



Image and Objectivity in Early Modern Ornithology

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Birds are closely bound to the history of illustration in natural history studies and, since Greco-Roman antiquity, also to general reflections on art. After all, starlings were prominent figures in Renaissance art theory. Deceived by the veristic depiction of grapes in an artwork, they tried to pick at the painted fruit in the famous and repeatedly retold anecdote of the competition between Zeuxis and Parrhasius.¹ A drawing by Hans von Aachen (Fig. 148) illustrates this popular legend of the fictional potency of painting. Here we see the animals deceived by Zeuxis's painting, which reveals that he not only knew how to imitate nature to perfection, but also had the gift of being able to outwit it.

If we take the masterly illustrations of animals of the sixteenth and seventeenth centuries, the question arises if we, as modern observers, also can be deceived by the very lifelike appearance of these representations. They depict the birds as if they were alive, and we have the impression that we can feel the softness of their plumage with our eyes. For a long time,

sheets with such images were discussed as evidence for the new Renaissance form of studying nature based on a quasi-objective empirical observation. Only recent research has brought to light that early modern images of natural history have their roots in complex traditions and that, additionally, the contingent objects themselves were not represented as a rule. Instead, through observation, pictorial ideal types were extracted to serve as scientific records. Encyclopaedic image collections of natural history objects were used for archiving and ordering knowledge in the sense of a *historia* of the different fields of knowledge. And also the allegorical interpretation of nature stemming from antique and medieval traditions long continued to be relevant, surviving into the seventeenth century, as Wolfgang Harms fascinatingly demonstrated in the case of the interpretations for the kingfisher. It was only gradually that new experiential knowledge supplanted the allegorical tradition that goes back to reports from antiquity. This, for example, maintained that the kingfisher hatched its young on



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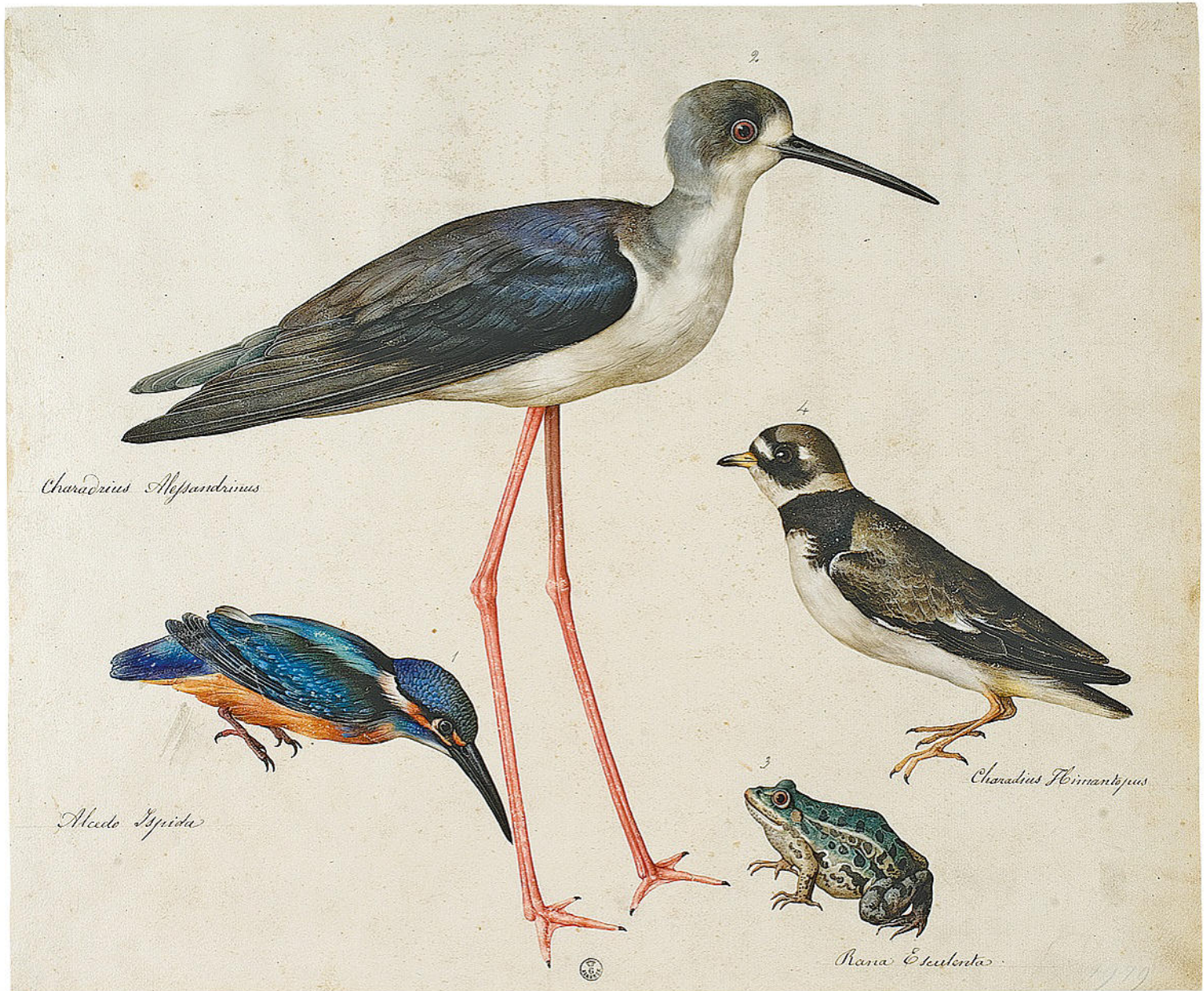
Hans von Aachen, *The Competition between Zeuxis and Parrhasius*, 1589, pencil and ink on paper, Collection Frits Lugt, Fondation Custodia, Institut Néerlandais, Paris

the ocean, which then calmed its waters—the so-called halcyon days—making this bird a symbol for ‘calm in the storm’ and even a symbol for a contemplative way of life.

In this essay I will focus on the field of knowledge of ornithology and seek to demonstrate how images and illustrated books played a decisive role in improving knowledge, despite the fact that they must be viewed critically because they were generated within a process of not only artistic but also scientific and technological upheaval.

The problem in question can be elucidated using an image (Fig. 149) that is assumed to have been executed around 1600 by Jacopo Ligozzi (1547–1627), who worked for the Medici court in Florence as a draftsman and left a considerable number of natural history illustrations as a legacy.² This example is undoubtedly testimony to truth to nature in its depiction and conveys the impression of an artist’s study made directly from the objects within it. A remarkable *autopsia* (firsthand experience) seems to be at work here, which earns the folio a place among a large group of surviving Renaissance animal studies

executed by Pisanello, Gentile da Fabriano, Albrecht Dürer, Giovanni da Udine, and others.³ But this only touches on one aspect of the history of this image. On a single page (Fig. 149) Ligozzi depicted three birds sharing water as their habitat. We recognize the kingfisher, a stilt (*Himantopus himantopus*), and a common ringed plover (*Charadrius hiaticula*), as well as a frog together in a biological context, at least to an extent. The representation of the kingfisher is unusual, as it appears to be a type of bird we encounter in constantly varied forms in illustrations. For example, the copperplate engraving published in 1622 in Giovanni Pietro Olini’s *Uccelliera* resembles in detail the sheet in question.⁴ And a definitely comparable depiction can be found on a sheet in the Galleria degli Uffizi that has been ascribed to Pordenone (Fig. 150), but I propose should instead be dated to the early seventeenth century. Research has not succeeded in finding a possible common source. The unnatural pose of the bird with its head extended upwards suggests the plausible explanation that this image type was not created after a living specimen, but after a dead bird. Only recent research has made clear—and I will return to this later in my essay—that, as early as the sixteenth century, ornithological collections containing taxidermically prepared animal specimens existed and that these strongly impacted illustrations in ornithological books. For example, in the case of Conrad Gesner’s *De natura avium* (book 3 of his *Historia animalium*) of 1555, it has been shown that at least one-third of the woodcuts were executed after dead specimens, skins or hides, and taxidermically prepared birds (Fig. 151).⁵ The same can be observed in the cases of Pierre Belon and Ulisse Aldrovandi. The inventory of Rudolf II’s cabinet of curiosities confirms that a large number of bird specimens were kept in the Prague castle around 1600.



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Jacopo Ligozzi, *Three birds sharing the water as habitat*, late 16th to early 17th century, tempera on paper, Gabinetto Disegni e Stampe degli Uffizi, Florence

These facts transform the way we view such images. I thus seek to link the history of ornithological illustration to that of technology, that is, to the rapid technological advances made in the area of taxidermic preparation of specimens in the sixteenth century. Certain deformations and unnatural poses possibly suggest that even Ligozzi himself resorted to taxidermic specimens for his illustrations despite his great efforts to achieve vivacity therein. Therefore, to an extent, technology impacts the style of images. The significance of such observations in Ligozzi's illustrations is that they are characteristic for natural history illustration in early modern times in general. On the one hand, images were repeatedly copied and used within new contexts

claiming to be based on autopsy and authenticity. On the other, the reference "from life" ("dal vivo," "ad vivum expressit," etc.) appears to be merely a topos attesting to vivacity and authenticity—to a much greater degree than we have hitherto understood it to be.⁶ We must therefore presume that even Ligozzi in no way confined himself to only observing from the "book of nature" directly and, in fact, resorted to graphic models and taxidermic specimens for his breathtakingly vivid and lifelike depictions of birds in the Uffizi Gallery in Florence, which represent, so to speak, the culmination of natural history illustration in early modern times. By comparing the drawings, a key problem of natural history images of this period can be shown.⁷



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Pordenone, *Kingfisher*, 16th century, drawing on paper, Gabinetto Disegni e Stampe degli Uffizi, Florence

In the sixteenth century, ornithology was inseparable from natural history in general, which was itself decisively transformed by the new body of knowledge during this period and also by the ensuing attempts to structure it.⁸ Ornithology was also determined by the long-enduring continuity of ancient natural history prior to an empirical approach that described birds according to their greatly varying outward appearances, their habits, and their specific habitats. It was only in the sixteenth century that ornithology developed into an independent branch of natural history and, in connection with this, several ornithological books were published that all in all are regarded as basic literature for the founding of early modern natural history. A crucial feature of these books is that they are illustrated, a fact that places them above the level of conveyers of knowledge, namely, the natural-history writings of Aristotle and of Pliny's *Naturalis historia*. With the *Histoire de la nature des oyseaux* (Paris, 1555), the French traveller and naturalist Pierre Belon (ca. 1517–1564) published

the first purely ornithological work of early modern times.⁹ This is a milestone publication in the history of the illustrated scientific book, comparable to Leonhard Fuchs's *Historia stirpium* (Basel, 1542), as well as Andreas Vesalius's *De humani corporis fabrica* (Basel, 1543), and invaluable for ornithology. Aside from basic expositions on the writings of antiquity and on the habits, biology, and anatomy of birds, the publication focuses especially on detailed descriptions of the different species. Incidentally, it is here that we find the famous analogy made between the skeleton of a human being and that of a bird. Belon classified birds according to their habits and anatomy: birds of prey (eagles, hawks, and owls), waterfowl (flat-footed/web-footed birds, that is, ducks, and those with non-palmated feet/non-flat-footed birds, such as herons and limicolae), ground birds (ground-nesters like the gallinaceous birds), small birds (divided into insect- and seed-eaters), and so forth.

Whereas Belon gives an account of the state of knowledge attained by the ancients (the description is always preceded by the relevant passage from Aristotle), he also adds new knowledge and his own observations. Additionally, he possibly carried out dissections on the carcasses of birds. He informs us of unidentified species sent to him by other scholars and was the first to provide instructions for the taxidermic preparation of specimens. Bird carcasses were probably dried in an oven during Belon's lifetime and thereby mummified. Belon therefore recommended that the viscera and muscle tissue be removed beforehand. Hardly varying from the process used today, the skin was mounted on a body formed of straw or sawdust. This procedure was to become customary by around 1600. Belon's comment distinctly demonstrates that taxidermically prepared animals were an integral part of natural history collections and curiosity cabinets as early as the mid-sixteenth century.

inerte rostrum & infundente genituram, quod uerisimile mihi nequaquam esse, supra in Vro-
galo dixi. Nos autem Brachyogel descripsimus in Elemento A. Arquatæ nomine, propter rostri
figuram, de qua an sentiat Encelius quoque, incertus sum, color quidem cyaneus arquatæ nostræ nõ
conuenit. Audio autem eam appellari Brachyogel, in quibusdam locis à mense Iunio quo aduen-
tæ ad illos solet: Encelius à quiescentibus & noualibus agris hoc nomē sive brachienne factum
ait. Arquatam nostram aliqui etiam Regemogel, hoc est auctem pluuię appellant, alij uenti uel eam
pellatis auctem; Windogel, Wätterogel, quod tempestatis futurę prognosticon ex ea sumatur.
Sed uideo hæc nomina parum certa esse: nam & aliæ quædam aues sisdem nuncupantur: quæ quos-
dam ad gallinaginum aquaticarum (ut omnino conicio ex pictura) historiam pertinent; itoneo-
rum hic adijciemus.

HANCAUÈ, quam arquatam minorem
dixerim, (de maiore scripti in Elemento A.)
aliqui similiter ut maiorem uocat Brachy-
ogel, id est pluuię auctem, (à qua tamen di-
uisio est que apud Gallos una uoce plu-
uies id est pluuialis uocatur.) In Italia qui-
dam tarangelo, Superiori (tam descripte)
sive similis est, cruribus ut illa cinereis, &
ventre albo, & sub capite similiter, itemq[ue]
refro, nisi quod paulo oblongius uidetur.
Alæ maculis albis asperguntur, alioqui ex
nullo fusce, sed longiores earum pennæ ni-
græ sunt, ut & dorsum & collum pronum
nigræ sunt. Collum supinum cum pectore
nonnulli ruboris habet obscurei & ualde di-
luti, plurimiq[ue] maculis nigricantibus dis-
tinguitur. ¶ Arquata minor & ochro-
peus magna, etiam Schmirring, quamquam
gallinule aquaticę sunt, aliter tamen ferè
capitur, ut ex aucupe quodam Argenti-
nemini intellexi: nempe alis duabus com-
missis, id est in gramine, non in ripa, alioqui
dispositis ut mox in Capite de Gallinulis
aquaticis capiendis in genere dicitur. Sed
cum hæc duo genera præ ceteris adeo cau-
tior, ut noctu in locis qui undique aqua
ambiantur quiescunt, astutia opus est ut alis
illis opportunè dispositis deprehendantur.
Si que è retibus euaserint, tam albe clamant,
in spatio itineris ferè horæ exaudiantur.

DE R A L A T E R restræ,

RALA uel ralla, nomen apud Anglos
& Gallos in usu, multis & diuersis aui-
bus inchoante, ut uideo, tribuitur, nam & ceter-
refres & aquaticę quædam sic appellantur,
omnes tamen gallinarum generis, & cru-
ribus oblongis. Petrus Bellonius orygo-
metram uulgo ralla dicit interpretatur. He-
gelcharam nobis proximè descriptam, An-
gelcharpon) ray) appellant. Perdix rustica
uel rusticala Plinij (inquit Turnerus in epi-
stola ad me) ab Anglis uocatur rala. Est au-
tem rala duplex, altera cibum è ripis flu-
minum petiit, altera degit in ericeto in lo-
cis syluestribus. Aquaticam illam Colo-
nia dicit alij, & male uolare deprehendi, &
egregie pugnam. Roftrum & crura erant
tuba, plumæ multis maculis resperse. Mon-
tana uero illa & syluestris crura habet mul-
to breuiora aquatili, & plumas undiq[ue] ma-



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In contrast to printed images, they guaranteed the advantages of color and a better morphological record of the respective species.

Belon's *Histoire* is a typical work for its time because, on the one hand, it pushes for the improvement of knowledge in natural history through new descriptions and the use of images, and, on the other, it follows Aristotle and the authority of antiquity in regard to classification and many other details. Printed books and images were the prime media for disseminating the new experiential knowledge, which did not yet fundamentally question traditional knowledge acquired from the authors of antiquity.

However, the desire for clarity initiated a great demand for images in the sixteenth century. Belon had already emphasized the claim that his images and descriptions were made "from life." In doing so he referred to the term used for portraits (in Italian *ritratto*) that guaranteed mimetic portrayal: "[t]he entire book contains only descriptions and images of birds that were drawn after nature and which the artist saw with his own eyes."¹⁰

In the sixteenth century, extensive collections of natural history drawings were formed and were archived in the various royal *Kunstkammern* and cabinets of curiosities. Throughout Europe such cabinets were filled with natural history objects in the form of either prepared specimens or images of rare species of animals and plants.¹¹ But what role did the advance in preparing taxidermic specimens play in the progress of knowledge in the sixteenth century? The copperplate engraving dated 1599 of the "Museo" of the Neapolitan apothecary and collector Ferrante Imperato (1550–1625) provides an example of a humanistic collection of natural history objects in which taxidermically prepared birds were used as objects for

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Whimbrel (*Numenius phaeopus*), engraving, in Conrad Gesner, *Historiae animalium*, book 3, *Qui est de avium natura*, Zurich, 1555

observation and gaining knowledge (Fig. 152). While valuable objects of natural history are concealed in the wall cupboards, the walls and ceiling of the room are nevertheless covered with animal relicts. It is therefore significant that the birds are not exhibited in the collection in the form of skins but in mounted poses, represented as if alive. Such collections served to represent nature as well as to facilitate scientific communication. Scholars exchanged knowledge on rare objects and findings by passing specimens on or using them as objects for observation and demonstration. The objects coming from the New World were presented in the most important location in the room as objects or images.¹² It is possible that taxidermically prepared



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The Museum of Ferrante Imperato, engraving, in Ferrante Imperato, *Dell'istoria naturale di Ferrante Imperato napolitano*, book 28, Naples, 1599

specimens were regarded as more authoritative than images, which were often studies of the former. Many of the images in the context of collections took on the role of documentation and classification rather than assisting the study of natural history itself. Furthermore, great sixteenth-century ornithologists such as Belon and Gesner wrote of descriptions and dead specimens (or parts thereof) sent to them by other persons. Gesner also often mentions the fact that a painter or researcher and friend sent him an image of an unidentified animal. This makes it likely that scholars of the sixteenth century gained knowledge through images in much the same way as they did from the autopsy of actual specimens.

The desire to make nature entirely accessible by means of images and also to encyclopaedically classify found material had a direct impact on the composition and design of pictures. In the case of traditional natural history still under the sway

of Aristotle, ideal types were required, which commissioned draftsmen often extracted by observing directly from nature and which they then assembled in their compositions. With this in mind, we are continuously confronted with the question: To what extent were the drawings, with their very lifelike and detailed rendering, really the product of firsthand observation of nature? This was exemplarily demonstrated by Paul Smith for the image history of the toucan, a representative of a South American bird family that first entered the European world of imagery during the sixteenth century. In this case, an animal had to be described that was unknown to the authors of antiquity. Some scholars, such as Belon, knew only of the brilliant beak of the species *Ramphastos toco* through a collection. Others attempted to reconstruct the bird using descriptions brought back by travelers. Once discovered and synthetically created as the palpable illustration in the writings of the

cosmographer André Thevet as early as 1557, the image of the toucan was endlessly copied, reproduced, and transformed. Nevertheless, in other, subsequent publications, the authors invariably insisted on the authenticity of the illustrations as being based on studies made directly from living or dead specimens.¹³ The image of a toucan that we find in Conrad Gesner's *Icones avium* of 1560 (first published 1555) is a composite representation of a bird that does not exist in this form.¹⁴ Newly discovered animals were ordered within the established classification of known birds and adapted into existing ornithological discourse. In it, forming analogies was decisive. The material available as a basis for describing a new species was rare and often fragmentary. Although in no way related, the toucan was compared to the European magpie (*Pica pica*) because of its appearance. We find the bird, for example, described as a “pepper-eating Brazilian magpie” (“*Pica Bresilica piperivora*”) in Ulisse Aldrovandi's compendium of illustrations (Fig. 153) and later also in ornithological books of the seventeenth century.

Ligozzi's sheets with depictions of exotic birds are undoubtedly particularly precious documents of advances in knowledge within the field of natural history, despite the fact that the described method—of draftsmen extracting universals from the particulars of nature—was upheld even with images of exotic species. These sheets are astounding on account of their extreme precision, even though they have been rendered in tempera. This medium imbues the illustrations with a characteristic softness despite the meticulousness of the contours and the details.

Through their international trade connections, products from the New World found their way into the Medici collections.¹⁵ Ligozzi illustrated indigenous and exotic birds for



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 Toucan, watercolor on paper, in Ulisse Aldrovandi, *Tavole di animali*, vol. 1, fol. 79, before 1599, Biblioteca Universitaria, Bologna

the Medici. In his bird representations Ligozzi depicted the ornamental beauty of feathers with ease and great ability, as we can observe in the sheet with the three species of whydahs (pintailed whydah or *Vidua macroura*, paradise whydah or *Steganura paradisea*, village indigobird or *Hypochera chalybeata*, all indigenous to Africa) on a fig-tree branch (Fig. 154). The birds' undulating tails of long feathers are echoed by the elegant sweeps formed by the fig leaves hanging from a branch. Ligozzi possibly studied them “dal vivo” in the aviary in the garden of Pratolino, where they were also viewed by Michel de Montaigne on his trip to Italy.¹⁶ The harmony of the line of beauty that permeates the entire composition resonates in the branch. Ligozzi very subtly fulfilled the natural-history demands of also displaying the inner part and core of the fruit by depicting one fig as half-eaten by the birds in his animated image. In contrast to print media such as copperplate



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Jacopo Ligozzi, *Three species of Viduas*, late 16th to early 17th century, tempera on paper, Gabinetto Disegni e Stampe degli Uffizi, Florence

engravings and woodcuts, the advantages of watercolors and tempera are apparent especially in representations of the more unfamiliar and exotic species. Only the deceptive nature of painting can reproduce the color and sheen of plumage or guarantee the reliable identification of the bird on the basis of its outward appearance. Scholars had to be able to rely on the abilities of good painters in order to secure credibility and to impart information to others.

We cannot judge sixteenth-century naturalists by the standards of modern biology. The imperfections of their information and their cul-de-sacs of classification are part and parcel of a scientific process of change for which these scholars were the trigger. Belon, Gesner, and Aldrovandi—totally conscious of their imperfections—brought images of unfamiliar natural history objects into palpable form and thereby facilitated progress in zoology. In early modern times, images

played a decisive role as conveyors of new knowledge. This is also and especially valid for the development of ornithology, as it depended on descriptions of new species and the autopsy of found specimens. Naturalists had to rely on images of exotic birds because taxidermic specimens were under constant threat of insect damage and were of poor quality until taxidermy was improved in the eighteenth century. The latter development ensured, of course, further progress in ornithology.¹⁷ I have sought to demonstrate how, also for the sixteenth century, artistic improvement of images took place by interacting with advances in the technology of taxidermy. Therefore, also, the field of ornithology is significant for the much-invoked empirical turn in early modern natural history. After all, it reveals that a taxidermically prepared specimen as ‘an image of itself’ in the development of natural history illustration in early modern times clearly left its mark, and that we must develop highly differentiated techniques of description in order to grasp how far these natural history images are objective and encompass reality.

1 Pliny the Elder, *Natural History*, book 1, chap. 36, vv. 64–65.

2 On these illustrations, cf. Mina Bacci and Anna Forlani Tempesti (eds.), *Mostra di disegni di Jacopo Ligozzi (1547–1626)*, Florence, Leo S. Olschki, 1961; Lucia Tongiorgi Tomasi and Sara Ferri, *I ritratti di piante di Jacopo Ligozzi*, Pisa, Pacini, 1993; Sofia Pezzati, in *Magnificenza alla corte dei Medici: arte a Firenze alla fine del Cinquecento*, exh. cat., ed. Cristina Acidini Luchinat, Florence, Electa, 1997, pp. 287–288, nos. 233–234; Alberto Cottino, “Le origini della natura morta fiorentina: Jacopo Ligozzi, l’illustrazione scientifica e i primi naturalisti,” in Pierluigi Carofano (ed.), *Luce e ombra: Caravaggismo e naturalismo nella pittura toscana del Seicento*, Pisa, Felici, 2005, pp. CCIII–CCIX.

3 See Fritz Koreny (ed.), *Albrecht Dürer und die Tier- und Pflanzenstudien der Renaissance*, Munich, Prestel, 1985.

4 The *Uccelliera* was the work commissioned by the scholar Cassiano dal Pozzo, who also contributed to some extent to the project. The illustrations are by Antonio Tempesta, Francesco Villamena, and Vincenzo Leonardi, who had already produced numerous drawings of birds and plants for Pozzo’s Museo Cartaceo.

5 Katharina B. Springer and Ragnar K. Kinzelbach, *Das Vogelbuch von Conrad Gessner (1516–1565): Ein Archiv für avifaunistische Daten*, Berlin and Heidelberg, Springer, 2009. On a similar technique (in which Gesner’s illustrations were also used through copies), see Ragnar K. Kinzelbach and Jochen

Hölzinger (eds.), *Marcus zum Lamm (1544–1606): Die Vogelbücher aus dem Thesaurus Picturarum*, Stuttgart, Eugen Ulmer, 2000.

6 Lucia Tongiorgi Tomasi, "Persistenze e 'migrazioni' dell'immagine naturalistica," in *Immagine e natura: l'immagine naturalistica nei codici e libri a stampa delle Biblioteche Estense e Universitaria, secoli xv–xvii*, Modena, Panini, 1984, pp. 173–180.

7 On this problem, see Bert W. Meijer, "Disegni dal vero o meno, e l'illustrazione scientifica," in Elizabeth Cropper, Giovanna Perini, and Francesco Solinas (eds.), *Documentary Culture: Florence and Rome from Grand-Duke Ferdinand I to Pope Alexander VII*, Bologna, Nuova Alfa Editoriale, 1992, pp. 127–139; Peter Parshall, "Imago contrafacta: Images and Facts in the Northern Renaissance," *Art History*, 16, no. 4 (1993), pp. 554–579; Gerhard Wolf, "Gestörte Kreise: Zum Wahrheitsanspruch des Bildes im Zeitalter des Disegno," in Hans-Jörg Rheinberger, Michael Hagner, and Bettina Wahrig-Schmidt (eds.), *Räume des Wissens: Repräsentation, Codierung, Spur*, Berlin, Akademie, 1997, pp. 39–62; Michael Thimann, "'Idea' und 'Conterfei': Künstlerisches und wissenschaftliches Zeichnen in der Frühen Neuzeit," in Heinrich Schulze Altcappenberg and Michael Thimann (eds.), *Disegno: Der Zeichner im Bild der Frühen Neuzeit*, Florence and Berlin, Kunsthistorische Institut in Florenz – Max-Planck-Institut/Kupferstichkabinett, Staatliche Museen zu Berlin, 2007, pp. 15–30.

8 See Valérie Chansigaud, *Histoire de l'ornithologie*, Paris, Delachaux et Niestlé, 2007, pp. 23–96.

9 On the author and his historical-scientific position, see the critical introduction by Philippe Glargon in the facsimile edition of *Histoire de la nature des oyseaux, avec leurs descriptions et naïfs portraits retirez du naturel* (Paris, Cavellat, 1555), Geneva, Ph. Glargon, 1997.

10 "Qu'il n'y a description ni portrait d'oiseau en tout cet œuvre, qui ne fait en nature, et qui n'ait été devant les yeux des peintres."

11 In recent year, numerous early modern galleries have been reconstructed and thoroughly researched; concerning these Kunstkammern and cabinets of curiosities, as well as their role in the history of science, see among others, Oliver Impy and Arthur MacGregor (eds.), *The Origins of*

Museums: The Cabinet of Curiosities in Sixteenth- and Seventeenth-Century Europe, Oxford, Clarendon, 1987; Horst Bredekamp, *Antikensehnsucht und Maschinenglauben: Die Geschichte der Kunstkammer und die Zukunft der Kunstgeschichte*, Berlin, Klaus Wagenbach, 1993; Paula Findlen, *Possessing Nature: Museums, Collecting, and Scientific Culture in Early Modern Italy*, Berkeley, University of California Press, 1994; Klaus Minges, *Das Sammlungswesen der Frühen Neuzeit: Kriterien der Ordnung und Spezialisierung*, Münster, Lit, 1998; Helmar Schramm (ed.), *Kunstkammer, Laboratorium, Bühne: Schauplätze des Wissens im 17. Jahrhundert*, Berlin, Walter de Gruyter, 2003.

12 Dominik Collet, *Die Welt in der Stube: Begegnungen mit Außereuropa in Kunstkammern der Frühen Neuzeit*, Göttingen, Vandenhoeck & Ruprecht, 2007.

13 See Paul J. Smith, "On Toucans and Hornbills: Readings in Early Modern Ornithology from Belon to Buffon," in Karl A. E. Enenkel and Paul J. Smith (eds.), *Early Modern Zoology: The Construction of Animals in Science, Literature and the Visual Arts*, vol. 1, Leiden and Boston, Brill, 2007, pp. 75–119.

14 *Icones avium omnium quae in historia avium Conradi Gesneri describuntur*, Zurich, C. Froschover, 1560, p. 130.

15 Detlef Heikamp, *Mexico and the Medici*, Florence, Edam, 1972; idem, "Mexiko und die Medici-Herzöge," in Karl-Heinz Kohl (ed.), *Mythen der Neuen Welt: Zur Entdeckungsgeschichte Lateinamerikas*, Berlin, Frölich & Kaufmann, 1982, pp. 126–146.

16 "Dans une très belle et grande volière, nous vîmes des petits oiseaux, comme chardonnerets, qui ont à la queue deux longues plumes, comme celles d'un grand chapon." ("In a beautiful large cage we saw some small birds like goldfinches, that have two long feathers in their tail, like those of a large capon.")

17 Karl Hagen-Schulze et al., "Avian Taxidermy in Europe from the Middle Ages to the Renaissance," *Journal für Ornithologie*, 144 (2003), pp. 459–478. On the history of dissection, as well as images of birds and plumage in Europe, see Jürgen Hevers (ed.), *Historische Vogelschau: Vogelkästen und Federbilder*, Braunschweig, Staatlichen, 2008.