

33 See Kusukawa S., “*Historia piscium* (1686) and Its Sources”, in Birkhead T. (ed.), *Virtuoso by Nature: The Scientific Worlds of Francis Willughby FRS (1635–1672)* (Leiden – Boston: 2016) 305–334.

a turbot, and a species of dogfish.<sup>34</sup> Some of these fish are exotic and belong, like the horseshoe crabs of Snyders and Van Dyck, in the *cabinets de curiosités* of the time. The frontispiece's garland of fish indeed resembles the pictorial representations of the well-known cabinets of Ole Worm or Ferrante Imperato. Van Somer seems to indicate how important collections are for the ichthyology of the 17th and 18th centuries. The frontispiece is also an expression of the growing interest in tropical fish. Willughby wanted to make another study trip to the New World. But due to his untimely death nothing came of that, and Ray had to make do with the descriptions and illustrations of Georg Marcgraf's *Historia Naturalis Brasiliae*, which were often integrated into the *Historia piscium*. This interest, already present in Willughby and Ray, would become characteristic of 18th- and 19th-century ichthyology.

## 8 The Present Volume

As mentioned, the contributions are divided into four more or less thematically related and chronological sections. In the section "Beginnings", a detailed overview is given of the ichthyology of the years 1520–1550. Holger Funk reviews the history of ichthyology from Aristotle through the 16th century from the point of view of true-to-life realism, zooming in on a controversy between Rondelet and Salviani. The development of ichthyology in the first half of the 16th century, outlined above, is given a new and more precise periodization by Philippe Gardon, with an emphasis on the work of Paolo Giovio. Onomastics and etymology play an essential role in this development, as Tobias Bulang shows in Gessner's work and in the fictional work of the German Rabelais translator Johann Fischart. From a lexicographical perspective, Bernardo Jerosch Herold and João Paulo S. Cabral demonstrate the same in the ichthyological notes of Leonhardt Thurneysser zum Thurn, a German traveller in Portugal.

In the section "Depicting", Florike Egmond provides an extensive overview and a cultural-historical contextualization of all European ichthyological images that had not appeared in print. Cynthia M. Pyle studies the role of 16th-century fish images drawn in the margins of a medieval manuscript. Marlise Rijks gives an overview of the above-mentioned pictorial subgenres of fish market scenes, fish still lifes, and some others which at the time of Jan

34 In the *Historia piscium*, the angular roughshark is represented in table B3 ('*Centrina supina*'), the boxfish on I17 ('*Piscis triangularis ex toto maculosus*'), the unicorn fish on O4 ('*Monoceros piscis*'), the pufferfish on I5 and I16, the hammerhead shark on B1 ('*Zygaena Salviani*'), the turbot on F2 ('*Rhombus maximus*') and the dogfish on B6 ('*Canis galeus*').

Brueghel had fish as their subject in the Low Countries. Anne M. Overduin-de Vries and Paul J. Smith report on an experimental study of fish motifs in early modern Netherlandish paintings, using citizen science (crowd sourcing).

The section “Fish and Society in Europe” draws knowledge about fish into a broader cultural-historical and social context: literature, fisheries, fish consumption, and medicine. In this context, Dirk Geirnaert analyses some 16th-century Bruges poems of praise for the fisherman’s profession. The use of fish in medical prescriptions, as found in late medieval German-language pharmacopoeias, is the subject of Sabina Tsapaeva’s contribution. Pietro Daniel Omodeo analyses how Venetian city administrators used the knowledge of local fishermen to regulate their city’s water management. Cristina Brito provides an interpretive overview of reports of whale landings in early modern Portugal. In the three other articles of this section, the step is taken to the 18th and 19th centuries. Ronny Spaans investigates how the knowledge of fish and fishing is used as an argument in a nationalist epic from 18th-century Norway. From the perspective of historical ecology, Rob Lenders analyses and demystifies the Western European myth of the maid and the cheap salmon against the background of changing aquatic biodiversity and the concept of the ‘shifting baseline syndrome’. Finally, Paul Smith conducts newspaper-based research into the changing public opinion regarding seals (commercial hunting object, fisherman’s competitor, iconic cuddly animal of the nascent animal protection movement ...) in the Netherlands in the 18th and 19th centuries.

With the articles of Spaans, Lenders, and Smith we have entered a new period, which is ushered in by Willughby and Ray’s *Historia piscium*. As mentioned above, this period is characterized by an increasing diversification in method and description. This is particularly evident when it comes to the description of unknown fish species, which forms the main topic of the last section of our volume, “Ichthyological Knowledge from Afar”. This section emphasizes the importance of collections and knowledge of newly discovered fish species – knowledge for which people are increasingly dependent on indigenous knowledge from distant lands. Incidentally, this knowledge transfer is bilateral because the knowledge does not only flow from the Far East and the Far West to Europe, but also vice versa, from Europe to the East and West. For example, Melinda Susanto focuses on an object, the nautilus, one of the *naturalia* that is integrated from the East into the culture of the West, where it is “artificialized”, made into an object of art. The ichthyological descriptions and drawings of the unknown account (1698) of a journey made by François de Meyer from La Rochelle (France) to Guadeloupe are presented and analysed by Paul Smith, Didi van Trijp, and Alan Moss. Dorothee Fisher focuses on a single fish, namely the pufferfish, and its integration into German collections

and ichthyological work. Theodore W. Pietsch and Justin R. Hanisch provide a synoptic overview of the research into Louis Renard's famous book on tropical fish (1719), supplemented with recent discoveries on the book. Johannes Müller examines some descriptions of fish from India in the authoritative work of Marcus Elieser Bloch – descriptions that could only be created by systematically drawing on indigenous knowledge. Ching-Ling Wang examines how illustrated ichthyological information from the West is incorporated into the ichthyology of 18th- and 19th-century China. *Mutatis mutandis*, Martien van Oijen does the same for early modern Japan, focusing more specifically on the Dutch contributions to Japanese ichthyology. Doreen Mueller addresses early modern Japanese whale knowledge, which 'was a vibrant field of intersecting local, cross-regional, Sino-Japanese, and Western epistemic practices.' Finally, Robbert Striekwold looks at the debates about scientific fish illustrations in the 19th century, zooming in on the ichthyological work of Hermann Schlegel.

## 9 Perspectives

In response to the research questions outlined in the NWO project description quoted in the beginning of this introduction, the present collection shows that the "longue durée" perspective is rewarding for mapping the developments of ichthyology towards an independent discipline within zoology. It shows that developments are never abrupt and absolutely innovative, because every innovation is rooted in a tradition, rebels against it, and takes over elements of it, in a modified form or not. Innovations can never be explained exclusively from a contemporary, teleological perspective, which falsely explains the development of a discipline in terms of linear progress – a progress that would inevitably and without detours lead to the contemporary scientific knowledge of nature.<sup>35</sup> On the contrary: the course of development of the natural sciences does not follow a straight path, but proceeds via side roads, detours, and dead ends, and in this respect is no different from the evolution in nature itself.

The contributions to this volume also show that developments do not take place in a vacuum but are always products of non-natural history factors, such as the biographical circumstances of the individual researcher trying to

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35 See Enenkel K.A.E. – Smith P.J., "Introduction", in idem (eds.), *Early Modern Zoology: The Construction of Animals in Science, Literature and the Visual Arts* (Leiden – Boston: 2007) 1–12.

position himself as a scientific *persona*,<sup>36</sup> or the more general cultural-historical contexts from which the developments arise. These contexts can be religious, political, economic, or art-aesthetic. And as said before, these contexts can themselves be influenced by knowledge about fish – this is especially true, as various contributions show, for the visual arts and literature.

As is clear, most of the contributions are case studies, and if not, they offer overview studies on specific areas of ichthyology. Both of the editors of this volume express the hope that the contributions, however different in subject matter and methodology they may be, will be extrapolated to wider research into the subjects of current scholarly attention, both within environmental humanities and in other fields, such as historical ecology, with its focus on water and the ocean, and the relationship between biodiversity and local knowledge, both within and outside Europe. We hope that the interdisciplinary and intradisciplinary design of this volume will ultimately result in a new cultural history of ichthyology.

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36 See Daston L. – Sibum O., “Introduction: Scientific Personae and Their Histories”, *Science in Context* 16.1–2 (2003) 1–8, and Paul H., “Introduction: Scholarly Personae: What They Are and Why They Matter”, in Paul H. (ed.), *How to Be a Historian: Scholarly Personae in Historical Studies* (Manchester: 2019) 1–14.

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