

# **& MERCHANTS** *Navels*

**Commerce, Science, and Art  
in Early Modern Europe**

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# *Inventing Nature*

## *Commerce, Art, and Science in the Early Modern Cabinet of Curiosities*

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"But is it a basilisk?"

"It's a saltwater fish that charlatans usually arrange in the form of a basilisk, and it helps them deal with peasants in the piazza when they want to sell their balsam."

—Carlo Goldoni, *Famiglia dell'antiquario*

### CURIOSITIES FOR SALE

In 1653, a curious book appeared in the city of Venice: Niccolò Serpetro's *Marketplace of Natural Marvels*. Serpetro's encyclopedia was one of many such volumes that satisfied the seemingly infinite desire for wonders in the early modern period. It followed a rich publishing history of broadsheets, natural histories, and encyclopedias of the strange and unfamiliar that characterized the sixteenth-century love affair with the marvelous, and that cataloged the many pleasurable and terrifying ways in which nature made manifest the hand of God in the world.<sup>1</sup> Serpetro drew liberally from this tradition to create his own theater of wonders. But he added one innovation that was entirely his own: he placed his marvels in the marketplace, a teeming piazza in which merchants and customers bargained over goods for sale, and wares were displayed for all to see (fig. 12.1). It was the most fitting location that he could imagine for the pursuit of wonder.

It is surely appropriate that a book published in the city of Venice—still a thriving center for trade and commerce despite the challenges of such northern cities as Amsterdam, Marseilles, and London, and the Spanish gateway to the Atlantic, Seville—should imagine the world of marvels to be a marketplace. Serpetro explained his metaphor as follows: "Since in a



Figure 12.1 Charlatans selling their wares in Piazza San Marco, Venice. Source: G. Franco, *Habiti d'huomini e donne* (Venice, 1609). Courtesy of Marquand Library of Art and Archaeology, Princeton University Library.

famous marketplace the wealthiest merchants come from many different countries to show gems and the most precious and admirable things that one finds in various provinces of the world, thus, in this work I tried to transport from the most celebrated authors the rarest and most delightful marvels that the Author of Nature has produced." He made his book a literal marketplace, dividing it into porticos, loggias, and shops so that passersby could "walk easily" among them.<sup>2</sup> Each chapter was an imagined purchase, or at the very least a bit of window shopping in the marketplace of marvels. Serpetro had probably taken the idea of the marketplace from works such as Tommaso Garzoni's *Universal Piazza* (1585), a popular encyclopedia that collected all the professions of the world into an imaginary piazza.<sup>3</sup> But he was also an astute observer of his times. Nature was for sale in many marketplaces throughout Europe. It was a commodity bought, sold, bartered, and exchanged—the centerpiece of a series of transactions that connected the world of commerce to the study of nature.

Shopping for natural curiosities was indeed possible by the time Serpetro wrote his *Marketplace of Natural Marvels*. We need only think of the Dutch tulip craze at the beginning of the seventeenth century to recall just how frenzied the market for a particular curiosity could become.<sup>4</sup> More generally, however, the growing popularity of cabinets of curiosities—private, princely, and, in a few cases, institutional collections that grew in size and scope throughout the early modern period—gradually transformed the act of collecting nature into a business. It produced a world of entrepreneurs who saw nature in new ways because of the culture of collecting. In February 1644, John Evelyn described the experience of walking through the merchants' stalls in the Isle du Palais in Paris. One shop, in particular, caught his attention, a place called Noah's Ark. There "are sold all curiosities naturall or artificial, Indian or European, for luxury or use, as cabinets, shells, ivory, porselan, dried fishes, insects, birds, pictures, and a thousand exotic extravagances."<sup>5</sup> Evelyn had found a cabinet of curiosities in which everything was for sale. Collectors missing some choice item for their cabinets could depend upon the proprietor of Noah's Ark to supply them with a sample—for the right price.

The idea of a shop filled with curiosities seemingly contradicted the humanist ideal of scientific collecting as a series of exchanges among scholars in which objects were freely given as an act of friendship; they accompanied and embellished the words that described them.<sup>6</sup> Many collectors accumulated the majority of their artifacts through travel and through the generosity of other scholars with whom they regularly exchanged letters, images, and specimens. But it was also possible to buy a cabinet of curiosities, or at least its most important parts, by the early seventeenth century. Such purchases were costly luxuries—not an act of scholarly inquiry into nature but a sign that the pleasures of collecting involved more than the single-



mindful pursuit of knowledge. If having a collection was one means by which a prince or a merchant might proclaim his ability to command the world, creating a microcosm in which to receive visitors and to demonstrate his place in a world of global commerce and conquest, then a collection was indeed worth something. Many objects did have a precise monetary value, even if scholarly collectors chose to ignore this aspect of the passion for curiosities.

The market for marvels produced more than one type of collector, and all of them in different ways responded to the exigencies of the marketplace. In addition to thinking about learned naturalists such as Ulisse Aldrovandi, who created a theater of nature in late sixteenth-century Bologna in order to know more about the natural world, we need to consider a different kind of collector who understood the idea of profiting from wonder. The early seventeenth-century Augsburg merchant Philipp Hainhofer, for example, not only acted as purchasing agent for rulers who sought out luxury goods, but explicitly made his cabinets of curiosities, filled with objects acquired from merchants at the Frankfurt fairs, to sell them. He speculated in nature. "When someone presents me with a foreign object for my *Kunstkammer*," he once said, "I experience more pleasure than if he had given me cash."<sup>7</sup> This comment that reflects the ways in which curiosity and commerce worked harmoniously together. Curiosities, after all, might be a good investment in terms of the favors and ultimately business they might bring from certain patrons.

Hainhofer was perhaps one of the earliest collectors, following in the wake of the Fugger merchants who had acquired many objects for princely patrons, to recognize that the value of the cabinet of curiosities was not simply intrinsic. By the late seventeenth century, tales of the fantastic sums that princes were willing to pay for a good cabinet circulated among connoisseurs of such things. The grand duke of Tuscany's efforts to acquire the Dutch naturalist Jan Swammerdam's collection of insects — and his expertise as a naturalist — for 12,000 guilders were well-known and only increased the status of this particular collection.<sup>8</sup> Around the same time, the duke of Modena became so fascinated with Manfredo Settala's gallery of curiosities and inventions in Milan that he attempted to purchase it. Negotiations had fallen apart by the early 1660s, but when John Ray and Philip Skippon visited the newly installed cabinet in the ducal palace in February 1664, visitors were still being told of the outrageous sums the duke had been willing to pay for a collection he never succeeded in buying.<sup>9</sup> The economic ability to *afford* a famous cabinet, in other words, had become a measure of one's status.

By the eighteenth century, natural history cabinets were put up for public auction, and sale catalogs began to appear with greater regularity, reflecting a full-scale commercialization of collecting culture. In the late sixteenth and seventeenth centuries, however, it was rare to have an entire cabinet made purely for profit. Individual objects might be heavily embedded in the world

of the marketplace, and occasionally princes might try to buy a collection, but the majority of cabinets emerged from an individual collector's passion for things. Yet even these collectors, however removed from the world of commerce, had to contend with the ways in which their fascination with nature was fueled by a variety of individuals who had unique access to natural objects and understood the profitability of nature. No collector could entirely remove himself from the marketplace. How they interacted with it reveals a series of interesting connections between commerce, science, and art.

#### TRAFFICKING IN NATURE

Early modern natural history was a product of the new material abundance that flowed into European cities from all corners of the world. It extended the medieval culture of buying and selling nature into new domains because knowledge quite literally grew in proportion to the expansion of European trade.<sup>10</sup> While humanists who studied nature for the pure pleasure of extracting knowledge might scoff at those who used their knowledge to turn a profit, the fact remains that nature had always been a commodity to the rest of the world. Since the Middle Ages the spice trade between western Europe and the Levant—dried bits of nature that traveled thousands of miles to satisfy the taste for the exotic—had shaped the commercial image of nature. Columbus's attentiveness to the wonders of the New World in 1492 was hardly disinterested curiosity. He was not simply looking for the monsters described in Pliny's *Natural History*, but also went in search of nature for profit—cinnamon, balsam, aromatic woods, and unusual animals and plants to delight the palate as well as the eye, and to cure the diseases of the Old World with the nature of the New.<sup>11</sup>

The profitability of nature was closely tied to its medicinal uses. Nature provided the ingredients for a vast array of medicines in the ancient pharmacopeia, from simple herbal remedies to more highly prized items such as balsam, bezoar stones, and all of the key ingredients to create that panacea of panaceas, theriac.<sup>12</sup> Merchants, apothecaries, and physicians together created an economy of natural objects. They bought those parts of nature that they could not cultivate and acquire on their own and transformed them into medicines. The rarest and most exotic medicines, dependent on ingredients from the Levant and later the New World, were usually composed of costly ingredients. Serpetro's image of marvels lined up under the porticos for sale was not at all improbable: it reflected the reality of the most marvelous aspects of medicine.

If commerce and medicine established the essential contours of trafficking in nature, faith placed a high premium on a different set of unusual

objects. By the thirteenth century the Crusades had created a lively trade in relics, but also in natural objects that conformed to ancient accounts of the marvels of the East.<sup>13</sup> The spoils of Christian conquest included a kind of mythologized conquest of nature: Egyptian crocodiles, ostrich eggs, alleged unicorn's horns, griffin's claws, and other examples of exotic nature, real and imagined, began to appear in churches and treasuries throughout western Europe.<sup>14</sup> While not as highly prized as sanctified relics, such objects reflected a growing interest in the fantastic parts of nature described in medieval bestiaries and other Christian allegories of nature that privileged certain animals as harbingers of God's will. The basilisks, griffins, and dragons found in the Bible and in such works as Pliny's *Natural History* became more than paper fantasies of natural omens. Increasingly, they were actual objects created to satisfy the taste for such curiosities. Such objects did not disappear at the end of the Middle Ages but enjoyed a certain revival in the age of the Reformation. In an era fascinated with reports of omens and prodigies that signified God's will in a world of divided faith, they were fully integrated into the cabinets of curiosities.

In all of these different ways, curiosity about the natural world shaped the marketplace of marvels. The fascination with wonder helped to create a kind of individual skilled in buying, selling, and creating wonder. Curiosity created its own commerce—a world of specialists in natural curiosities that we can only glimpse indirectly through accounts of nature in the early modern period. Such individuals did not aspire to interpret nature, but to sell nature to those who created knowledge out of the raw ingredients of the marketplace. Extraordinary things demanded a special expertise to acquire and invent them, which gave them economic as well as symbolic value. Understanding more precisely how learned collectors acquired the wonders that they prized brings us into closer contact with the marketplace that they were often loathe to discuss. It was a world filled with mountebanks and charlatans who cultivated ties with physicians, apothecaries, and merchants in order to sell their vision of nature to a public consumed by curiosities.

The tensions between those who sold nature and those who interpreted it are evident in letters that accompanied objects in circulation among naturalists. When a learned collector crossed the imagined boundary between science and commerce, he was subject to scathing criticism. In the 1590s, for example, naturalists complained to each other about the practices of the Basel physician Felix Platter who, according to one source, refused to make gifts of his curiosities, selling "everything he has."<sup>15</sup> This rather unusual comment about a learned naturalist suggests that by the end of the sixteenth century the line between science and commerce was increasingly blurred, if it had ever been clear. Buying nature in the marketplace was a commonly accepted practice among naturalists, a necessity to increase and replenish the



storehouse of knowledge. Selling nature, however, was an activity unworthy of a natural philosopher. Or was it? Platter's decision to sell what he possessed suggests that it had become possible to put a price on the time and expertise required to find and cultivate something rare, even for the purposes of study.

Selling curiosities in a cabinet, or selling an entire cabinet, represents the final step in a series of transactions that began the moment a curiosity became available. Following an object from the beginning to the end helps us to understand more precisely how science and commerce intersected. Let us take the case of a curiosity that entered Ulisse Aldrovandi's collection in Bologna in 1579, a gift of one of his regular correspondents, the Genoese patrician Bernardo Castelletti. Castelletti exemplified well the meaning of friendship in late Renaissance natural history. He routinely procured new curiosities for Aldrovandi to describe in his great, unpublished natural history, and asked nothing in return but the pleasure of corresponding with a famous naturalist. The gifts he gave to Aldrovandi arrived in his hands by many different avenues, and included curiosities he purchased in the public piazzas of his city. In February 1579, Castelletti sent a letter announcing the imminent arrival in Bologna of the most marvelous fish he had ever seen: "What's more, you will have a fish that is one of the rarest and most extravagant parts of nature in the sea." He described how he acquired this rather ugly fish with bulging eyes:

It was given to me dried, as I send it to you, by the fisherman who caught it, who, upon seeing it had such strange features, didn't throw it back into the sea, as fishermen usually do with all the other useless fish. Indeed he kept it alive as long as he could, and then had it dried to show to people as a miraculous thing.<sup>16</sup>

The ingredients in the story are the stuff of which cabinets of curiosities were made and replenished: a useless fish, an ambitious fisherman, an audience eager to pay to see natural oddities, and collectors who could not resist acquiring them. This was quite literally the experience of nature in the marketplace.

The dried monster made its way to Bologna and Aldrovandi added it to his museum. He may have even had his artists illustrate it and dictated a description to his scribes, in preparation for its inclusion in his *Natural History*.<sup>17</sup> This at least was Castelletti's fear a few years later. Apologetically and quite reluctantly, he informed Aldrovandi that the marvel had been invented by the fisherman who sold it to him. "I am sorry to have to tell you that in the description of the fish sent to you some years ago, I was deceived. . . ." Worried that he had compromised the veracity of Aldrovandi's account of



nature, he confessed that his words as much as the object itself were not a reliable source of information. They, too, had been bought and sold in the marketplace: "they are those that the fisherman sold me."<sup>18</sup> A clever vendor of the nature's bounty had tricked a gullible humanist into believing that all the monsters found in Pliny's *Natural History* truly might be acquired for one's museum, if only one looked hard enough. Castelletti had forgotten the golden rule: *caveat emptor*.

Such episodes give us further insight into the way in which the commerce in natural curiosities responded directly to the collector's passion for the exotic and unknown. A city like Genoa was a trading zone for natural curiosities. When the grand duke of Tuscany commissioned his botanist at the University of Pisa, Francesco Malocchi, to acquire curiosities for the university garden and its museum during the summer of 1599, Malocchi planned an itinerary that made Genoa his final destination. Malocchi's buying trips were, in essence, a merchant's itinerary to the port cities of Italy. In each city, he encountered men who had curiosities to sell, and made purchases for the grand duke which were recorded in his ledger. In April 1604, for instance, Malocchi acquired an entire "whale skeleton"—a rare prize for an early modern natural history museum—in the port city of Livorno.<sup>19</sup> He was more successful than the French royal surgeon Ambroise Paré, who was fascinated by "a head of a large fish in the house of a rich merchant" in Lyon that he hoped to acquire for King Charles IX.<sup>20</sup> Unfortunately the fish was quarantined with the family during a plague epidemic, and that was the last Paré ever saw of it. These and other anecdotes suggest that naturalists routinely visited merchants who owned and sold curious things.

Knowledge of nature could not increase without the commerce in nature. Naturalists had to come to terms with the marketplace in order to pursue curiosities. Digging further into Aldrovandi's correspondence we find indications that he knew some of the famous charlatans of his day who made and sold curiosities in the piazza, and considered them an interesting source of knowledge as well as artifacts. In April 1568, for example, a correspondent from Piacenza described their mutual acquaintance "Master Leone who sells his wares in public often, and is known to all the apothecaries in Venice."<sup>21</sup> Leone Tartaglini of Foiano was a famous mountebank known to most collectors of natural curiosities in late sixteenth-century Italy. He inhabited the Venetian piazza famously depicted as filled with men of his profession. Naturalists traveled from cities as dispersed as Lucca, Piacenza, Bologna, and Verona to see his cabinet of curiosities in Venice, which was an early precursor to the Parisian Noah's Ark that Evelyn described. Many of the objects Tartaglini possessed were evidently for sale. Among other things, he specialized in the sort of extravagant fish that Castelletti admired and purchased in Genoa. Visitors to Venice reported that he had a book illustrating

all of his dried fish—a book Aldrovandi, among others, wanted very much to see.<sup>22</sup> While many naturalists collected images of curiosities in order to create a complete archive of the natural world, in Tartaglini's case, such a book might have served the additional purpose of advertising the kind of nature that he sold.

The image of the seller of nature as a mountebank appears not only in descriptions of Tartaglini's activities in Venice, perhaps the most famous vendor of curiosities of whom we have a precise description, but also informed other accounts of the buying and selling of curiosities. In November 1663, the English traveler Philip Skippon encountered a mountebank named Rosachio, an astrologer who sold medicines in Piazza San Marco. Skippon was evidently fascinated by Rosachio; he followed his initial encounter with the mountebank by visiting Rosachio at home in order to see his "collection of rarities." In it was a flying serpent—or at least an alleged flying serpent since Skippon described it as having "a long furrow on either side, in which were cartilaginous parts (he said) when it was alive, that served for wings."<sup>23</sup> Skippon's traveling companion, the great English naturalist John Ray, evidently did not find the alleged dragon worthy of note since he neglected to include it in his own journal of the same voyage, but the fact remains that a century after Tartaglini had succeeded in getting all the great naturalists of Italy (and undoubtedly other regions) to visit his cabinet in Venice, mountebanks were still selling the same bits of artificial nature to the heirs of Aldrovandi. In the 1672 catalog to his museum in Verona, Count Lodovico Moscardo continued to discuss the "swindlers and charlatans from Dalmatia" who sold examples of the basilisk in his museum.<sup>24</sup>

The network of people who bought and sold nature was composed of more than just charlatans and random fishermen who showed exotic fish in the fish markets. Let us return for a moment to the fact that Master Leone of Venice was known to all the apothecaries of the city. Were they as much the source of his curiosities as he was of theirs? In his *History of Animals* (1558), the Swiss naturalist Conrad Gessner informed his readers about "apothecaries and others who usually dry rays and shape their skeletons into varied and wonderful forms for the ignorant."<sup>25</sup> Rather than condemning charlatans, Gessner blamed apothecaries for facilitating this trade, indeed accused them of inventing fraudulent curiosities. We can find traces of relationships among apothecaries and mountebanks in surviving correspondence. The Veronese apothecary Francesco Calzolari, for instance, was so intrigued by reports of Master Leone's activities that he sought out the artist who had illustrated the Venetian's curiosities.<sup>26</sup>

Scholarly collectors recognized that the pharmacy was both a world of wonder and an extension of the marketplace. They entered it expecting to find an invented nature (fig. 12.2). Visiting apothecaries was an important



*Figure 12.2* The apothecary Francesco Calzolari's museum in Verona, filled with many strange fish and reptiles hung from the ceiling. Source: Benedetto Ceruti and Andrea Chiocco, *Musaeum Franc[isci] Calceolarii Iun[ioris]. Veronensis* (Verona, 1622). Courtesy of the Biblioteca, Universitania, Bologna.

part of the collector's itinerary. John Ray took pleasure in "a so-called siren's rib" in the apothecary Jean van der Mere's collection in Delft and visited the apothecary Mario Salò in Verona, who claimed to have the "reliques of *Calceolarius* his *Museum*."<sup>27</sup> Possibly one of the items surviving from Calzolari's museum that did not especially impress Ray in 1663 was the unicorn's horn that Aldrovandi saw when he visited his shop at the Sign of the Golden Bell in Piazza dell'Erbe in 1571. Aldrovandi was too polite to tell Calzolari that it was a fake, but he privately noted "that there is no doubt that it is not a true example."<sup>28</sup> Such objects were also the ordinary stuff of any cabinet of curiosities. But apothecaries, who practiced a certain alchemy on nature to create their medicines, must have seen the fabrication of natural objects as a



demonstration of professional skill—the ability to manipulate nature. They filled their shops with those marvels, real and imaginary, that helped to sell their medicines and reminded people of the apothecary's close connections with the world of art to which they were officially joined in towns where painters and apothecaries belonged to the same guild because both transformed the raw ingredients of nature into art.<sup>29</sup>

Collectors understood that the more unusual nature *seemed* to be, the more likely it was a product of their own demand for a certain kind of wonder. They repeatedly offered advice on how to discern the difference between an authentic and fabricated version of nature. The Milanese physician Girolamo Cardano advised his readers to inspect the joints and sutures of marvelous creations in order to see if they had been put together by human rather than divine hands.<sup>30</sup> But the possibility of fraud did not make collectors any less interested in acquiring them—quite the opposite since invented bits of nature were highly prized. One of the less well-studied aspects of the cabinets of curiosities regards the significance of objects that purported to be natural while actually being artificial. These fabrications allow us to understand how commerce and science helped to create the art of nature in the early modern period.

#### INVENTING THE HYDRA AND THE BASILISK

The most popular fabrications of the sixteenth and seventeenth centuries were hydras and basilisks. They took their place in the cabinet of curiosities among the many different kinds of dragons that fascinated early modern collectors. Flying dragons, eagle-fish, and other hybrids of the imagination emerged from the pages of medieval bestiaries and church and princely treasuries to fill Renaissance museums. They did so according to rules of art that were best expressed in a passage from Leonardo da Vinci's notebooks. Describing how to make an imaginary animal appear natural, Leonardo wrote:

You know that you cannot make any animal without it having its limbs such that each bears some resemblance to that of some one of the other animals. If therefore you wish to make one of your imaginary animals appear natural—let us suppose it to be a dragon—take for its head that of a mastiff or setter, for its eyes those of a cat, for its ears those of a porcupine, for its nose that of a greyhound, with the eyebrows of a lion, the temples of an old cock and the neck of a water-tortoise.<sup>31</sup>

The rules of good painting applied no less to the three-dimensional construction of an imaginary animal. In order to be convincing, it had to origi-



nate in nature. Leonardo's contemporary Albrecht Dürer also believed that art emerged from nature, and he strove hard to give the beasts of the Apocalypse a more anatomical appearance.<sup>32</sup> Leonardo's example of a dragon was hardly casual because it was indeed the imaginary animal of choice. It was the most fantastic and symbolically potent animal in the Christian imagination, worthy of multiple inventions across the centuries.

The hydra and the basilisk — two of the most elaborate kinds of dragons described in ancient and biblical sources — had a level of complexity that many other natural inventions did not. A unicorn's horn was the horn of a narwhal. A griffin's claw was often a bison's or ox's horn. Many inventions of nature, in other words, were entirely natural. They simply involved an act of reinterpretation in order to see the imaginary in the real. Objects that took shape through the manipulation and transformation of nature belonged to an entirely different category. They were truly works of art in which one could take pleasure in the possibilities that nature suggested to the human mind.

Not coincidentally, they were also objects on which one could put a price — repositories of economic as well as spiritual capital.<sup>33</sup> Conrad Gessner described a hydra that had been brought from Turkey to Venice in 1530 and acquired by the king of France (fig. 12.3). "It is appraised at six thousand ducats," he wrote in 1560. Like Dürer's rhinoceros, Gessner's hydra was an image derived from an image. He lifted it from broadsheets such as Dürer's popular *Whore of Babylon* (1498) that depicted the seven-headed beast of the Apocalypse with vivid clarity for a public eager to see signs of a world in turmoil. An encyclopedia such as Conrad Lycosthenes's, *Chronicle of Prodigies and Portents* (1557) was probably the more direct source for Gessner's illustration. Evading the issue of its truth or falsehood, Gessner chose instead to comment on the hydra's art. "The ears, tongue, nose, and faces are different from the nature of all species of serpents. But if the author of such an invented natural thing were not ignorant, he would be able, with great artifice, to trick observers."<sup>34</sup>

Aldrovandi agreed with Gessner's assessment of the hydra. After receiving a hydra from a Ferrarese noble who wanted to know if it was authentic, Aldrovandi responded that, given the confused description of the hydra among the ancients — an animal with three, four, seven, nine, or even ninety heads — it was hardly surprising that no one knew the truth about it. He reflected on how others had profited from this uncertainty: "it is no wonder that in our age some have been deceived by the miraculous artifice with which these hydras are faked from other bodies and put together, as they have also done with the flying dragon — which however does exist in nature — trying to imitate it by using a species of marine ray, as one can see in my study." His assessment of the hydra of Ferrara was mixed. The body

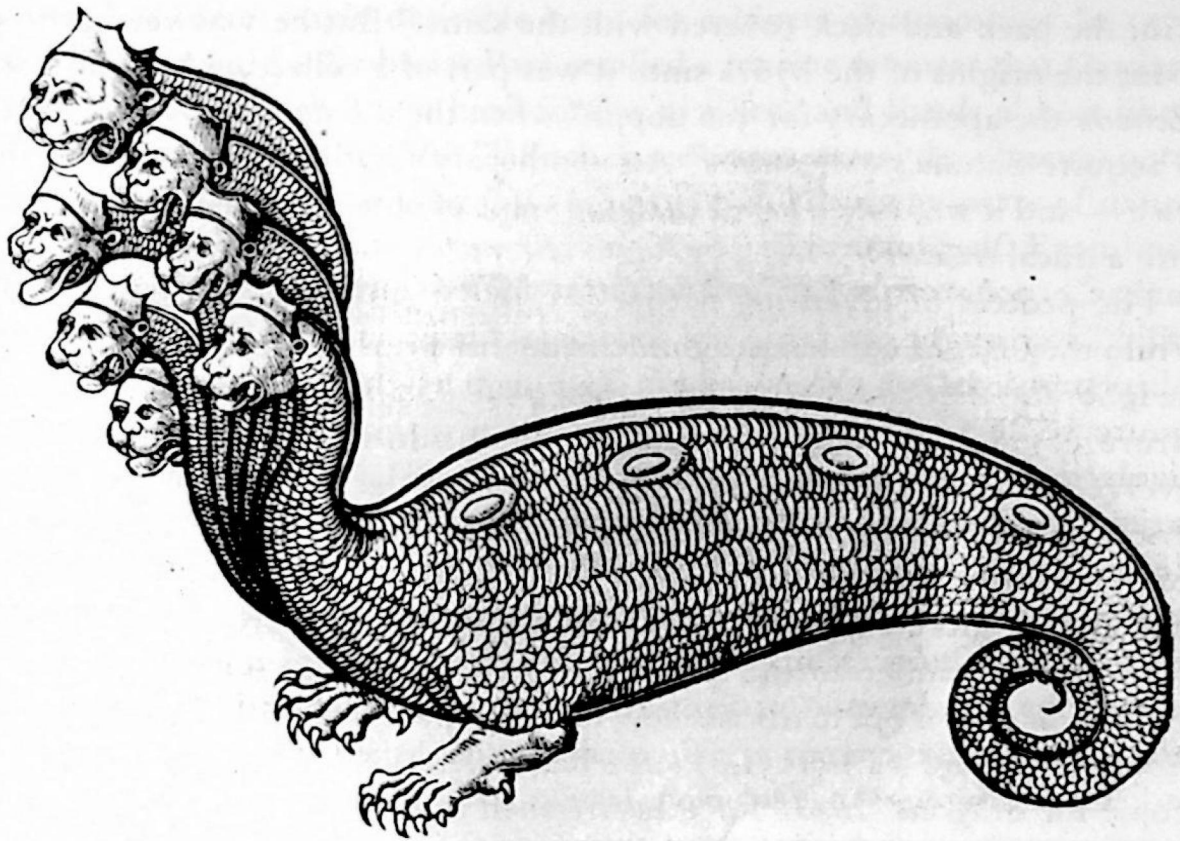


Figure 12.3 The King of France's many-headed hydra, valued at 6,000 ducats in 1560. Source: Conrad Gessner, *Nomenclator aquatiliū animantium. Icones animalium* (Tiguri, 1560). Courtesy of Department of Special Collections, Stanford University Libraries.

and tail came from the “true flying dragon that is born in Arabia and Egypt,” but the heads had come from different animals and one could see that various parts of the dragon—its wings and its hind legs—had been removed to give it the appearance of a hydra.<sup>35</sup> It was a half-true specimen, a wonder of nature transformed into a work of art by the desire of nature's artisans to turn a profit. Better, in short, than the hydra of San Marco in Venice, which he declared to be patently false.<sup>36</sup> For this reason, Aldrovandi engraved it for eventual inclusion in his *History of Serpents and Dragons*.

Undoubtedly because hydras were often found in state treasuries—the Venetian doge had a fine example with nine heads, for instance<sup>37</sup>—visitors talked more self-consciously about their monetary worth (and went to famous naturalists such as Aldrovandi to see if they would authenticate them, which surely increased their value). Skippon, for instance, admired the seven-headed hydra in the duke of Modena's gallery, originally a gift of the Holy Roman Emperor Charles V to the Gonzaga family of Guastallo. He, too, refused to say with certainty that the hydra was a fake, though he commented on “the head being like that of fitchet, or of that kind, the body and feet were of a rabbit or hare, and the tail was made of common snake's

skin, the back and neck covered with the same." But he was very precise about the origins of the hydra since it was part of a collection bought from "Zennon the apothecary for 300 doppii" when the d'Este family was unable to acquire Settala's collection.<sup>38</sup> An apothecary's hydra, of course, had its price—and it was much lower than the value of objects normally associated with a ducal treasury.

The process of inventing nature fascinated early modern naturalists. While they might condemn mountebanks for preying on the gullible and the ignorant, they could not contain their own delight in understanding how nature could be invented or suppress their admiration for the artistry involved in making monsters. As naturalists collected and inspected the variety of nature with greater regularity, they began to put into print their observations on nature's fabrications. Dragons were a focal point of this discussion and, more often than not, such discussions appeared in ichthyologies—further underscoring the idea that the point was not to talk about dragons *sui generis* but to discuss how to make them from fish. In his *Natural History of Strange Fish* (1551), Pierre Belon described the passion of many people for dragons "made for pleasure such as those that we see counterfeited with rays disguised in the manner of a flying serpent."<sup>39</sup> Conrad Gessner's complaint in 1558 about fraudulent apothecaries came in the midst of a lengthy discussion of dragon-making in his *History of Animals*. In a chapter on rays, he described in great detail how such monsters were made. "They bend the body, distort the head and mouth, and cut into and cut away other parts. They raise up the parts that remain and simulate wings, and invent other parts at will."<sup>40</sup> Understanding the possibilities of the ray as a dragon *in potentia* was the first step in appreciating the art of the dragon.

The ability of many naturalists to look critically at the anatomy of the hydra, the basilisk, and many other kinds of dragons reflected the shifting religious and intellectual climate. In the early decades of the sixteenth century, such creatures were sufficiently charged with religious meaning that it would have been heretical to suggest that they were anything less than God's will. By the 1550s, it had become possible to inspect these portents as examples of nature's variety and to suggest that human intervention made them approximate people's fantasies of a terrifying nature. Increasingly, such objects seemed to evoke pleasure more than horror.<sup>41</sup> The Renaissance dragon, after all, was usually no more than a couple of feet long. Cardano simply couldn't imagine how many of the specimens he saw could fly. J. C. Scaliger contented himself by observing: "The skin is like that of a ray."<sup>42</sup> One wanted to know *how* they were made while avoiding the question of whether they existed.

Naturalists actively collected and traded these physical talismans of the medieval and Reformation culture of portents—no longer clear demonstrations of the mysterious ways in which God's will manifested itself in the



world, but increasingly desirable items for cabinets of curiosities. In 1573, the French surgeon Ambroise Paré recalled a marine monster that Cardano sent Gessner, "which had a head similar to a bear and hands almost like a monkey, and the rest of a fish."<sup>43</sup> Such descriptions reveal the pleasure naturalists took in understanding how harmonizing the many parts of nature into something new and unexpected might be an art unto itself. Examining the griffin's claw in the treasury of Charles V, for instance, Cardano reflected: "perhaps by carving out an ox's horn, art invents nature."<sup>44</sup> The ability to dissect the bestiary that made the beast gave credence to the idea that knowledge did transform how one looked at an object. If commerce responded to curiosity by inventing what people wanted to see, then science responded to art by understanding that the boundaries between nature and art were there to be crossed. We need only think of the jeweled boxes that German and Italian artisans made in the shape of crocodiles and dragons, the French artisan Bernard Palissy's ceramic re-creations of nature, or the flying dragon chandelier that Dürer designed in Nuremberg, which used the natural shape of a stag's antlers for its wings, to recognize how the idea of making art from nature was a central theme of the late Renaissance.<sup>45</sup>

By the time Aldrovandi's *On Fish* appeared posthumously in 1613, it reflected the new sensibility of late Renaissance natural history toward the idea of inventing nature. While indebted to all previous publications that had discussed fabulous creatures in the cabinets of curiosities, Aldrovandi's book improved upon them by showing the artifice of inventing dragons and basilisks from rays in greater visual detail. His work included no less than two images of a "ray dried and shaped in the form of a dragon" as well as a "sea-eagle" that he declared to be patently false (fig 12.4).<sup>46</sup> Examining these images, we can see explicit efforts to demonstrate the artifice of the object in question while retaining the canonical form of the dragon.

Aldrovandi's images of flying dragons provided the introductory material for a chapter on the basilisk in Bartolomeo Ambrosini's edited version of Aldrovandi's *History of Serpents and Dragons* (1640). A small, solitary African dragon described by Pliny and Galen, it was reputedly so poisonous that it could kill someone with its breath or its glance, dry plants, and break stones in half.<sup>47</sup> It quickly became the canonical example of a work of nature transformed into a work of art (fig. 12.5). Aldrovandi reported that the great physician Girolamo Mercuriale had found a "basilisk's cadaver" in the treasury of the Holy Roman Emperor Maximilian II. He (or his editor Ambrosini) tactfully chose not to comment directly on the imperial basilisk, restricting himself instead to condemning those "imposters" who frequently made basilisks "out of small dried rays."<sup>48</sup>

Aldrovandi's comments on the invention of the basilisk rested on the more extensive critique of this animal composed by the imperial physician Pier



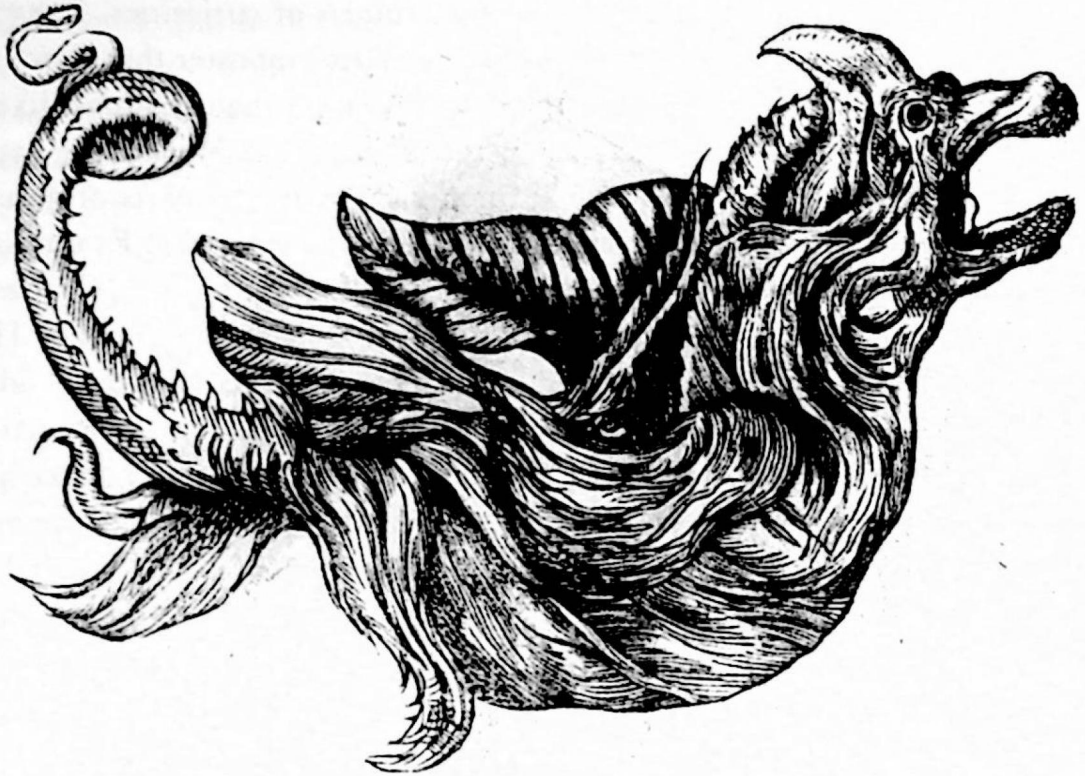
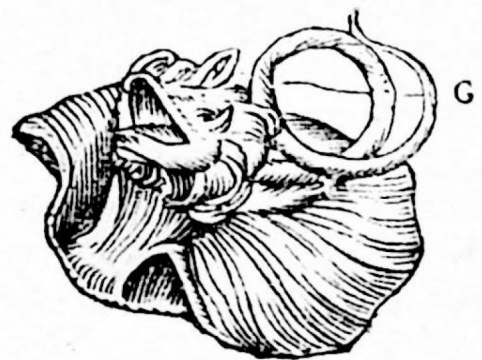
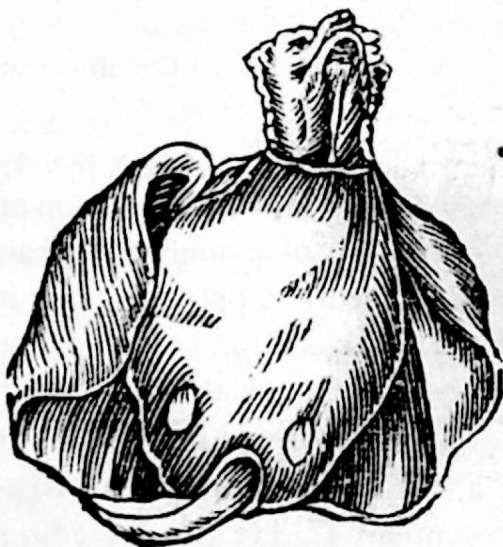


Figure 12.4 The “dragon formed a ray” in Ulisse Aldrovandi’s museum in Bologna. Source: Ulisse Aldrovandi, *De piscibus* (Bologna, 1613). Courtesy of Department of Special Collections, Stanford University Libraries.

### Basiliscus ex Raia effectus pronè, & supinè pictus.



H

Figure 12.5 Aldrovandi’s basilisk. Source: Ulisse Aldrovandi, *Serpentum et draconum historiae libro duo*, ed. Bartolomeo Ambrosini (Bologna, 1640). Courtesy of Department of Special Collections, Stanford University Libraries.

Andrea Mattioli. In the expansion of his 1544 commentary on Dioscorides's *De materia medica*, the leading handbook on medicinal simples since antiquity, Mattioli added a section on poisons. The final chapter of his popular commentary was devoted to the basilisk. "The variety of stories makes me easily believe that one can't determine anything about this animal," wrote Mattioli, "or know what its true history might be among all the stories told."<sup>49</sup> Nonetheless he proposed a few logical questions about the idea of the basilisk that reflected the growing numbers of specimens in cabinets of curiosities. How could something so dangerous that it could kill men instantly be so easily captured? If it were so small, how could men, observing it from a safe distance, see enough of its features to report on details such as the three points on the crested head, or the crown that it was often thought to wear? The basilisk, after all, had no Hercules to slay it like the hydra, nor a tale equivalent to the decapitation of the deadly Medusa. Only divine providence, or human delight in the endless invention of nature, could bring it into the museum.

The longevity of the basilisk, well beyond the period in which there was any doubt about its authenticity, suggests the importance of understanding the relations between science and art in the early modern period. Certainly the decision to make basilisks a prominent part of the iconography of natural history was a contributing factor. Each image created a prototype of an object that could be made by looking at its engraving, and remade by copying these images into new natural histories. Aldrovandi's fake dragons enjoyed a wide circulation in the seventeenth century. They reappeared in later editions of Aldrovandi's posthumous natural history and eventually found their way into Joannes Jonstonius's *Natural History of Serpents* (1657). In this work, Jonstonius brought together all of Aldrovandi's images to demonstrate the art of inventing nature (fig. 12.6). When it came to the basilisk, Jonstonius offered no lengthy discussion of its physical form, customs, and mythology, as earlier naturalists had done. He simply noted: "They are formed from a ray, just as one can see from this image. Preserved in the Bologna Museum."<sup>50</sup>

By 1622, connoisseurs of basilisks could enjoy a competing image of this dragon by turning to page 90 in the new and improved catalog of Calzolari's museum written by Benedetto Ceruti and Andrea Chiocco, two Veronese physicians in contact with the apothecary's grandson (fig. 12.7). There was a splendid portrayal of all the unique features of the basilisk, with a level of detail that no previous image had captured: the diadem decorating its crested forehead, the scales covering its wings and tail, the strange fins on which it balanced, and, most importantly, the act of flight. The engraver had succeeded in bringing the basilisk to life. Lest there be any confusion, Ceruti warned his readers: "You should know, lest any lies are discovered in our nomenclature, that this is neither a basilisk nor a dragon, but a fish from the

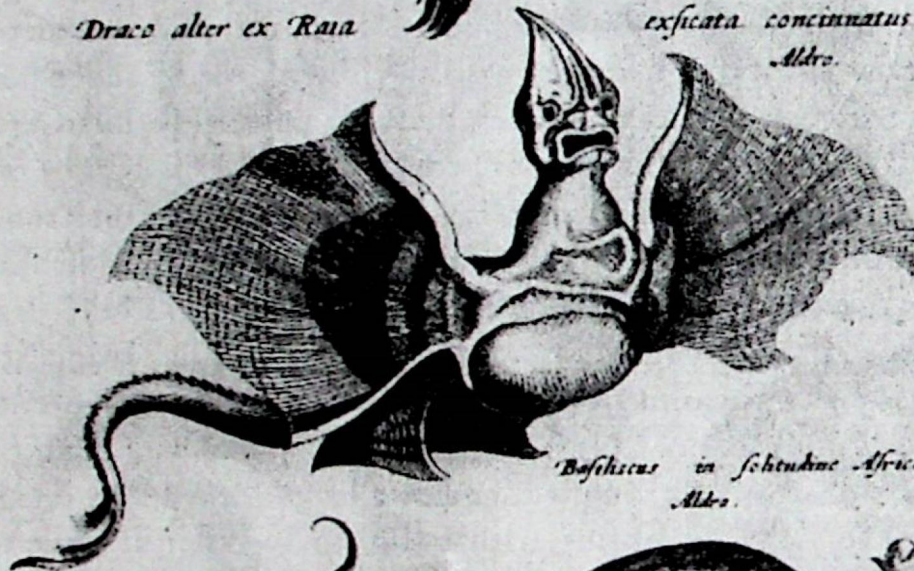


*Draco ex Raia effectus*  
Aldrov.

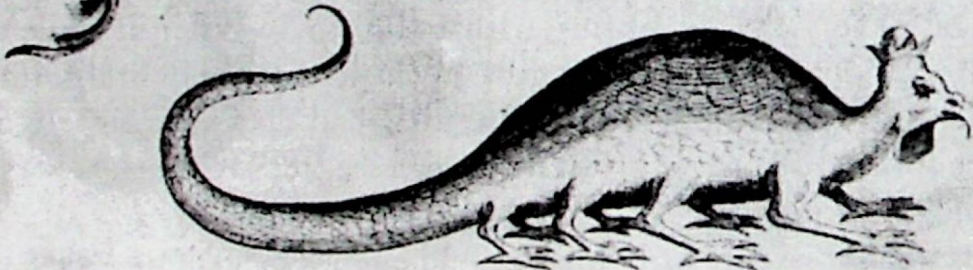


*Draco alter ex Raia*

*exficata concinnatus*  
Aldrov.



*Basiliscus in solitudine Africa vivens*  
Aldrov.



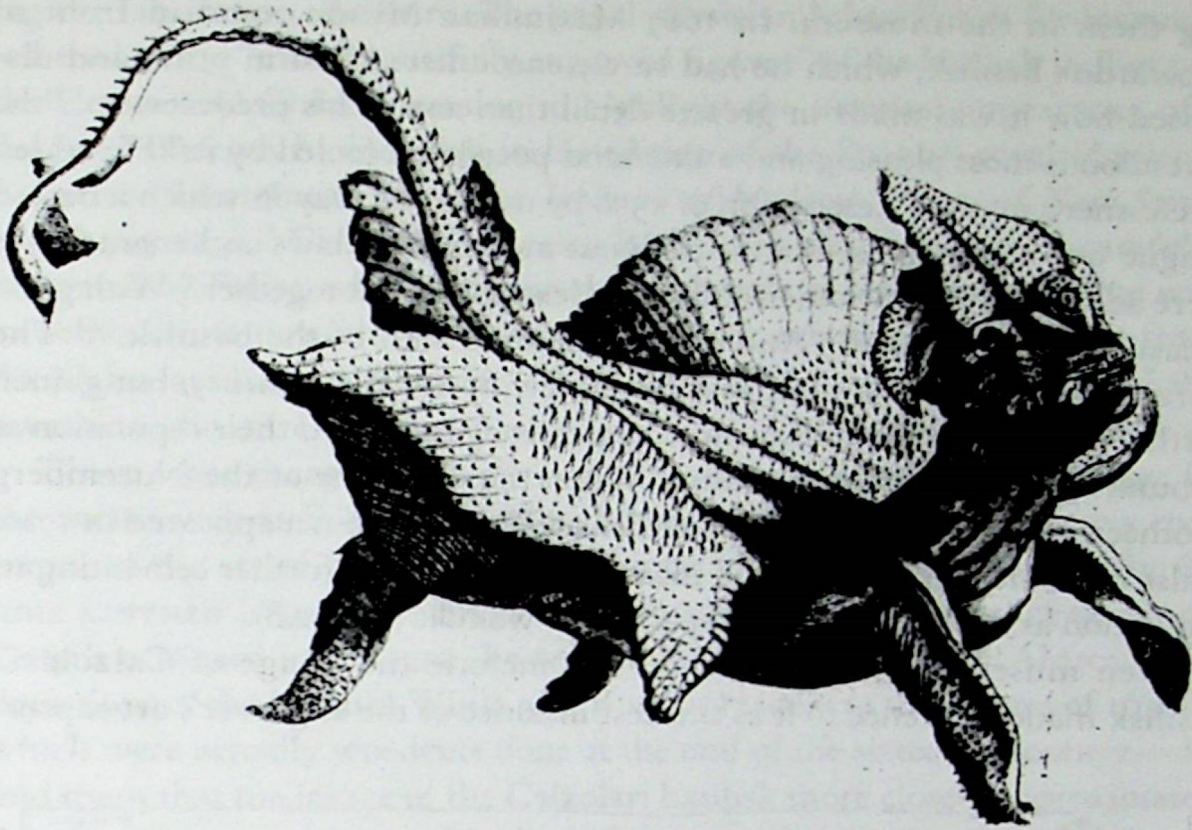
*Basiliscus ex Raia*

*effectus prone et supine pictus*  
Aldrov.



Figure 12.6 Joannes Jonstonius' reproduction of Aldrovandi's invented dragons. Joannes Jonstonius, *Historia naturalis de serpentibus libri II* (Amsterdam, 1657). Courtesy of the Biblioteca Nazionale Centrale, Florence.





*Figure 12.7* Calzolari's basilisk in Verona. Source: Benedetto Ceruti and Andrea Chiocco, *Musaeum Franc[isci] Calceolarii Iun[ioris] Veronensis* (Verona, 1622). Courtesy of the Biblioteca Nazionale Centrale, Florence.

sea — an ill-shaped ray of course — worked into this shape by the hand of an artisan.” He invited his readers to admire how Calzolari’s monster, “exhibited for viewing,” imitated the shape of the basilisk.<sup>51</sup>

Calzolari’s engraved basilisk quickly supplanted Aldrovandi’s illustrations as the canonical depiction of an object that *did* exist, even if the animal did not. When Lodovico Moscardo published two catalogs of his own collection in 1656 and 1672, he reproduced Calzolari’s image. Of course in Moscardo’s case it is not unlikely that he had Calzolari’s actual basilisk, since both collectors came from the same city. It was in regard to this particular basilisk that he offered the opinion that it “had been shaped in this way by swindlers and charlatans from Dalmatia, and shown by them in public stands to the people as a true basilisk.”<sup>52</sup> The image, in other words, now fully demonstrated the art of invention and the collector’s role as a critical consumer in the marketplace of marvels.

The power of Calzolari’s image and its circulation in various catalogues throughout the seventeenth-century attracted visitors to Moscardo’s museum who wanted to inspect the art of the basilisk. Catalogs gave objects a double life; visitors experienced them both in word and image, before see-



ing them in the museum. In 1687 Maximilian Misson stood in front of Moscardo's basilisk, which he had surely encountered first in print, and discussed how it was made in greater detail than any of his predecessors: "the invention is most pleasing and a thousand people are fooled by it." He added to Gessner's original description of 1558 by noting the way in which a darted tongue was neatly fitted into the fictitious mouth, and claws and enamel eyes were added "with some other little parts dexterously put together." With great pleasure, he concluded, "And voilà! The invention of the basilisk."<sup>53</sup> The Verona basilisk did not disappear from view in the next century, but gained further currency as naturalists more aggressively cultivated their reputation as debunkers of ancient superstitions. When the catalogue of the Nuremberg apothecary Basil Besler and his son Michael Rupert's cabinet appeared in 1716, it also contained an image of the 1622 Calzolari basilisk, further cementing its reputation as the measure of this particular wonder (fig. 12.8).

Even museum catalogs that did not include the image of Calzolari's basilisk made reference to it as the best instance of the engraver's art captur-

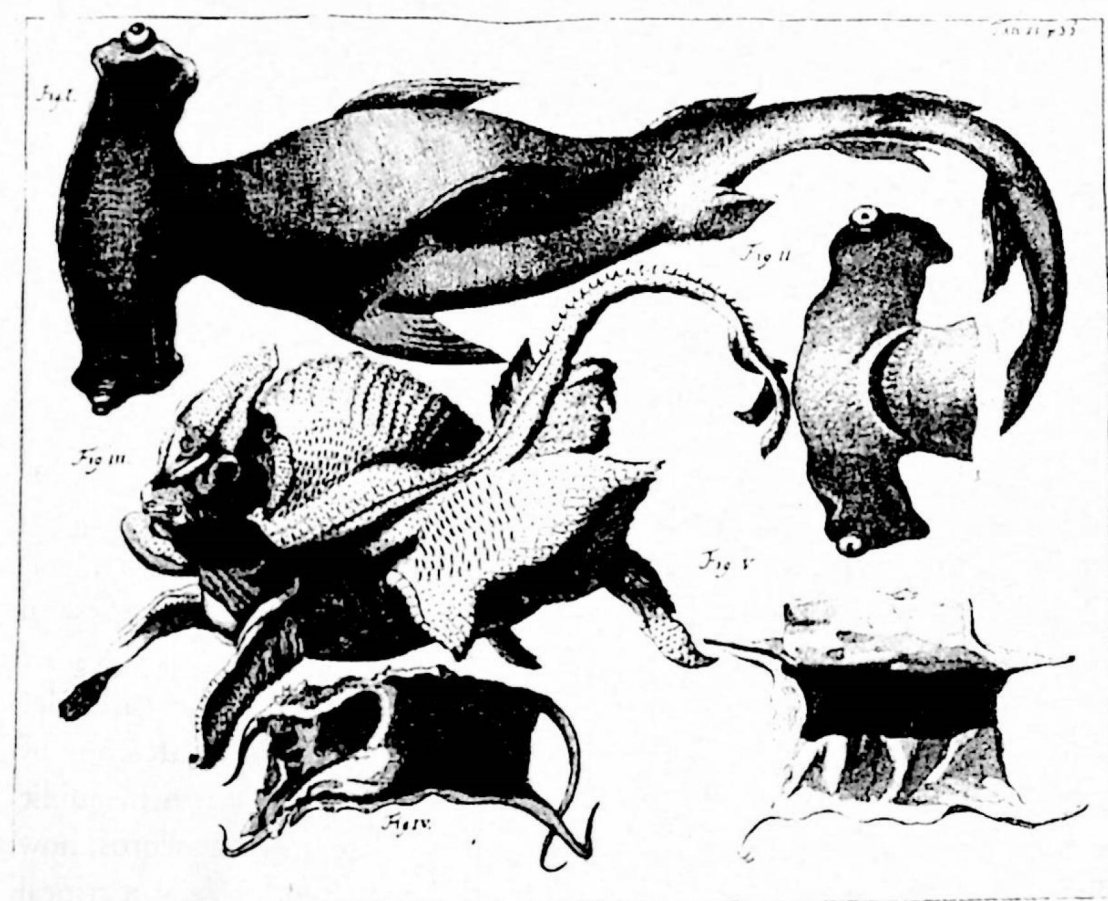


Figure 12.8 Basil and Michael Rupert Besler's basilisk, with a demonstration of how it was made from a ray. Source: *Rariorum Musei Besleriani quae olim Basilius et Michael Rupert Besler collegerunt, aeneisque tabulis ads vivum incisa evulgarunt: nunc commentariolo illustrata a Johanne Henrico Lochnero* (Nuremberg, 1716). Courtesy of the Biblioteca Nazionale Centrale, Florence.

ing the fabrication of nature. The papal physician Johan Faber, for instance, referred to the “most beautifully engraved figures” of the basilisk in flight in the Ceruti and Chiocco catalog to highlight the unusual appearance of a dragon’s skeleton he included in his edition of the Spanish royal physician Francisco Hernández’s famous *Treasure of Medical Things of New Spain* (1649) (fig 12.9).<sup>54</sup> Cardinal Francesco Barberini’s dragon had been carefully inspected by Faber, who pronounced it authentic in every respect. One way to demonstrate its authenticity was to depict it in a manner different from the Calzolari basilisk because it had become the canonical image of the invention of nature.

There were many technical reasons to admire the Calzolari image. In comments such as Faber’s we get a glimpse of the naturalist as a savvy consumer of the art of printing as a technique for reproducing nature. By the time Lorenzo Legati composed the 1677 catalog of Marchese Ferdinando Cospi’s museum in Bologna, he was no longer satisfied with Aldrovandi’s depictions of the basilisk. While referring his readers to the images of 1640—which were actually woodcuts done at the end of the sixteenth century—he told them that the image of the Calzolari basilisk more closely approximated the object he was trying to describe. “Other than being most finely engraved



*Figure 12.9* Cardinal Francesco Barberini’s dragon in Rome, as described by papal physician Johan Faber. Source: Francisco Hernández, *Rerum medicarum novae hispaniae thesaurus seu plantarum animalium mineralium Mexicanorum Historia ex Francisci Hernandez*, ed. Johan Faber (Rome, 1649). Courtesy of Bancroft Library, University of California, Berkeley.

in copper, it also articulates the spines and roughness of the tail that one doesn't observe in the first figures."<sup>55</sup> Legati did not follow Moscardo's example of including the image, on the presumption that readers of his catalog would simply turn to a copy of the 1622 catalog to confirm his opinion. In a much more decisive way, Legati reminded his audience that depicting a dubious nature was a special kind of art.

Only one seventeenth-century scholar took the image that Faber created in the 1640s to be a better likeness of a dragon. Both the image and description of Faber's dragon appeared prominently in the German Jesuit Athanasius Kircher's *Subterranean World* (1664).<sup>56</sup> But this was hardly surprising since Kircher was in the midst of dissecting a dragon's head with the Barberini librarian Hieronymus Lancia after a flying dragon made its appearance in Rome in 1660. Kircher was perhaps the last naturalist to believe passionately in the reality of any papal dragon he saw, even though he knew well the stories of basilisks invented from rays. His successor as curator of the Roman College museum, the Jesuit naturalist Filippo Bonanni, tactfully chose not to discuss the Barberini dragons, confining his comments instead to a splendid example of a dried ray "sold by some as a basilisk." It was surely one of the two rays "formed by art" that Giorgio de Sepi described in the 1678 catalog of Kircher's collection.<sup>57</sup> By the end of the seventeenth century, the vast majority of naturalists agreed with Ceruti that hydras, basilisks, and dragons existed only to the extent to which artisans and engravers could bring them to life.

#### MONSTROUS CODA: THE LAST HYDRA FOR SALE

No account of the early modern invention of nature, however, ends without the moral that belief is more powerful than any number of criticisms that might demolish it. The last hydra to preoccupy the community of naturalists belonged to two merchants in Hamburg. In the city of Amsterdam, the apothecary Albert Seba routinely enjoyed the company of visitors to his famous cabinet of curiosities. Around 1720, he began to hear tales of the hydra of Hamburg (fig. 12.10). At first, he dismissed it as a mere fable. A year later, a minister told him the same story and brought him an image of the hydra. But what finally convinced Seba that he needed to know more about the hydra was its price. "When I heard that it was for sale for 10,000 florins, a detail he confirmed, the immensity of the sum reawakened my desire to have a faithful copy of it." Seba's response to the hydra was not all that different than his contemporary Antonio Vallisnieri's reaction to the basilisk. Vallisnieri, one of the famed professors of natural history who practiced the kind of critical, microscopic natural history that his mentor Mar-





Figure 12.10 The hydra of Hamburg, engraved for Albert Seba. Source: Albert Seba, *Locupletissimi rerum naturalium thesauri accurata descriptio, et iconibus artificiosissimis expressio, per universam physices historiam* (Amsterdam, 1734), vol. 1, table CII. Courtesy of Bancroft Library, University of California, Berkeley.

cello Malpighi pioneered, kept a basilisk in his collection in Padua in the early eighteenth century because he could not believe the “high price” that an “Armenian trickster” had gotten for it.<sup>58</sup>

Commerce indeed was the final wonder of the art of inventing nature. Both truth and falsehood had their price. Seba immediately wrote to a fellow apothecary in Hamburg, asking his opinion of the hydra. “He assured me that it was in no way a work of art, but truly one of nature.”<sup>59</sup> The apothecary Natorp provided the “faithful copy” that Seba requested for him to see what kind of hydra it was. Seba subsequently circulated it widely among connoisseurs of curiosities by making it the most dramatic illustration in the 1734 catalog of his Amsterdam collection, even though he had no direct claim on the hydra. Shortly thereafter, young Linnaeus would declare that it was probably the fabrication of monks—not unlike the “basilisk’s tongue in two pieces” and the “two basilisk skeletons in pieces” that the abbot Matteo Priuli kept in his collection in Padua at the end of the seven-

teenth century. Debunking the hydra became part of Linnaeus's mythology as a modern naturalist.<sup>60</sup> Yet what we miss in such an account is Linnaeus's admiration for the hydra of Hamburg—a response to the fabrication of nature that he shared with Seba and all the naturalists who preceded them. The price on the hydra may have declined precipitously thereafter, but it was still a work of art.<sup>61</sup>

## Notes

1. See especially Lorraine Daston and Katharine Park, *Wonders and the Order of Nature 1150–1750* (New York: Zone Books, 1998); and Jean Céard, *La nature et les prodiges. L'insolite au siezième siècle* (Geneva: Droz, 1977); Ottavia Niccoli, *Prophecy and People in Renaissance Italy*, trans. Lydia G. Cochrane (Princeton, N.J.: Princeton University Press, 1990); and William Burns, *An Age of Wonders: Prodigies, Providence, and Politics in England, 1658–1727* (Manchester: Manchester University Press, 2001).

2. Nicolò Serpento, *Il mercato delle maraviglie della natura ovvero storia naturale* (Venice, 1653), n. p., "Introdutione per chi legge."

3. Tommaso Garzoni, *Piazza universale di tutte le professioni del mondo*, ed. Paolo Cherchi (Turin: Einaudi, 1996).

4. See Anne Goldgar's essay in this volume.

5. John Evelyn, *The Diary of John Evelyn*, ed. William Bray (London: Bickers and Son, 1906), Vol. 1, 51 (Paris, 3 February 1644).

6. The role of gifts in early modern natural history is discussed in Paula Findlen, "The Economy of Scientific Exchange in Early Modern Italy," in *Patronage and Institutions: Science, Technology and Medicine at the European Courts, 1500–1750* (Woodbridge, U.K.: Boydell & Brewer, 1991), 5–24; Giuseppe Olmi, "Molti amici in varii luoghi": Studio della natura e rapporti epistolari nel secolo XVI," *Nuncius* 6 (1991): 3–31; and Brian Ogilvie, *Observation and Experience in Early Modern Natural History* (Ph.D. diss., University of Chicago, 1997), esp. 8, 129–130, 241–242.

7. Hans-Olof Boström, "Philipp Hainhofer and Gustavus Adolphus's *Kunstschrank*," in *Origins of Museums: Cabinets of Curiosities in Early Modern Europe*, ed. Oliver Impey and Arthur MacGregor (Oxford: Clarendon Press, 1983), 91. For further discussion of this approach to a cabinet of curiosities, see Pamela H. Smith, *The Business of Alchemy: Science and Culture in the Holy Roman Empire* (Princeton, N.J.: Princeton University Press, 1994).

8. See Mark Meadow's and Harold Cook's essays in this volume for more on Hans Jacob Fugger and Jan Swammerdam.

9. John Ray, *Observations Topographical, Moral, & Physiological; Made in a Journey Through part of the Low-Countries, Germany, Italy, and France* (London, 1673), 237; and Philip Skippon, *An Account of a Journey Made Thro' Part of the Low-Countries, Germany, Italy, and France*, in *A Collection of Voyages and Travels*, eds. A. and S. Churchill (London, 1752), Vol. 6, 565.

10. Many of the essays in *Cultures of Natural History*, ed. Nick Jardine, James Secord, and Emma Spary (Cambridge: Cambridge University Press, 1995), touch upon this theme.

11. The commercial aspect of Columbus's interest in nature should be considered alongside those elements described in Mary Campbell, *The Witness and the Other World: Exotic European Travel Writing 400–1600* (Ithaca, N.Y.: Cornell University Press, 1988); and Stephen Greenblatt, *Marvelous Possessions: The Wonder of the New World* (Chicago: University of Chicago Press, 1991).

12. Theriac was an ancient medicine, described in great detail by Galen and composed of numerous ingredients that allegedly cured all manner of poisons. It was increasingly taken as a preventive medicine in an era of frequent plague epidemics. See Findlen, *Possessing Nature: Museums, Collecting, and Scientific Culture in Early Modern Italy* (Berkeley: University of California Press, 1994), ch. 5.

13. Patrick Geary, *Furta Sacra: Thefts of Relics in the Central Middle Ages* (Princeton, N.J.: Princeton University Press, 1978), indicates the extent of the passion for relics whose value escalated to such a degree that people stole as well as bought them.

14. Daston and Park, *Wonders*, 69, 74.

15. This marvelous passage is discussed in Ogilvie, *Observation*, 241.

16. Biblioteca Universitaria, Bologna (hereafter BUB), *Aldrovandi*, ms. 136, Vol. 9, c.5v (Castelletti to Aldrovandi, Genova, 22 February 1579).

17. See, for example, Ulisse Aldrovandi, *De piscibus libri V* (Bologna, 1613), 401. "De centrine" describes fish he acquired from Castelletti, who called them "verae ac genuinae."

18. BUB, *Aldrovandi*, ms. 136, Vol. 9, c.129r (Castelletti to Aldrovandi, n.d.)

19. Archivio di Stato, Pisa, *Università*, 530, c.2r (*Spese occorse nel viaggio fatto da un simplicista per ritrovare piante e minerali*); 518 (16 April 1604). This material is also discussed in Lucia Tongiorgi Tomasi, "Arte e natura nel Giardino dei Semplici: dalle origini alla fine dell'età medicea," in *Giardino dei Semplici: l'Orto botanico di Pisa dal XVI al XX secolo* ed. Fabio Garbari, Lucia Tongiorgi Tomasi, and Alessandro Tosi (Ospedaletto: Pacini, 1991) 162.

20. Ambroise Paré, *On Monsters and Marvels*, trans. Janis L. Pallister (Chicago: University of Chicago Press, 1980), 128.

21. BUB, *Aldrovandi*, ms. 38, Vol. 4, f.46 (Antonio Anguissola, Piacenza, 12 April 1568). The Italian original literally describes Master Leone as someone who "monta in banco spesso"—the origins of the word "mountebank."

22. The fascinating story of Leone Tartaglini has been reconstructed in Achille Forti, "Del drago che si trovava nella Raccolta Moscardo e di un probabile artefice di tali mistificazioni: Leone Tartaglini da Foiano," *Madonna Verona* 8 (1914): 26–51; and idem, "Il Basilisco esistente al Museo Civico di Storia Naturale a Venezia e gli affini simulacri finora conosciuti. Contributo alla storia della ciarlataneria," *Atti del Reale Istituto Veneto di scienze, lettere ed arti* 87, part 2 (1928–29): 225–238.

23. Skippon, *Account of a Journey*, 517. Compare with Ray, *Observations*.

24. Lodovico Moscardo, *Note ovvero memorie del Museo del Conte Lodovico Moscardo nobile veronese* (Verona, 1672), 235. Moscardo called them "ciurmatori, ò Zaratani." Achille Forti makes the interesting suggestion that the spelling of the last word indicated a kind of charlatan who came from Dalmatia into northern Italy so I have indicated this possibility in the translation. Forti, "Del drago," 30.

25. Conrad Gessner, *Historia animalium* (Tiguri, 1558), 4, 945.

26. Mario Cermenati, "Francesco Calzolari e le sue lettere all'Aldrovandi," *Annali di botanica* 7 (1908): 48 (Verona, 16 December 1571).

27. Ray, *Observations*, 27, 219.

28. BUB, *Aldrovandi*, ms. 136, Vol. 5, f. 179r. This episode is also discussed in Conor Fahy, *Printing a Book at Verona in 1622: The Account Book of Francesco Calzolari Junior* (Paris: Fondation Custodia, 1993), 20.

29. For more on this subject, see Pamela Smith's forthcoming book on artisans and science in early modern Europe.

30. Girolamo Cardano, *De rerum varietate*, in *Opera Omnia* (Leiden, 1663), Vol. 3, 342. Also discussed in Daston and Park, *Wonders*, 167.

31. Leonardo da Vinci, *The Notebooks of Leonardo da Vinci*, ed. Irma A. Richter (Oxford: Oxford University Press, 1952), 167. The original is in ms. A, f. 20r.



32. Colin Eisler, *Dürer's Animals* (Washington, D. C.: Smithsonian Institution Press, 1991), 311–312.
33. This formulation is found in Daston and Park, *Wonders*, 74, in their discussion of the medieval treasury. Since the treasury was the original location of many hydras and basilisks, it seems all the more fitting.
34. Conrad Gessner, *Nomenclator aquatiliū animantium. Icones animalium* (Tiguri, 1560), 362–363. Compare with Conrad Lycosthenes, *Prodigorum ac ostentorum chronicon* (Basel, 1657 ed.), 538–539. For further discussion of the religious significance of the hydra, see *Mythical Beasts*, ed. John Cherry, (London: British Museum Press, 1995), 20, 35–36.
35. BUB, *Aldrovandi*, ms. 21, Vol. 4, c. 89v.
36. Ulisse Aldrovandi, *Serpentum et draconum historiae libro duo*, ed. Bartolomeo Ambrosini (Bologna, 1640), 387. See the second hydra, which is evidently the hydra of Ferrara: "Hydra septiceps Equitis de Corneto affectatoris olim Sereniss. Ducis Ferrariae."
37. Edward Topsell, *Historie of Four-Footed Beastes* (London, 1607), 202.
38. Skippon, *Account of a Journey*, 565. "Zennon" is probably Giacomo Zanoni, a well-known Bolognese apothecary whom many collectors visited in the mid-seventeenth century. See also John Evelyn's account of a fifteen-headed hydra in the Villa Ludovisi in Rome that he saw in 1645; (*The Diary of John Evelyn*, ed. E. S. de Beer [Oxford: Clarendon Press, 1996, 1951], Vol. 2, 391).
39. Pierre Belon, *L'histoire naturelle des estranges poissons* (Paris, 1551), 18r. For a general discussion of fake animals, see E. W. Gudger, "Jenny Hanivers, Dragons and Basilisks in the Old Natural History Books and in Modern Times," *Scientific Monthly* 38 (June 1934): 511–523; Richard Carrington, *Mermaids and Mastodons: A Book of Natural and Unnatural History* (New York: Rinehart & Company, 1957); and Peter Dance, *Animal Fakes and Frauds* (Berkshire, UK: Sampson Low, 1976).
40. Gessner, *Historia animalium*, 945. Compare with Maximilian Misson, *Nouveau voyage d'Italie*, 5th ed. (La Haye, 1731), Vol. 1: 161–162.
41. See Daston and Park, *Wonders*; and Niccoli, *Prophecy*.
42. Carrington, *Mermaids and Mastodons*, 69–70. I have modified Carrington's translation of the passage in order to conform with other translations of "raia" as "ray."
43. Paré, *On Monsters and Marvels*, 109.
44. Cardano, *De rerum varietate*, 343.
45. Eisler, *Dürer's Animals*, 265, 321. An excellent example of a carved dragon can be found in the Museo degli Argenti in Florence, part of the Medicis' famous collection of worked objects.
46. Aldrovandi, *De piscibus*, 437, 443–444. I have wondered if the sea-eagle might not be Castelletti's bulging-eyed fish? The most detailed discussion of the sources of Aldrovandi's imagery can be found in Erminio Caprotti, *Mostri, draghi e serpenti nelle silografie dell'opera di Ulisse Aldrovandi e dei suoi contemporanei* (Milan: Gabriele Mazzotta, 1980).
47. For a classic description of the basilisk, see Lycosthenes, *Prodigorum*, 22; also Jacques Grevin, *De venenis libri duo* (Antwerp, 1571), ch. 18.
48. Aldrovandi, *Serpentum*, 364.
49. Pier Andrea Mattioli, *De i discorsi di M. Pietro Andrea Matthioli . . . Nelli sei libri di Pedacio Dioscoride Anazarbeo* (Venice, 1585 ed.), 1526–1527.
50. Joannes Jonstonius, *Historia naturalis de serpentibus libri II* (Amsterdam, 1657), 34.
51. Benedetto Ceruti and Andrea Chiocco, *Musaeum Franc[isci] Calceolarii Iun[ioris] Veronensis* (Verona, 1622), 90–91.
52. Moscardo, *Note*, 235.
53. Misson, *Nouveau voyage*, Vol. 1, 161.
54. Francisco Hernández, *Rerum medicarum novae hispaniae thesaurus seu plantarum animalium mineralium Mexicanorum Historia ex Francisci Hernandez*, ed. Johan Faber (Rome,

1649), 818. This text is discussed in greater detail in Silvia de Renzi, "Herodotus and the Microscope: Investigating Dragons in Seventeenth-Century Rome" (unpublished paper). I thank Dr. de Renzi for providing me with a copy.

55. Lorenzo Legati, *Museo Cospiano* (Bologna, 1677), 81.

56. Athanasius Kircher, *Mundus subterraneus* (Amsterdam, 1678), 103–108.

57. Filippo Bonanni, *Musaeum Kircherianum* (Rome, 1709), 270; Giorgio de Sepi, *Romani Collegii Societatis Jesu Musaeum Celeberrimum* (Amsterdam, 1678), 27. He concluded: "They are deformed rays and putative basilisks and, in the author's opinion, made by art and not by nature." There is no doubt that this opinion was also Kircher's, suggesting that he shared Aldrovandi's view of the distinctions between true dragons and false basilisks.

58. Antonio Vallisnieri, *Opere fisico-mediche* (Venice, 1733), Vol. 3, 370. Vallisnieri's biographer C. Lodoli also discussed how he showed the basilisk to "reveal the monstrous deceptions perpetrated in other museums where much was made of miraculous works of nature such as basilisks, fabulous hydras, petrified bread and fungi and other similar nonsense." Ibid., Vol. 1, LVI. This latter passage is discussed in Krzysztof Pomian, *Collectors and Curiosities: Paris and Venice, 1500–1800*, trans. Elizabeth Wiles-Portier (London: Polity, 1990), 104.

59. Albert Seba, *Locupletissimi rerum naturalium thesauri accurata descriptio, et iconibus artificiosissimis expressio, per universam physices historiam* (Amsterdam, 1734), Vol. 1, table 102, 159.

60. Pomian, *Collectors*, 103. On the hydra of Hamburg, see Colin Clair, *Unnatural History: An Illustrated Bestiary* (London: Aberlard-Schuman, 1967), 211–212, 235; and Dance, *Animal Fakes*, 33–36. For an excellent introduction to Linnaeus, see Lisbet Koerner, *Linnaeus: Nature and Nation* (Cambridge, Mass.: Harvard University Press, 1999).

61. Samuel Butler's *Hudibras* recounts a less well-known story—a send-up of the whole cult of fictitious nature—about a dead rat that James Bobart found in the Oxford physick garden in the late seventeenth century and turned into a dragon to see who would believe him. Yet after he revealed the joke, the dragon remained in the cabinet of curiosities associated with the Oxford anatomy theater, "looked upon as a masterpiece of art." In Dance, *Animal Fakes*, 59.