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*Talking of Animals: Whales, Ambergris, and the Circulation of Knowledge in
Seventeenth-Century Rome*

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I. INTRODUCTION

Animals feature prominently in the history of Western science. As the topic of numerous works by Aristotle, including his influential *Historia animalium* [*The History of Animals*], the study of animals (and humans as part of the animal kingdom) has represented a privileged site of investigation for generations of natural philosophers and physicians training at European universities. As objects of study in Catholic Europe, moreover, animals were subjected to numerous allegorical and moralizing interpretations; it was not completely unusual, therefore, to find Aristotle's zoological knowledge acquire symbolic or moral undertones.¹ The sixteenth century, however, signalled the beginning of a new era for the study of animals. As Brian Ogilvie has provocatively stated, 'natural history was invented in the Renaissance', when practitioners came to think of their discipline as related to, but distinct from, medicine and natural philosophy.² Never before the sixteenth century did so many Europeans devote so much time and so many resources to discovering, describing, and cataloguing nature, as witnessed by the veritable explosion of printed texts dedicated to the topic. In the case of animals, the peak was arguably reached with the publication of Conrad Gessner's monumental *Historiae Animalium* (1551-8) [*The Histories of Animals*], a text that is clearly indebted to Aristotle's *Historia animalium* down to its very title and structure, but that was aimed to surpass it in scope and depth.³ In it, Gessner described

each animal via a series of headings that included: its names in various languages, its geographic distribution and habitat, its physical features and habits, its temperament, its use for humans, its culinary uses and medicinal properties as well as its philological aspects.⁴ Animals could be studied for their own sake, but just as importantly for their practical utility to humans and for their moral and allegorical significance.

As argued by Laurence Pinon and Sachiko Kusukawa, Gessner's aim was never to establish the truth and reliability of all the information he assembled, but more simply to accumulate and juxtapose as much knowledge as possible about each animal to allow other scholars to form their own opinions.⁵ For this reason, Gessner's book – and others of the period – include a series of familiar animals, but also mythical and fictitious beasts, monsters, and rare and exotic animals that the author had never directly observed.⁶ While the moral and allegorical undertones did not completely disappear at least until the late eighteenth century,⁷ the field grew in complexity and saw the emergence of the figure of the professional 'naturalist'. Gessner's enterprise, like that of many contemporaries, was firmly based in the systematic mining of classical, medieval, and contemporary sources, extensive correspondence with naturalists and other informants, and, whenever possible, direct observation. The study of animals, therefore, engaged naturalists at all these levels.

Numerous studies have appeared in recent years about this extensive exchange of information, which took the form of letters, books, images, and occasionally instruments.⁸ Much of the research proceeds from the premise that one cannot properly understand early-modern scientific knowledge without also investigating the relationship between content and the contexts of its production, transmission, and use. Written words, images, and instruments – some of the 'vehicles' of such transmission – are central to our understanding of the period, and so is their relationship with one

another.⁹ Place, moreover, has acquired renewed significance in our modern understanding of how ‘science’ is produced and transmitted. Sociologists of science have emphasized how all knowledge, including scientific knowledge, is to various degrees and in various forms a product of its local context.¹⁰ Few early-modern Europeans who were engaged in the study of exotic animals, for example, had actually travelled to far lands and seen the animals in person, and even those scholars who studied the European fauna and flora did not always have access to all specimens themselves. Even when they did, they were confronted with a vast array of information – some of it conflicting and some of it confusing – as to the nature of the animals that they chose to investigate. The kind of scientific knowledge that investigators produced, then, depended on specific circumstances. It reflected the strengths of investigators’ local networks, what opportunities they had to make their own observations in their place of writing, and idiosyncrasies of the specific ‘cultures’ in which they were embedded. While sixteenth- and seventeenth-century naturalists had much in common, they were also different in their backgrounds, methods, and aims.¹¹

Attention to locality – to the place where knowledge was carved out from a mass of information so that it could be forged into written words, as well as into images and instruments – has not been matched by a similar interest in the role of orality and face-to-face exchange in generating scientific knowledge, including knowledge about animals, especially unusual ones.¹² In what follows I take locality and orality as guiding principles in my exploration of the ways in which oral knowledge contributed to Renaissance understanding of such animals. Naturalists, I shall demonstrate, learned about animals both from written and from oral sources. As a result, oral knowledge, complex and multifarious as it may have been, left some significant traces in their discussions of animals, especially the more mysterious ones. Here I shall focus in

particular on a case study, that of the Renaissance fascination with whales, to investigate how oral knowledge shaped and changed written knowledge about whales in seventeenth-century Rome. In doing so, I place the emphasis on the way local knowledge and distant knowledge were joined together through the medium of the uttered word, as well as how different authors juxtaposed oral knowledge to their written sources and weighed it differently, and sometimes inconsistently, against their written sources within their works. The aim is to show that the ‘vehicle’ of the uttered word, so often neglected in the history of science and yet so inextricably linked with direct observation and local knowledge production, provided an important but neglected space for the establishment of scientific authority and the creation of new knowledge about animals in the Renaissance.

II. THE EPHEMERAL WORLD

As Françoise Waquet lamented over two decades ago, despite the numerous studies dedicated to rhetoric as a discipline within Italian medieval and Renaissance culture little emphasis has been placed on ‘la voix vive’, the real spoken word, as a vehicle of transmission of knowledge.¹³ Indeed, until recently, surprisingly little research had been undertaken to return the voice to the central place that it occupied in early-modern society, a place that, in Waquet’s words, ‘the civilization of the book has largely obscured’.¹⁴ This is particularly true of the history of science and the history of medicine, where little attention has been placed on the importance of oral transmission in conveying both old and new knowledge. Yet we know that much of the scientific enterprise of the time was collaborative in nature, taking place in courts, academies and households; markets and piazzas; libraries, bookstores, and printing houses; pharmacies,

anatomy theatres, and laboratories – all of them privileged sites of conversation and collaboration.¹⁵ Medieval and Renaissance doctors, for instance, rarely treated patients alone, preferring to do so as a group of practitioners exchanging opinions and reaching consensus whenever possible. Likewise, natural philosophers were often aided by pupils, assistants, and occasionally their wives or daughters. Natural philosophers also often experimented in front of colleagues and explicated their views in front of patrons, either by means of disputations or by engaging in other forms of oral communication.¹⁶ Utterances, in short, were everywhere.

Yet *verba volant, scripta manent*. Part of the reason why orality has been neglected is that the spoken word is ephemeral. Before sound recording was invented, the voice could only be consigned to the page or be forever lost to the ravages of time, a topos common to much humanist literature. In putting words down on the page authors applied literary conventions and recast their words in a variety of other ways as well.¹⁷ Such practices, which inevitably concealed orality, clearly pose methodological problems for any historian who hopes to retrieve past oral discourse. Beyond such difficulties, however, practitioners of the history of science and medicine have traditionally privileged texts (especially those written in Latin), at the expense of exploring the contexts of their production.

There is growing evidence, however, that the role of orality in transmitting and transforming early modern scientific knowledge cannot safely be ignored. For instance, artisans and craftsmen played a vital role in shaping modern scientific knowledge. Much of their practical knowledge circulated orally, and, when they wrote it down, they almost exclusively used the vernacular.¹⁸ More broadly, the increasingly empirical approach to nature that sixteenth- and seventeenth-century natural historians and

philosophers adopted brought with it a change in emphasis from reading to a mix of reading, observing, and trying.¹⁹

By collecting specimens, images, and textual sources, natural historians and philosophers engaged in constant attempts to classify and systematize the world around them.²⁰ Together with the birth of the museum, this translated into books of natural knowledge that assembled an increasing number of particulars about all sorts of animals and plants. As noted, some of the particulars were taken from books (those written both by classical authors and by contemporary authorities), others from personal observations and other types of evidence. The additional evidence often travelled in the form of letters, drawings, material objects, and – we know from the written record – also oral reports and hearsay. The rich textual world of learning about nature was increasingly punctuated by personal experience. It is not surprising, therefore, that ‘seeing’ and ‘hearing’ slowly grew in importance. In the absence of a real specimen, images could function as a convenient, synthetic way to collect and present information about the natural world. The new emphasis on empiricism and observation, however, threw the issue of authority into sharp relief. Even images – the surrogates of visual sensory experience – presented challenges; they took a long time to establish themselves as adequate and reliable means of transmission of knowledge.²¹ So, we may ask, how did oral information fare within the panorama of early modern scientific understanding of animals? What kind of epistemic value was it given?

III. KNOW THY WHALES

A brief report dated February 1624 recounts how a whale, by then dead, was spotted in the sea near Rome, in proximity to the small town of Santa Severa. It was later brought

to shore and subsequently measured and dissected.²² The report was written by Giovanni Bricci (1579-1645), painter, musician, productive comedian, and prolific chronicler of all kinds of Roman events.²³ Bricci's 'report' (*relazione*) brought together a variety of sources. By his own admission, his slim booklet was partly based 'on a letter by a certain Friar Leone Oliva of Santo Spirito, who writes that he saw it; partly on others who were present; and partly on what was heard by Friar Luigi Bagutti, architect of Santo Spirito', a friend of Bricci's.²⁴ What the booklet contained then, was a mixture of written and oral communication, some originating from people who had seen the animal first-hand (Friar Leone Oliva and others); and some consisting of rumours that had reached the ears of Friar Luigi Bagutti (who may have communicated information either in writing or orally to Bricci – an important detail that we are not able to know with certainty). In addition, Bricci's report was based on first-hand observation of 'the bones, fins, teeth, flesh, fat, and other things that were brought to Rome, from the size of which, by extension (*procedendo per simmetria*), it is not hard to believe what has been written by those who have measured it'.²⁵ Visual, written, and oral information found their way into the final report.

The text proceeded to explain how the whale was discovered: the animal was first seen by a guard (*sentinella*) of the walled town of Civitavecchia. The animal's body had been visible from a distance of two miles, even though it was two-thirds under water; from afar it looked like a little island. It was only when somebody went out to see what it was that it was discovered to be a whale that had recently died – yet it was reported that sailors had seen it alive not long before, in the same waters. Bricci asserted that it was 'difficult to picture it by means of writing (*figurarla con scrittura*) in a short piece', but that in the remaining pages he was going to attempt to do just that.²⁶ What followed was a description of the whale: first its dimensions; then its mouth and teeth

(which he likened to the travertine foundations of Italian fortifications); then the eyes, its skin colour, fins, tail. Finally, Bricci mentioned its flesh and fat and the oil that could be extracted from the latter. The fins and the whale's teeth were later sent to the hospital of Santo Spirito for examination and dissection, whence they were later dispersed. Bricci claimed to possess a whale's tooth himself.

Here again Bricci indicated that information had travelled orally. It had been recounted by sailors and possibly also by the guard in spoken form – as well, perhaps, as by 'those others who were present'. It is certain that much of the information that Bricci relayed in his short report had travelled orally, passing from one person to the next, from the locality where the whale was seen and cut up back to Rome, where Bricci wrote. When it came to his own contribution, Bricci lamented that words, even those on the page, were inadequate to conjure up the true magnitude and nature of the beast, for they were not the same thing as the actual experience of seeing the animal itself. Writing could depict the whale only imperfectly, especially given the brevity of the text. Yet Bricci, a painter, only managed to accompany his *relazione* with a poor and rather stock image of a generic large fish (Fig.1) – no doubt because the booklet to which he was entrusting his words was a piece of cheap print.

INSERT FIGURE 1 HERE

Bricci's *relazione* was followed by a *discorso* (*discourse*) – evidently a specimen of a different literary genre. He began the *discorso* by discussing the only other case of a dead whale that he was aware of: a similar animal that had died off the southern tip of Corsica, near the small fishing village of Sartène. Bricci described how it took seventeen men to cut up the animal's fatty meat and take it ashore to make whale

oil out of it.²⁷ The veracity of Bricci's account may be confirmed by other images of similar episodes, which appear regularly in other natural historical publications depicting the capture and jointing of whales (e.g., Fig. 2, 3 and 4).²⁸

INSERT FIGURES 2, 3 AND 4 HERE

After mentioning the sighting in Corsica, Bricci launched into a brief 'natural history of whales'.²⁹ The numerous references to Scandinavian specimens hint at Bricci's indirect debt to Olaus Magnus' popular *Historia de Gentibus Septentrionalibus* (1555) [*History of the Northern Peoples*], an illustrated history of Scandinavia that contained an informative and richly illustrated section on whales and other marine monsters.³⁰ As Larry Silver has deftly demonstrated, Olaus' account of whales and other sea-monsters was highly influential among sixteenth- and seventeenth-century naturalists and map makers, with images from the text 'migrating' into a number of other important works of the period, including Conrad Gessner's *Historiae Animalium*, Ambroise Paré's *Des monstres et prodiges* (1573) [*On Monsters and Marvels*], and André Thevet's *Cosmographie universelle* (1575) [*Universal Cosmography*] (compare Fig. 2 from Olaus Magnus' *Historia* with Figs. 3 and 4 from Gessner and Thevet, above).³¹ Bricci had absorbed information from Olaus' work, which was first printed in Rome, second-hand from Giovanni Maria Bonardo, *La miniera del mondo* (1585) [*The Riches of the World*], a popular encyclopaedic work in the vernacular which he dutifully cited as his source.³² Following Olaus and Bonardo, the 'natural history' of whales explained how the sailors often dispersed castor oil into the water to discourage whales from drawing too close. Alternatively, sailors sounded trumpets to frighten them or threw round, empty vases in the water to make them play with them. Bricci then

recounted how a female whale gives birth and nurses its calf, just as other quadrupeds do, and how, as Pliny the Elder recounts, a whale's mouth is on its forehead. Here Bricci's sources are clearly textual, and often second or third hand. The pamphlet concluded, however, with a brief account of the causes that might have led the animal, which was found beached on the shores of Corsica, to enter the Mediterranean Sea. Here Bricci framed his speculations in a series of sentences prefaced by the phrase 'Some believe that': some believed that the whale (which was a male) had been chased by a killer whale (orca), its declared enemy; others, that it had died of old age; others, that it had been chasing a female and, having entered the Mediterranean, died of hunger. Others again argued that, frightened and injured by some ship, it had died and then washed ashore. Bricci's own opinion, however, was that it had been chased by a killer whale into the Mediterranean and that, once lost and unable to feed on its usual food, it had grown weaker and weaker, until finally it had succumbed to the waves.³³ The pamphlet's concluding passage has a more personal feel than what has gone before. It would appear that the phrase 'some believe that' introduces hearsay opinions, which were imparted to Bricci aloud or by letter.

If the sighting of a whale, dead or alive, was relatively uncommon, writing about it in the way Bricci did was not. Whales were an intriguing topic of discussion among early modern European natural historians, as well as physicians, and as such they feature prominently in their writings. Cetaceans like the one that beached at Santa Severa could be found on occasion on the coasts of Italy, and the two cases discussed by Bricci are far from the only ones that Italians could have heard about. For example, Federico Cesi (1585-1630), prince-patron of the illustrious Roman Academy of the Lynxes, recorded an earlier case in a letter to a fellow academician, Johannes Faber (1574-1629). In 1618 Cesi had received news of 'a cetacean of large dimensions' that

had been cast ashore by rough seas. He had ‘heard of it first through rumours, and then with the greatest certainty’.³⁴ Hearsay accounts were followed by trustworthy ones – both kinds delivered orally.

Cesi’s interest in whales reflected a wider interest among the Lynceans.

Johannes Faber himself dedicated a short section of his *Novae Hispaniae Animalium Expositio in Rerum Medicarum Novae Hispaniae Thesaurus* [*Exposition of the Animals of New Spain in the Treasury of Medical Matters of New Spain*], to the subject.³⁵

Beyond whale oil, discussion about whales in the period often centred around the production of ambergris (*ambra grisea*), a perfumed substance often found on beaches, and that we now know is produced from the bile of sperm whales. Its origins were widely debated in the Middle Ages and the Renaissance. Ambergris was sought after for its sweet scent and reputed healing properties (Fig. 5). Treatises of *materia medica* recommended it for the treatment of a variety of ailments, ranging from stomach and intestinal problems to the treatment of the plague, as well as diseases of the heart and brain. It was also used in the manufacture of perfumes and ointments of various kinds.³⁶

INSERT FIGURE 5 HERE

Because of how difficult it was to obtain, ambergris was costly. It was a luxury ingredient intended for rich patients and royalty. Unsurprisingly, then, Faber placed his discussion of ambergris just after the discussion of musk, in a section devoted to animal scents and their medicinal and other properties. As Faber acknowledged, opinions varied about the origins of ambergris, with some arguing that it was the sperm of whales, others that it was their vomit, and others again that it was their excrement.³⁷

Faber had turned to an expert: the Franciscan friar Gregorio de Bolívar, a missionary to

the New World, who provided him with an oral account (*sermon*), explaining his views.³⁸ In the friar's words, ambergris was nothing but bitumen (mineral pitch), which whales brought to the surface from the depths of the sea. More precisely, observation (*experientia*) indicated, he claimed, that the ambergris was generated by sponge-like formations in between rocks on the sea floor. Whales feasted voraciously on sweet ambergris, Friar Gregorio asserted, and for that reason they sometimes vomited it or excreted it. The best ambergris, however, was the kind that no whale had ever ingested but that surfaced spontaneously from the sea. But because it was much sought after by fish, crabs, and birds alike, the best kind of ambergris was particularly rare and as a result particularly expensive.³⁹

De Bolívar had passed this information to Faber in a *sermon*, namely the oral genre he was most familiar with, a rhetorical format suitable for indoctrination.⁴⁰ This was, then, not a dialogue among peers – at least not in Faber's eyes – but a monologue, which gave authority and a voice to one person: de Bolívar. The voice of the Franciscan friar emerged even more vividly when he stated that he had seen real ambergris on the coasts of Brazil, Mozambique, and Angola. Direct observation was coupled with oral delivery to bestow authority to the friar's words. Faber explicitly declared that the testimony of de Bolívar, somebody who had come across ambergris first-hand, provided the necessary preamble to his own discussion of other written authorities of *materia medica*, including men who argued respectively that ambergris was a plant, an animal product, or a mineral.⁴¹

Orality may be glimpsed as well in some of the authorities that Faber discussed. He cited, for example, Andrea Bacci's *De Thermis* (1571) [*On Baths*], a work on baths and hydrology, whose author stated: 'it is not far from the truth what I heard related from a prince from the Indies: much like the civet of the Indian cat or the *musk* [of the

musk deer] or the *castoreum* [of the beaver], ambergris is the excrement of a certain fish, who having eaten enough grass from certain herbs that grow, sometimes produces an abscess in its abdomen, which, once ruptured, gives the ambergris'.⁴² Like Faber, Bacci invested his statement with authority by invoking the oral report of a person of status – in this case an 'Indian' prince. Yet the prince's opinion conflicted with what de Bolívar had stated. Oral accounts carried weight, especially if people of status gave them, but in this case the oral account of a friend and missionary trumped that of an 'Indian' prince reported in the work of Faber's teacher Bacci. More intriguing, however, is the fact that Faber failed to mention Ulisse Aldrovandi's opinion regarding the disputed origins of ambergris. By the 1570s the Bolognese natural philosopher was an acknowledged authority when it came to natural knowledge. His opinions were an essential point of reference for natural philosophers, natural historians and anatomists alike. Aldrovandi had dedicated a substantial section to ambergris in his *Musæum Metallicum* [*Museum of Metals*], published in 1648, a few years before the *Thesaurus Mexicanus* [*Mexican Treasure*] finally appeared in print. Aldrovandi had considered a large number of authorities. One, Charles de l'Écluse (Carolus Clusius, 1526-1609), had based his account on the words of a trustworthy merchant. Others had talked to fishermen who had occasionally found amber in fish.⁴³ Aldrovandi, however, rejected all such reports. Other men reported having dissected whales and not finding the precious substance. That led Aldrovandi to conclude, as de Bolívar did, that ambergris was neither the excrement of fish nor that of cetaceans, but simply bitumen generated from the depths of the sea. Aldrovandi pointed out that Avicenna and Serapion had made the same argument.⁴⁴ He cited other authors who concurred, including a Dutch physician, Berent ten Broecke (Bernardus Paludanus, 1550-1633), who in his annotations to a text recounting the journey to the East Indies of a countryman and

merchant, Jan Huygen van Linschoten, argued that ambergris flowed from springs at the bottom of the sea.⁴⁵

It is puzzling that Faber failed to mention Aldrovandi in support of de Bolívar's assertion. The Bolognese natural philosopher would have certainly added further authority to the friar's words. It is possible that Faber wrote this section of his *Expositio* well before Aldrovandi's work appeared in print. It is also possible that he failed to check Aldrovandi's own sources: Avicenna, Serapion and the less-well-known contemporary, Berent ten Broecke. He did, however, consult some of the same sources cited by Aldrovandi, including Charles de l'Écluse, Julius Caesar Scaliger, and Andreas Libavius.⁴⁶ We should also entertain a third hypothesis, however briefly: that the omission was intentional and that Faber wanted to convey the sense that direct observation, through the eyes of the trustworthy eyewitness de Bolívar, was more reliable than what Aldrovandi had read in the authors whom he cited.

Although he mentioned the oral reports of merchants and fishermen, Aldrovandi largely fell back on the authority of two well-established medical writers, Avicenna and Serapion (both somewhat out of fashion). While Aldrovandi and Faber reached the same conclusion – that ambergris was indeed bitumen, which oozed from the seabed – the basis on which each did so could hardly have been more different. Aldrovandi relied on authoritative written sources; Faber on the voice and eyes of a trusted witness and friend.

Further evidence of spoken communication emerges from Faber's later treatment of whales and ambergris. Despite having ruled whales out as the sources of ambergris, Faber launched into a long digression about the nature of whales themselves – and particularly about their teeth. He wrote that his account was based in part on his own experience and in part on the oral accounts of others who were deemed trustworthy

(*ex fide dignorum auditione*).⁴⁷ Once again the oral transmission of information emerges clearly, albeit briefly, from the written text. Like Cesi, Faber felt that he needed to go beyond mere rumour and obtain reliable information about the animals he was writing about, to which he added his own direct experience. Faber began this part of his text with an account of the same whale beached on the coast near Santa Severa that Bricci described in his report (*relatione*). In the margin, guiding the reader, appeared the words ‘Description of what is believed to be a true whale’ (*vera putatae Balenæ descriptio*).⁴⁸ Faber asserted that the whale was dead and its body lodged between two cliffs near the shore. If one had propped its mouth open with a rafter, he added, there would have been room inside for a man to stand. Faber was an accomplished anatomist, who had started to practice animal and human dissection at Santo Spirito as a young physician.⁴⁹ As Bricci had indicated, the fins and the teeth of the whale of Santa Severa had been sent to the Roman hospital of Santo Spirito, and clearly it was here that Faber had a chance to observe what was left of the large cetacean. The ‘teeth’, which he examined himself (*ut probe ego examinavi*), were nothing but corneal bristles, he argued. Clearly here Faber was talking of a specimen of a baleen whale (suborder *Mysticeti*), which lacks teeth but instead has plates in its mouth that filter food from the water. Faber’s aim, stated numerous times in the succeeding pages, was to prove that the specimen was an exemplar of a ‘true whale’.⁵⁰ In subsequent paragraphs he proceeded to describe the baleen’s eyes, skin, fins, and tail. He concluded melancholically by noting that he could not examine its bones, because of the stench caused by the advanced state of putrefaction of the beast.⁵¹ At the time of writing, Faber added, the ‘teeth’ had been offered to Cardinal Francesco Barberini and were being preserved by his secretary, the learned antiquarian Cassiano del Pozzo.⁵²

Like Bricci, Faber also mentioned another whale, the one that had died in Corsica in 1620, remarking that the mammal had been bigger than the one at Santa Severa and had been a pregnant female. Remarkably, Bricci and Faber recited largely the same details about the Corsican mammal. Both authors, for example, mentioned that the animal had thirty-two vertebrae, and that these were used to make a number of seats (*scabelli/sedilia*); that the animal had been pregnant with a calf measuring thirty feet and weighing 1,500 pounds, and that the mother's intestines were so large that a whole horse could easily have fitted inside them.⁵³ There are various possible explanations for why the two accounts coincided so neatly. It is possible that Faber relied on Bricci's cheap print as a source of information for both the whale of Santa Severa and the one beached in Corsica (Bricci's work predated the publication of the *Thesaurus* by twenty-seven years). Bricci's account, although brief, still included a few more details than Faber's. It is also possible that Bricci obtained the information from an earlier draft version of the *Thesaurus* – an eventuality, however, that seems less likely. Or it could be, finally, that the two authors drew on one or more common sources. Such sources, of course, could have been either written or oral, but given the details about the animals' measurements, it is possible that some of the information circulated in manuscript among Roman intellectuals and natural historians.

While so far I have not found any evidence of their ever having known each other personally, it is quite possible that the two men had friends in common. They were both well acquainted with the intellectual and artistic circles revolving around the Roman curia, had numerous acquaintances within the artistic community in Rome (Bricci himself was a painter), and had connections with the hospital of Santo Spirito, where Faber himself worked as a physician. Indeed, by Bricci's own admission, he had received much of his information on the specimen from Santa Severa from two people

connected directly with the hospital: friars Leone Oliva and Luigi Bagutti. It is clear, therefore, that Santo Spirito represented a major axis for the circulation and exchange of information regarding the two whales and their characteristics.⁵⁴

While the two accounts are similar in some respects, they differ in others. Faber's treatment expanded considerably on Bricci's report when it came to discussing the whale of Santa Severa in relation to the topic of ambergris – a subject that Bricci completely neglected but to which Faber, as a physician and naturalist, accorded importance both because of the medicinal properties of ambergris and because much had been written about it by other natural philosophers and naturalists. Again Faber returned to the topic of the substance's origin. He took issue with Guillaume Rondelet's view that whales were a source and contended that 'our people' could not find any in the specimen that had been examined at Santa Severa.⁵⁵ Indeed, he proceeded to claim that one of Federico Cesi's own servants – somebody who had an interest in natural history and who found himself within Cesi's territory of Civitella Cesi, not too far away from Santa Severa – had been sent there to investigate and examine the animal, observe and report what was inside it, and measure it. The servant even came back with some of its 'teeth', Faber added, which had since been housed in Cesi's own museum. There were, however, other kinds of whales that did not have corneous plates like this one, but proper teeth instead. He cited the example of one that he remembered, which had been beached at Torre Astura, not too far from the ancient port of Nettuno. Once again Cesi, who owned land and a villa nearby, had been instrumental in providing Faber with reliable knowledge. He had even been able to pass on to Faber a vertebra from the tail and a tooth, for further study.⁵⁶ In sum, Cesi's servant, Cesi himself, and unspecified 'people', perhaps including other members of Cesi's entourage, had inspected the animal personally and as a result had been able to serve as important sources of

information for the German anatomist. We can assume that Cesi collected much of his information about the cetacean orally from local informants in and around Santa Severa. He then must have proceeded to share the information either in writing, orally, or quite likely both, with Faber himself. Faber, in turn, used his own direct and indirect knowledge of the cetaceans beached in Lazio and Corsica to argue against other natural historians' opinions, including Rondelet's. This marks a shift from the previous century, when the Milanese polymath and physician Girolamo Cardano, for example, had based his own account of the dietary properties of fish in his *De Sanitate Tuenda* (1560) [*On the Care of Health*] entirely on the numerous texts on ichthyology that had appeared in the 1550s, including Rondelet's *Libri de Piscibus Marinis* (1554) [*Books of Marine Fish*].⁵⁷ Cardano too made reference to experience, but in a very limited way in comparison to Faber: he recounted of his meals of salmon in Scotland and fish that he saw in Dièppe, but as a Milanese, he had had limited experience in dissecting and studying fish himself, whether large or small.⁵⁸

Unlike Cardano, Giovanni Faber engaged actively with data emerging from reasoning and observation (his own and that of others), together with the oral and written reports of his informants. The informants may have not been 'authorities' in the sense understood by a physician like Cardano, but at least in this case Faber gave them more credit than traditional classical authors and contemporary natural historians alike.

IV. TALKING ABOUT ANIMALS: A PLURALITY OF VOICES

As Silvia de Renzi has emphasised, Faber's *Thesaurus Mexicanus* represents a privileged source of investigation when it comes to oral knowledge. This impressive volume about the natural history of the New World contained information gathered by a Spanish physician, Francisco Hernández, during his journey to New Spain in the 1570s.

(It was later edited by another physician, Antonio Leonardo Recchi). It also contained contributions by other members of the Academy of the Lynxes. Hernández claimed to have gleaned much of the information in his notes from conversations with indigenous people.⁵⁹ But that was not the only type of oral knowledge that the book contained: as de Renzi has shown in her study of the complex history of the *Thesaurus* and as the examples that I have given above confirm, Faber relied extensively on the ‘voice’ of the trusted Franciscan missionary Gregorio de Bolívar. De Bolívar’s ‘mouth and notes’, Faber emphasized, could conjure up vividly all sorts of animals.⁶⁰ Seeing first-hand was better than reading, but hearing what other reliable witnesses had seen, Faber argued, could be at least as authoritative, or more so, than reading from books.⁶¹ Much like Cesi, Faber distinguished between hearsay and gossip on the one hand – which needed to be validated – and reliable accounts on the other. Just as it would be today, the perceived reliability of an account often depended upon the moral and intellectual status of the witness.⁶² And yet it is evident that in collecting and transmitting knowledge about animals, whether exotic or not, Faber often relied on a plurality of oral sources, not all of whom qualified as classic ‘eyewitnesses of credit’.⁶³ Even if we concur with de Renzi’s assessment that Faber was concerned about his own over-reliance on oral sources and on the dubious status of hearsay,⁶⁴ his systematic use of a plurality of informants nevertheless demonstrates that in the seventeenth century knowledge about animals was not only constituted by reading ancient or contemporary authors (many of whom had made it their task to challenge and revise Roman and Greek natural knowledge) and supplementing their reports with one’s own observations, whenever possible. On the contrary, informal reports, many of them conveyed by word of mouth, could legitimately enter into the mix of evidence.⁶⁵

The status of such informants could vary substantially. Indeed, the passages analyzed indicate that the acceptable sources could be more varied than has often been assumed: sailors, missionaries, merchants, servants, and learned friends could all act as vehicles of oral knowledge.⁶⁶ It seems evident that in studying animals Faber and others gave more credit to some sources than to others and that they inflected the concept of ‘expert witness’ in terms of social status and personal acquaintance. Local knowledge from people of lesser status, however, was not automatically discarded. Although they attempted to exercise quality control over the information that they received by cross-referencing it with other sources and searching for more reliable informants when they thought that they needed to, Aldrovandi, Bricci, Faber and Bacci nevertheless incorporated information from a broad range of people. Social status was important – but it was not all that mattered.⁶⁷

The accounts of Bricci and Faber, much more than those of Scaliger, Aldrovandi, or Bacci, were shaped by local and personal circumstances. Rome, with its proximity to the sea and with the hospital of Santo Spirito, provided a focal point for the study of beached whales. In each of the two cases, orality and locality combined to produce a type of knowledge that suited the author’s enterprise. When the authors put things down on paper, so that what they had learned could be transmitted to a wider audience, the process of combining oral, written, and visual evidence became submerged. And yet it is evident that the voice remained an important vehicle of transmission of natural knowledge, and that this knowledge was not limited to the close-knit, erudite circles of early modern Europe.⁶⁸

V. CONCLUSION

In 1624, the year of the beached whale of Santa Severa, Pope Urban VIII, who had always had an active interest in the activities of the Lynceans, entertained the physicians Johannes Faber and Giulio Mancini. A topic of their lively conversation was a two-headed calf, which Faber had dissected in front of his students, and a drawing of which he presented to the Pope. Animals, especially unusual ones, were clearly a fascinating object of study and conversation among seventeenth-century Roman erudites, physicians, and naturalists.

A number of historians have retold the story of the two-headed calf. It tells us about medical and anatomical competence, about how natural investigation became central to the seventeenth-century scientific enterprise, and about how monsters such as this served as privileged specimens in the investigation into the workings of nature.⁶⁹ The story provides yet another example of how oral information helped shape seventeenth-century knowledge.

In this article, I have argued that early modern knowledge-creation was contingent upon myriad factors. Animals feature prominently within this narrative: they were studied in books, observed first-hand (either alive or dead), prodded, poked, and at times dissected, and – importantly – spoken about. The localities where knowledge was produced and later consumed helped give this knowledge its specific shape, as did the way in which information travelled. While historians have rightly emphasized the impressive correspondence networks of some natural philosophers and natural historians,⁷⁰ it is important to remember that much knowledge was gained locally, through the exchange of spoken words, including the collection of hearsay. The global and the local were not mutually exclusive, and learned practitioners of natural history did not neglect to collect information from the broad array of people who had come into contact with the animals that they were studying.

In the seventeenth century, observation and experimentation entered into a dialectic relationship with ancient and contemporary authorities. Testing knowledge became a feature of science.⁷¹ With the slow but steady rise of observation and experimentation, I argue, spoken testimony returned more forcefully to the pages of natural-historical works. Animals – rare, real or imagined, exotic or prosaic – increasingly attracted the attention of early moderns, who interpreted them differently according to the local knowledge that they possessed and the contexts – cultural and confessional – in which they lived.⁷²

The seventeenth century, however, did not experience a neat epistemological rupture with respect to the previous century when it came to the ‘objective description’ of animals – be it through images, or, as I have discussed here, through words. Descriptions – oral, visual and written – of wondrous and rare creatures continued to circulate.⁷³ Between testing nature and observing and describing it – between the realm of the natural philosopher and that of the natural historian – a lively area existed where early moderns’ knowledge of animals was still tentative and ideas were contested. This area was replete with occasional observations delivered through the uttered word that did not always have the heuristic value of solid evidence but that did, nonetheless, contribute actively to shaping this knowledge. This area, moreover, was more variedly populated than were the learned circles to which many writers belonged.

Bricci and Faber (like many of their contemporaries) attempted to assemble a plurality of voices, some more authoritative than others. The voices were not limited to those of the learned colleagues who had written extensive tomes about the animal world, but encompassed a variety of informants, including fishermen, merchants, architects, missionaries, and servants. It was a veritable ‘republic of people’. Ignoring these lost voices diminishes our understanding of how early-modern knowledge

emerged, travelled, and was reconfigured. If we forget about the spoken word, we accord undue weight to the authority of the writers, who themselves lent heed to what others had to say. In doing so, we also lose sight of an important aspect of early modern life, namely the regular contact of various sectors of society – learned and non-learned – with the animal kingdom.

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¹ On the intersections of these two traditions, the natural philosophical and the biblical, see Carlos Steel, Guy Guldentops, and Pieter Beullens (eds.), *Aristotle's Animals in the Middle Ages and Renaissance* (Leuven: Leuven University Press, 1999), and Aafke M. I. Van Oppenraay, 'The Reception of Aristotle's History of Animals in the Marginalia of Some Latin Manuscripts of Michael Scot's Arabic-Latin Translation', *Early Science and Medicine*, 8 (2003), 387-403.

² Brian W. Ogilvie, *The Science of Describing. Natural History in Renaissance Europe* (Chicago: University of Chicago Press, 2006), 1.

³ On zoology in the Renaissance, see Laurent Pinon, *Livres de zoologie de la Renaissance: une anthologie (1450–1700)* (Paris: Klincksieck, 1995); Stefano Perfetti, *Aristotle's Zoology and its Commentators (1521-1601)* (Leuven: Leuven University Press, 2000); and Karl A. E. Enenkel and Paul J. Smith (eds.), *Early Modern Zoology: The Construction of Animals in Science, Literature, and the Visual Arts*, 2 vols. (Boston: Brill, 2007). For Gessner specifically, see Laurent Pinon, 'Conrad Gessner and the Historical Depth of Renaissance Natural History', in Gianna Pomata and Nancy Siraisi (eds.), *Historia: Empiricism and Erudition in Early Modern Europe* (Cambridge, MA: MIT Press, 2005), 241-67.

⁴ On Gessner, I have benefitted enormously from the insights of Pinon's 'Conrad Gessner', and Sachiko Kusukawa 'The Sources of Gessner's Pictures for the *Historia animalium*', *Annals of Science*, 67 (2010), 303-28. The precise list of headings under which each animal is described is provided in Pinon, 'Conrad Gessner', 249. On the complex relationship between zoology and allegory in Gessner I refer the reader to Kususawa's article and her useful bibliographical references (esp. 305-7).

⁵ Pinon, 'Conrad Gessner', 245-50; Kusukawa, 'Sources of Gessner's Pictures', 306. There are, however, cases where Gessner endorses certain views over others (see the case of the unicorn discussed in Pinon, 'Conrad Gessner', 249-50).

⁶ Kusukawa, 'Sources of Gessner's Pictures', 306; Pinon, 'Conrad Gessner', 249-59.

⁷ Nicholas Jardine and Emma C. Spary, 'Natures of Cultural History', in N. Jardine, J. A. Secord, and E. C. Spary (eds.), *Cultures of Natural History* (Cambridge: Cambridge University Press, 1996), 3-13.

⁸ This literature is now vast. Among the most significant studies are David S. Lux and Harold J. Cook, 'Closed Circles or Open Networks? Communicating at a Distance during the Scientific Revolution', *History of Science*, 36 (1998), 179-211; Ogilvie, *Science of Describing*; Sachiko Kusukawa and Ian Maclean (eds.), *Transmitting Knowledge: Words, Images, and Instruments in Early Modern Europe* (Oxford and New York: Oxford University Press, 2006); Candice Delisle, *Establishing the Facts: Conrad Gessner's epistolæ medicinales between the particular and the general*, Ph.D. dissertation, University College, London, 2008; Sven Dupré and Sachiko Kusukawa (eds.), *The Circulation of News and Knowledge in Intersecting Networks*, special issue of *History of Universities*, 23/2 (2008), 1-158; Sven Dupré and Christoph Lüthy (eds.), *Silent Messengers: The Circulation of Material Objects of Knowledge in the Early Modern Low Countries* (Berlin: LIT, 2011); Bernard Lightman, Gordon McOuat and

Larry Stewart (eds.), *The Circulation of Knowledge Between Britain, India and China: The Early-Modern World to the Twentieth Century* (Leiden and Boston: Brill, 2013); Dirk van Miert (ed.), *Communicating Observations in Early Modern Letters (1500–1675): Epistolography and Epistemology in the Age of the Scientific Revolution* (London: Warburg Institute, 2013); Eileen A. Reeves, *Evening News: Optics, Astronomy, and Journalism in Early Modern Europe* (Philadelphia: University of Pennsylvania Press, 2014).

⁹ Richard Scholar, 'Introduction', in Maclean and Kusukawa, *Transmitting Knowledge*, 1.

¹⁰ Steven Shapin, 'Here and Everywhere: Sociology of Scientific Knowledge', *Annual Review of Sociology*, 21 (1995), 289-321; David N. Livingstone, *Putting Science in Its Place: Geographies of Scientific Knowledge* (Chicago: University of Chicago Press, 2006).

¹¹ Ogilvie, *Science of Describing*, 54-74.

¹² The topic has, however, received substantial attention in other contexts. See Francoise Waquet, *Parler comme un livre: l'oralité et le savoir, XVIe-XXe siècle* (Paris: A. Michel, 2003). For Britain in particular, see Adam Fox, *Oral and Literate Culture in England 1500-1700* (Oxford: Oxford University Press, 2000); and Adam Fox and Daniel Woolf (eds.), *The Spoken Word: Oral Culture in Britain, 1500-1850* (Manchester: Manchester University Press, 2002), 1-51. New exciting research has appeared recently in relation to Renaissance and early-modern Italy as part of an ERC project led by Professor Brian Richardson (Leeds). See Richardson, 'Manuscript, Print, Orality and the Authority of Texts in Renaissance Italy', in Pollie Bromilow (ed.), *Authority in European Book Culture 1400-1600* (Aldershot: Ashgate, 2013), 15-29; Stefano Dall'Aglio, Luca Degl'Innocenti, Brian Richardson, Massimo Rospoher, and

Chiara Sbordonì (eds.), *Oral Culture in Early Modern Italy: Performance, Language, Religion*, special issue of *The Italianist*, 34/3 (2014); Luca Degl'Innocenti, Brian Richardson and Chiara Sbordonì (eds.), *Interactions between Orality and Writing in Early Modern Italian Culture* (London: Routledge, 2016); Stefano Dall'Aglio, Brian Richardson and Massimo Rospocher (eds.), *Voices and Texts in Early Modern Italian Society* (London: Routledge, 2017). A valuable exception is represented by Elizabeth Yale's very recent *Sociable Knowledge: Natural History and the Nation in Early Modern Britain* (Philadelphia: University of Pennsylvania Press, 2016), where the author dedicates her third chapter to the numerous ways in which natural knowledge was shaped by conversation as well as letter exchange and printing. This article was submitted before Yale's book was published but an attempt has been made here to integrate some of her findings.

¹³ Françoise Waquet, 'Au "pays de belles paroles"'. Premières recherches sur la voix en Italie aux XVI^e et XVII^e siècles', *Rhetorica: A Journal of the History of Rhetoric*, 11 (1993), 275-92 (quotation at 276).

¹⁴ Waquet, 'Au "pays de belles paroles"', 275.

¹⁵ For these sites of natural knowledge see Katharine Park and Lorraine Daston (eds.), *The Cambridge History of Science. Vol. 3. Early Modern Science* (Cambridge: Cambridge University Press, 2006), Part II.

¹⁶ On the 'invisible' role of the assistant, see Steven Shapin, 'The Invisible Technician', *American Scientist*, 77 (1989), 554-63 and *idem*, *A Social History of Truth: Civility and Science in Seventeenth-Century England* (Chicago: University of Chicago Press, 1994), Ch. 8. On these exchanges within the Royal Society of London see Yale, *Sociable Knowledge*, 107-13; on natural philosophical conversations in London's coffeehouses, see Brian W. Cowan, *The Social Life of Coffee: The Emergence of the British*

Coffeehouse (New Haven: Yale University Press, 2005); and Adrian Johns, “Coffeehouses and Print Shops”, in Daston and Park, *Cambridge History of Early Modern Science*, 320-40.

¹⁷ On this point see also Luca Degl’Innocenti and Brian Richardson, ‘Introduction’, in Degl’Innocenti, Richardson, and Sbordoni, *Interactions between Orality and Writing*.

¹⁸ On this topic, see also Sarah Cockram’s contribution to this issue.

¹⁹ It is now recognized that the origins of modern science should be traced at least in part in the hands-on, empirical work of artisans and craftsmen and their increasing interaction with Renaissance intellectuals during this time. See Pamela H. Smith, *The Body of the Artisan: Art and Experience in the Scientific Revolution* (Chicago: University of Chicago Press, 2004). See also William Eamon, *Science and the Secrets of Nature: Books of Secrets in Medieval and Early Modern Culture* (Princeton: Princeton University Press, 1994); Pamela O. Long, ‘Power, Patronage, and the Authorship of *Ars*: From Mechanical Know-How to Mechanical Knowledge in the Last Scribal Age’, *Isis* 88 (1997), 1–41; *eadem*, *Openness, Secrecy, Authorship: Technical Arts and the Culture of Knowledge from Antiquity to the Renaissance* (Baltimore: Johns Hopkins University Press, 2001); *eadem*, *Artisan/Practitioners and the Rise of the New Sciences, 1400-1600* (Corvallis, OR: Oregon State University Press, 2011). On the oral culture of alchemists, see Tara E. Nummedal, *Alchemy and Authority in the Holy Roman Empire* (Chicago: University of Chicago Press, 2007), 30-31, and Deborah E. Harkness, *The Jewel House: Elizabethan London and the Scientific Revolution* (New Haven: Yale University Press, 2007). On vernacular nomenclature, see Florike Egmond, ‘Names of Naturalia in the Early Modern Period: Between the Vernacular and the Latin, Identification and Classification’, in Harold J. Cook and Sven Dupré (eds.), *Translating*

Knowledge in the Early Modern Low Countries (Wien and Berlin: LIT Verlag, 2012), 131-62.

²⁰ This is evident in the work of all the major natural historians whom Ogilvie analyses in his *Science of Describing*. See also Paula Findlen, *Possessing Nature: Museums, Collecting, and Scientific Culture in Early Modern Italy* (Berkeley: University of California Press, 1994). On the rise of the same sort of erudite empiricism, see also Siraisi and Pomata (eds.), *Historia*. On the rise of natural particulars, or singular pieces of natural knowledge, see also Anthony Grafton and Nancy G. Siraisi (eds.), *Natural Particulars: Nature and the Disciplines in Renaissance Europe* (Cambridge, MA: MIT Press, 1999).

²¹ On the contested use of scientific illustration in the sixteenth century, see Sachiko Kusukawa, *Picturing the Book of Nature: Image, Text and Argument in Sixteenth-Century Human Anatomy and Medical Botany* (Chicago: University of Chicago Press, 2012) and the rich bibliography contained therein.

²² Giovanni Bricci, *Relatione della Balena ritrovata morta vicino a Santa Severa, luogo di S. Spirito, circa il principio di Febraro 1624, dove si describe la forma, e misura di detto pesce, con altre particolarità* (Bracciano: Per Andrea Fei stampator ducale, 1624).

I have consulted the only copy I have been able to locate in Italian libraries, now at the Biblioteca Vallicelliana, Rome. On Bricci see Oliver Michel and Lovanio Rossi, 'Bricci (Briccio, Brissio, Brizio), Giovanni', in *Dizionario Biografico degli Italiani* (hereafter *DBI*) (Rome: Istituto della enciclopedia italiana, 1960-present), 14: 220-23.

²³ Bricci wrote about things as diverse as the marriage festivities of some Roman noble families; the death of Roman cardinals; the life, death and miracles of St Carlo Borromeo; the festivities for the election of various popes; and – as in this case – unusual events, such as the sighting of a dead whale. On his work as a *poligrafo* see

Michel and Rossi, 'Bricci (Briccio, Brissio, Brizio), Giovanni'; Maria Cristina Terzaghi, *Caravaggio, Annibale Carracci, Guido Reni: tra le ricevute del banco Herrera-Costa* (Rome: "L'Erma" di Bretschneider, 2007), *passim*.

²⁴ Bricci, *Relatione*, A2r.

²⁵ *Ibid.*

²⁶ *Ibid.*

²⁷ *Ibid.*, A3v.

²⁸ Numerous woodcuts and etchings of whales circulated in the sixteenth and seventeenth century, especially in northern Europe. For a survey of the images, see Klaus Barthelmeß und Joachim Münzing, *Wale und Walstrandungen in der Druckgraphik des 16. Jahrhunderts und ihr motivkundlicher Einfluß*, 3 vols. (Hamburg: Ernst Kabel Verlag, 1991).

²⁹ Bricci, *Relatione*, A3v-A4v.

³⁰ Larry Silver, 'De profundis: Linear Leviathans in the Lowlands', in Jennifer Spinks and Dagmar Eichberger (eds.), *Religion, the Supernatural and Visual Culture in Early Modern Europe* (Leiden: Brill, 2005), 260-82. Olaus Magnus, *Historia de Gentibus Septentrionalibus* (Rome: Johannes Maria de Viottis, 1555). On Olaus and on marine monsters more generally, see also Chet Van Duzer, *Sea Monsters on Medieval and Renaissance Maps* (London: British Library, 2013), and Joseph Nigg, *Sea Monsters: A Voyage around the World's Most Beguiling Map* (Chicago: University of Chicago Press, 2013), on Olaus' 1539 *Carta Marina*.

³¹ Silver, 'De profundis', 264-8. Silver seems to have failed to notice that Adrian Coenen's *The Whale Book*, which he discusses in the same pages, also borrowed freely from Olaus's text and iconography. Compare Coenen's *Walvisboeck* (MS 30.021), Royal Zoological Society, Antwerp, fol. XX with Figs. 2 and 5 in this article. The

image and text from fol. XX of MS 30.021 are reproduced in Florike Egmond and Peter Mason (eds.), *The Whale Book: Whales and Other Marine Animals as Described by Adriaen Coenen in 1585* (London: Reaktion, 2003), 72-3.

³² Giovanni Maria Bonardo, *La minera del mondo nella qual si tratta delle cose più secrete e più rare de' corpi semplici nel mondo elementare, e de' corpi composti, inanimati e animati d'anima vegetativa, sensitiva, e ragionevole* (Venice: Fabio et Agostino Zoppelli, 1585), 88v-89r, with many subsequent editions. On Bonardo, see Giorgio Stabile, 'Bonardo, Giovanni Maria', *DBI*, 11: 573-5. It is entirely possible that the information that Bricci had from the classical authors came to him by way of additional, intermediary sources, rather than the original texts.

³³ Bricci, *Relatione*, A4v.

³⁴ Federico Cesi to Giovanni Faber, Rome, 1 January 1618: 'Cetacei generis grandem belluam oris maritimis hic propinquis undarum impetus advolutam, primum ex rumore, deinde certissime audivimus'. The letter is edited in Giuseppe Gabrieli, *Il Carteggio Linceo* (Rome: Accademia Nazionale dei Lincei, 1996), 622-3. On the Academy's scientific activities, see Irene Baldriga, *L'occhio della Lince: I primi Lincei tra arte, scienza e collezionismo (1603-1630)* (Rome: Accademia Nazionale dei Lincei, 2002), and David Freedberg, *The Eye of the Lynx: Galileo, his Friends, and the Beginning of Natural History* (Chicago: University of Chicago Press, 2002).

³⁵ Johannes Faber, *Novae Hispaniae animalium expositio* (henceforth *Expositio*) in *Rerum Medicarum Novae Hispaniae Thesaurus* (Rome: Vitale Mascardi, 1651), 460-840 (on whales and ambergris, 564-77). On Faber, see Gabriella Belloni Speciale, 'Faber, Giovanni', *DBI*, 43: 686-9; Silvia de Renzi, *Storia naturale e erudizione nella prima età moderna: Giovanni Faber (1574-1629) medico linceo*, Tesi di dottorato, Università degli Studi di Bari, 1993; Baldriga and Freedberg, *passim*.

³⁶ John M. Riddle, ‘Pomum ambrae: Amber and Ambergris in Plague Remedies’, in *idem*, *Quid pro quo: Studies in the History of Drugs* (Aldershot: Variorum, 1992), Ch. I [orig. pub. in *Sudhoffs Archiv* 48 (1964), 111-22]. As Riddle explains, people also confused amber (the resin) with ambergris. For its use as a perfumed substance in the Renaissance, see Evelyn Welch, ‘Scented Buttons and Perfumed Gloves: Smelling Things in the Renaissance’, in Bella Mirabella (ed.), *Ornamentalism: The Art of Renaissance Accessories* (Ann Arbor: University of Michigan, 2011), 13-39. For the highly profitable Mediterranean trade in ambergris during the Middle Ages, see also Efraim Lev and Zohar Amar, *Practical materia medica of the medieval Eastern Mediterranean, according to the Cairo Genziah* (Leiden: Brill, 2008), 331-3. For our modern fascination with ambergris, see Christopher Kemp, *Floating Gold: A Natural (and Unnatural) History of Ambergris* (Chicago: University of Chicago Press, 2012).

³⁷ Faber, *Expositio*, 564-5. For an intriguing parallel to Faber’s discussion of ambergris among members of the Royal Society, see Daniel Carey, ‘Compiling Nature’s History: Travellers and Travel Narratives in the Early Royal Society’, *Annals of Science*, 54 (1997), 269-92 (at 287).

³⁸ ‘His igitur meis inductus precibus hanc suam patrio, ut solitus est, sermone de *Ambra* grisea seu odorata, non de *Succino* inquam, antiquorum *Electro* sententiam mihi scriptis consignavit.’ Faber, *Expositio*, 565-6. On the oral exchanges between Gregorio de Bolívar and Faber, see also Silvia de Renzi, ‘Writing and Talking of Exotic Animals’, in Marina Frasca-Spada and Nicholas Jardine (eds.), *Books and the Sciences in History* (Cambridge: Cambridge University Press, 2000), 150-67; Freedberg, *Eye of the Lynx*, and further discussion below.

³⁹ Faber, *Expositio*, 565-6.

⁴⁰ Interestingly, however, nowhere in Faber's or Bricci's texts are whales described as bad omens, depicted as sea-monsters, or connected with the story of Jonah in the Bible. This distinguishes their treatment from that of the Northern authors discussed in Silver, 'De profundis', and in Simon Schama, *The Embarrassment of Riches* (New York: Knopf, 1987), 130-44.

⁴¹ Faber, *Expositio*, 566-8. The authorities included Julius Caesar Scaliger (1484-1558), Andreas Libavius (1555-1616), Filippo Pigafetta (1533-1604), Andrea Bacci (1524-1600), and Charles de l'Écluse (1526-1609). I have not tracked down the specific references unless directly relevant to the issue of orality.

⁴² 'Non dissimile autem veri sit [...] quod relatum ab Indis audivi a viro principe: Ambar piscis quoddam esse excrementum, ut zibethum catti Indici, & moschus castorium, qui quarundam adnascentium herbarum pabulo satur, gignat aliquando abscessum in ventre intimo. Quo disrupto tria habentur Ambaris genera'. *Expositio*, 567. On Andrea Bacci, who held the chair of botany at La Sapienza University in Rome and later became *archiatra* of Sixtus V, see Mario Crespi, 'Bacci, Andrea', *DBI*, 5: 29-30.

⁴³ 'Carulus Clusius, in Annotationibus ad hanc historiam, a quodam mercatore fide digno intellexit, hæc non Avium, sed Sepiarum (quod magis credendum est) rostella esse. Alij scriptis mandarunt Ambram esse semen horrendi & monstrosi piscis ex cetaceo genere [...] Alij retulerunt Ambram inveniri in quodam piscis genere, qui illam devorans subito interit. Quapropter Piscatores huiusmodi piscem mortuum, & supernatantem observantes apprehendunt, & aperto ventre, Ambram eximunt'. Ulisse Aldrovandi, *Musæum Metallicum in Libros III* (Bologna: Battista Ferroni, 1648), 430. Aldrovandi's use of the term *intellexit* when mentioning the merchant is strongly suggestive of an oral account. The other reference is to Charles de l'Écluse's *Stirpium per Hispanias Historia* (1576).

⁴⁴ Aldrovandi, *Musæum Metallicum*, 430-31. Presumably Serapion the Younger, who lived in the twelfth century and wrote a book on simple medicaments.

⁴⁵ *Ibid.*, 431. The text that Paludanus annotated was Jan Huygen van Linschoten's *Navigatio ac Itinerarium Iohannis Hugonis Linscotani in Orientalem Sive Lusitanorum Indiam* (1599).

⁴⁶ Compare Aldrovandi, *Musæum Metallicum*, 431 (which includes also the Spanish physician Nicolás Monardes) and Faber, *Expositio*, 566-7. Aldrovandi incorrectly stated that Scaliger and de l'Écluse agreed that ambergris was a mineral. Faber reported instead that Scaliger thought that it was a fungus (and Scaliger was challenged by Libavius on this point), while de l'Écluse argued it was an animal product. See Julius Caesar Scaliger, *Exotericarum Exercitationum Liber XV* (Frankfurt: Giovanni and Andrea Marni, 1612), Exercit. 104 §10, 389-91 ('facilius inclinatur animus, ut credamus, Fungi esse speciem', 391).

⁴⁷ 'Quod sit amen non-nemo meis velit denegare, sua ipsimet libera maneat phantasia & opinandi potestas [...] Atque hæc volui ex F. Gregorij mente ac præscriptio statim meis prælibare Lectoribus, ne in hoc Ambræ controversiarum undis plenissimo, dubitabundi diutius fluctuarent, sed certum in prospectu portum haberent, ad quem vela dirigerent'. And again, 'Opportunissimum nunc accidit, ut de hac vera putata expert *Balaena*, vel in *Romanorum* nostrorum gratia mea hic scribam, quorum partem ipsi mecum viderunt, partem ex fide dignorum auditione ego accepi, cum ea præcipue ad hanc nostrum aliquid facere controversiam, & lectorem ipsum non parum delectare videantur'. *Expositio*, 566, 568.

⁴⁸ *Ibid.*, 568.

⁴⁹ Bellone Speciale, ‘Faber, Giovanni’, and Silvia de Renzi, ‘Medical Competence, Anatomy and the Polity in Seventeenth-Century Rome’, *Renaissance Studies*, 21 (2007), 551-67.

⁵⁰ On the seventeenth-century preoccupation with correctly identifying different types of fish, see Sophia Hendriks, ‘Identification of Herring Species (Clupeidae) in Conrad Gessner’s Ichthyological Works: A Case Study on Taxonomy, Nomenclature, and Animal Depiction in the 16th Century’, in Paul J. Smith and Karl A. E. Enenkel (eds.), *Zoology in Early Modern Culture: Intersections of Science, Theology, Philology and Political and Religious Education* (Leiden: Brill, 2014), 149-71; and Sachiko Kusukawa, ‘The *Historia piscium* and its Sources’, in T. R. Birkhead (ed.), *Virtuoso by Nature: The Scientific Worlds of Francis Willughby FRS (1635-1672)* (Leiden: Brill, 2016). On concerns with the reality of exotic and rare animals more generally, see Peter Mason, *Before Disenchantment: Images of Exotic Animals and Plants in the Early Modern World* (London: Reaktion, 2009), and, on the trustworthiness of images, Freedberg, *Eye of the Lynx*, 282-3, 290-304. As noted in the case of Gessner, when faced with contrasting and conflicting information about the animals they discussed, naturalists sometimes defended a specific view, other times reported the available information uncritically. Generalizing, therefore, would be unwise. I am grateful to Sachiko Kusukawa for providing access to her article before publication.

⁵¹ *Expositio*, 568-9.

⁵² *Ibid.*, 569.

⁵³ Compare Bricci, *Relatione*, A3v and Faber, *Expositio*, 569.

⁵⁴ On Santo Spirito and its links with the Roman curia, see Silvia de Renzi, “‘A Fountain for the Thirsty’ and a Bank for the Pope: Charity, Conflicts, and Medical Careers at the Hospital of Santo Spirito in Seventeenth-Century Rome’, in Ole Peter

Grell, Andrew Cunningham, and Jon Arrizabalaga (eds.), *Health Care and Poor Relief in Counter-Reformation Europe* (London: Routledge, 1999), 102-31.

⁵⁵ ‘in nostra certe belva, quam ad nostrum hoc mare mediterraneum appulsam iam satis delineavimus, nostri homines praeter malevolentia & naribus vix toleranda retributa, nihil quicquam offenderunt’. *Expositio*, 570. Compare Guillaume Rondelet, *Libri de Piscibus Marinis* (Lyon: Matthias Bonhomme, 1554).

⁵⁶ *Expositio*, 571. There is inconsistency in this account: only a few pages before (569), Faber stated that the teeth were in the museum of Cassiano del Pozzo. See above.

⁵⁷ On Cardano’s treatment of fish, see Nancy G. Siraisi, *The Clock and the Mirror: Girolamo Cardano and Renaissance Medicine* (Chicago: University of Chicago Press), 85-7.

⁵⁸ *Ibid.*, 86. On this epistemological shift see Findlen, *Possessing Nature*, 194-240.

⁵⁹ De Renzi, ‘Writing and Talking of Exotic Animals’.

⁶⁰ *Expositio*, 540, and de Renzi, ‘Writing and Talking of Exotic Animals’, 160-61.

⁶¹ De Renzi, ‘Writing and Talking of Exotic Animals’, 162.

⁶² On the issue of expert witnesses in early modern medico-legal cases, see Silvia de Renzi, ‘Witnesses of the Body: Medico-Legal Cases in Seventeenth-Century Rome’, *Studies in History and Philosophy of Science Part A*, 33 (2002), 219–42.

⁶³ For the use of this term in the Royal Society of London, see Kusukawa, ‘*Historia piscium*’.

⁶⁴ De Renzi, ‘Writing and Talking of Exotic Animals’, 161-2.

⁶⁵ On similar dynamics of knowledge construction in the Royal Society see now Yale, *Sociable Knowledge*, 89-115.

⁶⁶ In *A Social History of Truth: Civility and Science in Seventeenth-century England* (Chicago: University of Chicago Press, 1994), Steven Shapin famously argued that

Robert Boyle and his circle trusted only the reports of gentlemen (ideally those known to them), and discarded those of uncouth craftsmen and other practitioners. Shapin's argument, however, fails to fully acknowledge Boyle's own rhetorical posture and the fact that he may not be fully representative of seventeenth-century science. For a more nuanced view of the richness of sources and the variety of informants used by British naturalists, see Carey, 'Compiling Nature's History'.

⁶⁷ For other examples of how personal observation, hearsay from merchants and fishermen, and learned sources could enter conversation in validating early modern knowledge about fish, see Kusukawa, '*Historia piscium* and its sources', and Egmond and Mason, *Whale Book*. The notebooks of Adriaen Coenen, who lived as a fish merchant, are replete with examples of how written sources (including the Bible, ephemeral pamphlets, and the work of contemporary natural historians who had written about ichthyology) were seamlessly mixed with his own personal experience and the oral report of local fishermen and other acquaintances. On Coenen see also Florike Egmond, 'Curious Fish: Connections between some Sixteenth-Century Watercolours and Prints', in Enenkel and Smith, *Early Modern Zoology*, 1: 245-72. For broader examples of these dynamics of knowledge exchange among British naturalists see Carey, 'Compiling Nature's History', and Yale, *Sociable Knowledge*, 89-115.

⁶⁸ Natural history may have been the privilege of a Latinate early modern elite, as argued by Ogilvie, but my analysis suggests that this community may have not been always as close and as exclusive as he maintained. Compare Ogilvie, *The Science of Describing*, 1-24.

⁶⁹ See Findlen, *Possessing Nature*, 211-14; David Freedberg, *The Eye of the Lynx*, 277-8; Silvia de Renzi, 'Medical Competence, Anatomy and Polity', 551-2.

⁷⁰ See Lux and Cook, ‘Closed Circles or Open Networks?’; Ogilvie, *Science of Describing*; Delisle, *Establishing the Facts*; Lightman, McOuat and Stewart, *Circulation of Knowledge*; and especially van Miert, *Communicating Observations*.

⁷¹ The origins of experimental culture lay in the emergence of a new brand of *experientia* as a form of authority. The literature on seventeenth century experimental science is too extensive to be summed up here. Among classics on the topic, see Steven Shapin and Simon Schaffer, *Leviathan and the Air-Pump: Hobbes, Boyle and the Experimental Life* (Princeton: Princeton University Press, 1985), Peter Dear, *Discipline and Experience: The Mathematical Way in the Scientific Revolution* (Chicago and London: University of Chicago Press, 1995), and Findlen, *Possessing Nature*. On scientific observation, see Lorraine Daston and Elizabeth Lunbeck (eds.), *Histories of Scientific Observation* (Chicago: University of Chicago Press, 2011).

⁷² The literature on mythical and wondrous creatures is very large. On underwater creatures, see Maria Conforti, ‘Divers, Sirens, and Fishes: The Anatomy of Underwater Creatures’, in Marco Beretta and Maria Conforti (eds.), *Fakes!?! Hoaxes, Counterfeits and Deception in Early Modern Science* (Sagamore Beach: Science History Publications, 2014), 130-52. On the visual history of some of these animals, see Mason, *Before Disenchantment*. See also bibliography at n. 30.

⁷³ On this point, see Mason, *Before Disenchantment*, 11-35.