

1 Visions of ancient natural history

Ancient books were essential sources for Renaissance naturalists: above all, Aristotle on animals, Theophrastus and Dioscorides on plants, and Pliny the Elder's encyclopaedic *Natural History*. Equally important, though, were shared visions of how the ancients studied nature. Like the Renaissance understanding of the ancient world in general, naturalists' visions of ancient natural history were grounded in sources, but on those solid foundations they projected their own desires and practices. Not the least of these was their conviction that there was an ancient discipline called 'natural history' with a coherent history, an idea that they projected on what were, in fact, several distinct projects for investigating the animal and plant world. Some of those projects had a continuous tradition, such as the practice of agriculture and herbal medicine, but others – notably the philosophical zoology and botany of Aristotle and Theophrastus – were local, short-lived enterprises. Like humanists more generally, as Renaissance naturalists studied antiquity, they idealised it.

Aristotle and Solomon, founders of natural history?

'Alexander the Great', wrote the Swiss physician Conrad Gessner around 1550, 'burning with desire to know the nature of animals, delegated this work to Aristotle, the master of every subject, and ordered a thousand men to assemble everything that was hunted, fished, and kept domestically in the lands of Greece and Asia, so that he should remain ignorant of nothing born there'. When Aristotle finished his studies and presented fifty books to Alexander, Gessner continued, he was rewarded with a kingly sum: 700 gold talents according to some authors, 800 according to others. In Gessner's day, the scholars Robert Cenalis and Guillaume Budé agreed, 100 Attic talents were 600,000 crowns: thus, Aristotle received 4 or 5 million crowns.¹

That was thousands of times what Gessner himself received as the city physician of Zurich, his post while he was compiling his own *Historia animalium* ('History of Animals'). But Alexander got his

money's worth: the great warrior's name was remembered above all, Gessner claimed, for being Aristotle's patron. Gessner returned to the theme a few years later in his history of oviparous quadrupeds (1554), and again in his history of aquatic animals (1558). In that volume, dedicated to none other than the Holy Roman Emperor Ferdinand himself, Gessner not so subtly hinted that Ferdinand ought to play Alexander to Gessner's Aristotle.

Gessner was far from the only writer to portray Aristotle as the head of a vast research project supported by a royal fortune. In his preface to John Gerard's *Herball* (1597), the physician Stephen Bredwell cited the example negatively as well as positively:

Admirable and for the imitation of Princes, was that act of Alexander, who setting Aristotle to compile commentaries of the brute creatures, allowed him for the better performance thereof, certaine thousands of men, in all Asia and Greece, most skilfull observers of such things, to give him information touching all beasts, fishes, foules, serpents and flies. What came of it? A book written, wherein all learned men in all ages since do exercise themselves principally, for the knowledge of the creatures. Great is the number of those that of their owne private, have laboured in the same matter, from his age downe to our present time, which all do not in comparison satisfie us. Whereas if in those ensuing ages there had risen still new Alexanders, there (certainly) would not have wanted Aristotles to have made the evidence of those things a hundred fold more cleered unto us, than now they be.²

In Bredwell's understanding of history, great achievements required munificent patrons; the renewal of natural history in the sixteenth century owed much to patrons such as the Holy Roman Emperor Ferdinand, Cosimo de' Medici and King Henri II of France.

In one way or another, Gessner, Bredwell and others were repeating Pliny the Elder: Gessner's account was lifted, nearly word for word, from Pliny's *Natural History* (8.17.44), with additions from Athenaeus's *The Learned Banqueters*. Two centuries later, the comte de Buffon would refer back to the Aristotle–Alexander story in support of his belief that Aristotle's empirical approach to taxonomy was superior to the rational method of Buffon's rival Linnaeus.

Despite its good classical pedigree, the story was most certainly a fabrication. Aristotle's works reveal that he knew quite a lot about animals, especially those of the eastern Mediterranean.³ Yet his accounts of the fauna of the Near East are sketchy and rely on second-hand reports. Moreover, Alexander was engaged in a campaign of rapid conquest; he had neither the bureaucracy nor the time to send specimens back to the Lyceum in Athens. Pliny was projecting backwards to Aristotle's time the sort of systematic quest for exotic animals driven by Roman Imperial games in the Flavian Amphitheatre (the Colosseum).⁴

Renaissance naturalists had little reason to doubt Pliny and Athenaeus. The story of Aristotle and Alexander fitted the idealised vision of classical antiquity that characterised the humanist movement of Renaissance Europe. Humanists appealed further to Old Testament sacred history: to Adam, who gave every creature its name, but whose perfect knowledge was lost in the twin catastrophes of the Fall and the Flood, and to Solomon, who ‘spake of trees, from the cedar tree that is in Lebanon even unto the hyssop that springeth out of the wall: he spake also of beasts, and of fowl, and of creeping things, and of fishes’.⁵ In his scientific utopia *The New Atlantis*, the English natural philosopher Francis Bacon claimed that the people of the fictional island of Bensalem had preserved Solomon’s natural history. In reality, Solomon’s wisdom was lost to the moderns, but his example, alongside Alexander’s, suggested that not only kings but also God himself smiled on natural history.

Humanist naturalists and the ancient past

For Gessner, Bredwell and other participants in the humanist movement of the European Renaissance, classical antiquity was both a beacon and a standard. Already by the early fifteenth century, scholars stepped in the classical *studia humanitatis* – grammar, rhetoric, poetry, history, and ethics – spoke of the ‘rebirth of literature’ in the works of Petrarch, Boccaccio and other fourteenth-century writers. By the sixteenth century, literary scholars (Polydore Vergil), art historians (Giorgio Vasari), anatomists (Andreas Vesalius) and naturalists (Conrad Gessner) had elaborated this idea of rebirth into a more comprehensive historical scheme. The arts and sciences had flourished in ancient Greece and Rome, from the age of Homer to that of Augustine. In the Middle Ages, the twin forces of barbarism and superstition had ruined them; and in the modern age, they were being restored to their ancient glory. This restoration had been made possible by the scholars who recovered ancient texts, restored them to their pristine condition, replaced erroneous medieval translations and fatuous medieval commentaries with accurate translations and interpretations, and used them as models – not to imitate slavishly, but to emulate.

Needless to say, this vision of antiquity was tendentious.⁶ Classical texts had not vanished during the Latin Middle Ages: the very existence of medieval translations and commentaries attests to their availability and use. Nonetheless, the scheme, which we find repeated over and over in sixteenth- and seventeenth-century histories of the arts and sciences, reveals how important ancient texts and models were to Renaissance thinkers. Natural history is no exception. Modern natural history was born

out of the attempt to understand ancient books on plants and animals, and to compare their claims with what naturalists observed themselves. Even as the actual claims of ancient texts diminished in importance, certain ancient authors and their texts – above all, Aristotle – continued to be taken seriously. From the fifteenth through the eighteenth centuries, natural history was profoundly shaped by these visions of classical antiquity.

Renaissance thinkers also shared a broad vision of sacred antiquity. In this vision, Adam, who gave all creatures their proper name, had been imbued with knowledge of all the arts and sciences. Much of this knowledge, and the perfect language in which he had expressed it, was lost with the Fall, or perhaps with the confusion of languages at Babel, but divine revelation kept its spark alive. Moses possessed a portion of it, as did Solomon. And in Egypt, some of this knowledge was passed on to the Egyptian Hermes Trismegistus ('Thrice-great Hermes'), and eventually, during his studies in Egypt, to the Greek philosopher Plato.⁷ John Gerard cited Adam as 'the Herbarist' of the Garden of Eden, and noted that Solomon, wisest and most royal of kings, in 'his lofty wisdom thought no scorn to stoupe unto the lowly plants'.⁸ The engraved title page of Carolus Clusius's *Rariorum plantarum historia* (1601) gave pictorial form to this idea: underneath the Tetragrammaton (the Hebrew YHWH), four figures represented ancient knowledge of plants: Adam and Solomon above, Theophrastus and Dioscorides below (Figure 1.1).

The English herbalist John Parkinson explicitly contrasted the pagan and Christian stories in his address 'to the courteous reader' in his 1629 *Paradisus Terrestris* ('Earthly Garden'):

Although the ancient Heathens did appropriate the first invention of the knowledge of Herbes . . . some unto Chiron the Centaure, and others unto Apollo or Ae[s]culapius his sonne; yet wee that are Christians have out of a better Schoole learned, that God, the Creator of Heaven and Earth, at the beginning when he created Adam, inspired him with the knowledge of all natural things (which successively descended to Noah afterwards, and to his Posterity).⁹

Ancient sources

Though Renaissance humanists identified both Christian and pagan origins for natural history, the actual texts they had at hand derived almost exclusively from the latter – and not only those that modern historians identify as works of natural history. All kinds of texts, from travel narratives to lyric poetry, provided a trove of facts, some of them more dubious than others, about animals, plants and minerals. But certain texts also introduced methods for studying nature and

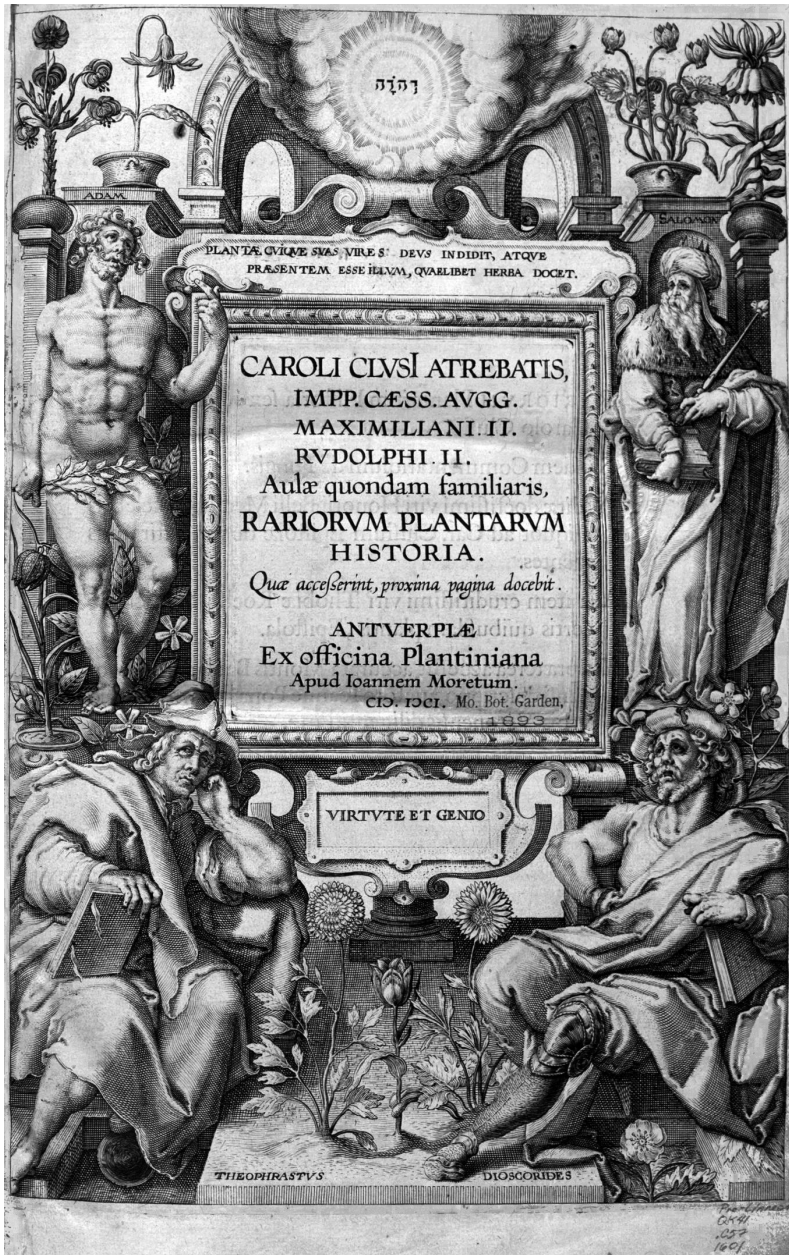


Figure 1.1 Engraved title page to C. Clusius, *Rariorum plantarum historia* (Antwerp, 1601). Under the Divine Name, the engraving depicts the principal ancient sources of Renaissance botany, imagined or real: Adam, who gave all creatures their names; Solomon, who wrote about all creatures great and small (in books that did not survive); Theophrastus, author of books on the history and causes of plants; and Dioscorides, who produced the most important ancient work on medical botany. Image from the Biodiversity Heritage Library. Digitised by Missouri Botanical Garden, Peter H. Raven Library (www.biodiversitylibrary.org).

provided models for naturalists as they wrote their own books of natural history.

Despite what Renaissance naturalists claimed, the classical world had no discipline or genre of 'natural history'.¹⁰ Gessner and his fellow humanists did not consciously set out to deceive their readers. But

they interpreted their ancient sources and models in light of the practices for investigating nature that they themselves had developed from the 1490s through the 1550s: identifying plants and animals; collecting them or their parts; describing in image and word their forms, places, habits and medicinal virtues; noting their cultural associations and uses; and trying to make some sense out of the underlying natural order that many of them vaguely perceived. The story of the birth, decline and rebirth of natural history was elaborated in the sixteenth century. The late fifteenth-century humanist Giorgio Valla, for instance, had no separate category for natural history in his encyclopaedic overview of secular learning, *De rebus expetendis et fugiendis* ('Things to Seek and to Avoid', published posthumously in 1501). Following his ancient sources, Valla discussed plants and animals in three separate parts of his work: the books on natural philosophy, agriculture and husbandry, and medicine.

The texts that Renaissance naturalists retrospectively fused into one tradition came, in fact, from several ancient literary genres.¹¹ There were works called *Inquiries into Animals* (by Aristotle),¹² *Inquiries into Plants* (by his disciple Theophrastus), *On Plants* (attributed to Aristotle but written by someone else), *On the Nature of Animals* (by Aelian), and of course *Natural History* (by Pliny the Elder). But these were not part of a single literary tradition. Aristotle's and Theophrastus's works were part of a philosophical enterprise. Aristotle's *Inquiries into Animals* provided material for better understanding their generation, anatomy and motion; Theophrastus's *Inquiries* were accompanied by another work on *The Causes of Plants*. Aelian's book was a collection of animal lore. And Pliny's work was an enormous compilation of material, mostly drawn from other writers, on everything from geography to the medicinal and magical properties of gemstones, including books on animals and plants.

Beyond these works of natural philosophy and encyclopaedic compendia, there were three further ancient genres that contained material on natural history: medical texts, agricultural treatises and works on hunting and fishing. Of the first, the most important was *On Medicinal Substances*, written by the Greek physician Dioscorides of Anazarbos. Its five books contained hundreds of descriptions of plants, animals and minerals that could be used as 'simple medicines' or compounded into more elaborate drugs. The second included short works by Xenophon, Cato the Elder and Varro, as well as more substantial treatises by Columella and Palladius. And the third consisted of a handful of texts, some of them existing only in fragments, by Xenophon, Nemesianus and two different writers named Oppian.

Renaissance naturalists plumbed the depths of all these texts, but they also scoured other classical works for references to nature. In his 1552 book *De differentiis animalium* ('On the Distinguishing Characteristics of Animals'), the English scholar Edward Wotton cited 214 authorities,

though many were indirect citations by way of other sources.¹³ Of those, 191 were ancients, mostly Greek and Roman sources, though the Bible and Zoroaster also appeared in Wotton's list. Seven or eight were medieval, and the rest were fifteenth-century humanists or Wotton's contemporaries. And even that enumeration is misleading. Among the ten authorities who accounted for over a third of the index's 432 lines, there were eight ancients. Pliny was cited on 160 of the volume's 220 folios, Aristotle on 131, Galen on 90, Dioscorides on 50, Oppian on 48, Athenaeus on 39, Varro on 37 and Ovid on 34. Only two moderns were in the top ten: Theodore Gaza, cited on 69 folios, and Ermolao Barbaro, on 34. Gaza had translated Aristotle's works on animals into Latin, while Barbaro had written an important commentary on Pliny: even Wotton's modern authorities were cited because they were experts on antiquity.

The uses of antiquity

How did early modern naturalists use these ancient sources? We can identify three broad ways – interdependent, but distinct – in which ancient texts shaped the daily practice of Renaissance naturalists. First, they edited ancient texts, translated them from Greek into Latin, and commented on obscure or controversial passages. Second, they extracted every last fact that could be mined from their pages and organised them in new compilations. And third, they used certain classical works, but not all, as models for their own new compositions.

The earliest humanist engagement with ancient sources for natural history was in translations, textual editions and commentaries. In the 1440s and 1450s, George of Trebizond and Theodore Gaza, rival refugees from Byzantium, produced Latin versions of Aristotle, Theophrastus and other ancient philosophical and medical writers, making their works available to scholars in the Latin West.¹⁴ Gaza's translations became the basis for the first printed editions of many of these authors; the Venetian presses of Aldus Manutius soon followed, around the turn of the sixteenth century, with the first printed Greek editions.

Texts that referred to strange or obscure phenomena were particularly subject to 'corruption' through imperfect transcription, so textual critics like the Venetian Ermolao Barbaro and the Florentine Marcello Virgilio produced 'corrections' to received text in an attempt to ensure that the vitally important medical information contained in the works of Pliny, Dioscorides and others was as accurate as possible.¹⁵ And while the earliest commentaries were philological, focusing on textual problems and comparing manuscripts, later commentaries included factual criticism and, often, substantial new material alongside the ancient text. Indeed, the immensely popular 'commentaries' on

Dioscorides by the Italian Pier Andrea Mattioli ended up dwarfing the original work of the Greek military physician.

Meanwhile, compilers like Leonhart Fuchs, Conrad Gessner and Ulisse Aldrovandi, armed with new editions and translations of ancient texts, scoured those works for all the facts they could provide on the names, anatomy, physiology, behaviour, uses and cultural significance of plants and animals. In works such as Fuchs's *Notable Commentaries on the History of Plants* (1542), Gessner's *Historia animalium* and Aldrovandi's many folio volumes (published from 1599 until well after his death) on the history of trees, metals, birds, quadrupeds and monsters, ancient works were carved up and rearranged in ways their authors would never have imagined. In these weighty tomes, readers could find everything known to ancient and contemporary writers on creatures ranging from the 'antelope' to the 'zibet or civet cat', the first and last alphabetical entries in Edward Topsell's *Historie of Foure-Footed Beastes* (1607), a work that was largely a translation of Gessner's Latin.

Aldrovandi's 1602 tome *De animalibus insectis libri septem* ('Seven Books on Insects') provides an example of the compilers' methods. In his general introduction to insects, Aldrovandi touched on the nature of their coitus and generation, which was sometimes from a fertilised egg, and sometimes spontaneous, the result of the Sun's action on decaying organic matter. In support of these diverse views, he proffered a wealth of ancient sources and some modern commentators: along with extensive quotations from Aristotle's work *Generation of Animals*, he also cited Theophrastus, Pliny, Galen, St Augustine of Hippo, the fifth-century bishop Eucherius of Lyon and the sixteenth-century writer Julius Caesar Scaliger.¹⁶ Earlier, in the dedicatory letter to the Duke of Urbino, Aldrovandi had quoted the *Hieroglyphics* of the late antique writer Horapollo on how the scarab reproduced. But Aldrovandi supplemented ancient texts with his own observations – sometimes extensively; as he noted with surprise, ancient natural histories never mentioned dragonflies and damselflies, despite their ubiquity.

Even as they extracted facts from ancient texts, Renaissance naturalists also used ancient works as models for their own prose compositions. The most influential of these texts was Dioscorides's work *On Medicinal Substances*. Each of Dioscorides's chapters contained the names of a plant, animal or mineral substance; its description; the place and time where it could be found (unless it was available only from resellers in the marketplace); and its medicinal properties. This model was adopted by Renaissance botanists as the basis for their own descriptions of transalpine plants that were completely unknown to the ancients. The more expansive works of natural philosophers such

as Aristotle and Theophrastus were also emulated in works like Andrea Cesalpino's *De plantis* ('On Plants', 1583).

Turning away from antiquity

While sixteenth- and early seventeenth-century writers emulated ancient works and incorporated their contents, by the middle of the seventeenth century, those works were largely superseded. Ancient texts continued to provide justifications for studying nature. In the introduction to his *Anatomical Exercises on the Generation of Animals* (1651), the English physician William Harvey praised 'the ancient philosophers, whose industry even we admire', for their 'unwearied labour and variety of experiments'. Their knowledge was limited and their claims sometimes erroneous, but like the moderns who emulated them, they, 'following the traces of nature with their own eyes, pursued her through devious but most assured ways till they reached her in the citadel of truth'. Aristotle provided Harvey with a robust theory of knowledge: drawing on the *Physics*, the *Posterior Analytics* and the *Metaphysics*, Harvey argued that all knowledge came from sensory experience, and thus, knowledge of the generation of animals must be drawn from 'experience, i.e. from repeated memory, frequent perception by sense, and diligent observation'.¹⁷

But as naturalists and anatomists like Harvey turned toward the kinds of problems that had exercised Aristotle and Theophrastus – attempting not only to enumerate, describe and classify animals and plants but also to explain how and why they were generated and lived – the actual claims of ancient authors no longer attracted much attention. When Jan Swammerdam discussed the method to be adopted in natural history in his *Historia insectorum generalis* ('General History of Insects', 1669), his references were Harvey, Descartes and Robert Boyle, not the ancients. When John Ray justified the publication of his new *Historia plantarum* ('History of Plants') in 1686, he did so because many years had elapsed since the publication, in 1640 and 1650 respectively, of Parkinson's *Theatre of Botany* and Johann Bauhin's *Historia plantarum universalis* ('Universal History of Plants').

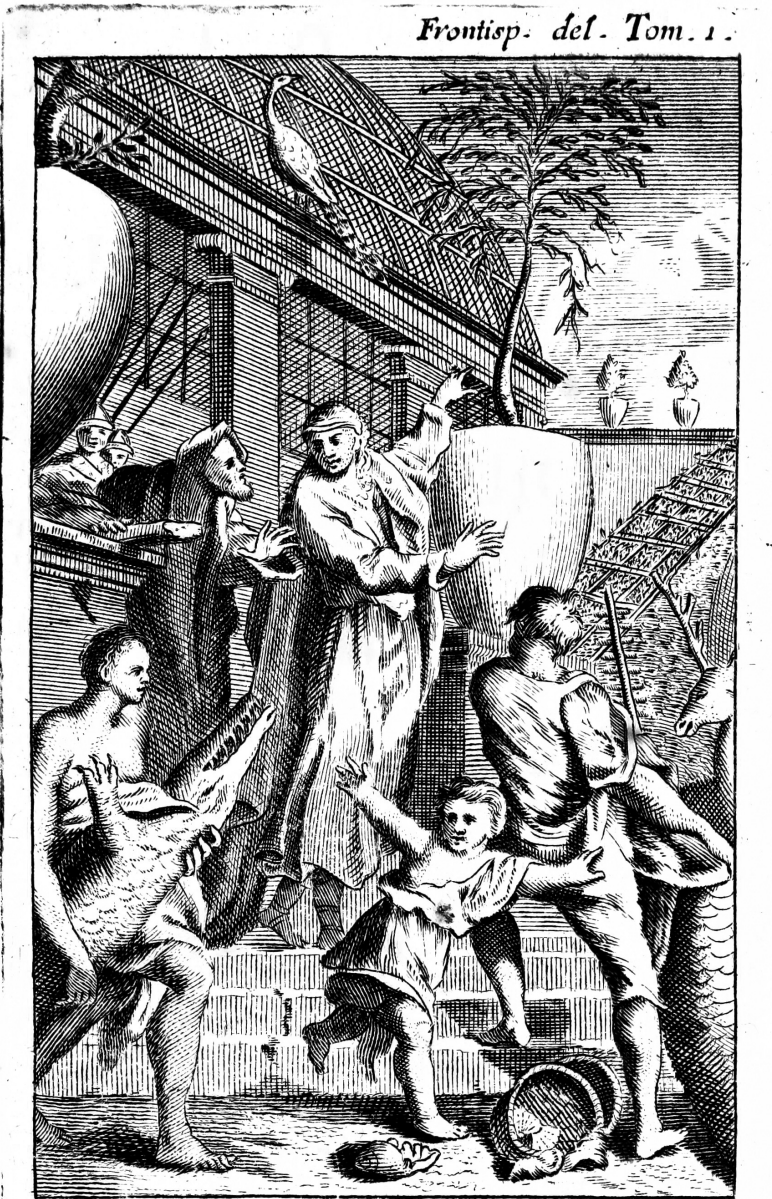
Enlightenment naturalists did not reject the Renaissance idea that the ancients had been the founders of their tradition. Nor did they, in general, declare a radical break between the ancients and their own time, as Galileo, Descartes, and other defenders of the New Sciences had done in the seventeenth century. Authors continued to appeal to the symbolic authority of antiquity. In the first volume of his immensely popular work, *Le Spectacle de la nature* ('The Spectacle of Nature', 1732–50), the French naturalist and clergyman Noël-Antoine Pluche offered an engraved frontispiece depicting the plants and animals of

the world being brought to King Solomon that he might describe them (Figure 1.2). They read the ancients – whose works, after all, were relatively slim, even Pliny's *Natural History* – but they did not linger on them.

When they did discuss the ancients, it was often critically. In his *Mémoires pour servir à l'histoire des insectes* ('Memoirs to Serve a History of Insects', 1734–42), the French academician René-Antoine Ferchault de Réaumur promoted the memoir, a detailed account of particulars, as best suited to his subject: 'Had Aristotle written his History of Animals following this plan, we would have learned much more from it. It contains many facts, and had he told us which ones he had witnessed himself, they would merit our belief; but he did not provide us a way to distinguish them from the others.' In his estimation, Pliny and Aelian, who based their works on Aristotle, were no better, and the organisation of Aristotle's book, too, was poor.¹⁸

Réaumur regretted that Aldrovandi, Gessner, Moffett and other Renaissance naturalists had spent so much time studying the ancients instead of nature itself. 'Nature opens, finally, even the eyes of those who are only looking to verify what they read in Aristotle and Pliny', but only after they 'gradually lost – perhaps even too much – the respect owed to the ancients'. Observers like Johannes Goedaert and Maria Sibylla Merian who could not read Latin were, in that respect, at an advantage. Indeed, the first step in studying the history of insects was to dispel the fables with which the ancients had surrounded the subject.¹⁹

Réaumur's rival, the comte de Buffon, appears to be an exception. In his *Natural History: General and Particular*, published in 44 volumes from 1749 to 1804, Buffon cited ancient writers hundreds of times, especially Aristotle.²⁰ In the lengthy discourse 'On how to study natural history' in his work's first volume, he proclaimed, 'it seems to me that Aristotle, Theophrastus, and Pliny, who were the first naturalists, were also the greatest in certain respects. Aristotle's history of animals is perhaps still the best work we have on the subject.' And, he added, Alexander's support made the whole thing possible.²¹ Buffon's praise of the ancients, though, followed immediately after his attack on his arch-rival Carl Linnaeus and the Swedish naturalist's disciples. He magnified the former to diminish the latter. The ancients, Buffon claimed, had a broad grasp of nature (like Buffon himself), whereas the Linnaeans (like Réaumur) focused on minutiae. When Buffon turned to specific claims made by the ancients, he could be highly critical, such as their appeals to spontaneous generation: 'Most of the species that the ancients believed to be generated from decaying matter in fact come from an egg or a worm, as modern observers have verified.'²² The nature and context of his citations suggest that ancient



Et disputavit super lignis, a cedro, quae est in Libano, usque ad hyssopum, quae egreditur de pariete: et disseravit de jumentis, et volucribus, et reptilibus, et piscibus. 3.1. de Regi 4:33.

Figure 1.2 The world's creatures being brought to Solomon for his natural history. Engraved frontispiece to N.-A. Pluche, *Lo spettacolo della natura*, vol. I (Venice, 1786, copy after the original French version from 1732). The artist has imagined Solomon in an eighteenth-century natural history institution, perhaps the Jardin et Cabinet du Roi (Royal Garden and Cabinet) in Paris. Image from the Biodiversity Heritage Library. Digitised by Smithsonian Libraries (www.biodiversitylibrary.org).

authority functioned as rhetorical confirmation of Buffon's own approach to the subject. If the ancients agreed with them, he approved; if not, he corrected them. Nature, not antiquity, was his guide.

Conclusion

Though the content of Enlightenment natural history owed little to the ancients, even toward the end of the eighteenth century we find echoes of the Renaissance vision of ancient natural history. In the third (1775) edition of his *Dictionnaire raisonné universel d'histoire naturelle* ('Universal Methodical Dictionary of Natural History'), Jacques-Christophe Valmont de Bomare offered an engraved frontispiece depicting Adam naming the animals (Figure 1.3). And the reader who turned to the first page of the text would find Adam's counterpart, Aristotle – or at least a figure who could be taken to be Aristotle – standing in a suspiciously Edenic setting and noting down his observations with an assistant at his side (Figure 1.4). The latter engraving echoes a fifteenth-century miniature depicting Aristotle as the 'scribe of nature'.²³

The vision of a continuous tradition of natural history, with Aristotle and Solomon as its ancient founders, has proven surprisingly durable. In a recent, insightful study of Aristotle, *The Lagoon*, the biologist Armand-Marie Leroi argues that the ancient Greek did nothing less than invent science itself. Modern biologists are less likely to think of Solomon as their ancestor. But it is striking that practising scientists, like Leroi or Ernst Mayr (in his monumental *The Growth of Biological Thought*, 1982), still look back to ancient Greece as if Aristotle and Theophrastus were engaged in the same enterprise as a modern biologist. Why should this be so?

Part of the answer lies in a tendency to define disciplines by their objects, not their methods and traditions: to think that anyone who studies a particular object is engaged in the same enterprise, regardless of how they do it. The eighteenth-century Swiss naturalist Albrecht von Haller took this point of view in his *Bibliotheca botanica* ('Botanical Library', 1771–2), a work promising to review every writing on botany 'from the beginning'. In fact, Haller went beyond his promise, beginning with the ancient Druids, Chinese and Egyptian sages whose writings, like Solomon's, survived only in hearsay. In this view, Aristotle counts as a founder of natural history because he collected animals, studied the differences between them, classified them into broad groups, dissected them and proffered an explanation of how and why they functioned. From this perspective, the fact that his word '*historia*' meant simply 'inquiry' and that he considered himself a *physikos* (inquirer into nature), not a naturalist, are unimportant.

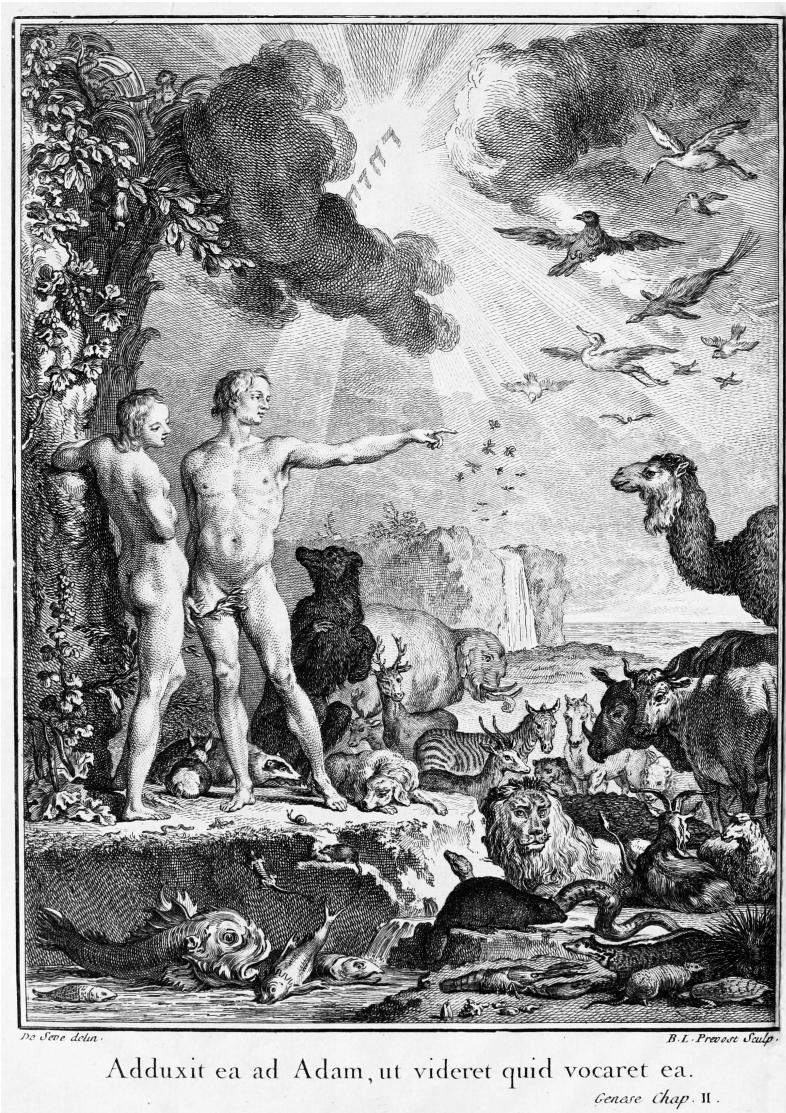


Figure 1.3 Adam naming the animals. Engraved frontispiece to J.-C. Valmont de Bomare, *Dictionnaire raisonné universel d'histoire naturelle*, vol. I (Paris, 1775). Even as natural history had less and less to do with actual ancient sources and methods, the myth of Adam's complete mastery of the natural order remained potent. Image from the Biodiversity Heritage Library. Digitised by Smithsonian Libraries (www.biodiversitylibrary.org).



Figure 1.4 In this engraving, two ancient Greeks – perhaps Aristotle and Theophrastus – describe the animals. Engraving in J.-C. Valmont de Bomare, *Dictionnaire raisonné universel d'histoire naturelle*, vol. I (Paris, 1775). Enlightenment iconography continued to reach for the classical as well as scriptural past. Unlike Adam, whose knowledge is divinely inspired, the Greek investigators are writing down their observations in a book. Image from the Biodiversity Heritage Library. Digitised by John Adams Library at the Boston Public Library (www.biodiversitylibrary.org).

A second reason lies in how subjects were taught in ancient, medieval and Renaissance schools. When texts had to be copied by hand, and were thus relatively rare and expensive, a typical way to teach was by commenting on an authoritative text.²⁴ To Gessner, Bredwell and other humanists, it was natural to think that the authors of texts used to teach natural history, such as Aristotle, Dioscorides and Pliny, were part of a continuous tradition of practice. We know that their manuscripts were copied and commented, and that they were sometimes used as reference works (especially in medicine), but we also know that, with a few exceptions, their expansive inquiries into nature were not emulated. Renaissance naturalists, though, failed to appreciate this – aided by the fact that, as William McCuaig pointed out, Renaissance

scholars often had only a vague appreciation of how profoundly ancient societies had changed; most tended to think of 'antiquity' as a whole.²⁵

But there is a third reason. The Renaissance vision of antiquity was powerful because its creators inserted ancient writers, and their texts, into their own milieu. Renaissance naturalists created a new way to study nature, one based on experiencing nature, collecting its specimens, describing them carefully, and cataloguing them, and then they read the ancients in light of those new practices. Humanists had learned that in many ways, antiquity was very different from their own age. But hard-learned as that lesson was, they often forgot it in practice. Their natural history was collaborative, based on extensive travel and correspondence, often involving objects brought at great expense from faraway lands. It was natural for them to think that Aristotle and Pliny had done the same, just as it seemed natural for Mayr and Leroi to imagine Aristotle as a twentieth-century scientist in ancient Greek garb.

But it is too simple to conclude that Renaissance naturalists – and their Enlightenment and modern successors – were just being bad historians of natural history. They were first of all practitioners, not historians, and they engaged ancient texts because they were, in fact, useful. Aristotle, Theophrastus, Dioscorides, Pliny, and even Aelian and the poets, provoked their readers. They offered unusual claims and, in some cases, powerful theories. Their works, read through the lens of Renaissance and Enlightenment practice, offered models for investigating nature and provocative claims to investigate, confirm or debunk. Ancient writers were not part of a continuous tradition of natural history. But in the Renaissance vision they were, and that vision inspired generations of naturalists.

Further reading

- Bolgar, R. R., *The Classical Heritage and its Beneficiaries* (Cambridge, 1963).
- Enekel, K. A. E. and Smith, P. J. (eds.), *Early Modern Zoology: The Construction of Animals in Science, Literature and the Visual Arts* (Leiden, 2007).
- French, R., *Ancient Natural History: Histories of Nature* (London, 1994).
- Grafton, A., Most, G. W. and Settis, S. (eds.), *The Classical Tradition* (Cambridge, MA, 2010). See especially the articles on 'Botany', 'Natural History', and 'Zoology'.
- Hornblower, S., Spawforth, A. and Eidinow, E. (eds.), *The Oxford Classical Dictionary*, 4th edn (Oxford, 2012).
- Huxley, R. (ed.), *The Great Naturalists* (London, 2007).

- Leroi, A.-M., *The Lagoon: How Aristotle Invented Science* (New York, 2014).
- Monfasani, J., 'Aristotle as scribe of nature: the title-page of MS Vat. Lat. 2094', *Journal of the Warburg and Courtauld Institutes*, 69 (2006), pp. 193–205.
- Nauert, C. G., Jr, 'Humanists, scientists, and Pliny: changing approaches to a classical author', *American Historical Review*, 84 (1979), pp. 72–85.
- Nauert, C. G., Jr, *Humanism and the Culture of Renaissance Europe*, 2nd edn (Cambridge, 2006).
- Ogilvie, B. W., *The Science of Describing: Natural History in Renaissance Europe* (Chicago, 2006).
- Perfetti, S., *Aristotle's Zoology and its Renaissance Commentators* (Leuven, 2000).
- Reynolds, L. D. and Wilson, N. G., *Scribes and Scholars: A Guide to the Transmission of Greek and Latin Literature*, 4th edn (Oxford, 2014).
- Sarton, G., *Appreciation of Ancient and Medieval Science during the Renaissance, 1450–1600* (New York, 1955).