

Aesthetics for Birds:
Institutions, Artist-Naturalists, and Printmakers in
American Ornithologies, from Alexander Wilson to
John Cassin

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Thesis submitted to the faculty of the Virginia Polytechnic Institute and State University in
partial fulfillment of the requirements for the degree of

Master of Science

in

Science and Technology Studies

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September 18, 2014

Blacksburg, VA

Keywords: Philadelphia, natural history, illustration, ornithology

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Abstract

In this project I explore the development of bird illustrations in early American natural history publication. I follow three groups in Philadelphia from 1812 to 1858: institutions, artist-naturalists, and printmakers. Each of these groups modeled a certain normative vision of illustration, promoting, producing, and publishing images that reflected their senses of what constituted good illustration. I argue that no single set of actors in this narrative did work that would become the ultimate standard-bearer for ornithological illustration; rather, all of them negotiated the conflicting interests of their own work as positioned against, or alongside, those who had come before. Their diverse intentions, aesthetic and practical, sat prominently in their separate visions of drawing birds; utility, artistry, and feasibility of the images directed the creation of the illustrations. How they used their ideal ways of depicting birds changed the ways that their successors would confront the practice of illustrating birds.

Acknowledgements

With the completion of this project, I owe many thanks to many different people.

Matthew Goodrum and Matt Wisnioski saw early—and very unrefined—attempts at parts of this thesis in history of science seminars. Their comments and encouragement through the project helped it to move forward. Similarly, Eileen Crist's enthusiasm for the project provided some momentum when I found myself at a standstill.

Mark Barrow read through many drafts of proposals, chapter outlines, and chapters, challenging me to make them better. I hope I've succeeded in that. His high standards have been a source of reassurance that the end product would be something worthwhile.

The librarians and archivists in Special Collections at Virginia Tech's Newman Library helped me handle excessively large and deteriorating books, and they let me create a display based on this work. The latter, especially, forced me to consolidate ideas.

The folks who maintain Biodiversity Heritage Library are wonderful people, and they've embarked on a highly useful project. I've joked that without them I'd actually have to go to archives, but the reality is that they've saved me countless travel hours and travel dollars.

Most importantly, Lissa, Miles, and Adele have pushed me to finish this project. Though the younger ones certainly didn't do it deliberately, their presence and joyfulness, and all the questions kids ask, inspired efficient writing. Lissa's patience, strength, and questions pushed this project into the final stages. Making coffee when she knew I needed some helped, too. This project is for her.

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Introduction

Natural history illustration has long been characterized by a tension between aesthetics and scientific utility, appearance and purpose, form and function.¹ For many nineteenth-century United States naturalist-illustrators, that tension meant an adherence to conventions promoted by scientific institutions, like the Academy of Natural Sciences in Philadelphia (ANSP).

Nevertheless, many illustrators also paid careful attention to the aesthetics that were critical for reaching a wider audience.

The early decades of nineteenth-century America saw two major efforts to identify, describe, and illustrate the birds of the United States. Both Alexander Wilson's *American Ornithology* (1808-1814) and John James Audubon's *Birds of America* (1827-1838) found success, though among different audiences. Wilson's birds continued in the tradition of illustrators like Mark Catesby (1683-1749), whose *Natural History of Carolina, Florida and the Bahama Islands* (1729-1747) was the first published catalog of North American wildlife. The British naturalist, along with those who followed, like Wilson, depicted birds in profile and on a mostly blank page, a style that reflected scientific utility. Audubon's birds contrasted with Wilson's and Catesby's, focusing on artistic aesthetics instead of scientific purpose. Illustrated to the actual size of the birds—"of natural size"—Audubon's illustrations fit one species to a page, unlike Wilson's several species of birds per plate.² Furthermore, Audubon eschewed the practice of stuffing his birds for illustration, and he painted them as he saw them in nature: existing with

¹ Lorraine Daston and Peter Galison, *Objectivity* (New York: Zone Books, 2007); Martin Kemp, "Taking It on Trust: Form and Meaning in Naturalistic Representation," *Archives of Natural History* 17, no. 2 (1990); Francesco Panese, "The Accursed Part of Scientific Iconography," in *Visual Cultures of Science*, ed. Luc Pauwels (Hanover, N. H.: Dartmouth College Press, 2006); Thomas Hallock, "Vivification and the Early Art of William Bartram," in *A Keener Perception: Ecocritical Studies in American Art History*, ed. Alan C. Braddock and Christoph Irmscher (Tuscaloosa: The University of Alabama Press, 2009).

² John James Audubon, "Account of the Method of Drawing Birds, employed by J. J. Audubon, Esq. F. R. S. E. In a Letter to a Friend," *Edinburgh Journal of Science* viii (1828), 48.

other birds and in their natural environment. Later illustrators—that is, those who followed Audubon and Wilson—were inheritors of the conflicting ways of drawing birds.³

This project is concerned with the negotiations that occurred between the various parties involved in ornithological illustration. In nineteenth-century Philadelphia, institutions, artist-naturalists, and printmakers each embraced a normative vision of depicting nature. Believing that certain aspects of bird representation were more important than others, they promoted and produced sets of published drawings that reflected those values of good illustration. In this thesis, I argue that no single set of these actors established themselves as a standard-bearer for ornithological illustration. Rather, all of them negotiated the conflicting interests of their own work as positioned against, or alongside, those who had come before.

Beyond illustration practices, this case speaks to larger tensions in American natural history in the nineteenth century. Institutionally lauded scientific practices enjoyed great success. In representing nature, though, an individual could gain recognition outside scientific societies. Regardless of which carried more intellectual weight, both aesthetics and scientific utility mattered in natural history illustration.

In this project, I assume that conversations happen between illustrators, naturalists, and printmakers, through the medium of the illustrations, in the same way that writers converse through articles and books.⁴ These illustrations help to convey where negotiations are, especially in changes in style from one book to the next. Examining the relationships surrounding the creation of the various illustrations reveals how they developed in a particular way.

³ Jonathan Elphick, *Birds: The Art of Ornithology* (New York: Rizzoli, 2005); Darryl Wheye and Donald Kennedy, *Humans, Nature, and Birds: Science Art from Cave Walls to Computer Screens* (New Haven: Yale University Press, 2008).

⁴ Lorraine Daston, "Speechless," in *Things that Talk: Object Lessons from Art and Science*, ed. Lorraine Daston (New York: Zone Books, 2004).

The physical reality of illustration also matters, as does the way in which that drawings came to be. When it became permanently fixed on the page, it also became fixed in the span of knowledge. In this way, the development of a style of illustration reflected knowledge transmission and the ways information could be passed through generations. Lorraine Daston and contributors to *Things that Talk* focus on the discourse between objects, especially artistic objects.⁵ For the volume, the artistry in scientific things, such as representational illustrations, represents a conversation that bridges the perceived gaps between historians of art and of science. Discussing the importance of things to the production of knowledge, Daston identifies “things that are simultaneously material and meaningful.”⁶ Fruitful discussion of natural history illustrations reflects the process of knowledge production in natural history communities.

One early and significant community that illustrated natural history existed in Philadelphia. Amy R. W. Meyers’ *Knowing Nature: Art and Science in Philadelphia, 1740-1840* analyzed the large artistic and scientific community in and around that city. Meyers and her collaborators provide “a dynamic picture of how the visual and material interpretation of the natural world functioned not only in colonial and early republican science but across the culture of the period more generally.”⁷ The edited volume discusses the connections between art, science, and social hierarchies that were present in Philadelphia society. Like Meyers’ volume, this project centers on Philadelphia, where art and science centered around conceptualizations of “self-definition and communal affiliation.”⁸ Geographically central to the new republic of the

⁵ Lorraine Daston, ed., *Things That Talk: Object Lessons from Art and Science* (New York: Zone Books, 2004).

⁶ Daston, “Speechless,” in *Things That Talk*, 17.

⁷ Meyers, “Introduction,” in Amy R. W. Meyers and Lisa L. Ford, *Knowing Nature: Art and Science in Philadelphia, 1740-1840* (New Haven, Conn.: Yale University Press, 2011), 4.

⁸ Meyers, “Introduction,” in *Knowing Nature*, 6.

United States, Philadelphia became the young nation's capital of political, artistic, and scientific life, playing a prominent role in the development of American culture.⁹

Though it might stand in for American culture writ large, Philadelphia hosted a localized community that produced many important sets of bird illustrations. Alexander Wilson became interested in natural history and ornithology by way of William Bartram, who cultivated an historic garden across the Schuylkill River from central Philadelphia. The Academy of Natural Sciences of Philadelphia promoted knowledge of the natural world, as one of the first natural history societies in the Early Republic. John James Audubon tended to his family's farm at Mill Grove, a few miles northwest of Philadelphia. Lithography first appeared in the United States in a Philadelphia journal, and it quickly became a favorite medium for printing images in the city.

Insofar as it hosted these several prominent people, institutions, and media of illustration, Philadelphia offers a prime site for the study of developments in the history of bird illustration. We can learn about the negotiation of image-making between printmakers, institutions, and artist-naturalists in the relatively confined area of Philadelphia.

The images themselves, and not solely in the context of their makers, have scientific and cultural meaning, as demonstrated by the histories of natural history illustration that have focused on those meanings. Emblematic of this idea is *Objectivity*, wherein Lorraine Daston and Peter Galison explore the development of the scientific standard of objectivity—the development of what mattered when it came to representations of scientific knowledge.¹⁰ As they noted, the nineteenth century's focus on “truth to nature” illustration was a culturally accepted standard by

⁹ I use the culture of Philadelphia to stand in for an American culture, though other Atlantic port cities developed concurrently and to varying degrees of prominence: Boston, New York, Baltimore, and Charleston.

¹⁰ Daston and Galison, *Objectivity*.

which natural objects could be meaningfully represented.¹¹ The questions they ask regard the development of meaning for visual representations, continuing the tradition in science studies of addressing social construction in illustration and scientific representation.¹²

In a similar line, though focusing specifically on natural history illustrations in the United States, Ann Blum and Margaret Welch explore the development of zoological books within broader cultural movements.¹³ Blum and Welch discuss illustration and printed books as media for providing information to the masses. In *Picturing Nature*, Blum traces the transition in the United States of the naturalist-as-illustrator to the artist-as-naturalist, the internal struggle with self-identification for those who observed and drew nature, who would need to identify which part—art or nature—was most important in their illustration.¹⁴ Margaret Welch extends Blum’s argument to the printed book as a sort of “social history of natural history in the United States.”¹⁵ She positions publication centrally in the transmission of scientific knowledge and focusing on individual contributions to American natural history instead of institutional efforts.

¹¹ Illustrations validated their observations through some variation on the epigraph “drawn from nature,” which accompanied the naturalist’s name. See Chapter 2, “Truth-to-Nature,” in *Objectivity*, 55-114.

¹² Alex Soojun-Kim Pang provides a fair review of the appropriate literature in “Visual Representation and Post-Constructivist History of Science.” In it, he examines the academic treatment of images in science, with regard to the sociology of science and art history, identifying ways in which the fields are mutually informative. Alex Soojun-Kim Pang, “Visual Representation and Post-Constructivist History of Science,” *Historical Studies in the Physical and Biological Sciences* 28, no. 1 (1997). Additional works include the following: Brian S. Baigrie, ed. *Picturing Knowledge: Historical and Philosophical Problems Concerning the Use of Art in Science* (Toronto: University of Toronto Press, 1996); Brian J. Ford, *Images of Science: A History of Scientific Illustration* (New York: Oxford University Press, 1993); Caroline A. Jones, Peter Galison, and Amy E. Slaton, eds., *Picturing Science, Producing Art* (New York: Routledge, 1998); Timothy Lenoir, *Inscribing Science: Scientific Texts and the Materiality of Communication* (Stanford, Calif.: Stanford University Press, 1998); James Mussell, *Science, Time and Space in the Late Nineteenth-Century Periodical Press: Movable Types* (Burlington, Ver.: Ashgate, 2007).

¹³ Ann Shelby Blum, *Picturing Nature: American Nineteenth-Century Zoological Illustration* (Princeton, N.J.: Princeton University Press, 1993); Margaret Welch, *The Book of Nature: Natural History in the United States, 1825-1875* (Boston: Northeastern University Press, 1998).

¹⁴ Blum, *Picturing Nature*.

¹⁵ Welch, *The Book of Nature*, 4.

Though institutions provided outlets for the publication of natural history illustrations and a stage for their visibility, individuals reflected and influenced illustration styles. In this vein, my project incorporates arguments presented by Welch and Blum. Blum's *Picturing Nature* is an exploration of the "what" of the images, discussing the materiality of the illustrations and physical constraints that influenced American scientific illustration. She examines important questions concerning what the illustrations meant and what they provided to communities of naturalists. While this thesis does not argue that ornithological illustrations tended toward either art or science, it does examine tensions that arose out of related discussions. Artistry, scientific utility, economic feasibility, and technological capability all entered into the processes of decision-making through which illustrators honed their styles of illustrating birds.

Furthermore, this project assumes that illustrations function as reflectors and shapers of cultural ideas, as well as packets of information about the natural world.¹⁶ Ornithological books served as a way to observe nature from a distance, though under the influence of the humans who created the illustrations—institutions, artists, and printmakers. The works of Wilson, Audubon, and those who followed clarified those differences, and how preferences changed the way humans saw and depicted nature. They all navigated through the decisions their predecessors had made, tending toward one and then another, offering different perspectives along the way.

The three sets of actors for this project are all equally important, though they have an unbalanced historiographical heritage. That is, institutions and artist-naturalists have received much more scholarly attention, at least partly due to the prevalence of source material.

¹⁶ Barbara Novak's work was an early exploration of the duality of art as influencing and being influenced by culture. Barbara Novak, *Nature and Culture: American Landscape and Painting, 1825-1875*, 3rd ed. (New York: Oxford University Press, 2007).

Printmakers have received less attention, though historical treatments of the technologies they used often address these actors to some extent.¹⁷

Natural history in the nineteenth century was most often practiced by amateurs involved with scientific societies. In *The Naturalist in Britain*, David Elliston Allen discusses at length the practices of the amateur gentleman's leisure activity, exploring the role of the scientific society as natural history developed into a labor-intensive field science.¹⁸ Locating Allen's argument within a broader and different cultural context, Diarmid Finnegan explores the cultural tensions that existed between Scottish natural history communities and the wider culture—the “civic culture,” as he calls it.¹⁹ Finnegan argues that natural history societies believed they could improve civic cultures through members' negotiations between science and the state. “Subscribing to a natural history society,” he writes, “meant subscribing to the conjoint success of civic and scientific culture.”²⁰

By expanding Finnegan into a different context, one that approaches the texts of natural history, we can see how those texts and their accompanying illustrations negotiated between institutions of scientific studies and the work of a layman. Finnegan argues that subscription to a natural history publication indicated an interest in the success of culture. If success for both civic and scientific cultures meant a shared interest in natural history, then appealing to the aesthetic sensibilities of both was crucial to their mutual success. In this construct, the illustrator for

¹⁷ Some historians have looked at the laborers involved in printmaking alongside the technologies: see especially Judith A. McGaw, *Most Wonderful Machine: Mechanization and Social Change in Berkshire Paper Making, 1801-1885* (Princeton, N.J.: Princeton University Press, 1987); Erika Piola and Jennifer Ambrose, eds., *Philadelphia on Stone: Commercial Lithography in Philadelphia, 1828-1878* (Philadelphia: Pennsylvania State University Press, 2012).

¹⁸ David Elliston Allen, *The Naturalist in Britain: A Social History* (London: A. Lane, 1976).

¹⁹ Diarmid A. Finnegan, *Natural History Societies and Civic Culture in Victorian Scotland* (London: Pickering & Chatto, 2009).

²⁰ Finnegan, *Natural History Societies and Civic Culture*, 6.

natural history books was a crucial intermediary, a liaison for authority in natural history. For natural history cultures, this authority rested in natural history societies, such as the ANSP. For lay readers, authority was just as likely to rest with individuals such as Audubon, whose work appealed to their aesthetic sensibility. In order to find joint success, in both institutions and among popular audiences, illustrators who followed Audubon and who had seen the shifts in authority found themselves the inheritors of a monumental task—to find some balance between the utility and artistry in their illustrations.

Scholarship has demonstrated that institutions, on the spectrum from local collectives to national organizations, have been central to the production of natural history knowledge. For example, Charlotte Porter's *The Eagle's Nest* argues that early American studies in natural history relied on the 1812 formation of the ANSP and its standards, which continued the process of professionalizing natural history in the United States.²¹ Porter's work includes some discussion of the importance of illustrations to the ANSP, though they are not a central part of the evidence. Her exploration of the significance of the ANSP to the publication of natural history books emphasizes the role of the institution in the publication process. With one of the early printing presses at a science society, the ANSP exerted exclusive control over the works it decided to publish. Similar in scope, Mark Barrow's *A Passion for Birds* explores the contributions of individual ornithologists to the development of institutions like the American

²¹ Charlotte M. Porter, *The Eagle's Nest: Natural History and American Ideas, 1812-1842* (Tuscaloosa: University of Alabama Press, 1986). Not unimportantly, her evaluation of the importance of the ANSP in American natural history is a way to explain the influx of nationalistic ideals in an American understanding of nature. This defense of American nature provided incentive for such works as Wilson's *American Ornithology* and Audubon's *Birds of America*, which would demonstrate the wide variety of American nature, suggesting the contrast with European nature, and liberating American nature from Europe's natural superiority.

Ornithologists' Union.²² Both Porter and Barrow, following the lead of Allen's *Naturalist in Britain*, examine the development of the naturalist profession, from a leisure amateur activity into something that required extensive training and institutional affiliation.

Historical treatments of artist-naturalists as individuals largely take the form of biographical works or appear in sections of other, broader histories. Porter addresses Audubon and Wilson separately, and William Souder devotes the first half of his book to the two naturalists.²³ More generally, Kärin Nickelsen addresses the production of eighteenth-century plant images, especially the individual styles of those images, and Carlo Ginzburg explores the ways in which individuals' styles reflected their affiliations and rejections of other styles of illustration.²⁴ These treatments of individual artists and artist-naturalists focus on the agency they had in developing and issuing their work.

Art historians have focused their efforts on printing technologies more than historians of science and technology. That is, the discipline of art history has readily embraced the challenges of exploring the people who put illustrations onto the printed page. Notably, two works have appeared that discuss the development of particular styles among specific firms in the printmaking industry. Amy von Lintel addresses the modernistic foreshadowings of nineteenth-century woodcuts, and Erika Piola and collaborators argue for Philadelphia's centrality in the

²² Mark V. Barrow, *A Passion for Birds: American Ornithology after Audubon* (Princeton, N.J.: Princeton University Press, 1998).

²³ "The Lessons of Nature" and "Drawn from Nature," chapters 2 and 3 in Porter, *The Eagle's Nest*; William Souder, *Under a Wild Sky: John James Audubon and the Making of The Birds of America* (New York: North Point Press, 2004). The vast quantities of Audubon literature are discussed in chapter two.

²⁴ Kärin Nickelsen, *Draughtsmen, Botanists and Nature: The Construction of Eighteenth-Century Botanical Illustrations* (Dordrecht: Springer, 2006); Carlo Ginzburg, "Style as Inclusion, Style as Exclusion," in *Picturing Science, Producing Art*, ed. Caroline A. Jones and Peter Galison (New York: Routledge, 2004).

century's lithography.²⁵ Though neither work focuses on a single engraver or firm, they open opportunities for other scholars to explore those subjects. This project is an extension of their work, claiming that printmakers played an equal role alongside artist-naturalists and institutions.

* * *

The three chapters of this thesis follow a topical-chronological structure. Each focuses on a single group of actors: institutions, artist-naturalists, and printmakers. The first chapter looks at the development of illustration conventions accepted and promoted by the Academy of Natural Sciences of Philadelphia, which made Alexander Wilson's work a standard-bearer for American natural history illustration. Wilson's work in ornithology affected the Academy in ways that shaped the study of natural history in the United States, through Academy members' partiality to him and his illustration style. Institutional support perpetuated Wilson's style among scientifically oriented ornithologies.

Embracing Wilson caused some ANSP members to reject other styles. Chapter 2 looks at Audubon's position in the ANSP and in the broader American culture. His artistic style contrasted with Wilson in ways that were problematic for some Academy members. This chapter provides a comparison of two sets of bird illustrations, focusing on the artist-naturalists who created each. Audubon illustrated according to his own style, while Thomas Nuttall, Audubon's contemporary, stayed closer to Wilson's style. Artist-naturalists who developed their own artistic, and not strictly scientific, styles of drawing nature faced criticism from naturalists. However, they used aesthetics that appealed to a larger culture—that is, outside of those societies—and that could help fund their success, as Audubon demonstrates.

²⁵ Amy M. von Lintel, "Wood Engravings, the "Marvellous Spread of Illustrated Publications," and the History of Art," *Modernism/Modernity* 19, no. 3 (2012); Erika Piola, ed., *Philadelphia on Stone*.

Printmakers are the primary subject of analysis in Chapter 3. Invisible in the first two chapters, their work created illustrations developed by institutions and individual artists. In particular, this chapter focuses on the development of lithography as the medium for scientific representation, and on the lithography firm of John T. Bowen, which guided numerous bird illustrations in print. Bowen's connections to Nuttall, the ANSP, and Audubon helped to secure the importance of printmakers in demonstrating the lines of influence in ornithological illustration.

* * *

This examination of natural history illustration and its development in the United States can say bigger things about American culture and about the history of science. Ideas and cultural values undergo transformations after a series of negotiations, as does knowledge and the ways people depict that knowledge. In this way, this project reaches toward the broader ideas of negotiation through the people who worked in the development of depictions of knowledge. Illustration styles changed, also changing the focus on the depicted birds.

This project uses the historical context of illustration practices by naturalists in the nineteenth century to recognize the shared importance of institutions, artist-naturalists, and printmakers, who benefited from each other's practices and ideas. Both art and science emerged as important factors in ornithological drawings, as made evident by the various participating actors. In finding the ways in which they all contributed to the development of illustration, we can more acutely see greater constructions of negotiation in the construction of knowledge and its depiction.

Chapter 1 Institutional Standards: The Academy of Natural Sciences of Philadelphia and Alexander Wilson

Natural history illustrations in early nineteenth-century America often look similar. However, no formal written guidelines governed the conventions used by natural history illustrators, engravers, or naturalists. Ann Shelby Blum, historian of natural history illustrations, notes this lack of delineated technique for scientific images, citing the “rejected frills and decorations” as the only specified aesthetic.¹ This lack of codified conventions does not indicate a lack of accepted standard for illustration. Serious naturalists expected to find in illustrations the values held in the seventeenth century by the Royal Society of London: transparent representations of nature—free from metaphor, fancy, or embellishment.² These were implicit standards or conventions of illustrations, not explicitly stated or ever written down.

In this chapter, I argue that established standards, or conventions, did exist surrounding American natural history illustrations, though they were informal. The Academy of Natural Sciences of Philadelphia (ANSP) adopted the illustrations of Alexander Wilson’s *American Ornithology* (1808-1814) as the example that other naturalist-illustrators should follow. As Charlotte Porter argues, members of the Academy “attempted to emulate Wilson, for his *American Ornithology* immediately set the standard against which all other works of natural history would be judged.”³ The conventions of Wilson’s illustrations remained uncoded, though the ANSP suggested their use through various celebrations of Wilson.

PHILADELPHIA AND THE ANSP

¹ Ann Shelby Blum, *Picturing Nature: American Nineteenth-Century Zoological Illustration* (Princeton, N.J.: Princeton University Press, 1993), 12.

² Blum, *Picturing Nature*, 10.

³ Charlotte M. Porter, *The Eagle's Nest: Natural History and American Ideas, 1812-1842* (Tuscaloosa: University of Alabama Press, 1986), 3.

For citizens of the Early Republic, Philadelphia held a great deal of significance. Robert Morris, a Revolutionary-era merchant, signer of the Declaration of Independence and the Constitution, and senator from Pennsylvania, said of the city, “You will consider Philadelphia, from its central situation, the extent of its commerce, the number of its artificers, manufactures and other circumstances, to be to the United States what the heart is to the human body in circulating the blood.”⁴ While Morris offered his remarks in the heat of the war effort against Great Britain, in which Philadelphia supplied the lifeblood in the forms of soldiers and morale, the sentiment remained true of the city through the Early Republic.

The city was central to the war for political independence from Great Britain, where it was the site for the First and Second Continental Congresses (1774 and 1775). After American independence, Philadelphia became the temporary national capital for a decade, 1790-1800. Alone, these two roles of Philadelphia demonstrated its centrality for the new United States. It was the place for American government and, to some extent, American politics.

Culturally, Philadelphia provided a humanistic and academic center for the young nation. Identified as the “Athens of America” by painter Gilbert Stuart, Philadelphia found itself expanding in cultural importance through the increased development of literature, art, science, technology, and medicine.⁵ The American Philosophical Society was founded there in 1743, with a mission “for Promoting Useful Knowledge,” and other societies came to existence in the early years of the nineteenth century: The Pennsylvania Academy of the Fine Arts in 1805, the ANSP in 1812, the Athenaeum of Philadelphia in 1814, and the Franklin Institute and the Historical Society of Pennsylvania, both in 1824. These diverse institutions provided a home for

⁴ Harry M. Tinkcom, "The Revolutionary City, 1765-1783," in *Philadelphia: A 300 Year History*, ed. Russell Frank Weigley (New York: W.W. Norton, 1982), 134.

⁵ Edgar P. Richardson, "The Athens of America, 1800-1825," in *Philadelphia: A 300 Year History*, ed. Russell Frank Weigley (New York: W.W. Norton, 1982), 240.

intellectual work outside of Philadelphians' regular work as lawyers, physicians, farmers, or merchants. They represented the academic center of the new United States.⁶

In this story, the Academy of Natural Sciences of Philadelphia provided a key site for the natural history work done in Philadelphia in the first half of the nineteenth century. A list of the founding members identified several self-identified gentlemen of science, a class of persons who sought leisure in producing scientific knowledge.⁷ The signed founders of the ANSP included the following Philadelphians: Thomas Say, Camillus Mann (secretary), John Speakman (treasurer pro tempore to the Society), Nicholas Parmantier (dean of assembly and chairman to the Committees), Jacob Gilliams, and Gerard Troost.⁸ Naturalists by general interest and self-teaching, their specific areas of study varied. Say (1787-1834) studied and published *American Entomology* (1824-1828) and *American Conchology* (1830-1834).⁹ Mann was a doctor of medicine and secretary of ANSP.¹⁰ John Speakman was the apothecary whose shop held the first ANSP meeting, and Gerard Troost (1776-1850), educated in medicine, would become the first professor of chemistry at the Philadelphia College of Pharmacy.¹¹ Parmantier distilled spermaceti

⁶ It is useful here to point out that Thomas Jefferson would extol these societies as places where citizens could become knowledgeable about a variety of subjects, becoming the informed persons foundational to democracy.

⁷ David Elliston Allen, *The Naturalist in Britain: A Social History* (London: A. Lane, 1976). Though politically independent of Great Britain, American culture and society remained similar.

⁸ Academy of Natural Sciences of Philadelphia, "Minutes and Related Documents, 1812," in *Minutes and Correspondence: Minutes and Related Documents, 1812-1925* (Academy of Natural Sciences of Drexel University: Nineteenth Century Collections Online). January 25, 1812.

⁹ Thomas Say, *American Entomology, or, Descriptions of the Insects of North America Illustrated by Coloured Figures from Original Drawings Executed from Nature*, 3 vols. (Philadelphia: Philadelphia Museum, S.A. Mitchell, 1824-1828); *American Conchology; or, Descriptions of the Shells of North America* (New Harmony, Ind.: School Press, 1830-34).

¹⁰ Academy of Natural Sciences of Philadelphia, "Minutes and Related Documents, 1812."

¹¹ Philadelphia College of Pharmacy and John Eicholtz Kramer, *The First Century of the Philadelphia College of Pharmacy, 1821-1921*, ed. Joseph Winters Engels (Philadelphia College of Pharmacy and Science, 1922), 30.

oil, and Gilliams ran a dentistry with his father.¹²

The men who founded the Academy identified themselves as “friends of Science and of rational disposal of leisure.”¹³ As self-identified gentlemen, they had disposable time that they could dedicate to developing and sharing scientific knowledge.¹⁴ The principles necessary for membership in the Academy included the following: “A well known love for Science and devotedness to its progress, observantly, experimentally, liberally and diffusively, for the honor of the Society, the celebrity of discovery, and the advantage of all good men.”¹⁵ Those without a passion for science would not want to become members, and members would not want their presence in ANSP meetings. Additionally, scientific discovery would advance not only the ANSP, but the broader society as well, both commendable achievements.

Further descriptions of their scientific work and efforts, found in their foundational meetings, added depth to their principles. Words such as “usefulness,” “necessity,” “progress,” and “illucidation” reflect the elevated status of science and of scientific work for the founding members of ANSP.¹⁶ However, the clearest purpose of the Academy comes at the end of a litany of “Considerations”—justifications for the founding of the Academy. ANSP would exist for the primary purpose of the “advancement and diffusion of sciences.”¹⁷

Written in 1812, the Constitution of the Academy elaborated on these principles. Citing “useful science and liberal knowledge” as the guiding purpose of the ANSP, and the ends it

¹² Venia Phillips, *Minutes and Correspondence of the Academy of Natural Sciences of Philadelphia, 1812-1924* (Philadelphia: DIANE Publishing, 1967), 10.

¹³ Academy of Natural Sciences of Philadelphia, "Minutes and Related Documents, 1812." January 25, 1812.

¹⁴ This is true also of naturalists in Great Britain. see Allen, *The Naturalist in Britain*.

¹⁵ Academy of Natural Sciences of Philadelphia, "Minutes and Related Documents, 1812." January 25, 1812.

¹⁶ "Minutes and Related Documents, 1812." February 1, 1812.

¹⁷ "Minutes and Related Documents, 1812." February 1, 1812.

would strive to achieve.¹⁸ One element crucial to the progress of scientific knowledge was a dispassionate disposition, that is, the pursuit of science for the sake of knowledge, unconnected to personal gain. Mentioned several times in the earliest meeting minutes, this materialized in the Constitution as “Science unconnected with Religion or Politics.”¹⁹ Clearly important to the founders, this unbiased practice of science began a litany of characteristics that ANSP members should possess, including “patient enquiry, singleness of attention, abstraction from ambition and from intention, [...] good humoured association and cooperation.”²⁰

In 1814, the General Assembly of the Commonwealth of Pennsylvania incorporated the Academy “as a society devoted entirely to the advancement of useful learning,” act of incorporation suggesting additional cultural importance for the ANSP.²¹ By seeking incorporation—legitimacy from a governmental entity—ANSP founders expected the knowledge gained in their meetings would have benefit beyond the members. The usefulness of scientific knowledge could advance the state and could benefit all.

Founders of the Academy understood the institution’s importance to natural history studies in the United States. Specifically, they knew that most naturalists were amateurs who studied natural history as a leisure activity.²² What naturalists lacked at home, the Academy could provide, with its museum, library, laboratory, “and every other desirable appendage or convenience, for the illustration and advancement of natural knowledge, and for the common

¹⁸ ANSP Constitution, in “Minutes and Related Documents, 1812.”

¹⁹ ANSP Constitution, in “Minutes and Related Documents, 1812.”

²⁰ ANSP Constitution, in “Minutes and Related Documents, 1812.”

²¹ “An Act to Incorporate the Academy of Natural Sciences,” *Journal of the Academy of Natural Sciences of Philadelphia* October 1817, no. 6 (1817), 193.

²² see Allen, *The Naturalist in Britain*.

benefit of all the individuals who may be admitted members of our Institution.”²³ Etched into the framework of the Academy itself was a plan to provide naturalists with a space to share knowledge and resources.

One of the resources housed by the Academy would be a library, where members could read natural history texts not otherwise widely available, either for purchase or lent through the Library Company of Philadelphia.²⁴ Members of the Academy were aware of the prohibitive cost of books, as well as their general lack of availability. After several volumes went missing or became unusable, the Academy decided to lend books “to members only, or to correspondents while in the city,” though the rare or costly books “shall on no pretext be lent out or removed from the rooms of the Academy.”²⁵ The full library would form the basis for the scientific knowledge produced by the Academy. It would be open to use for members to identify specimens, to explore new arenas of natural history, and to review literature on their areas of expertise.

In addition to a library, and perhaps of most significance for Philadelphia naturalists, was a collection of specimens. Curiosity cabinets, found in the houses of nearly all naturalists, however amateur, ranged in size from small boxes that held leaves or shells to large rooms that

²³ ANSP Constitution, in Academy of Natural Sciences of Philadelphia, "Minutes and Related Documents, 1812."

²⁴ Founded in 1731 by Benjamin Franklin and among the first public libraries in the United States, the Library Company was a subscription library. Free public libraries would come in the middle of the nineteenth century. Jesse Hauk Shera, *Foundations of the Public Library: The Origins of the Public Library Movement in New England, 1629-1855* (Chicago: University of Chicago Press, 1949).

²⁵ The minutes are unclear as to the nature of “losses which the Academy have lately sustained.” They suggest that the books may have been stolen or misused, intentionally or not, and that the retention of the books was of utmost importance. “Security of Library Books.” Academy of Natural Sciences of Philadelphia, "Minutes and Related Documents, 1823," in *Minutes and Correspondence: Minutes and Related Documents, 1812-1925* (Academy of Natural Sciences of Drexel University: Nineteenth Century Collections Online).

could hold, among other items, taxidermied animals.²⁶ The Academy would house a wide variety of specimens, procured from travelers. By 1817, the Academy had requested that explorers bear it in mind during their voyages, and “preserve every natural curiosity that you may meet with.”²⁷ Significantly, this circulated pamphlet bore an exhortation to adhere to certain standards that would maintain the integrity of the specimens: “It is a material object, and the particular desire of the Academy, that every piece of information which can be gained respecting the specimens presented, should accompany them; as regards the climate, soil, locality and other peculiarities.”²⁸ With such descriptions and the specimens themselves, the Academy could develop fuller taxonomies and descriptions of diverse species, local, national, and exotic.

The published policy for the collection of animals suggests some of the control that the Academy strove to exert over studies of natural history. For collection, members of the Academy traveled with the intent to procure specimens, and the Academy not only helped to fund many of those expeditions, but it also developed a series of standards for gathering and preserving specimens. An 1817 Florida Expedition sent ANSP President William Maclure, with George Ord, Titian Peale, and Thomas Say, way from Philadelphia, as naturalists had already identified and described many, if not most or even all, specimens in the region. Other expeditions extended into the American frontier, especially west of the Mississippi River, providing additional specimens that other naturalists, more tied to Philadelphia, could use in their studies.²⁹

Expeditions sponsored by the U.S. Government also utilized the knowledge and

²⁶ Katie Whitaker, "The Culture of Curiosity," in *Cultures of Natural History*, ed. Nicholas Jardine, James A. Secord, and E. C. Spary (Cambridge: Cambridge University Press, 1996).

²⁷ “Circular to Captains and Other Voyagers,” 4 February. Academy of Natural Sciences of Philadelphia, "Minutes and Related Documents, 1817," in *Minutes and Correspondence: Minutes and Related Documents, 1812-1925* (Academy of Natural Sciences of Drexel University: Nineteenth Century Collections Online), 7.

²⁸ “Circular to Captains and Other Voyagers,” 4 February. "Minutes and Related Documents, 1817," 7.

²⁹ Phillips, *Guide to ANSP Microfilm*, 11-12.

experiences of Academy members. ANSP members were among the travelers on the 1819-1820 Long Expedition to the Rocky Mountains and the 1838-1842 U.S. Exploring Expedition under Captain Wilkes, an effort to explore and survey the Pacific Ocean. Government expeditions that sought to augment natural history knowledge used the Academy's publication outlets, its *Proceedings* and *Journals*, to record the results and findings of such surveys. The Academy helped shape the ways in which the U.S. Government would study and publish natural history.³⁰

The ANSP exerted influence over natural history illustration by including certain illustrations—and *types* of illustrations—in its library and its *Journal*. It provided an outlet for scientific publications in the early nineteenth century, centered in the Philadelphia area. When the Academy did include a volume or illustration in its library or *Journal*, it granted implicit approval to the style of illustration and to its content.

The illustration style that came out of the ANSP did not develop on its own. Instead, it drew from the practices of generations of European illustrators in creating a style that would become an early emblem of American natural history illustration. The negotiations evident in Alexander Wilson's *American Ornithology* borrowed elements of several diverse techniques that would make him a significant contributor to American natural history.

EUROPEAN CONVENTION

In the artistic traditions of illustrating nature in scientific text, two traditions emerged parallel to two traditions of natural history. Swedish naturalist Carl von Linné, latinised to Linnaeus (1707-1778), developed a taxonomic system of nature that emphasized physical similarities of species. Critical of Linnaeus, French naturalist Georges-Louis Leclerc, Comte de Buffon (1708-1788) promoted a descriptive form of natural history, crediting geography and

³⁰ *Guide to ANSP Microfilm*, 11-12.

environment for differences between species. Illustrations that followed descriptive and taxonomic natural history divided along the lines of these two traditions.³¹

Buffonian illustrations—that is, those that followed the conventions of descriptive natural history—emphasized the environment and species’ change within that environment. They often included a large area that contained a single specimen on the page. The partial habitat, a city or ruins for more exotic animals, contained unidentified (and often unidentifiable) herbs, shrubs, and trees, which served a decorative purpose, unless the plant was the focus of the illustration. The specimen was in profile, and, in the case of a bird, it was usually on a fence or a tree branch, which was often cut off at a terminal branch.

The idea that animals existed in habitats was paramount for Buffon, and it was evident in his notions of geography’s effects on physical structures of animals. His *Histoire naturelle, générale et particulière* (1749–1788) contained a number of plates by Scottish engraver Andrew Bell (1726-1809), that illustrated several Buffonian principles, especially the focus on the animal as it existed in nature, a partial habitat. However, the plates did not necessarily include other creatures. Alone, the specimen held the whole attention of the viewer, yet it was placed in a context that evoked the reality of the living creature. Buffon’s “Virginian Opossum” and “Female Virginian Opossum” display this with clarity (figure 1.1). “Virginian Opossum,” the male of the species, poses on a rock, which functions as a platform.³² Ruins dominate the background, under the white sky that contrasts with the darkness preferred by opossums. “Female Virginian Opossum” is similar, with ruins visible in the similarly contrasting background. The inclusion of ruins in the more-exotic (i.e. non-European) species reflected

³¹ See especially Phillip R. Sloan, "The Buffon-Linnaeus Controversy," *Isis* 67, no. 3 (1976): 356-75.

³² Males are set in most natural histories as the normative type of each species. Females are labeled in distinct, qualified illustrations, suggesting a natural hierarchy in nature.

Buffon's ideas of degeneration, suggesting that these New World creatures, like their New World landscapes, were not as grand as their Old World counterparts.³³

Placing quadrupeds in habitats suggested a general geography for their existence. However, some mammals, and most birds, rely on plants for their living quarters. The “Great Flying Squirrel” is in a tree, which is its habit.³⁴ His forepaws grasp branches, showcasing the flap of skin that allows it to “fly.” The tree, however, is unidentifiable, like the plants in the “Virginian Opossum” plates. This lack of identifiable attributes is characteristic of Buffonian illustration. The focus is on the animal, not the plant. Logically, for Buffon, the only identified part of the illustration ought to be the animal.

Set in profile, the animals' distinguishing characteristics are clear. The bilateral symmetry of most species, assumed in natural history illustrations, allows the viewer to imagine the whole specimen while only viewing half on the two-dimensional plane. “Virginian Opossum” is positioned in this manner—in profile. The “Female Virginian Opossum,” though, stands unnaturally upright, to display the young in her pouch. The distinguishing feature of the pouch would have been of special importance for Buffon, as Europe has no indigenous marsupial.³⁵

Linnaean illustrations emphasized the similarities and differences between species in the system of nature. Unlike Buffonian illustrations, his contained multiple specimens per page, all in profile. However, the specimens were arranged in a taxonomic order, parallel to the texts the

³³ Buffon claimed that modern species were improvements or degenerations from a central point in the world's creation, ideas that were used in scientific justifications of racism. Some discussion exists in Sloan, “The Buffon-Linnaeus Controversy.”

³⁴ Plates CXLII in Georges Louis Leclerc Buffon, *Selections from Natural History, General and Particular*, 2 vols., vol. 1 (New York: Arno Press, 1977). A. Bell, sculpt.

³⁵ The first marsupial to arrive in Europe, an opossum, arrived in 1500 with Vincente Yañez Pinzón, who had previously traveled to the New World with Columbus, aboard *La Niña*. C. H. Tyndale-Biscoe, *Life of Marsupials* (Collingwood, Vic.: CSIRO, 2005), 3.

illustrations accompanied. The specimens were not alone on the page, especially in the case of birds. Shrubs and trees were partial, cut off at a terminal branch, and birds nearly always perched on one. Plants were always flowering or fruiting, important to Linnaeus since his system depended on the reproductive parts of plants.³⁶

Linnaeus' *Philosophia botanica* (1751) functioned as instruction for the proper keeping of a journal and sketches when studying plants.³⁷ It provided some details regarding important characteristics of field drawings and of published botanical texts. Foremost, "all parts should be recorded in their *natural* position and *size*, including the most minute parts of the *fruit-body*."³⁸ Of course, large trees would not fit onto a printed page, so a portion drawn to natural size would suffice, cut at a terminal branch. The full plant would then be drawn, in reduced scale around the life-size section.

Regardless of the plant's size, all parts were to appear, as "the most numerous and outstanding differences, which do most to distinguish a species, lurk in the *smallest* parts, especially those of the fruit body."³⁹ By including multiple parts of the same plant on the same page and separating them, the illustrator suggested to the reader a cognitive distinction among the parts. The reader then could piece the objects together to form a whole, having already considered them in their individual roles.⁴⁰

Depictions of many parts of a plant on a single page correlated to multiple specimens on

³⁶ Ann Shelby Blum reduces it thus: "For taxonomic analysis, the whole animal was reduced to its diagnostic parts." *Picturing Nature*, 310.

³⁷ Importantly, for historians of science, *Philosophia Botanica* also contains the first detailed explication of Linnaeus' taxonomic system and binomial nomenclature.

³⁸ Carl von Linné and Stephen Freer, *Linnaeus' Philosophia Botanica* (Oxford: Oxford University Press, 2003), 17, 283, original emphasis.

³⁹ Linné and Freer, *Linnaeus' Philosophia Botanica*, 284, original emphasis.

⁴⁰ Isabelle Charmantier, "Carl Linnaeus and the Visual Representation of Nature," *Historical Studies in the Natural Sciences* 41, no. 4 (2011), 381.

the same page as a way to focus the reader's analysis of the illustration. Many species on the same plate conveyed information regarding some fullness of nature.⁴¹ Furthermore, they provided several elements for comparison.⁴² In zoological illustrations, this meant that the reader could identify differentiating morphological characteristics. The blank space between specimens signified for the reader separate observations, though the composite plate invited comparison between them.⁴³

Isabelle Charmantier argues that illustration was formative in Linnaeus' ways of classification, that his diagrammatic schema and sketches developed his taxonomic system.⁴⁴ Linnaeus as much confirmed this, writing, "The botanists that have also practised the arts of drawing and engraving have left the most outstanding figures."⁴⁵ Those trained as naturalists and as artists could see nature differently and, perhaps, better.

A contemporary to Linnaeus, English naturalist Mark Catesby (1682/83-1749) published the first illustrated account of natural history in North America, *The Natural History of Carolina, Florida and the Bahama Islands* (1729-1747). His illustrations consolidated the conventions of Linnaeus and Buffon in such a manner that his work became a standard-bearer for natural history illustrations to come.⁴⁶ In the preface, he acknowledged some of the shortcomings of his illustrations: "As I was not bred a Painter I hope some faults in Perspective, and other Niceties, may be more readily excused, for I humbly conceive Plants, and other Things done in a Flat, tho'

⁴¹ Additionally, placing several specimens on the same plate reduced the overall number of plates and, in the end, the cost of printing.

⁴² Charmantier, "Carl Linnaeus and the Visual Representation of Nature," 397.

⁴³ Blum, *Picturing Nature*, 106.

⁴⁴ Charmantier, "Carl Linnaeus and the Visual Representation of Nature."

⁴⁵ Linné and Freer, *Linnaeus' Philosophia Botanica*, 284.

⁴⁶ Margaret Welch, *The Book of Nature: Natural History in the United States, 1825-1875* (Boston: Northeastern University Press, 1998), 17-18.

exact manner, may serve the Purpose of Natural History, better in some measure than in a more bold and Painter-like Way.”⁴⁷ His emphasis on exactness reflected the focus of eighteenth-century natural history, with transparent representations of nature—free from metaphor, fancy, or embellishment.⁴⁸ Though the illustrations remained flat, that is, two-dimensional, they succeeded in their purpose of providing a visual representation of the descriptions presented in the text.⁴⁹

Catesby's borrowed elements from Buffon and Linnaeus appear on most of his plates. Catesby followed Buffon's convention of positioning the animal in a natural context (i.e. likely animals and plants together), though focusing on a single creature and plant. He utilized Buffon's positioning of animals in profile to showcase bilateral symmetry. Following Linnaeus, Catesby positioned multiple species, though of different kingdoms, on a page, and he identified all elements. He retained some blank space to separate specimens that functioned, in a way similar to Linnaeus, as a way to hold onto the cognitive boundary for the reader's experience.

One clear example of Catesby's consolidation of previous illustration conventions is his rendition of the Parrot of Paradise of Cuba (figure 1.2).⁵⁰ The bird perches in a Red Wood, looking to the left of the page. As such, its head is in profile, with several identifying characteristics prominent—the shape of the beak, the red eyes, and red markings on its neck and tail. The bird and the plant are the only specimens on the page; there is no extended habitat to

⁴⁷ Mark Catesby, *The Natural History of Carolina, Florida and the Bahama Islands* (London: Printed at the expence of the author, 1754), xi.

⁴⁸ Blum, *Picturing Nature*, 10.

⁴⁹ Catesby specifically identified this intention to his illustrations: “The Illuminating Natural History is so particularly Essential to the perfect understanding of it, that I may aver a clearer Idea may be conceiv'd from the Figures of Animals and Plants in their proper Colours, than from the most exact Description without them: Wherefore I have been less prolix in the Discription, judging it unnecessary to tire the Reader with Describing every Feather, yet I hope sufficient to distinguish them without Confusion.” Catesby, *The Natural History of Carolina, Florida and the Bahama Islands*. xi-xii.

⁵⁰ “Psitticus Paradisi ex Cuba,” *The Natural History of Carolina, Florida and the Bahama Islands*, Plate 10.

provide context for the illustration.⁵¹ The plant’s branch, truncated for space, shows leaves in various stages, and the berries help to identify it.

In consolidating the conventions of Buffon and Linnaeus, as well as producing the first English natural history of the New World, Catesby influenced American natural history in several ways. First, he drew natural history so the illustrations could be descriptive, showing a part of the animals’ habits, as well as taxonomically useful, for identification. Second, Catesby’s status as the first English naturalist to produce work about the New World influenced the ways in which naturalists in North America practiced and studied natural history. Illustrations that followed Catesby inherited his style and suggested a standard way of illustrating nature.

DEVELOPING STANDARDS

Among the most important ornithological works that followed Catesby was *American Ornithology*. Scottish by birth, poet Alexander Wilson (1766-1813) traveled to America in 1794, seeking a new, better life for himself.⁵² Working as a schoolteacher near Philadelphia, Wilson met naturalist William Bartram (1739-1823), whose natural history writings inspired Wilson’s interest in ornithology. The year after their meeting, Wilson decided to travel America cataloging, describing, and illustrating American birds. This ornithological work became the seminal *American Ornithology*, and Wilson, called “the Father of American Ornithology,” often received credit for launching ornithology in the United States.

American Ornithology identified, described, and illustrated more than 70% of the birds present in 1812 United States, and it provided a foundation for North American avian taxonomy

⁵¹ The text produced by Catesby would provide a natural context for the bird.

⁵² In Scotland, Wilson had written several satirical poems about a mill owner’s treatment of workers. The mill owner found them incendiary, and Wilson was arrested, forced to publicly burn the poems, and imprisoned.

and description.⁵³ A letter to a friend in 1803 provides early evidence of Wilson’s interest in developing *American Ornithology*. He wrote, “I am now about to make a collection of all our finest birds.”⁵⁴ Wilson was the first American ornithologist to describe and classify North American birds within the Linnaean system, connecting his work in the US with the wider world of international ornithology. The book found success, demonstrating that public interest could financially underwrite a large publishing project, and that ornithology in the United States could rival ornithology in Europe.⁵⁵

The intended purpose of *American Ornithology* was clearly delineated in the prospectus, written by Samuel Bradford: “To promote the study of this branch of Natural History, so friendly to virtue and piety, and so congenial to innocence, by exhibiting to the eye, a faithful representation of the numerous, and richly adorned families of the feathered race.”⁵⁶ It would be true to nature and morality, aesthetically pleasing, accurate, and luxurious. In short, it would be publically accessible and scientifically meaningful.

Wilson acknowledged that his work was not done in an intellectual vacuum, citing his debt to “the efforts of the naturalists.”⁵⁷ Yet he also believed that “Nothing similar to the present undertaking has ever been attempted in America; and, indeed, if we except the efforts of a few distinguished individuals, the annals of our literary history present a long and melancholy void in

⁵³ It is important to note that the 1812 U.S. only included states east of the Mississippi River. Edward H. Burt and Davis, *Alexander Wilson: The Scot who Founded American Ornithology* (Cambridge, Mass.: Harvard University Press, 2013), 329, 333.

⁵⁴ Alexander Wilson to a friend in Paisley, 1 June 1803, in Clark Hunter, ed., *The Life and Letters of Alexander Wilson*, Memoirs Series (Philadelphia: American Philosophical Society, 1983), 202-203.

⁵⁵ Burt and Davis, *Alexander Wilson*, 1, 329, 333.

⁵⁶ Proposal for *American Ornithology*, in Hunter, ed., *The Life and Letters of Alexander Wilson*, 270.

⁵⁷ Proposal for *American Ornithology*, in Hunter, ed., *The Life and Letters of Alexander Wilson*, 270.

this most interesting and instructive department of science.”⁵⁸ Wilson’s efforts would fill that void, with text and with illustrations. His poetic background made his *Ornithology* literary, and his illustrations made it visually compelling as well.

American ornithology owed a great debt to Catesby, whose work preceded Wilson by nearly a century. Unlike Wilson, however, Catesby and other Europeans who drew American birds “derived their figures and descriptions chiefly from *dried subjects*.”⁵⁹ For Wilson, this diminished their usefulness and beauty. Instead, the artist-naturalist ought to draw from live observation, for “if he has nothing but stuffed skins, or dried specimens to draw from, he can no more give the true tints, form and air of the living original.”⁶⁰ In contrast to his predecessors, Wilson had “neither drawn nor described a single species before examining several individuals of the same kind; and collecting, from personal observation, facts relative to their history.”⁶¹ By observing living nature, Wilson was able to capture it in his memory, and he could use that image to inform his paintings of the dead specimen before him.

This was an ornithology for naturalists—those who had expressed specific interest in studying birds. *American Ornithology* retained text at the forefront; the illustrations provided a visual representation that complemented the text. *American Ornithology* contained all that ornithology focused on at the time: size of birds, identifying features, names, and descriptions of their habits. Additionally, and perhaps to entice potential subscriptions, Wilson peppered

⁵⁸ Proposal for *American Ornithology*, in Hunter, ed., *The Life and Letters of Alexander Wilson*, 270.

⁵⁹ Proposal for *American Ornithology*, in Hunter, ed., *The Life and Letters of Alexander Wilson*, 270-271.

⁶⁰ Proposal for *American Ornithology*, in Hunter, ed., *The Life and Letters of Alexander Wilson*, 270-271.

⁶¹ Proposal for *American Ornithology*, in Hunter, ed., *The Life and Letters of Alexander Wilson*, 271.

throughout the work poetic anecdotes about his travels, proving himself an adventurer, seeking to know wild nature.⁶² In doing so, Wilson continued in the tradition of ornithological texts.

Like his predecessors, Wilson scaled his illustrations to fit onto the page. That is, he included several birds on the same engraved plate, but the measurements present in the text allowed naturalists to recognize the size of the birds. The 268 species of *American Ornithology* fit onto seventy-six plates, averaging more than three birds per plate. Some birds appeared multiple times within the same plate, to distinguish male from female and adult from young. There was also a varying number of birds per plate. The White-Headed Eagle appeared alone on its own plate, and several birds (more than six) appeared on several plates (see figure 1.3).

The illustrations in *American Ornithology* followed the standards Linnaeus and Buffon had established. More to the point, Wilson imitated Catesby's style. Ann Shelby Blum offers a short delineation of characteristics in Wilson's drawings, which replicated Catesby: The bird was rendered in profile and often on a stump or branch; the drawing was in a flat space; the specimens did not interact; and the specimens congregated on a single plane.⁶³ *American Ornithology*'s structure further coalesced the conventions of Buffonian descriptive illustration with Linnaean taxonomic illustration.

Wilson's birds became typical examples of the standard American ornithology in the early nineteenth century, as he worked to make his *American Ornithology* relevant to the field. In addition to the visual presentation of the birds, their organization mattered to ornithologists.

Wilson adhered to Linnaean order—that is, a rank-based system of scientific classification—

⁶² *American Ornithology* was not a disinterested intellectual pursuit. Hoping it would gain him fame and fortune, Wilson spent nearly all his wealth in producing the book, as he complained to his father regularly: "It has swallowed up the little I have saved." 25 February 1811, in Hunter, ed., *The Life and Letters of Alexander Wilson*, 383.

⁶³ Blum, *Picturing Nature*, 39.

following again the example set by Catesby. Following Linnaean taxonomy made sense for Wilson—both in text and in illustration—and works that resembled this standard were more likely to receive serious attention from ornithologists.⁶⁴

To execute his illustrations on the printed page, Wilson enlisted the help of fellow Scottish immigrant Alexander Lawson (1772-1846). Lawson's prints of Wilson's birds, formed on copper plates, earned the ornithologist's praise.⁶⁵ As *American Ornithology* gained more subscribers, Lawson's work received more laud. Wilson wrote of "the thousands of compliments I have rec'd for my birds, from persons of all descriptions, which were chiefly due to the taste and skill of the engraver. In short, the book, in all its parts, so far exceeds the ideas and expectations of the first literary characters in the eastern parts of the Unites States, as to command their admiration and respect."⁶⁶ Without Lawson, Wilson suspected, his birds would not have been exceptional. The success of *American Ornithology* owed a great deal to Lawson's work.

Artistic ability was at the front of Wilson's ornithological illustrations. Without the ability to draw distinguishing characteristics of birds, he could not hope to describe them accurately. Similarly, he understood that a knowledge of birds was insufficient for the production of a high-quality natural history work, and that a greater breadth of knowledge would make him a better naturalist. He wrote, "I am miserably deficient in many acquirements absolutely necessary. [...] Botany, mineralogy, and drawing, I most ardently wish to be instructed in, and

⁶⁴ Blum, *Picturing Nature*, 13-18. Wilson's affinity for Linnaean classification is unclear. Perhaps his work with William Bartram affected this loyalty, with Bartram's familiarity with Linnaeus' work. Along with his experience with plants, Bartram had provided illustrations for Benjamin Smith Barton's *Elements of Botany* (1803-1804), which provided an explanation of the Linnaean system.

⁶⁵ Wilson called the prints "most acceptable." To Alexander Lawson, 6 April 1810, in Hunter, ed., *The Life and Letters of Alexander Wilson*, 339.

⁶⁶ Alexander Wilson to Alexander Lawson, 3 November 1808, in Hunter, ed., *The Life and Letters of Alexander Wilson*, 254.

with these I should fear nothing.”⁶⁷ Despite observations of nature, Wilson knew that good observations required good description, but good illustration—a “truth to nature”—would increase the observer’s credibility.

Wilson aimed to identify all the birds in North America for his *Ornithology*. Writing to fellow naturalist William Bartram, he said, “I am inclined to believe that many subjects still remain to be added to our Nomenclature in the Ornithology of the middle and northern states.”⁶⁸ The *Ornithology* was incomplete until all these species had been identified, described, classified, and illustrated: “I still intend to complete my collection of drawings; but the last will be by far the best.”⁶⁹ Though he would not complete his *Ornithology* before his death in 1813, Wilson began the work that would become the standard for ornithology, and perhaps natural history, in the United States.

ANSP AND CONVENTIONS OF ILLUSTRATION

Looking to Wilson’s illustrations as a model, the ANSP established implicit conventions for natural history illustration. Wilson’s death prior to the complete publication of his *American Ornithology* affected many members of the Academy. George Ord (1781-1866), ANSP vice president, acted as executor of Wilson’s estate and helped to block membership for John James Audubon, whose *Birds of America* would compete with Wilson’s work. Furthermore, the ANSP included *American Ornithology* in its library. The early volumes of the *Journal of the Academy of Natural Sciences of Philadelphia*, begun in 1817, contained articles written or sponsored by its

⁶⁷ Alexander Wilson to William Bartram, 15 December 1804, in Hunter, ed., *The Life and Letters of Alexander Wilson*, 225-226.

⁶⁸ Alexander Wilson to Thomas Jefferson, 18 March 1805, in Hunter, ed., *The Life and Letters of Alexander Wilson*, 232-233.

⁶⁹ Alexander Wilson to William Duncan, 26 March 1805, in Hunter, ed., *The Life and Letters of Alexander Wilson*, 236.

members, and until its second series in 1847, the *Journal* published no bird illustrations, instead referring the reader to Wilson's work. Through a series of decisions regarding what books the library ought to include, which members to endorse, and which systems to embrace, the Academy would engage in a passive standardization of natural history illustrations in the United States.

A crucial decision made by the ANSP in the nineteenth century regarded the adoption of a classification system. Divided between the Linnaean system and a new, American system that broke away from European thought, the Academy could not come to a decision.⁷⁰ Wilson's use of Linnaean nomenclature and classification in *American Ornithology* was a large, if not the central, element in the Academy's adoption of Linnaean classification in the century's early decades.⁷¹

Early members of the Academy, too, adopted Linnaean classification. Thomas Say suggested the importance of Wilson in the major natural history works that came out of the ANSP in the few years after *American Ornithology*. Say's own *American Entomology*, Charles Alexandre LeSueur's work on American fish, and Barton's work with American botany all earned Say's recognition as significant works, and all used Linnaean classification.⁷² These names he mentioned to John F. Melsheimer (d. 1829), a fellow Pennsylvania entomologist, were all central figures in the early years of the Academy, as naturalists and as founders. Their positive opinions of *American Ornithology* cemented its place in the canon of American natural history literature.

The Academy's promotion of *American Ornithology* affirmed that Wilson offered it and

⁷⁰ The system was never explicated; the decision was simply between adopting a Linnaean classification system or developing a new one.

⁷¹ Burt and Davis, *Alexander Wilson*, 338.

⁷² Thomas Say to John F. Melsheimer, 27 April 1817. in "1900," *Entomological News* 11-12, 176-177.

the field of ornithology something of value. The ANSP included the book in its library; they subscribed to the work; and in 1825, George Ord, then ANSP vice president, provided a supplement.⁷³ Indeed, the Academy itself played a role in producing the high quality of *American Ornithology*. ANSP members were recognized practitioners of the highest caliber: Titian Peale and Charles Alexandre LeSueur were artists; Wilson and Thomas Nuttall were apprenticed printers. Seeing the success of Wilson's work would doubtless encourage them to continue in his style, as self-promotion was necessary to ensure their own—and the Academy's—continued success.⁷⁴

Ord's influence largely came through his vice presidency at the ANSP. Wilson had named Ord executor of his estate, a responsibility that he took seriously.⁷⁵ Perhaps to honor the deceased, or to elevate *American Ornithology* as Wilson's unparalleled life work, Ord treated with contempt any competition with Wilson.⁷⁶ Since *American Ornithology* was unfinished, Ord completed the eighth and ninth volumes, before Charles Lucien Bonaparte (1803-1857) took control of the project. Loyal to his friend and colleague, Ord promoted Wilson after his death, and he even promoted Bonaparte's extension of Wilson's work.⁷⁷ It was this combination of Ord's loyalty and his leadership at the ANSP—and the Academy itself—that Wilson's style in illustration, ornithology, and even description, became the standard-bearer for American

⁷³ Burt, *Alexander Wilson*, 409; "Library Reports and Documents," Academy of Natural Sciences of Philadelphia, "Minutes and Related Documents, 1825," in *Minutes and Correspondence: Minutes and Related Documents, 1812-1925* (Academy of Natural Sciences of Drexel University: Nineteenth Century Collections Online).

⁷⁴ Porter, *The Eagle's Nest*, 56.

⁷⁵ Burt and Davis, *Alexander Wilson*, 344.

⁷⁶ The second chapter provides some details concerning Ord's treatment of Audubon and *Birds of America*.

⁷⁷ "Biographical Sketch of Alexander Wilson," in Alexander Wilson and George Ord, *American Ornithology, or The Natural History of the Birds of the United States: Illustrated with Plates, Engraved and Coloured from Original Drawings Taken from Nature*, 3 vols. (New York; Philadelphia: Collins; Harrison Hall, 1828), clxvi.

ornithology.

WILSON'S LEGACY

In pursuing subscribers for *American Ornithology*, Wilson remarked, “the only objection has been the 120 dollars.”⁷⁸ The high price prevented both the New York and Maryland legislatures from adding their names to the growing list of his subscribers.⁷⁹ Of course the Library of Congress and wealthy patrons of the arts and sciences would purchase this book, but who else would want it, and what would be its value?

Showing various plates to potential subscribers, Wilson's birds elicited positive responses. He wrote, “All who have seen it admire it,” though he did not specify to whom he had shown the birds.⁸⁰ More broadly, and justifying his American pursuits to his Scottish father, he wrote, “The publication of the *Ornithology*... has procured me the honour of many friends, eminent in this country, and the esteem of the public at large.”⁸¹ Certainly myopic and optimistic, Wilson's perception of others' viewing his work lacked nuance, and it focused on broadly-complimentary comments.

Reviews in Philadelphia and New York serials described the cultural contributions of *American Ornithology*, as well as some specific characteristics that elevated the significance of Wilson's ornithology. In 1811, Samuel Mitchill wrote of “the exquisite paper, the distinct type,

⁷⁸ Alexander Wilson to Alexander Lawson, 3 November 1808, in Hunter, ed., *The Life and Letters of Alexander Wilson*, 287.

⁷⁹ Alexander Wilson to Alexander Lawson, 3 November 1808, in Hunter, ed., *The Life and Letters of Alexander Wilson*, 287-288; to Daniel H. Miller, 24 December 1808, 294-295. The legislators in Albany and Annapolis would later reconsider and add their legislatures to the list of subscribers.

⁸⁰ Alexander Wilson to F. A. Michaux, 6 June 1812, in Hunter, ed., *The Life and Letters of Alexander Wilson*, 400.

⁸¹ Alexander Wilson to his father, 25 February 1811, in Hunter, ed., *The Life and Letters of Alexander Wilson*, 383.

the correct engraving, and the finest colouring” present in Wilson.”⁸² Three years later, a review appeared in Philadelphia’s *Port Folio*: “The magnificent performance, so honorable to the country, and so eminently calculated to shed a lustre on the era which has produced it, has reached in its progress its eighth volume.”⁸³ Similar reviews appeared elsewhere in Philadelphia and New York, praising the artistry of the book’s illustrations and assembly, as well as its contributions to American culture and the nation’s perception abroad.

Both Americans and Europeans subscribed to *American Ornithology*—650 in all.⁸⁴ Institutions, like the Academy of Natural Sciences of Philadelphia, the Library of Congress, and the American Philosophical Society had their own copies, and they would purchase supplements as they became available.⁸⁵ In Philadelphia, “all of her literati, her men of benevolence, taste and riches, SEVENTY only, to the period of the author’s decease, had the liberality to countenance him by a subscription, more than half of whom were *tradesmen, artists*, and those of the middle class of society.”⁸⁶ So, not only societies and wealthy patrons subscribed to *American Ornithology*; working people, too, saw value in Wilson’s work.

Artists found Wilson’s work appealing as a representation of the best of contemporary American art. Artist and naturalist Charles Willson Peale (1741-1827) was so impressed with *American Ornithology* that he sent his copy to Benjamin West in London, considered by many,

⁸² Samuel L. Mitchill, “*American Ornithology, or the Natural History of the Birds of the United States*,” *Medical Repository* 14 (1811). Mitchill wrote another review after Wilson’s death, writing that naturalists “make efforts for future and perhaps posthumous renown,” while surviving on very little. “*American Ornithology*,” *Medical Repository* 17 (1814).

⁸³ “*American Ornithology, of the Natural History of the United States*,” *Port Folio* 3, no. June (1814).

⁸⁴ Porter, *The Eagle's Nest*, 47.

⁸⁵ “Library Reports and Documents.” Academy of Natural Sciences of Philadelphia, “Minutes and Related Documents, 1825.”

⁸⁶ “Biographical Sketch of Alexander Wilson,” in Wilson and Ord, *American Ornithology*, clxvi.

including Peale, to be the greatest contemporary artist.⁸⁷ Impressed by what he saw, West allowed the book, and news of the ANSP and the Pennsylvania Academy of Fine Arts, to color—favorably—his view of Philadelphia and of the United States.

Naturalists similarly found *American Ornithology* worthwhile. William Bartram, a mentor to Wilson, “approve[d] of my intended publication of *American Ornithology*.”⁸⁸ Finding Wilson’s work precise and scientifically meaningful, he sent a drawing to President Thomas Jefferson: “I have taken the liberty to cover a Letter for your Excell’y from Mr. Alexander Wilson accompanying a *fine and accurate drawing* of two rare birds.”⁸⁹ Thomas Jefferson called these illustrations “the elegant drawings,” finding them important for natural history in the United States.⁹⁰

Indeed, Wilson’s work with American birds did breathe new life into American natural history.⁹¹ One result of Wilson’s publication was a demonstrative rebuttal of Buffon’s degeneration. No longer would American naturalists have to defend the beauty of American nature against it: “It gives us pleasure to learn that the dogmata of this vain and whimsical

⁸⁷ see Sir Benjamin West to Charles W. Peale, Esq., 19 September 1809. in *Port Folio* 3 (July 1810): 8. “Mr.[Peale] has presented me with the first number of the natural history of the birds of the United States, the production of that ingenious gentleman Mr. Alexander Wilson of your city; it is a work highly creditable to the abilities of that artist; and the world are greatly indebted to Messrs. Bradford and Inskip for laying it before them.”

⁸⁸ Alexander Wilson to William Bartram, 29 April 1807, in Hunter, ed., *The Life and Letters of Alexander Wilson*, 261.

⁸⁹ William Bartram to Thomas Jefferson, 18 March 1805, in Hunter, ed., *The Life and Letters of Alexander Wilson*, 233, emphasis added.

⁹⁰ Thomas Jefferson to Alexander Wilson, 7 April 1805, in Hunter, ed., *The Life and Letters of Alexander Wilson*, 236.

⁹¹ Charlotte Porter says that Wilson’s work “heralded a new era for natural history in the United States.” Certainly, it added a nationalistic element to American natural history, but the extension of European natural history practices into the New World was not new. *The Eagle's Nest*, 2.

philosopher have lost much of that regard which an imposing name has contributed to attract.”⁹²
 No longer would American naturalists have to defend against European theories about American nature.

Furthermore, the public praise of *American Ornithology* gave ornithologists confidence that Americans would continue to spend hundreds of dollars for well-executed natural history illustrations and texts. This trend would continue for several decades, beyond Bonaparte’s supplements to Wilson’s ornithology.⁹³

CONCLUSION

The Academy of Natural Sciences of Philadelphia promoted a specific brand of natural history illustration. It was aesthetically pleasing, and it provided naturalists, both novice and experienced, with the information they needed. Furthermore, it was a style of illustration that consolidated dueling camps in natural history, yet retained its pedigree.

However, the Academy’s standards came from a negotiation among generations of naturalist illustrators, engaged by Alexander Wilson. Wilson’s illustrations became the benchmark set by the Academy, which would prefer his type for decades, printing images in their *Journal* that resembled it. Personal loyalty to Wilson, perhaps influenced by his early death, persuaded the Academy into this mode of thought, but it became well-justified. Wilson’s drawings negotiated the work of Linnaeus and Buffon, including Catesby while, for many Academy members, surpassing him. By latching onto Wilson as the standard-bearer for natural history illustrations, the ANSP placed itself in a position of significance, where developments of new styles of ornithological illustration would have to negotiate with it.

⁹² George Ord, "North American Zoology," in *A New Geographical, Historical, and Commercial Grammar*, ed. William Guthrie (Philadelphia: Johnson & Walker, 1815), 313.

⁹³ Porter, *The Eagle's Nest*, 61-62.

Chapter 2 The Rogue Illustrator and His Critics: Audubon's and Nuttall's Ornithologies

In nineteenth-century natural history, American artists created representations based on individual aesthetic orientations. Their creative efforts emphasized individuality over affiliation with any particular group or artistic trend. Rogue naturalist-illustrators, drawing nature outside of traditional conventions, initially found acceptance more among art communities than scientific communities.

These traditional conventions, followed the illustrations in Alexander Wilson's *American Ornithology*, published serially from 1808 to 1814 and promoted by the Academy of Natural Sciences of Philadelphia (ANSP). Wilson's influence on the Academy came after his death in 1813, as he had used Linnaean classification in such a way that Academy members adopted it for their work. His illustrations positioned the bird in profile, on a stump or branch, in a flat space; the specimens appeared on a single plane and did not interact with each other.¹ The ANSP had adopted Wilson's work as a model for American ornithological illustration.

Specified conventions for natural history illustration limited its artistic creativity. The hold that the ANSP had on the scientific community in and around Philadelphia seemed to stall natural history illustrations, preventing any major changes to their aesthetics.

Jean-Jacques Audubon (1785-1851), a French-American naturalist, sought to make his own fame through a re-envisioning of American ornithology. Born in Les Cayes, Saint-Dominique (on the island of Hispaniola), a bastard son to Captain Jean Audubon and Jeanne Raline, Audubon spent much of his early life in the French navy, having been sent to Rochefort-sur-Mer for naval training at age eleven. In 1803, he left France for the United States to tend the

¹ Ann Shelby Blum, *Picturing Nature: American Nineteenth-Century Zoological Illustration* (Princeton, N.J.: Princeton University Press, 1993), 39.

family's property at Mill Grove, near Philadelphia. John James Audubon Americanized his name and became a US citizen in the midst of the War of 1812.²

Audubon's embrace of America, coupled with his rejection of French citizenship, found expression in his desire to break from the style of Wilson and traditional ornithology. In a brief autobiographical sketch, Audubon mentions Wilson once: "Alexander the naturalist—not the *American* naturalist."³ Audubon's intent in including Wilson here is clear; he wanted recognition as the great American naturalist. He allowed that Wilson was the Scottish naturalist who studied American birds, but Audubon wanted to be *the* American naturalist. Though Audubon was French, he had developed a sense of pride in being an American. His 1812 citizenship supplanted, for Audubon, his French ancestry, solidifying his American identity.⁴

For Audubon, a new ornithology would be instilled with and beget American pride. He wrote, "I would have liked to raise an everlasting monument, commemorating with a grand effect the history and portraits of the birds of America, by adding to each drawing of a single species a vignette exhibiting corresponding parts of the country where the specimen is most

² There is a large volume of Audubon literature, especially biographical, in the history of ornithology. Though these biographies, especially Richard Rhodes, *Audubon: The Making of an American* (New York: Alfred A. Knopf, 2004) and Shirley Streshinsky, *Audubon: Life and Art in the American Wilderness* (New York: Villard Books, 1993), give context to Audubon's life; they focus on Audubon's family life, self-fashioning, and development as an American ornithologist. His best-known work, *Birds of America*, has found itself the subject of several works, including Waldemar H. Fries, *The Double Elephant Folio: The Story of Audubon's Birds of America* (Chicago: American Library Association, 1973); Duff Hart-Davis, *Audubon's Elephant: America's Greatest Naturalist and the Making of the Birds of America* (New York: H. Holt, 2004); and William Souder, *Under a Wild Sky: John James Audubon and the Making of the Birds of America* (New York: North Point Press, 2004). Like the Audubon biographies, these works focus on the artistic, scientific, and economic factors that affected the construction and formation of the illustrations and the final product.

³ John James Audubon, "Myself," in *Writings and Drawings*, ed. Christoph Irmscher (New York: The Library of America, [1893], 1999), 785, original emphasis.

⁴ As argued in Rhodes, *Audubon*.

plentifully found.”⁵ In erecting this monument, Audubon would reflect the vastness and diversity of American birds, expanding into the realm of nature the ideas of Michel Guillaume Jean de Crèvecoeur (1735-1813), whose *Letters from an American Farmer* described the diversity of American people. Like his predecessors, who sought to prove that American birds were not weaker or less beautiful than those of Europe, Audubon demonstrated that American ornithological illustration did not need to be as constrictive as what had preceded him.⁶ In fact, illustration, for Audubon, need not be smaller or less beautiful than nature itself.

Audubon’s work in *Birds of America* was quite an ambitious work; to illustrate all the birds in America at the size of life proved an herculean task. And for Audubon as an artist, it meant that his work would break existing conventions that seemed to dominate American natural history, thus transforming the field’s illustrations.

DEVELOPMENT OF AUDUBON’S STYLE

Like Wilson and Catesby before him, Audubon inherited artistic sensibilities from his predecessors. Certain cultural expectations of naturalist illustrations made those illustrations appear similar, to Audubon. To differentiate his own work from others, Audubon, early in life, “formed a resolution...to draw each individual [bird] of its natural size and colouring.”⁷ Thus began the project that would become his *Birds of America*, published by subscription between 1827 and 1838.⁸ He knew that there would be problems convincing naturalists of his work’s legitimacy, writing, “I knew well that closet naturalists would expect drawings exhibiting, in the

⁵ John James Audubon, "Account of the Method of Drawing Birds, Employed by J. J. Audubon, Esq. F. R. S. E. In a Letter to a Friend," *Edinburgh Journal of Science* viii (1828), 53-54.

⁶ Wilson, et al, felt a need to counter these claims by Buffon, about species degeneration in the New World.

⁷ Audubon, "Method of Drawing Birds," 48.

⁸ Subscribers paid \$10 for each number, comprising of five plates. The eighty-seven numbers, combining to the total of 435 plates, were sent periodically to the subscribers over the eleven-year period.

old way, all those parts that are called by them *necessary characteristics*; and to content these gentlemen I have put in all my representations of groups always either parts or entire specimens, showing fully all that may be defined of those particulars.”⁹ To ensure that his work met the standards of ornithologists, he had to address these specific issues, incorporating all the “necessary characteristics,” such as markings, beak shape, and other taxonomic identifiers, into his illustrations. Furthermore, he would incorporate descriptive practices of naturalists, placing the birds as close to nature as illustration could afford: “My plan was then to form sketches in my *mind’s eye*, each representing, if possible, each family as if employed in their most constant and natural avocations, and to complete those family pictures as chance might bring perfect specimens.”¹⁰ But to satisfy his aesthetic sensibilities and a desire to make something new, he needed to negotiate between the “necessary characteristics” of the status quo and his new, distinct style.

The 1810 meeting of Audubon and Wilson in Louisville, Kentucky, shaped Audubon’s opinion of Wilson.¹¹ In the United States, Wilson’s *American Ornithology* had received significant publicity, which Audubon knew. Wilson’s account of his time in Louisville, which he spent seeking subscriptions for his book, was short and critical:

March 23d, 1810.—I have bade adieu to Louisville, to which place I had from letter of recommendation, and was taught to expect much of every thing there; but neither received one act of civility from those whom I was recommended, one subscriber, nor one new bird; though I delivered my letters, ransacked the woods

⁹ Audubon, "Method of Drawing Birds," 50, original emphasis.

¹⁰ Audubon, "Method of Drawing Birds," 49, original emphasis.

¹¹ Audubon has the only description of this meeting, which is fraught with bias. However, Wilson omitted all specific details of his time in Louisville, and Audubon found this omission curious, and problematic. Though prone to self-aggrandizement, Audubon’s account points to his opinion of his own work in contrast to Wilson’s.

repeatedly, and visited all the characters likely to subscribe. Science or Literature has not one friend in this place.¹²

Audubon's description of their encounter was more detailed than Wilson's account. It included his reaction to Wilson's drawings and Wilson's dismissal of Louisville, described by Audubon as "little knowing how much his talents were appreciated in our little town."¹³ According to Audubon, he began to sign his name as a subscriber to Wilson, when his companion said to him in French, "Your drawings are certainly far better, and again you must know as much of the habits of American birds as this gentleman."¹⁴ Instead of subscribing to Wilson, he showed him some drawings and described his reaction: "His surprise appeared great, as he told me he never had the most distant idea that any other individual than himself had been engaged in forming such a collection."¹⁵ Displeased with their Louisville encounter, Audubon sought future meetings with Wilson. In 1812, Audubon visited Wilson in Philadelphia and saw that he "was then drawing a White-headed Eagle."¹⁶ The similarities between Wilson's eagle and Audubon's are substantial: both appear in profile, facing the left of the illustration, and with the right foot over a killed fish.¹⁷ Though Wilson may not have taken much away from his meetings with Audubon, Audubon saw in Wilson something substantial.

¹² John James Audubon and William MacGillivray, *Ornithological Biography or an Account of the Habits of the Birds of the United States of America ; Accompanied by Descriptions of the Objects Represented in the Work Entitled the Birds of America, and Interspersed with Delineations of American Scenery and Manners*, 5 vols. (Edinburgh: A. Black, 1831-1839), vol 1, 440. It is important to note that this excerpt attributed to Wilson only appears in Audubon's writings, not anywhere else.

¹³ Audubon and MacGillivray, *Ornithological Biography*: vol 1, 439.

¹⁴ Audubon and MacGillivray, *Ornithological Biography*: vol 1, 438.

¹⁵ Audubon and MacGillivray, *Ornithological Biography*: vol 1, 439.

¹⁶ Audubon and MacGillivray, *Ornithological Biography*: vol 1, 440.

¹⁷ There are many criticisms of Audubon, alleging that he copied various birds found in Wilson. While there is no indisputable evidence proving these allegations, the similarities are undeniable. See especially Edward H. Burtt and Davis, *Alexander Wilson: The Scot Who Founded American Ornithology* (Cambridge, Mass.: Harvard University Press, 2013), 337-376.

Understanding the ornithological importance of Wilson's work, Audubon struggled with finding a copy to consult. Several times through his *Mississippi River Journals* of 1820-1821, he wrote of this dilemma. During February 1821, he found himself "Running about pretty much all day trying to procure some More Work and also Enquiry about Willson's Ornithology, but in Vain—the high value set on that Work more Particularly Lately [h]as rendered it extremely rare and the few who possess it will not Lend it."¹⁸ Later in the month, he "walked a good deal about the City [of New Orleans] in search of Work & Willson's [sic] Ornithology but was not favoured with any success."¹⁹ Connecting his own work to what Wilson had already done with American birds was essential to Audubon's defining himself as a distinct ornithologist and bird illustrator. If Audubon would produce a work greater than Wilson's, he would need to demonstrate its scientific validity through his knowledge of *American Ornithology*.²⁰

In critiquing Wilson's methods of illustration, Audubon focused on two primary areas. Live observation for drawings was, for both ornithologists, a critical part of depicting nature. Audubon believed that Wilson's drawings reflected a lack of first-hand observation of the living bird: "Sorry I am to have to say that Mr Willson's Drawing could not have been Made from the Bird fresh killed or if so it was in very bad order about the head."²¹ Audubon faulted Wilson for his method of bird observation, since dead specimens differed dramatically from of living specimens. Though Wilson claimed to draw birds from nature, the discontinuity between that

¹⁸ John James Audubon, "Mississippi River Journals," in *Writings and Drawings*, ed. Christoph Irmscher (New York: The Library of America, 1820-1, 1999), 79-80.

¹⁹ Audubon, "Mississippi River Journals," 83.

²⁰ Audubon used the intellectual contents of *American Ornithology* to help him identify birds and to corroborate some claims. For instance, Audubon "saw an Eagle with a White head and Brown Body & Tail, this Corroborates with the Idea of Willson of its being the Same Bird with the Brown Eagle." Additionally, he would not "Consider [Terns] as a New Specie, untill I See Willson's 9th Volume," needing to ascertain that Wilson had not already made the claim. in Audubon, "Mississippi River Journals," 71.

²¹ Audubon, "Mississippi River Journals," 114.

claim and the ensuing illustrations demonstrated, for Audubon, that Wilson had engaged in poor representational work.

Audubon demonstrated his disdain for Wilson's style of drawing birds by demoting Wilson to the status of other illustrated ornithologies that comprised the field's heritage—a sharp criticism. Audubon became concerned about his own drawings' similarities to Wilson's, especially of the same bird. After purchasing and illustrating a Blue Crane, Audubon wrote that the similarities between his bird and Wilson's prevented him from completing it himself.²² Similarities to Wilson made Audubon's illustrations problematic, especially as his goal in creating *Birds of America* was to break from Wilson's more traditional approach of drawing multiple static birds on a page.

Rejecting this traditional approach was evident from Audubon's early drawings. Of his first collection, he wrote, "They were all represented *strictly ornithologically*, which means neither more nor less than in stiff, unmeaning profiles, such as are found in most works published to the present day."²³ His disregard for this particular style of illustration informed his own habits of drawing birds, which often pointed directly away from the existing conventions.²⁴

These early illustrations resembled the static birds of Mark Catesby and Alexander Wilson, the bird standing in profile on a branch, with little else on the page. Audubon disliked these early drawings, saying, "I saw my attempt flat, and without that life that I have always

²² "Its Corresponding so well with A. Willson Description Stopd Me from writting it Myself." Audubon, "Mississippi River Journals," 89.

²³ John James Audubon, "My Style of Drawing Birds," in *Audubon and His Journals*, ed. Maria Rebecca Audubon and Elliott Coues (New York: Scribner's Sons, 1897), 523, original emphasis.

²⁴ Ann Blum suggests that Audubon also indicated a new way of relating to birds through illustration. Conventional ornithological illustrations depicted the bird staring distantly, away from the reader, "creating and maintaining an emotional and conceptual separation between bird and viewer." Audubon connected the birds and humans, through the "challenging stare" from the illustrations. Blum, *Picturing Nature*, 106.

thought absolutely necessary to render them distinguishable from all those priorly made.”²⁵

Clearly, Audubon’s intent in illustrating birds was, in part, to distinguish his work from what had become standard in ornithology illustration.

Two accounts outlined Audubon’s particular method for depicting birds. In 1828, a “Letter to a Friend,” written by Audubon, appeared in the *Edinburgh Journal of Science* as “Account of the Method of Drawing Birds.”²⁶ By 1838, another, similar statement had appeared, simply called “My Style of Drawing Birds.”²⁷ Though the latter provided more insight into the history of Audubon’s bird illustration, both were explanatory tools for illuminating the ways in which Audubon distinguished his work from other ornithological illustrations.

Audubon valued most highly the live observation of birds prior to their representation, reflected in his numerous attempts to copy nature alive. In perhaps the clearest divergence from traditional ornithological illustration, Audubon set his birds in motion, placing them in flight or running along the ground. In this way, he illustrated nature as it was, rather than as a static specimen. “Nothing after all could ever answer my Anthusiastic [sic] desires to represent nature, than to attempt to Copy her in her own Way, alive and Moving!”²⁸ By depicting birds in motion, he captured nature and captivated subscribers.

The preference for drawing living nature formed Audubon’s methodology for collecting observations and for his illustrations. So valuable was this practice that Audubon repeatedly chastised other naturalist-illustrators for failing to draw to his standards: “In forming works entirely with a view to distinguish the true from the false, nature *must* be seen first alive, and

²⁵ Audubon, "Method of Drawing Birds," 49.

²⁶ Audubon, "Method of Drawing Birds."

²⁷ Audubon, "My Style of Drawing Birds."

²⁸ Audubon, "My Style of Drawing Birds," 523.

well studied, before attempts are made at representing it. Take such advantages away from the naturalist, who ought to be artist also, and he fails.”²⁹ This focus on artist-and-naturalist reflected Audubon’s ethos of natural history. “To study Nature,” he wrote, “was to ramble through her domains late and early.”³⁰ By studying living nature, he could study the completeness of nature. Dead birds had no life in them, obviously, so they gave no life, he thought, to his illustrations. Only through observing living nature could Audubon adequately animate it. Familiarity begat better drawings, as Audubon saw in the relationship between his observations and his illustrations: “The more I understood all these particulars, the better representations I made of the originals.”³¹ In improving his observations, Audubon could make illustrations, even when using dead specimens as models, better than his predecessors.

Positioning the birds in a natural, observed, pose proved difficult for Audubon. He explained his process: “The more I understood my Subjects the better I became able to represent them in what I hoped was a Natural position, the Bird once fixed with Wires or Squares, and its Nature (as far as habits Went) previously Known to Me, I Studied it whilst thus places as a lay figure before me, according to its Specificality, this lead me to Judge as it were before hand of its general form.”³² He drew many sketches of different species until he made one that was satisfactory; he elevated parts of the birds by threads, using wood, cork and wires to position the bird as though it were alive.³³ A series of wires and cork would allow him an arrangement that resembled life most closely while conforming to his artistic aesthetic of presenting nature alive and moving.

²⁹ Audubon, "Method of Drawing Birds," 52, original emphasis.

³⁰ Audubon, "My Style of Drawing Birds," 525.

³¹ Audubon, "My Style of Drawing Birds," 526.

³² Audubon, "My Style of Drawing Birds," 523-524.

³³ Audubon, "My Style of Drawing Birds," 523-524.

There were other ways that Audubon's birds looked different. Earlier conventions of natural history illustrations avoided shading, as it obscured the subject's natural coloring. Audubon could not understand the aversion to this natural aesthetic of shade, declaring, "Among the naturalists of the time, several who are distinguished have said that representations of subjects ought to be entirely devoid of shades in all their parts. [...] My opinion is, that he who cannot conceive and determine the *natural* colouring of a shaded part, need not study either natural history or any thing else connected with it."³⁴ His work was for those intelligent enough to understand shading, and it was one aesthetic that would make his work distinct. Additionally, the birds originally appeared in watercolor, a popular medium in contemporary art, especially in the United States and in natural history. Watercolor allowed for more vibrant and nuanced coloration than oil painting or sketching. He wrote that watercolor was "more particularly adapted to the imitation of feathers."³⁵ In order to make his work more noticeable, the colors of the birds would have to excite the viewers.

Another way in which Audubon's birds appealed to American culture stemmed from his stated purpose. *Birds of America* followed Audubon's resolution "to draw each individual [bird] of its natural size and colouring."³⁶ Part marketing ploy, part aesthetic, and part accurate representation, the double elephant folio allowed for greater precision and more flourishes than small, folio-sized plates could contain.³⁷ The printed bird would be an exact replica—in two dimensions—of its natural counterpart. In describing the purpose of the illustrations' size,

³⁴ Audubon, "Method of Drawing Birds," 52.

³⁵ Audubon, "Method of Drawing Birds," 48-49.

³⁶ Audubon, "Method of Drawing Birds," 48.

³⁷ Double elephant was the largest size paper in the 1820s and 1830s, measuring fifty inches tall.

Audubon diminished the text's importance in *Birds of America*, proclaiming his illustrations' accuracy and precision:

In my work I wish to curtail these extremely tiresome descriptions; more anxious that those who study ornithology should compare at once my figures with the living specimens than with a description so easily made to correspond with the drawings by any person who merely knows the technical appellations of each part and feathers, with the name and colours chosen by authors for their purpose.³⁸

Audubon's illustrations placed more importance on the dynamic nature of the specimens. Less important was to derive a description from the illustration. Measuring his illustrations against descriptions by other ornithologists, he concluded that descriptions could not convey the same information as an illustration. His figures correspond to nature in shape, color, habits, *and size*, whereas other figures corresponded to a description. Audubon's illustrated bird—by itself—demonstrated truth to nature.

DRAWING FOR ART OR FOR SCIENCE?

Representation of nature, as Audubon demonstrated, could have both scientific value and artistic quality. In contemporary debates over the relative artistic and scientific merits of *Birds of America*, both sides made valid claims. However, few positioned themselves in such a way that allowed it to function in both capacities.³⁹ Audubon saw that his work could straddle the dichotomy, being of some value to any who viewed it, “a collection not only valuable to the scientific class, but pleasing to every person, by adopting a different course of representation from the mere profile-like cut figures, given usually in works of that kind.”⁴⁰ Again, he distanced

³⁸ Audubon, "Method of Drawing Birds," 52.

³⁹ Even Baron Cuvier's claim that *Birds* was “the most splendid monument which art has erected in honor of ornithology” makes the work art and not science. in Lucy Bakewell Audubon, ed. *The Life of John James Audubon: The Naturalist* (New York: G. P. Putnam & Son, 1869), iv.

⁴⁰ Audubon, "Method of Drawing Birds," 48-49.

his own work from contemporary conventions of natural history illustration, recognizing that it would be valuable to “every person” and not just the scientific community.

The scientific value of Audubon’s illustrations lay in their ability to provide identifiable representation. Like other ornithological works, Audubon’s presented measurements and descriptions in the accompanying text, called *Ornithological Biography*, written largely by Scottish ornithologist William McaGillivray (1796-1852). Audubon’s conceptualization of the work as a whole—that is, *Birds of America* and *Ornithological Biography*—was that the illustrations would suffice for scientific use. The text would then support the claims made in the drawings. To achieve this new balance, Audubon occasionally included some technical details of bird anatomy in his illustrations. His Pied Oystercatcher (plate CCXXIII) displays a sketch of the bird’s beak in the empty space above the running bird, demonstrating that the beak is horizontally narrow yet tall, and the American Flamingo (plate CCCCXXI) has various cross-section sketches of the bill, the tongue, and the webbed foot, situated in the empty space around the bird (figure 2.1).

Even the Academy of Natural Sciences of Philadelphia recognized some utility of Audubon’s illustrations, for their scientific purposes. An editorial note in the Academy’s *Journal* stated, “To the next plates of Mr. AUDUBON’s work, therefore, we refer the reader for beautiful and accurate figures of the following species.”⁴¹ Audubon’s birds were, for the Academy’s purposes, adequate substitutes for real specimens, where actual specimens were yet

⁴¹ Editorial note, John Kirk Townsend, "Descriptions of Twelve New Species of Birds, Chiefly from the Vicinity of the Columbia River," *Journal of the Academy of Natural Sciences of Philadelphia* 7, no. 2 (1837), 187.

unavailable.⁴² They contained enough of the “necessary characteristics” to be of use to naturalists in their taxonomic work.⁴³

In addition to identifying morphological markers of the birds’ taxonomies, Audubon added valuable descriptions to his illustrations. He situated his subjects in natural settings, incorporating the interactions of birds in their ecological contexts. “Each tree, each shrub, each flower, attracted my curiosity and attention, and my anxiety to have all those in my portfolios introduced the thought of joining as much as possible nature as it existed.”⁴⁴ He intended for his illustrations to include flora consistent with the bird’s natural habitat, as he had observed in nature.

Birds of America would have value outside ornithology, in other parts of natural history. The work would be relevant for herpetologists, entomologists, ichthyologists, and botanists, in that flora and additional fauna grace the illustrations. Like Catesby had, Audubon identified the Harlequin snake that interests the Chuck-will’s Widows (plate LII) and the Bull-frog captured by the Winter Hawk (plate LXXI), as well as others throughout the illustrations. The Grass Finch (plate XCIV) stands on a rock, in front of a Prickly Pear, which Audubon identifies in both its scientific name and its common name. The addition of supplemental flora and fauna did not simply serve a purpose for naturalists; it would increase the overall attractiveness of the work. He wrote, “If I have joined to many of my drawings, plants, insects, reptiles, or views, it has been with the hope to render them all more attractive to the generality of observers; and I can assure you that all these were copied with the same exactness with which all the birds are

⁴² Specimens of the birds J. K. Townsend described in the article had not yet arrived in Philadelphia at the time of its writing.

⁴³ Audubon, "Method of Drawing Birds," 50.

⁴⁴ Audubon, "Method of Drawing Birds," 51.

represented, you will no doubt view them with as much pleasure.”⁴⁵ For Audubon, a greater number of beautifully rendered objects increased the aesthetic value of the whole work. Furthermore, a greater number of precisely rendered objects increased the scientific value of the enterprise.

Many illustrations carried with them a narrative quality. In some cases, the illustrations tell their own clear story, as in the Ferruginous Thrush (plate CXVI), which wards off a black snake that had attacked its nest. Audubon spelled out the narrative in the text entry for the *Ornithological Biography*.⁴⁶ Other illustrations used the narrative in the illustrations differently. The watercolor for the Golden Eagle included, in the bottom left, a human figure crossing a fallen tree, positioned precariously over a ravine. With a bird strapped to his back, this figure reflected Audubon’s treacherous travels.⁴⁷ Storytelling was a way of narrating one’s ornithological practices, demonstrating the ways in which nature was observed.

The prospectus for *Birds of America*’s further identified Audubon’s intent for his illustrations, focusing on the size and precision of the work. *Birds of America*’s “superiority consists in every specimen being of the full size of life, portrayed with a degree of accuracy as to proportion and outline, the result of peculiar means discovered and employed by the author.”⁴⁸ The prospectus highlighted the artistic distinctiveness of this work from previous bird illustrations, and the ways Audubon mixed the conventional with the novel.

⁴⁵ Audubon, "Method of Drawing Birds," 52.

⁴⁶ Audubon and MacGillivray, *Ornithological Biography*, vol 2, 102-107.

⁴⁷ Curiously, his figure is absent from the printed illustration. See Christoph Irmscher, "Audubon at Large," in *The Poetics of Natural History: From John Bartram to William James* (New Brunswick, NJ: Rutgers University Press, 1999), 225.

⁴⁸ John James Audubon, "Prospectus for *Birds of America*," in *The Audubon Reader*, ed. Richard Rhodes (New York: A.A. Knopf, 1828, 2006), 215.

Audubon presented his work as a piece of art more than as an ornithological work. In the first pages of *Ornithological Biography*, he explains the organization of the work:

I do not present to you the objects of which my work consists in the order adopted by systematic writers. Indeed, I can scarcely believe that yourself, good-natured reader, could wish that I should do so; for although you and I, and all the world besides, are well aware that a grand connected chain does exist in the Creator's sublime system, the subjects of it have been left at liberty to disperse in quest of the food best adapted for them, or the comforts that have been so abundantly scattered for each of them over the globe, and are not in the habit of following each other, as if marching in regular procession to a funeral or a merry-making.⁴⁹

The sequence of publication aligned more with selling the book rather than with presenting ornithological subjects. Instead of following the Linnaean system, which separated birds into orders and families, Audubon sold his prints in a specific five-print order, according to the size of the plate used for the print.⁵⁰ The result was a collection of these illustrations organized around size rather than a scientific taxonomy—a focus on aesthetic rather than science.

RECEPTION OF AUDUBON

Audubon's work appealed both to scientific and artistic audiences. The wide variety of American subscribers included the Library of Congress, several state legislatures, universities, and natural history societies; European subscribers included Adelaide, Queen Consort of the United Kingdom, French King Charles X, several members of Parliament, universities, and natural history societies.⁵¹ *Birds of America* was not a book strictly for ornithologists, or even for naturalists, but it was useful and appreciated much more broadly.

⁴⁹ Audubon and MacGillivray, *Ornithological Biography*, vol 1, xix.

⁵⁰ Each number—a set of five plates—would contain one large print and at least one medium and one small print. The full subscription was a series of eighty-seven numbers. Details of the printing, subscription, and publication processes are in Fries, *The Double Elephant Folio: The Story of Audubon's Birds of America*.

⁵¹ A list of the 161 subscribers (82 from the US and 79 from Europe) appeared at the back of the final volume of Audubon and MacGillivray, *Ornithological Biography*, vol. 5, 647-651.

Of particular interest is the reaction to *Birds of America* by the Academy of Natural Sciences of Philadelphia. Strong supporters of Alexander Wilson's work in *American Ornithology* populated the Academy, and many were especially reticent to embrace a new ornithological work. Most subscribers in the Philadelphia area were members of the American Philosophical Society (APS) or the ANSP, and sometimes both. Eight subscribers were ANSP members, and twenty-six were from APS.⁵² This disparity between the subscription rates of the two Philadelphia-based societies suggests the hesitation of Academy members to accept Audubon's work, exemplified in the tension between George Ord (1781-1866), a naturalist and friend of Wilson, and Audubon in the Academy.

Disparaging the book, Ord referred to *Birds of America* as "les mille et une nuits de l'histoire naturelle"⁵³ Clearly, his thoughts about the book were not entirely positive: he thought it more a fanciful depiction of natural history than one with original scientific value. Ord's critique of Audubon's lack of original value may have stemmed from his loyalty to Wilson and to his memory. Charles Lucien Bonaparte (1803-1857), a French naturalist who continued Wilson's work, and Thomas Say (1787-1834), a founding member of ANSP and an entomologist, were impressed by Audubon's birds; George Ord was not.⁵⁴ Ostensibly, his objections stemmed from Audubon's incorporation of plants into bird illustrations, though, according to Audubon's granddaughter, Ord "spoke well of them otherwise."⁵⁵

⁵² Charlotte M. Porter, *The Eagle's Nest: Natural History and American Ideas, 1812-1842* (Tuscaloosa: University of Alabama Press, 1986), 145.

⁵³ "1,001 nights of Natural History," an allusion to the fanciful stories of *Arabian Nights*, translated and available in English by 1707. George Ord to Charles Waterton, 21 November 1842, typescript from the original, American Philosophical Society. in Porter, *The Eagle's Nest*, 144.

⁵⁴ Burtt and Davis, *Alexander Wilson*, 338.

⁵⁵ Maria Rebecca Audubon, "Audubon," in *Audubon and His Journals*, ed. Maria Rebecca Audubon and Elliott Coues (New York: Scribner's Sons, 1897), 56.

Upon Wilson's death in 1813, Ord had been named the executor of the estate. Taking his obligation to Wilson very seriously, Ord did all he could to preserve Wilson's legacy, including editing the eighth and ninth volumes of *American Ornithology*, published in 1828 and 1829, fifteen years after Wilson's death. Elliott Coues (1842-1899), ornithologist and editor of Audubon's journals, believed that this responsibility was "probably enough to account for his attitude toward Audubon."⁵⁶ Audubon's *Birds of America* was competition for Ord's expansion of *American Ornithology*.⁵⁷

The beginnings of the debates between Audubon and the Wilson camp had appeared in March 1824.⁵⁸ Ord, standing for Wilson, objected to the interaction between birds and plants, as well as the contorting of birds for aesthetic and dramatic narrative. These objections played some role, and not an insignificant one, in Ord's blocking of Audubon's election to the Academy, a prerogative of original members and of the executive board.⁵⁹ As vice president of the Academy from 1816 to 1834, Ord carried with him a great deal of influence.⁶⁰ His attempts to discredit

⁵⁶ Maria Rebecca Audubon, "Audubon," 56, n. 2.

⁵⁷ Edward Burt and William Davis approach the Ord-Audubon conversation with a nuanced view. "It is indeed unfortunate that George Ord, to whom Wilson entrusted his legacy, could not comprehend that Wilson's achievement was beyond eclipse. Ord simply could not understand that Wilson—naturalist, scientist, and artist—had not only established scientific ornithology in the United States, but had also set a new standard for the illustration of nature, had set a new standard for scientific description, and had elevated nature writing to a distinctly American literary tradition. [...] It is equally unfortunate that Audubon, the quintessential artist-naturalist, could not see that acknowledging Wilson's pioneering work would only enhance his own unique contribution to ornithology and American culture. Perhaps Ord's unreasonable and crushing opposition to Audubon's plans tainted Audubon's view of Wilson." Burt and Davis, *Alexander Wilson*, 344.

⁵⁸ Burt and Davis, *Alexander Wilson*, 338.

⁵⁹ Burt and Davis, *Alexander Wilson*, 338; Porter, *The Eagle's Nest*, 71.

⁶⁰ Burt and Davis, *Alexander Wilson*, 409.

Audubon's observations kept the naturalist out of the Academy until after the 1840 death of then-president William Maclure.⁶¹

The primary reason for Ord's objections to Audubon was the artistic license Audubon appeared to take with nature. Liberties with the narratives, both in images and in text, reflected scenes that other naturalists had not seen. For Ord, this cast doubt over large swaths of the book. Alleging a fabrication in observation, Ord heavily criticized the inclusion of a tree-climbing rattlesnake in the Mockingbird plate (figure 2.2).⁶² English naturalist Charles Waterton (1782-1865) bolstered Ord's claims, calling *Birds of America* "solely a work of art."⁶³ His criticism of Audubon's ornithological work focused on Audubon's words, which Waterton believed were not written by Audubon, being so different from other things he had ostensibly written: "Were the *Biography of Birds* really the production of Mr. Audubon's own pen, I should not be tardy in praising its *literary* merit, notwithstanding its *ornithological* faults."⁶⁴ The clout carried by Ord and Waterton, over two continents, may have discredited Audubon in some natural history communities.

Several individuals came to Audubon's defense. His son Victor (1809-1860) specifically addressed Waterton's ghostwriter allegation: "Mr. Audubon, and no other person, is the *bonâ fide* author of the *Ornithological Biography*."⁶⁵ South Carolinian naturalist John Bachman (1790-1874), also a close friend of Audubon, defended the naturalist against Waterton's and Ord's

⁶¹ Porter, *The Eagle's Nest*, 71, 145.

⁶² Porter, *The Eagle's Nest*, 36.

⁶³ Charles Waterton, "On the "Biography of Birds" of J. J. Audubon," *Loudon's Magazine of Natural History* vi (1833), 215.

⁶⁴ Waterton, "On the "Biography of Birds" of J. J. Audubon," 216, original emphasis.

⁶⁵ Victor Audubon, "In Reply to Mr. Waterton's Remarks on Audubon's Biography of Birds," *Loudon's Magazine of Natural History* vi (1833), 269.

attacks regarding the *Mocking-Bird* plate.⁶⁶ Coues described Waterton's 1833 review: "Waterton appears to have been satisfied that Audubon was a lying charlatan, and accordingly attacked him with a very pointed pen."⁶⁷ Additionally, Coues addressed an 1834 article by Waterton that had launched similar accusations against Audubon, saying that Waterton's response was a "further installment of this person's flippant and supercilious animadversion."⁶⁸ Despite the several attacks on Audubon, naturalists within his network of influence defended his character and scientific integrity for decades.

These two groups—Audubon's critics and his defenders—may have been influenced in their staunch viewpoints for some reason outside the quality of Audubon's work. Less biased reviews of *Birds of America* appeared throughout the United States. The Lyceum of Natural History of New York examined *Birds of America* to determine whether the society should purchase it. Calling the book "the most magnificent work of its kind ever executed in any country," the review celebrates the accuracy of the illustrations of observed specimens, and an inferred accuracy "of others which they have had no opportunity of personally verifying."⁶⁹ Their primary criticism of the work was its cost, though they "hoped that all public institutions whose object is the encouragement of science or the liberal arts, may be induced to patronize it."⁷⁰

⁶⁶ in Michael Reed Minneah, "The Rev. John D. Bachman: Audubon's Collaborator," in *Historical Sketches: A Collection of Papers Prepared for the Historical Society of Montgomery County, Pennsylvania* (Norristown: Historical Society of Montgomery County, 1905), 229. Bachman cited this article in documents published in 1888, but the original article seems to have been destroyed.

⁶⁷ Elliott Coues, *Birds of the Colorado Valley: A Repository of Scientific and Popular Information Concerning North American Ornithology* (Washington: Government Printing Office, 1878), 621.

⁶⁸ Coues, *Birds of the Colorado Valley*, 622.

⁶⁹ "Report of a Committee Appointed by the Lyceum of Natural History of New York to Examine the Splendid Work of Mr. Audubon Upon the Birds of North America," *American Journal of Science* xvi (1828), 353-354.

⁷⁰ "Report of a Committee Appointed by the Lyceum of Natural History of New York," 354

Other reviews expressed similar views, citing the “perfect copy of nature,” the “twofold quality of an artist and a naturalist,” and the “expressive, animated, and often very eloquent” style.⁷¹ British naturalist William Swainson (1789-1855) found miniscule faults, though he paired them with Audubon’s honorable lack of seeking honor and eminence, a disinterested pursuit of scientific knowledge.⁷² An anonymous reviewer for *The North American Review* echoed this sentiment, suggesting that Audubon was misunderstood by his contemporaries, creating his work without the social advantages that Wilson had.⁷³ Celebrations of Audubon as a heroic naturalist further elevated his status among Americans.

Audubon’s work inspired Americans who worked outside of natural history. Swainson’s review included this sentence: “Here every object speaks, either to the senses or to the imagination.”⁷⁴ The object of *Birds of America* itself spoke to the American imagination, manifest in some lines of poetry contemporary to the work. Poet Elliott Ebenezer described Audubon’s birds thus: “Thy forms of Nature's terror, love, and ire, / Thy copied words of God.”⁷⁵ Not only did Audubon’s birds reflect nature; they reflected the creator of nature, elevating Audubon’s talents even higher. Poet Thomas Aird wrote some years later of Audubon as representative of the American spirit, or how Americans ought to interact with nature:

How joys the enthusiast Audubon to catch
And fix the creatures of the solitudes

⁷¹ William Swainson, "Some Account of the Work Now Publishing by Mr. Audubon, Entitled the Birds of America," *Magazine of Natural History* i (1829) 47; B., "Audubon's Ornithological Biography," *Magazine of Natural History* viii (1835) 185; anon., "Audubon's Biography of Birds, Ornithological Biography," *The North American Review* xli, no. 88 (1835), 230.

⁷² Swainson, "Account Of ... The Birds of America," 50.

⁷³ anon., "Audubon's Biography of Birds," 195.

⁷⁴ Swainson, "Account Of ... The Birds of America," 51.

⁷⁵ Ebenezer Elliott, "Lines Written after Seeing, at Mr. John Heppenstall's of Upperthorpe, near Sheffield, the Plates of Audubon's Birds of America," in *The Poetical Works of Ebenezer Elliott*, ed. Edwin Elliott (London: Henry S. King & Co., 1876), lines 38-39.

In pictured play, the play of tameless life,
 Wanton and freakish free, their sallies tart,
 Their secret gestures, and the wild escapes
 From out their eyes; watching how Nature works
 Her fine frugalities of means, even there
 Where all is lavish freedom, finer still,
 The compensations of her processes,
 Throughout their whole economy of life.⁷⁶

Audubon, it seemed, knew how to depict the whole of nature, not just how it appeared, but how it acted. This method became significant for ornithologists and illustrators, certainly—but for Americans as well.⁷⁷

THOMAS NUTTALL, A CONTRAST

A contemporary to Audubon's *Birds of America*, Thomas Nuttall's *Manual of the Ornithology of the United States and Canada* came out of Boston in two volumes, published in 1832 and 1834. Ostensibly, this book was to be “a compendious and scientific treatise on the subject” of ornithology.⁷⁸ Implicitly, it provided an alternative to Audubon's overly large and over-priced work.

In his preface, Thomas Nuttall (1786-1859) was not subtle about his book's intended purpose. By specifying the work as a “scientific treatise,” he suggested that such a work had not recently been produced in ornithology. Additionally, he discussed the need for a book such as his. He would produce his *Manual* “at a price so reasonable as to permit it to find a place in the hands of general readers, seemed, however, still a desideratum; and to supply this defect has

⁷⁶ Thomas Aird, “A Summer Day,” in *The Poetical Works of Thomas Aird* (Edinburgh: William Blackwood, 1878), lines 538-547.

⁷⁷ Blum writes, “Audubon's work became a widely held model for American expectation of nature, for the way Americans saw birds and saw themselves observing birds.” *Picturing Nature*, 114-115.

⁷⁸ Thomas Nuttall, *A Manual of the Ornithology of the United States and of Canada*, Second ed. (Boston: Hilliard, Gray, and Co., 1840), vol 1, v.

been a principal object with the author of the present publication.”⁷⁹ *Manual of the Ornithology of the United States and Canada* would fill a void in American ornithological publications.

Nuttall was aware of the heritage that supported his work. He owed a debt to “the labors of the immortal Wilson and of the justly celebrated Audubon.”⁸⁰ His word choices reflect a careful positioning in natural history, where he gave ample respect for Wilson’s work, suggesting his prominence in the scientific world. However, Audubon’s contribution to ornithology was “justly celebrated.” This nod to Audubon’s work, in contrast with the recognition given to Wilson, suggests the relative value Nuttall gave to the work of each naturalist.

The treatment of Audubon changed between the two volumes of Nuttall’s *Manual*. The first volume identified the “indefatigable Wilson and celebrated Audubon,” wherein Wilson’s identification was through a character trait and Audubon’s was through how others saw him.⁸¹ The second volume reveals Nuttall’s “friend Mr. Audubon,” a personal connection between the two.⁸² Between the publications of the two volumes, Audubon had communicated with Nuttall about some birds Nuttall had not seen—perhaps enough to warrant Nuttall’s change in perception.⁸³

The illustrations in Nuttall’s *Manual* differed vastly from those in Audubon’s *Birds of America*. Foremost, they were woodcut engravings, not the copper-plate aquatints of Audubon.

⁷⁹ Nuttall, *A Manual of the Ornithology of the United States and of Canada*, vol 1, v.

⁸⁰ Nuttall, *A Manual of the Ornithology of the United States and of Canada*, vol 1, v.

⁸¹ Nuttall, *A Manual of the Ornithology of the United States and of Canada*, vol 1, 631.

⁸² Nuttall, *A Manual of the Ornithology of the United States and of Canada*, vol 2, v, 58, 100.

⁸³ Audubon, John James, 31 August 1833, *The Labrador Journal*, “Whilst at Boston I wrote several letters, one very long one to Thomas Nuttall, in which I gave him some account of the habits of water-birds with which he was unacquainted; he sent me an extremely kind letter in answer.” In John James Audubon, *Audubon and His Journals*, ed. Maria Rebecca Audubon and Elliott Coues, 2 vols. (New York: Scribner's Sons, 1897), 445.

In part, this was to keep the cost of the book low, as Nuttall mentioned this preference specifically: “wood engravings, not sufficiently numerous, in consequence of their cost.”⁸⁴

Printed in the United States, rather than in London, Nuttall’s birds came out of the workshop of George Carter and Joseph Andrews of Lancaster, Massachusetts, with the engraving done by John T. Bowen of Boston.⁸⁵ The illustrations of the second volume came out of the same shop, though Bowen’s name did not appear in a list of engravers. Nuttall saw an improvement in the illustrations, describing them as “more uniform and correct than those of the previous volume.”⁸⁶ Nuttall’s focus in his *Manual* was to allow the illustrations to assist in the understanding of the birds they represented, not to place the reader’s focus on the illustrations.⁸⁷

In their content, Nuttall’s illustrations reacted against Audubon’s stylistic representations of birds. Nuttall’s birds, generally, adhere to institutional standards more-widely accepted by natural history communities. The birds were in profile, wings spread, and beak slightly open. Any flora in the illustration remained unidentified, and the birds appeared in the frame alone, though occasionally in flight.

Audubon’s influence is nevertheless present, as exemplified in the engraving of the bluebird (figure 2.3).⁸⁸ The bluebird is alone, perched on a branch of an unidentified tree, its wings outstretched. However, there is not white space outlining the bird. The lines of the bird intersect with the bird’s background—in this case, a farm, complete with hogs.

Nuttall’s illustration does provide some contrast to Audubon, evident in this illustration. The textual descriptions of the bluebird superceded whatever the illustration showed. This, in

⁸⁴ Nuttall, *A Manual of the Ornithology of the United States and of Canada*, vol 1, vi.

⁸⁵ Nuttall, *A Manual of the Ornithology of the United States and of Canada*, vol 1, vi.

⁸⁶ Nuttall, *A Manual of the Ornithology of the United States and of Canada*, vol 1, vii.

⁸⁷ Nuttall, *A Manual of the Ornithology of the United States and of Canada*, vol 1, vii.

⁸⁸ Nuttall, *A Manual of the Ornithology of the United States and of Canada*, vol 1, 444.

itself, hearkened to Wilson's illustrations. The text describes the feet of the bird, which the tree branch obscures. Nuttall's description described the "rich sky-blue" color of the bird, which is absent from the illustration.⁸⁹ Most importantly, though, is the inclusion of the images alongside the text. Nuttall's *Manual* did not separate printings of textual description and ornate plates, as Audubon and Wilson had produced. Instead, the woodcuts fit on the same page as description, allowing the reader to use them concurrently. A shift away from Audubon, the return to text and simple, profiled, static birds reflected the leanings of Nuttall's ornithology toward an institution-supported style.

Advertisements for Nuttall's *Manual* reflected this hierarchy, too. In comparison with advertising for Audubon's *Birds of America*, Nuttall noted his ornithological observations and descriptions more than his illustrations. The *National Gazette* and *Rhode-Island American* described the book as "illustrated by numerous engravings" and "illustrated with accurate illustrations."⁹⁰ Since advertisements were the responsibility of the publisher and booksellers, the best and most flattering parts of the book receive the most attention, truncated to fit the newspaper space. As such, the illustrations found mention, though not the attention of the descriptive work done by Nuttall.

Like Audubon and Wilson, Nuttall's work received the most immediate attention in ornithological work following his own. American naturalist John Kirk Townsend (1809-1851) considered Nuttall's book, "highly valuable as a text book, which, like all that has proceeded from his pen, exhibits in an uncommon degree the qualities of patient investigation and sound

⁸⁹ Nuttall, *A Manual of the Ornithology of the United States and of Canada*, vol 1, 449.

⁹⁰ "Advertisement," *National Gazette*, 22 September 1832; "Advertisement," *Rhode-Island American and Gazette*, 13 March 1832.

judgment, with great beauty and eloquence of description.”⁹¹ Like the advertisements, and Nuttall’s own preface, the focus remained on observations and descriptions, not on the illustrations.

Periodical reviews of Nuttall followed in a similar vein. The *American Journal of Science* published a review that focused primarily on Nuttall’s accomplishments, saying “his habits of observation, as well as powers of description, were well suited to the task he has performed, as all will readily acknowledge who peruse the work.”⁹² Nevertheless, the “large number of very beautiful wood cuts” received some mention, however scant.⁹³ The review lacked significant discussion of the illustrations, perhaps due to Audubon’s popular work in the area. Instead, the focus remained on Nuttall’s observations and descriptions—a tribute to traditional ornithology. Similarly brief was the discussion of Nuttall at the British Association for the Advancement of Science (BAAS). The BAAS found Nuttall “a very convenient hand-book, containing a compendium of the labours of Wilson, Bonaparte and Audubon, accompanied with many original observations on the habits of the species. The work is illustrated with woodcuts, which, though not equal to the works of Bewick, are executed in a similar style and with considerable success.”⁹⁴ This review compared Nuttall to Audubon and Wilson, but it lacked high praise of any specific aspect of the illustration work. “Considerable success” hedged a compliment, comparing the technical skill of the woodcuts to that of renowned English engraver and naturalist Thomas Bewick (1753-1828).

⁹¹ John Kirk Townsend, *Ornithology of the United States of North America, or, Descriptions of the Birds Inhabiting the States and Territories of the Union with an Accurate Figure of Each, Drawn and Coloured from Nature* (Philadelphia: J.B. Chevalier, 1839), iii.

⁹² Review, "A Manual of the Ornithology of the United States and Canada. By Thomas Nuttall," *American Journal of Science* 22, no. July (1832), 178.

⁹³ Review, "A Manual of the Ornithology of the United States and Canada. By Thomas Nuttall," 179.

⁹⁴ British Association for the Advancement of Science, *Report of the Fourteenth Meeting of the British Association for the Advancement of Science* (London: John Murray, 1845), 192.

The advertisements and reviews of Nuttall's *Manual* reflected the cultural avenues Nuttall intended his work to travel. His ornithological work was not for the social elite, nor for mass appeal, in the ways that Audubon's was. Instead, it was for institution-based ornithology, fitting into the standard schema developed and utilized by Wilson and the Academy of Natural Sciences of Philadelphia.

CONCLUSION

By the time Nuttall had begun publishing his *Manual*, Audubon had already changed some aspects of American natural history illustration. Though Nuttall published both his volumes in the middle of Audubon's eleven-year publishing process, he had already felt the influence. Like Audubon, Nuttall put only a single bird on his pages and incorporated the birds into the background, breaking some conventions promoted by Wilson and the ANSP, though not the most prominent ones.

Audubon had developed a style antithetical to the informal conventions established by the ANSP. In doing so, he established new ways of engaging with natural history, ways that appealed to a wider American culture. Tradition existed, but it was not an unbreakable monolith. Negotiating with tradition allowed for new ideas to seep into natural history illustration, reflecting a variety in ways artists and naturalists saw nature.

This particular episode in American natural history illustration demonstrates the role of the individual in illustrating scientific knowledge. Conventions existed, and they existed within an institution. However, they were not the only framework within which scientific representation could exist, as Audubon demonstrated. Individual aesthetic functioned alongside institutional conventions, challenging them, and proving the importance of the individual artist-naturalist.

Chapter 3 The Rise of the Lithographed Bird and the New Negotiators

Though Boston had seen Nuttall's 1832 and 1834 *Manuals* into print, Philadelphia became a center for American image printing, as it had for American natural history. The Academy of Natural Sciences of Philadelphia (ANSP) already had established itself as an important locale for natural history work, on the heels of the many Philadelphia residents who reflected the city's scientific status: John Bartram (1699-1777) and William Bartram (1739-1823) maintained an historic garden that contained a large collection of North American plants; Benjamin Franklin (1706-1790) studied meteorology and the currents of the North Atlantic; Charles Willson Peale (1741-1827) organized an 1801 scientific expedition and founded the Philadelphia Museum; Alexander Wilson, discussed earlier, produced the first American ornithology. This spate of scientific inquiry had already made Philadelphia an important center for natural history in North America. Image-making reinforced that importance.

This chapter examines the role of people rooted in Philadelphia, especially the success of lithographers that accompanied the proliferation of lithography in the city. John T. Bowen (1801-1856) had become known through his ANSP-appreciated illustrations in Nuttall's *Manual*, and his transition into lithography made his work in illustration accepted by scientific communities and naturalist-artists. In this way, the lithographers—that is, those printing the image onto the page—became the agents of influence in natural history illustrations.

Lithography gained importance in the middle decades of the nineteenth century, gradually replacing woodcuts and engraved steel and copper as a widely used method of transmitting visual information. Lithography used an image drawn in oil, fat, or wax, onto the surface of a smooth, semi-porous, level, limestone lithographic plate. By treating the stone with a mixture of acid and gum arabic, the lithographer etched the portions of the stone that were not

protected by the grease-based image. With the stone moistened, these etched areas retained water; an oil-based ink could then be applied and would be repelled by the water, sticking only to the original drawing. The ink would finally be transferred to a blank paper sheet, producing a printed page. In sum, the grease on the stone repelled the water, and the greasy marks attract the greasy printing ink.¹

In July 1819 *Analectic Magazine*, a Philadelphia journal that reprinted and translated European publications alongside original American reviews, published an article entitled “Lithography.”² It described the techniques of lithography, including detailed descriptions of wax, ink, and crayons; the different stones that could be used; and the processes of pressing the stone and applying ink and water. It also contained a lithographic pastoral scene, the first lithograph printed in the United States.³ Furthermore, the essay delineated numerous benefits that lithography provided, many of which reduce to expediency, including producing “a perfect fac simile,” printing the image “the instant the drawing is dry,” a plate “never worn out,” and large drawings done by “any man who can draw.”⁴

More importantly, *Analectic* testified to the value lithography provided for scientific publications: “All works of science, may now be freed from the prodigious expense attending numerous engravings.”⁵ Illustrations could bolster the efficiency of scientific research, though at a cost. Engravings proved expensive, often an inefficient use of a publication’s resources.

¹ Michael Twyman, “Putting Philadelphia on Stone: An Introduction to the Techniques Used,” in *Philadelphia on Stone: Commercial Lithography in Philadelphia, 1828-1878*, ed. Erika Piola (Philadelphia: Pennsylvania State University Press, 2012).

² “Lithography,” *The Analectic Magazine* 14 (July 1819).

³ Albert H. Smyth, *The Philadelphia Magazines and Their Contributors, 1741-1850* (Philadelphia: R.M. Lindsay, 1892), 180.

⁴ “Lithography,” 72-73.

⁵ “Lithography,” 73.

Lithography furthermore provided artistic democracy, wherein “any man who can draw” supplanted illustrators who specialized in creating printable illustrations.⁶ Finally, whereas engravings made permanent marks on blocks of wood or copper sheets, only finding repurpose in exact replicas, lithography allowed different artists to reuse the same stone simply by cleaning it.

Lithography had a great deal of potential, especially in Philadelphia. With publishers like Otis Brown (1784-1861) and naturalists like Charles Alexandre LeSueur (1778-1846), both eager to promote lithography and utilize the possibilities it afforded, Philadelphia would become a New World center for scientific lithography. Indeed, the city had already overseen the printing of the earliest American lithographs for scientific representation. From 1821 to 1822, the *Journal of the Academy of Natural Science* and *American Journal of Science of Philadelphia* produced the first American lithographic map, a lithograph of technical machinery, and a lithograph of fish, by LeSueur.⁷ The quick expansion of lithography from a pastoral scene in 1819 to the 1821 natural history images signaled a merger of two important Philadelphia cultures: natural history and lithography.

Historians of this new print medium recognize Philadelphia’s centrality. Some have called Philadelphia “the ideal environment for artists, scientists, and publishers...to promote the new printing press.”⁸ Others have recognized the early adoption of lithography in the printing world of Philadelphia as an important development in the promotion of “useful knowledge,”

⁶ "Lithography," 72-73.

⁷ Erika Piola and Jennifer Ambrose, "The First Fifty Years of Commercial Lithography in Philadelphia: An Overview of the Trade, 1828-1878," in *Philadelphia on Stone*, ed. Erika Piola, 2-3.

⁸ Piola and Ambrose, "The First Fifty Years of Commercial Lithography in Philadelphia," 1.

which was so important to regional scholarship.⁹ Philadelphia was the place in the United States for experimental printing, and illustrations, especially in scientific works, received the most attention in these new methods.¹⁰

Although it served as a new medium for spreading knowledge, lithography served a greater purpose than simply to provide an avenue for scientific illustrations to find publication. Lithography put printers into conversations about the aesthetics of scientific illustration. In addition to the technological capabilities discussed above, lithography brought a new artistry to printed images. It could achieve, among other things, smoother lines and a shading not reliant on cross-hatching. Furthermore, the lithographers exerted influence over the illustrations themselves, mediating the image of nature as it had been observed and the image on the printed page.

Whereas institutions and artist-naturalists negotiated their imaginings of nature with engraving firms to get the image onto the page, lithographers often inscribed an image directly onto the stone, which would then put that image onto the page. Printers worked with naturalists' sketches, imposing their own styles over the naturalists' observations, developing a new source of influence. With the rise of lithography, artisans enjoyed a new responsibility in imagining nature, as they were the new negotiators of natural images.

LITHOGRAPHY AT ANSP

In 1821, LeSueur made lithographs to illustrate his article on fish genera within the

⁹ Robert McCracken Peck, "Illustrating Nature: Institutional Support for Art and Science in Philadelphia, 1770-1830," in *Knowing Nature: Art and Science in Philadelphia, 1740-1840*, ed. Amy R. W. Meyers and Lisa L. Ford (New Haven, Conn.: Yale University Press, 2011).

¹⁰ James N. Green argues that color printing techniques, developed in the early decades of the nineteenth century, benefited the printer, as it was a cheaper method than hand-coloring, but it also enhanced the final product. James N. Green, "Hand-Coloring Vs. Color Printing in Early-Nineteenth-Century Natural History Color-Plate Books," in *Knowing Nature: Art and Science in Philadelphia, 1740-1840*, ed. Amy R. W. Meyers and Lisa L. Ford (New Haven, Conn.: Yale University Press, 2011).

family Esoces.¹¹ However, for reasons that remain unclear, these lithographs did not appear in most printings of the *Journal of the Academy of Natural Sciences of Philadelphia*'s second volume.¹² LeSueur's lithograph shows two fish, *Belona argalus* and *Belona truncata*, in profile. *B. argulus* turns upon itself, so that both the fish's snout and tail are at the page's right; *B. truncata*, at half the length, faces page left. In publications of this volume, the two fish appear on individual pages as engravings, with the images altered. Now, the fish are mirror images, both turned upon themselves so that snout and tail are at the same side of the page, *B. argulus* facing left and *B. truncata* facing right.

This plate's exclusion from publication stemmed from its failure to meet LeSueur's expectations for publication. He may have found the printing of the plate unsatisfactory, as the technology available for printing lithographs in the United States could not produce an image that would meet his standards.¹³ Alternately, LeSueur's dissatisfaction might have been broader, with the image on stone lacking some detail, reason enough to make the illustrations larger.¹⁴

Regardless of the reasoning behind the plate's exclusion, its status as the first known American lithograph of a natural history subject demonstrated that the ANSP was interested in lithography as a means of printing and communicating scientific images. The technology for adequate printing did not arrive until later in the decade, but the progressive thinking that promoted lithography also encouraged a new set of actors to influence scientific illustration.

¹¹ Charles Alexander LeSueur, "Observations on Several Genera and Species of Fish, Belonging to the Natural Family of the Esoces," *Journal of the Academy of Natural Sciences of Philadelphia* Vol II (1821), 124-138.

¹² In the editor's copy of the volume is the only known print of this lithograph. Maurice E. Phillips, "Unpublished Fish Plate by Lesueur," *Academy of Natural Sciences. Notable Naturae* of The Acad. of Natural Sciences of Phila., no. 270 (1955), 2.

¹³ Phillips, "Unpublished Fish Plate," 2.

¹⁴ Suggested in Philip J. Weimerskirch, "The Beginnings of Lithography in America," *Journal of the Printing Historical Society* 27(1998), 56.

Between 1817 and 1830, all illustrations in the *Journal* were engravings of some sort. These illustrations exclusively accompanied articles, and the author of each article frequently illustrated it as well, though no clear pattern of illustration and authorship emerges through the first several volumes of the *Journal*'s nineteenth-century publications. LeSueur's illustrated fish, mentioned above, accompanied the article on the topic, as did his illustrations throughout the *Journal*'s early history. His illustration was so useful in accompanying his writing that, of the seventy-eight illustrated plates in the first four volumes (1817-1825) of the *Journal*'s run, LeSueur's name, in some variation of "C. A. LeSueur, *del & sculpt*" graced forty-five.

By 1830, the Academy's preferred presses had embraced lithography as an important medium for scientific illustration.¹⁵ The fifteen plates of the *Journal of the Academy of Natural Sciences of Philadelphia*'s sixth volume were all lithographs, a sharp difference from the previous volumes. Depicting individual specimen of fish, reptiles, shells, and the like, these lithographs resembled the woodcuts that had previously appeared in the *Journal*. Regardless of appearance or artistic quality, their mere existence demonstrated some sort of progressive quality to ANSP publications. As lithography allowed artistic renderings directly on stone, naturalists like Timothy A. Conrad could depict some twenty-four shells to accompany his "Description of Fifteen new species of Recent, and Three of Fossil Shells, chiefly from the coast of the U. S."¹⁶ This uncolored illustration was perhaps, emblematic of the style found throughout the first several volumes of lithographic illustrations: The shells in profile against the blank page, with

¹⁵ The second through fifth volumes of *J. ANSP* came from Jesper Harding's shop. The sixth and seventh (1829/30 and 1834/37) were printed by Mifflin & Parry and William P. Gibbons, respectively. At that point, and through the 1860s, printing the *Journal* went to Merrihew & Thompson. All were Philadelphia-based printers.

¹⁶ Timothy A. Conrad, "Description of Fifteen New Species of Recent, and Three of Fossil Shells, Chiefly from the Coast of the U. S.," *Journal of the Academy of Natural Sciences of Philadelphia* Vol. VI (1830), Plate 11, del. T. Sinclair's Lithography, Phila.

minimal shading (figure 3.1).

Since these naturalists could draw directly on stone, there was little need for a mediator. Nevertheless, a lithographic firm provided the stones necessary for the illustrations, as well as the drawing tools necessary to create the image on stone. ANSP used the services of Philadelphia lithography companies to produce the images that accompanied its *Journal*. Five lithographic companies produced the *Journal's* lithographs before 1842, with few exceptions: T. Sinclair's Lithography, C. G. Childs' Lithography, Childs' and Lehman, P. S. Duval, and Lehman and Duval. Though there were different delineators, those who created the drawings, the Academy relied on these lithography firms through the eighth volume.

Why the Academy changed medium from engravings to lithography remains unclear. Certainly, lithography offered more reliable depiction of the observations of the specimen the naturalist intended to illustrate. By removing an intermediary who would necessarily translate the naturalist's sketches or descriptions onto copper or steel, lithography imbued these naturalists' illustrations with more credibility, a credibility that would also bolster the status of the Academy.

This use of lithography may not have ushered in an era of better communication through images, but it did enhance the visibility of lithography in Philadelphia. With a widely disbursed geographic membership, ANSP's lithography—Philadelphia's lithography—could reach new audiences. Natural history illustrations could find new life in new fields and could help naturalists revisit and try to find and develop improvements in fields that had seen success in previous decades, namely, ornithology.

JOHN KIRK TOWNSEND, 1839

Among the Academy's ornithologists interested in lithographed birds was American

naturalist and collector, John Kirk Townsend (1809-1851), editor of *Ornithology of the United States of North America, or Descriptions of the Birds Inhabiting the States and Territories of the Union, with an Accurate Figure of Each, Drawn and Coloured from Nature* (1839). Townsend, a member of the Academy and curator of its collection, had acquired specimens from the American West for Audubon to use in *Birds of America*.¹⁷ As a result, his reputation as a collector of specimens had secured him a place of prominence among American naturalists, and, more specifically, Philadelphia naturalists. His *The Narrative of a Journey across the Rocky Mountains to the Columbia River and a Visit to the Sandwich Islands*, also published in 1839, described these Westward expeditions, which Townsend undertook at Thomas Nuttall's request, to collect specimens for Nuttall's work.¹⁸ By 1839, Nuttall had joined the ranks of prominent American ornithologists.

This new ornithology purported to succeed the work of American naturalists who had come before Townsend. In his Introduction, he cites the “several highly creditable ones [ornithologies] which already adorn the literature of our country.”¹⁹ In particular, Townsend identifies three ornithologists who influenced American natural history texts: Alexander Wilson, “the great pioneer in this branch of American science,” John James Audubon, “a man of whom America may well be proud,” and Thomas Nuttall, “that eminent naturalist.”²⁰ Townsend's elevation of these naturalists follows in the same line of praise others had offered: Wilson contributed to early American ornithology; Audubon's work was one of beauty and

¹⁷ Barbara Mearns and Richard Mearns, *John Kirk Townsend: Collector of Audubon's Western Birds and Mammals* (Dumfries: Mearns, 2007), 19, 26-27.

¹⁸ Mearns and Mearns, *Townsend*, 19, 26-27.

¹⁹ John Kirk Townsend, *Ornithology of the United States of North America, or, Descriptions of the Birds Inhabiting the States and Territories of the Union with an Accurate Figure of Each, Drawn and Coloured from Nature* (Philadelphia: J.B. Chevalier, 1839), iii.

²⁰ Townsend, *Ornithology*, iii.

“magnificence;” and Nuttall produced a “highly valuable” book.²¹ Townsend recognized Audubon’s work as a monument to American ornithology, but Townsend overshadowed its usefulness with his praise of other works. Audubon earned recognition for being “amiable and enthusiastic,” while Wilson and Nuttall, respectively, created an “accurate and happy delineation of a class of the most lovely objects in nature” and “uncommon degree the qualities of patient investigation and sound judgment, with great beauty and eloquence of description.”²² This unparallel praise revealed disparity between the types of work done by Audubon and by Wilson and Nuttall, elevating each, though for different reasons.

Townsend intended for his book to revisit American ornithology. He recognized that it could not compete in the same circles as Wilson, Audubon, and Nuttall, but he did see a specific place for his affordable and useable ornithology. Townsend thought it “desirable to offer the public a work of portable dimensions and generally accessible form, containing a particular account of the birds of the United States, with all the newly discovered species, and a faithful and accurate figure of each.” But he also recognized that “the indefatigable Audubon” had already completed that task.²³ However, Audubon’s ornithology was problematic, though not as a result of any shortcomings in his scientific training. Instead, Townsend saw *Birds of America* as inaccessible, “the high price of whose splendid work confines it to the libraries of the affluent.”²⁴ So, Townsend set out to produce an American ornithology of the same scope as Audubon’s, though printed to a smaller size for a wider audience, because “it is considered

²¹ Townsend, *Ornithology*, iii.

²² Townsend, *Ornithology*, iii.

²³ Townsend, *Ornithology*, iv.

²⁴ Townsend, *Ornithology*, iv.

desirable to offer the public a work of portable dimensions and generally accessible form.”²⁵

Consideration of public acceptance, rather than scientific approval, of his work placed Townsend in harmony with Audubon, though he was concerned with different aspects of that acceptance.²⁶

Books with a smaller page size, as Townsend wanted, were limited to the same number of pages as larger books, as binding relied on number of pages and not their size. So, for Townsend to complete this project, he required multiple volumes. Unfortunately, the publisher, J. B. Chevalier, completed only one volume since there were not enough sales and subscriptions to warrant and fund a second volume.²⁷

In its sole volume, *Ornithology of the United States of North America* contained four illustrations, of four birds of prey. The first plate, depicting the California vulture (*Cathartes californianus*), closely resembles the artistic style of Alexander Wilson’s birds. The vulture is in profile, though it stands atop a rock, with mountains in the distance suggesting its natural domain, a pose replicated, in large part, in the third plate, which shows the turkey buzzard (*Cathartes aura*). The dynamic black vulture (or carrion crow, *Cathartes jota*) of the second plate has lifted wings, and a scene in the background depicts the social feeding of the birds. The fourth plate shows a caracara eagle (*Polyborus brasiliensis*) triumphantly standing over a small, unidentified frog (figure 3.2). These four lithographs are all colored, and all contain the bird at the foreground, with a suggested ecological context. Little discussion explicitly accompanies these images as far as descriptive text; they must speak for themselves, though the ornithological narrations illuminate some aspects of the illustrations, identifying, for example, specific habits and habitats of the birds.

²⁵ Townsend, *Ornithology*, iii-iv.

²⁶ To wit, Townsend was concerned with the practicability of his book for widespread use; Audubon was concerned with appealing to popular aesthetics.

²⁷ Mearns and Mearns, *Townsend*, 284.

J.B. Chevalier and Company printed lithographs drawn by artist T. Delarne for Townsend's *Ornithology*. Subscribers received these lithographs bound within the text block, an unusual practice at the time. Illustrations unattached to text were not uncommon in subscription-based natural histories, nor were they impractical.²⁸ In books, lithography was exclusively on separate plates, not in-text. Blocks of text comprised of many individual letter blocks, and a woodcut could fit in the midst of the letters. Lithographs were separate by necessity, as the process of printing them was incongruous with contemporary printing presses. First-rate plates would be lithographs or finer engravings, which could provide much more detail than woodcuts. Furthermore, the hand coloring of these plates added to this increased appeal.²⁹

Delarne's illustrations introduced lithography as a valuable medium for ornithological representation within a written monograph. Likely, the illustrations by LeSueur in *The American Journal of Science* were influential to Delarne, as the earliest examples of American scientific lithography. Delarne's birds also reflected some influence from both Wilson and Audubon. The birds are in profile, as preferred by the Academy, but they have varying positions, as in Audubon. The caracara eagle's captured prey replicates some of Audubon's birds, especially the winter hawk (or red-shouldered hawk, plate 71), which shows a bullfrog similarly caught in its talons. These similarities suggest that influence had been transferred from artist to printer.

Delarne's practiced illustrations may have been copies of Audubon and Wilson, and his attention

²⁸ For example, illustrations that accompanied Wilson's *American Ornithology* could be purchased without the text, and Audubon's *Birds of America* did not find supplementary text until after the illustrations' completion.

²⁹ "Plate books are publications in which the plates are as important as the text, or more so. In the nineteenth century, plate books were issued with elaborate illustrations, and they tended to be expensive publications meant for a more elite audience. Hand-coloring, which added to their expense but also made these works more luxurious, gave these plate books a cachet that appealed to the wealthy." Christopher W. Lane, "Lithographed Plates for Books and Periodicals: A Mainstay of Philadelphia Lithographers," *Philadelphia on Stone*, ed. Erika Piola, 120.

to those illustrations likely influenced how he drew his own birds. Glimpses of Audubon and Wilson exist throughout the four illustrations that adorn Townsend's *Ornithology*, and future artisans supporting the new medium of lithography would do well to imitate representations, like Audubon's and Wilson's, which had already found success.

Only one volume of Townsend made its way through the press to the public, though this was not due to a lack of praise. Newspaper advertisements, the publisher's notices of subscription as well as sale, lauded Townsend's *Ornithology* on two fronts. The first was its size. Touted by Townsend as a volume that could be as useful as Audubon's *Birds of America* though more affordable, practical, and usable, his *Ornithology* found similar acclaim in the *National Gazette*. This 1839 advertisement promoted the book's "neatness and beauty with comparative cheapness."³⁰ The second vein of admiration cited the grace of the illustrations. The *National Gazette* lauded Delarue's lithographs as "very tasteful, and colored after nature with peculiar delicacy."³¹ Of course, celebrating Delarue's illustrations necessitated a comparison to Audubon and Wilson, as their work in American ornithology illustration had set some standard to which other illustrators of nature would achieve. To this end, the *National Gazette*, in its lengthy advertisement of the book, mentions the high quality of Wilson, saying, "Neither the literary matter nor the illustrations can be surpassed."³² The sole mention of Audubon placed him in the same company as Wilson in their overseas fame. This relegation of Audubon's success to international popularity makes clear the elevated status of Wilson's work by comparison. In approaching this topic, the *National Gazette* emphasized Chevalier's "intention to encroach upon

³⁰ "Advertisement," *National Gazette*, 10 September 1839.

³¹ "Advertisement," *National Gazette*, 10 September 1839.

³² "Advertisement," *National Gazette*, 10 September 1839.

ground already occupied,” that is, Wilson’s intellectual territory.³³ Furthermore, the notice suggests a broader preference, in scientific communities, of the works of Wilson over those of Audubon.

The words of the *National Gazette* echoed in the *United States Gazette*, which printed this notice:

Ornithology: Mr. J. B. Chevalier, No. 85 Dock Street, has commenced the publication, in numbers, of the ‘Ornithology of the United States,’ the description by J. K. Townsend. *The illustrations are large, done in lithograph, and richly colored from nature.* We have had occasion to mention the plan of the work already, and are happy to observe that the proprietor is encouraged to carry it into execution.³⁴

Chevalier intended to carry on the plans to print four complete volumes of Townsend’s work, “containing sixty plates,” as mentioned in the *National Gazette*’s notice.³⁵ Perhaps the ambition of this project reveals that lithography had become the new, fashionable, and practical medium for natural history illustration. However, only one small volume found its way through Chevalier’s press, with only twelve pages of text and four illustrations. With only this small sample, Townsend’s *Ornithology* remained at a standstill. Delarue had no book job, and Chevalier would find a new project.

AUDUBON’S ROYAL OCTAVO EDITION

The double elephant folio of Audubon’s *Birds of America* enjoyed a great deal of success, much of it outside of the United States. Only eighty-two subscriptions came from the United States, and most were institutions, such as the Library of Congress, American

³³ "Advertisement," *National Gazette*, 10 September 1839.

³⁴ "Advertisement," *United States Gazette*, 4 September 1839, emphasis added.

³⁵ "Advertisement," *National Gazette*, September 10, 1839.

Philosophical Society, and the ANSP, or affiliates thereof.³⁶ Audubon's celebrity in the United States came more through reproductions of his bird images and public displays rather than individual ownership of his book.³⁷ As the printings of the double elephant folio neared completion, Audubon sought to produce a new edition, roughly an eighth of the size. Called the "Royal Octavo" edition, this new publication of Audubon's *Birds of America* was printed serially from 1839 to 1844.

Perceived competition from John Kirk Townsend's *Ornithology* provoked Audubon.³⁸ Townsend had been careful in his Introduction to avoid any comparison to Audubon, saying that his *Ornithology* "is not expected to rival in their appropriate sphere those which have preceded it."³⁹ Nevertheless, Townsend suggested an inadequacy in Audubon's work when describing the social impact of a book: "It is considered desirable to offer the public a work of portable dimensions and generally accessible form."⁴⁰ Townsend's publisher, J. B. Chevalier, continued this line of criticism, advertising on the back cover that Audubon's *Birds* would cost the purchaser "upwards of \$800." The economic problems posed by such a large book, compounded by the problems of its physical size, prevented widespread purchase and use of Audubon's

³⁶ Wildemar Fries, catalogs the different subscriptions and pedigree of individual volumes of Audubon's *Birds*. Waldemar H. Fries, *The Double Elephant Folio: The Story of Audubon's Birds of America* (Chicago: American Library Association, 1973).

³⁷ Margaret Welch discusses the wide use of Audubon's images. Margaret Welch, "John James Audubon and His American Audience: Art, Science, and Nature, 1830-1860" (University of Pennsylvania, 1988); Margaret Welch, "'Gentlemen of Fortune and Liberality': The Original Subscribers to the Audubon Folios," *Imprint: Journal of the American Historical Print Collectors Society* 16, no. 1 (1991); Margaret Welch, *The Book of Nature: Natural History in the United States, 1825-1875* (Boston: Northeastern University Press, 1998).

³⁸ Ron Tyler discusses Audubon's reactions to Townsend in *Audubon's Great National Work: The Royal Octavo Edition of Birds of America* (Austin: University of Texas Press, 1993), 48-49.

³⁹ Townsend, *Ornithology*, iii-iv.

⁴⁰ Townsend, *Ornithology*, iii-iv.

original edition. To remedy these physical problems, and the prohibitive \$1000 cost of the double-elephant folio, the Royal Octavo would only cost \$100.

Developing a new edition, especially a smaller one, however, presented new problems. Foremost was that the project would require the creation of new, smaller plates. By 1840, Robert Havell, Jr. (1793-1878), the principle engraver for the double-elephant *Birds of America*, had moved from England to New York, in pursuit of an artistic career.⁴¹ His unavailability, in conjunction with the high cost of the creation of new aquatint plates, required Audubon to find printing technologies elsewhere.⁴²

The best solution for Audubon came out of the failure of Townsend's *Ornithology*. J. B. Chevalier needed a new project, as Townsend's work would not continue beyond the first volume. Without any other large-scale project, Chevalier could provide the publishing support (managing advertisements, subscriptions, and distribution), and Townsend could work, ironically, as Audubon's sales agent through J. B. Chevalier and Company.⁴³ Audubon still needed a delineator to provide the illustrations, someone whose skills could rival Havell's.

With the Royal Octavo firmly set in motion in Philadelphia, it made sense to use a Philadelphia printing house. John T. Bowen, a printer, lithographer, and colorist, had already made his work known through the woodcuts for the first volume of Thomas Nuttall's 1832 *Manual of the Ornithology of the United States and of Canada*, though he had not participated in illustrating the second volume.⁴⁴

⁴¹ Sadly, Havell's artistic career never found him the same success that his printing had. His son traveled west later in the century and enjoyed some small success as a landscape painter.

⁴² Tyler, *Audubon's Great National Work*, 8-51.

⁴³ Tyler, *Audubon's Great National Work*, 51-52.

⁴⁴ Thomas Nuttall, *A Manual of the Ornithology of the United States and of Canada*, Second ed. (Boston: Hilliard, Gray, and Co., 1840), vol 1, vi.

The reduction of Audubon's images came first at the hands of his son, John Woodhouse Audubon (1812-1862), a portrait and wildlife painter like his father. J. W. Audubon utilized a camera lucida to resize the double elephant plates produced by Havell, which superimposed the Havell plates onto a different surface. J. W. Audubon would see both the plate and his own tracing of that scene, and he could duplicate a few points to render a precise sketch of the Havell plate in a smaller perspective. With this outline, Bowen and his firm, which included artists George White and William Hitchcock, would develop these images, using the original watercolors of Audubon's birds to add details and to correct any distortions caused by the camera lucida.⁴⁵

Bowen gained prominence by the 1840s due to this work on the Royal Octavo Edition of *Birds of America*, which contained all the illustrations of the original, as well as an additional sixty-five birds.⁴⁶ Like the double elephant folio, this smaller edition was sold by subscription—one hundred parts of five plates each, for a dollar per part. The total cost of \$100 was nearly a tenth the double elephant's cost. Newspapers quickly identified the quality that Bowen brought to Audubon's new project. The *Saturday Courier* wrote, on January 4, 1840, "Audubon was truly fortunate in placing his great work in such hands [Bowen's], but he had seen the Indians [Bowen's earlier work] and their admirable execution."⁴⁷ Bowen scaled Audubon's birds to a more-manageable size, through reducing the number of birds on the plates, though maintaining the aesthetic integrity of the original drawings (figure 3.3).

⁴⁵ Tyler, *Audubon's Great National Work*, 54.

⁴⁶ Tyler, *Audubon's Great National Work*, 74; Richard Rhodes, *Audubon: The Making of an American* (New York: Alfred A. Knopf, 2004), 430.

⁴⁷ Quoted in Lane, "Lithographed Plates for Books and Periodicals," 139.

Through Bowen, Audubon found success in this new edition of *Birds of America*. Bowen was amenable to Audubon's oversight, and Bowen's costs were not exorbitant.⁴⁸ The skills at Havell's workshop were also present in Bowen's shop, and the Royal Octavo's success elevated the prominence of Bowen's firm's high-quality lithography, which Audubon would use again for his work *Viviparous Quadrupeds of North America* (1845-48). As for the publisher, Chevalier's success with Audubon was limited. Audubon recognized Chevalier's contributions in only the first five of the work's seven volumes, though the publisher remained with Audubon throughout its run.⁴⁹

Audubon remedied the prohibitive cost of his earlier *Birds*, making his work available to more people. Of the subscribers to the double elephant folio, only eighty-two were in the United States. For the Royal Octavo, seventy-four subscriptions came from Philadelphia alone; this edition attracted more than a thousand subscribers, attesting to its continued popularity.⁵⁰ Though it did not receive any different recognition from institutions like the ANSP, subscription lists (which show the ANSP as an interested party) accumulated faster than the book's production; Bowen's firm had to reprint several numbers of plates.⁵¹ Audubon's reputation certainly secured him many of these subscriptions and the success of the book, but the fine work by Bowen's firm in reproducing Audubon's birds ensured the production of the smaller edition through seven additional printings. For his own part, Bowen secured his own position of importance in American lithography.

ENGRAVING IN THE AGE OF LITHOGRAPHY

⁴⁸ Ron Tyler's discussion of the economics of Bowen's print shop and the business deal in furnishing the royal octavo edition of *Birds of America* is in his Tyler, *Audubon's Great National Work*, 55-56, 69.

⁴⁹ Lane, "Lithographed Plates for Books and Periodicals," 126.

⁵⁰ Tyler, *Audubon's Great National Work*, 60-72.

⁵¹ Tyler, *Audubon's Great National Work*, 60-72. A table of subscribers by location is on 157-160.

Despite lithography's popularity, engraved illustrations did not disappear from scientific publications. For practical reasons, in-text illustrations needed to be engraved blocks, as they used the same base—ink—to produce the images. Furthermore, these engraved blocks could fit into the forme, or frame, along with the type, and the inked parts would be uniform in position—that is, they would be raised for even printing. Edward Augustus Samuels' *Ornithology and Oölogy* (1867) contained nearly a hundred such in-text illustrations of birds, often copied from Audubon, and diagrams of bird anatomy, though it also used engraved plates for its larger illustrations. Though these plates were not widely popular, their existence demonstrated that lithography had not fully replaced the practice of engraved illustration.

In Philadelphia, engravings still graced some ornithological books. Of particular interest is *Ornithology: The Natural History of Birds* (1842), by Philadelphia native William Samuel Waithman Ruschenberger (1807-1895), a US Navy surgeon, as well as a member of the ANSP and fellow of the College of Physics.⁵² His *Ornithology* was the third book of a natural history set, prepared for use in schools and colleges. The text followed that of French naturalists Henri Milne Edwards (1800-1885), also a physician, and Achille Joseph Comte (1802-1866).

The book contains only eight plates of birds, all at the back and each with a particular focus. These diagrams of bird anatomy and illustrations of certain orders of birds are all engravings, and all are uncolored. The uncolored illustrations most resemble the birds in Catesby and Wilson, that they are depicted in profile, flat, and crowded together to preserve page space. Furthermore, the illustrations removed the birds from a natural context, as depicted in plate 3, which depicts several disembodied heads of birds (figure 3.4).

⁵² W. S. W. Ruschenberger, *Ornithology, the Natural History of Birds: Third Book of Natural History Prepared for the Use of Schools and Colleges*, (Philadelphia: Turner & Fisher publishers, 1842). tp.

That these illustrations are at the end of the book is not unexpected. The focus of Ruschenberger's *Ornithology*, as an instructional book, was the text. Intended as a companion to classroom activities in schools and colleges, it was likely of little use (and probably of little interest) to others.

Few contemporary newspapers reviewed Ruschenberger's *Ornithology*. *The North American and Daily Advertiser* identified the value of the text, "systematically and lucidly treated by the learned editor."⁵³ Without mention of the illustrations, they valued the book as "eminently useful, supplying adequately the instruction in Natural History necessary to a proper school education."⁵⁴ Similarly, *The American Medical Intelligencer* offered Ruschenberger and his publisher congratulations, and an exhortation "to continue this interesting and instructive series."⁵⁵

The historical value of Ruschenberger lies not in the book's illustrations or its use of French natural history texts. Instead, the conditions of its publication provide historical interest in the book. Ruschenberger, as mentioned above, was a native Philadelphian, and his book was published in Philadelphia by Turner and Fisher.⁵⁶ The engravings, done by Philadelphian George Thomas, followed in a tradition of engraved natural history illustrations, but they resisted the recent trend of lithography that had taken hold of Philadelphia printing, perhaps revealing an era of transition in the city.⁵⁷ Nevertheless, engravings still took place in Philadelphia, despite the city's newfound predisposition to lithography.

⁵³ "Advertisement," *The North American and Daily Advertiser*, May 27, 1842.

⁵⁴ "Advertisement," *The North American and Daily Advertiser*, May 27, 1842.

⁵⁵ A. Waldie, "Review, Ruschenberger Ornithology," *The American Medical Intelligencer* 4 (1841), 254.

⁵⁶ Ruschenberger, *Ornithology, the Natural History of Birds*, tp.

⁵⁷ The use of woodcut instead of lithograph might also be attributed to the difference between a pedagogical text and natural history.

JOHN CASSIN AND ILLUSTRATIONS BY ARTISANS

As Philadelphia became geographically central for lithographers and naturalists, so followed natural history illustrations. With the publication of Audubon's Royal Octavo *Birds of America*, J. T. Bowen's lithography firm increased in business and clout in the natural history community around the ANSP. Philadelphia naturalist John Cassin (1813-1869) knew of Bowen's work with the Royal Octavo. So, he sought out Bowen to work on his own project, an effort to illustrate North American birds not previously described or illustrated in American ornithologies.

Cassin knew what naturalists expected from the kind of ornithology he intended to create. After all, he was a member of the Academy of Natural Sciences of Philadelphia, the American Philosophical Society, the Horticultural Society of Pennsylvania, and of other institutions, in New York, Montreal, and beyond.⁵⁸ An aesthetic for bird illustrations existed among scientific institutions, as Thomas Nuttall had ensured in the 1830s. Cassin's book, *Illustrations of the Birds of California, Texas, Oregon, British and Russian America* (1853), focused on the illustrations and further developed that aesthetic.

In 1842, ANSP members elected John Cassin to join their company. His superior taxonomic skills proved a major contribution in American ornithology, approaching the influential level that Audubon later enjoyed. Cassin's knowledge of birds was superior, though he was not as adept an observer of birds in nature.⁵⁹ More specifically, Cassin knew the Academy's birds. In the 1830s and 1840s, natural history activity in North America was centered

⁵⁸ John Cassin, *Illustrations of the Birds of California, Texas, Oregon, British and Russian America ... And a General Synopsis of North American Ornithology* (Philadelphia: J. P. Lippincott & Co., 1853), tp.

⁵⁹ Robert McCracken Peck, "Introduction," in *Illustrations of the Birds of California, Texas, Oregon, British and Russian America*, ed. Robert McCracken Peck (Austin: Texas State Historical Association, 1991), I-4-8.

at the ANSP.⁶⁰ Cassin's 1842 election to the Academy's membership brought with it an appointment to the Academy museum curatorship. At the time, the ANSP had the largest bird collection in the US, and by 1856, the largest in the world, with 29,000 specimens.⁶¹ As curator, Cassin personally managed this large collection, gaining a substantial knowledge of its birds.

Additionally, Cassin knew the biases of the ANSP, revealing them in an 1852 letter: "I have been, years ago, under the necessity of adopting, though very reluctantly, the opinion that all statements by Audubon are to be received with caution."⁶² His "years ago" was 1845, when he met Audubon for the first and last time, at the Academy. Cassin disliked Audubon, much like Nuttall and others at the ANSP, and did "not particularly admire him," describing him as "no naturalist—positively not, by nature."⁶³ On what grounds did Cassin, and the ANSP, so strongly dislike Audubon? Ornithology, as a discipline, owed Audubon some debt for its increase in popularity, and many ornithological texts acknowledged the skill and artistry that he had brought to bird representation. However, naturalists found fault with Audubon's ornithology, not his artistry. His work did not reflect a strong reliance on precise observation, unlike Wilson and Nuttall. In this capacity, he did not deserve the same elevated status that Nuttall, Wilson, and Cassin enjoyed.

Despite distaste for Audubon's ornithological capabilities and sensibilities, Cassin had the business sense to connect his work to Audubon.⁶⁴ On the second edition's title page, Cassin

⁶⁰ Peck, "Introduction to Cassin," I-8.

⁶¹ Erwin Cottrell G. William Stresemann, *Ornithology from Aristotle to the Present* (Cambridge, Mass.: Harvard University Press, 1975), 243.

⁶² 1852 letter to Dr. P. R. Hoy, Racine, Wisconsin, Beinecke Rare Book and Manuscript Library, Yale University, quoted in Peck, "Introduction to Cassin," I-35, n4.

⁶³ John Cassin to Spencer Fullerton Baird, June 23, 1845, Record Unit 7002, Box 17, Spencer F. Baird Collection, quoted in Peck, "Introduction to Cassin," I-3.

⁶⁴ Peck, "Introduction to Cassin," I-11; Lane, "Lithographed Plates for Books and Periodicals," 142.

described *Illustrations* as “forming a supplement to AUDUBON’S BIRDS OF AMERICA, octavo edition.”⁶⁵ These four words are rendered capitalized, typeset larger than the author’s name. The connection was clear: both books focused on a study of birds, and transparent reference to Audubon would sell. Hoping to capitalize on the success of Audubon’s 1840 Royal Octavo edition, Cassin placed Audubon’s name both above and larger than his own.

The connections between Audubon’s *Birds of America* and Cassin’s *Illustrations of the Birds of California, Texas, and British and Russian America* advanced beyond the use of Audubon’s name on the cover. Cassin intended his *Illustrations* as a complementary companion to Audubon. In many regards, it truly was Audubon’s companion, though Cassin does not explicate the relationship between the books. Nevertheless, Cassin inherited the same impetus to illustrate: The ornithologies that preceded him were insufficient.⁶⁶ Furthermore, the ornithological narratives and descriptions were as similar in style as in scope of the books; both aimed to provide an illustrated taxonomic compendium for birds of a specified geographic region. Whereas Audubon’s was broad, and therefore unable to identify *all* the birds of America, Cassin’s narrow focus to the western United States allowed him to identify, describe, and illustrate birds that Audubon and others had missed.

Neither Cassin nor Audubon might have contained such a wealth of ornithological knowledge without the ANSP-sponsored expeditions undertaken by Nuttall for Audubon, and by Townsend for Cassin. In his Introduction, Cassin acknowledged the debt he owed to the ANSP. His praise for the institution resembled flattery. He first discussed the institution’s unique role in the development of American ornithology, “for which science is indebted, not to the

⁶⁵ Cassin, *Illustrations*, second edition, 1853.

⁶⁶ Cassin suggest this in the title page to early editions of the book: “Intended to contain descriptions and figures of all North American Birds not given by former American authors.” Cassin, *Illustrations*, tp.

Government, nor to public patronage of any kind, but to strictly private enterprise and individual scientific taste.”⁶⁷ The facilities offered by the ANSP for ornithological study ushered in, according to Cassin, “a new era in the history of the zoological sciences in the United States,” with the acquisition of several additional collections of birds, as well as the establishment of a new library, which “contain[ed] very nearly every book relating to this branch of natural science.”⁶⁸ He called the Academy a “monument to Natural Science as enduring as its influence in the minds of men, and more honorable to themselves than the proudest obelisk or the richest memento of the conqueror's triumph,” with which ornithologists, and naturalists more broadly, “have necessarily had advantages over other American Ornithologists.”⁶⁹ This elevation of the Academy reflected Cassin’s allegiance to it, and the adulation placed his own work higher in the sights of the Academy and Academy members.

Cassin’s *Illustrations* followed the same practice as other publications-by-subscription. Each of the thirty parts would contain five colored plates, at the price of a dollar per part, payable on delivery. This meant that Cassin would pay an advance for the artists, paper, printing, lithography, hand coloring, and distribution.⁷⁰ In order to recover the pre-publication expenses, Cassin would need to sign 250 subscribers. By April 1852, the book had only forty subscribers.⁷¹ Due to these small numbers, Cassin could not complete the work, as he explained in

Illustrations’ preface:

Though we hope and fully intend to proceed with a second series of this work, as materials accumulate, especially as the present volume has met with a degree of

⁶⁷ Cassin, *Illustrations*, iv.

⁶⁸ Cassin, *Illustrations*, iv.

⁶⁹ Cassin, *Illustrations*, v.

⁷⁰ Chromolithography would eliminate the need for hand-coloring once it had achieved the same reliability in mass production as lithography—after the Civil War.

⁷¹ Peck, "Introduction to Cassin," I-15-16.

patronage much greater than we had any right or reason to expect, we have to say to our friends and patrons, that at present we have no definite prospect of such continuation. Should we be favored with life and health, we hope to present two additional volumes or series, each, like the present, complete in itself, for which very nearly a sufficient number of birds are now known as inhabiting the United States, and which are not given by former authors on North American Ornithology. At present, our engagements, we regret to say, render such an undertaking quite impossible.⁷²

Others might have seen this as a failure along the same lines as Townsend had experienced some fifteen years earlier. The sorrowful “hope” and “regret” that Cassin expressed in this Preface certainly suggested failure, but Cassin’s business savvy turned this incomplete endeavor into one of the more-successful natural history enterprises in America’s nineteenth century.

To furnish his *Illustrations*, Cassin employed the artist Henry Louis Stephens (1824-1882), an American cartoonist, whose caricatures of people-as-birds had earned him popularity through literary journals.⁷³ Under this employment, Stephens found himself as the principal illustrator for a new ornithological work. Initially, Cassin found Stephen’s illustrations quite good. In 1852 he wrote to Spencer Fullerton Baird (1823-1887), the first curator at the Smithsonian Institution, noting that Stephens drew “birds and plants like Audubon.”⁷⁴ Quite high praise, especially in the eyes of Baird, who had learned something about bird drawing from Audubon, but this satisfaction did not extend beyond the illustrator and to the printers.⁷⁵ In the same letter, Cassin expressed his dissatisfaction with Lewis Rosenthal, Stephens’ lithographer: “I have to most carefully watch all hands and expect to have to fight either the lithographic printer

⁷² Cassin, *Illustrations*, vi.

⁷³ An example of his birds can be found in *Death and Burial of Old Cock Robin* (Henry Stephens, New York: Hurd & Houghton, 1865).

⁷⁴ John Cassin to Spencer Fullerton Baird, February 21, 1852, Record Unit 7002, Box 17, Spencer F. Baird Collection, quoted in Peck, "Introduction to Cassin," I-17.

⁷⁵ William Healey Dall, *Spencer Fullerton Baird: A Biography, Including Selections from His Correspondence with Audubon, Agassiz, Dana, and Others* (Philadelphia & London: J. B. Lippincott company, 1915), 57.

who is the most obstreperous, or a young lady colorist who is not much better.”⁷⁶ This trouble with the lithographer, though, increased the difficulties in completing the work.

Cassin turned to renowned Philadelphia lithographer J. T. Bowen to print the plates for his *Illustrations*, having seen the quality of the prints for the Royal Octavo edition of Audubon’s *Birds*. Bowen initially declined the offer, citing his involvement with Audubon’s *Quadrupeds*. Cassin was later able to convince Bowen to accept the work, though Stephens had to remove himself from the work in the interim.⁷⁷

Cassin’s use of J. T. Bowen’s lithography firm resembled Nuttall’s use of Bowen’s services in the engravings for his *Manuals* nearly two decades earlier. The Academy had embraced Nuttall’s illustrations within their canon of appropriate illustration style, thereby placing Bowen among acceptable artists for natural history illustration. His renderings of Audubon’s birds in lithographs, for the Royal Octavo Edition, may have inspired Cassin to hire the company for his *Illustrations*. The illustrator connections, from Nuttall, to Audubon, and to Cassin, linked the styles of those books together, through J.T. Bowen’s lithographic firm.

With Stephens’ withdrawal, future illustrations would be inconsistent in quality.⁷⁸ Now, Cassin needed a new artist to accompany his new lithographer. American artist George Gorgas White (d. 1898) could draw the birds, so Cassin could restart *Illustrations*, with the artistic direction of White and Bowen. After reprinting the first part with this new team, Cassin found the birds lacking in artistic quality, in part due to some difficulties of lithographic representation.

Paramount to bird illustrations was the observation of nature prior to illustrating it. Lithographic

⁷⁶ John Cassin to Spencer Fullerton Baird, February 21, 1852, Record Unit 7002, Box 17, Spencer F. Baird Collection, quoted in Peck, "Introduction to Cassin," I-17.

⁷⁷ Peck, "Introduction to Cassin," I-20.

⁷⁸ Though they do not appear in any edition of Cassin, some of Stephens’ birds accompanied Cassin’s articles in the *Journal of the Academy of Natural Sciences* (Series II, Vol. 2, plates 13, 14, 22, 23, 1852-1853).

stones could not accompany naturalists into the field, so illustrators had to rely on the sketches provided by the naturalists. Artists like Stephens and White did not have the benefit of looking at the birds, or of seeing live specimens. Their reliance on Cassin's sketches could not replicate the best drawings by Audubon.⁷⁹

In creating the depictions of birds, Cassin employed techniques similar to what Audubon had used. He described his process to Baird: "I make sketches of [birds] myself in details as was formerly done by [the] Audubons."⁸⁰ Though none of Cassin's illustrations survive, this description suggests a great deal about his method of producing bird prints. Had his sketches been produced with sufficient artistry, he might have drawn the birds himself, directly onto the lithographic stone.

The employment of a lithography firm suggests that Cassin's drawings lacked some detail or refinement that he found in Stephens, who worked directly on stone. White drew birds on paper, and a second artist, William E. Hitchcock (1823-1880), drew those illustrations on stone. In the use of Hitchcock as an additional intermediary, Cassin grew "tired of George," as he wrote to Baird in 1853.⁸¹ Soon after, Hitchcock became the principal illustrator, with White removed from the project.

Two of Hitchcock's best plates are of the purple-throated hummingbird and the ferruginous hawk. Plate XXII depicts the purple-throated hummingbird, positioned among a flowering plant (figure 3.5). Following Wilson, the topmost bird directs his vision upward, to display the purple color of the throat. The tail splays behind him; his erect body shows the form

⁷⁹ Robert McCracken Peck describes their illustrations as "stiff and lifeless when compared to Audubon's best." Peck, "Introduction to Cassin," I-20.

⁸⁰ John Cassin to Spencer Fullerton Baird, January 3, 1865, Record Unit 7002, Box 17, Spencer F. Baird Collection, quoted in Peck, "Introduction to Cassin," I-37, n37.

⁸¹ John Cassin to Spencer Fullerton Baird, December 17, 1853, Record Unit 7002, Box 17, Spencer F. Baird Collection, quoted in Peck, "Intro," I-20.

of the bird. A second bird, though, hovers near the opened flower, his bill pointed in the direction of the flower as he goes to drink of its nectar. This second bird, located about the plate's midpoint, displays the green back of the bird, as well as interacting with the natural context of the illustration, following the artistic heritage of Audubon. Plate XXVI shows the ferruginous buzzard, in a pair, like the plate of purple-throated hummingbirds. It, too, shows the birds in profile, on branches, gazing into the distance. Their eyes, along with a slightly opened beak, suggest the living birds, unlike the stuffed birds that had been Wilson's models. This inclusion of life-likeness in Wilson-like drawings suggests the same dual heritage. These two plates, drawn by Hitchcock and printed by Bowen, also allowed for Cassin to suggest that the project had a steady improvement in illustration over the course of the publication's history.

The quality of the artwork owed no small debt to the lithography firm J. T. Bowen and Company. Their work received mention in Cassin's Preface: "Of the superior execution of the plates of our work, it is perhaps unnecessary for us to speak, but in justice to Mr. J. T. Bowen, and Mr. W. E. Hitchcock, we may be allowed to say that we regard them as having in this volume fully established a degree of excellence in the production of zoological plates, rarely excelled, if equalled, in this country."⁸² The preface includes no mention of George White, who provided the artwork for early plates, eighteen of the fifty total. Instead, Bowen enjoyed the more prominent position, in front of Hitchcock. Cassin saw the important role that lithography played as a medium for illustration, and he exalted it as such.

Bowen's prominent association with Cassin did not end with the completion of the first volume of *Illustrations*. Indeed, lithographs of birds printed in the *Journal of the Academy of Natural Sciences* through the 1860s came from Bowen's shop, despite Bowen's 1856 death, a

⁸² Cassin, *Illustrations*, vi.

firm indicator of his continued significance. As lithographers gained prominence, especially J. T. Bowen and Company, the names of artists and delineators began to disappear from lithographs in favor of the lithography company, as evidenced in ANSP's *Journals* from 1850 to 1863. The lithographer became increasingly important to the production of high quality illustrations, and not just as a vehicle for printing.

CONCLUSION

Artisans played no small role in the development of lithographic scientific illustrations in the nineteenth century. This printing technology required little technical skill, as it put the image directly onto the printing medium. However, artist-naturalists could not carry lithographic stone into the field for directly painting the image of the bird onto its surface, so the intermediary, in this case the lithographic firm, remained important. The artisans—draughtsmen—made the printed images; the naturalist made the sketch from which that image came. Without viewing the birds in nature, artisans relied on imagination and their own aesthetic sensibilities in order to make a print that satisfied the naturalist and reflected nature. Cassin recognized the place of lithographers in illustration. With them, a consistence in style became manifest, as theirs was the final stop of illustration prior to its permanent publication.

John Cassin knew the importance of the practical work of illustration. In the years that followed the publications of Bowen's illustrations in Cassin's ornithological work, and despite Bowen's death, the caption "Lith. Printed & col^d by J. T. Bowen, Phila." continued to appear in bird illustrations printed in the *Journal of the Academy of Natural Sciences of Philadelphia*. Though certainly a signal that Bowen's influence had not disappeared, this inclusion also carried additional meaning. Cassin had joined Bowen's widow in joint-ownership of Bowen's lithography company, as its president: "I am now the solemnly constituted head of a large

establishment, [with] printers, colorists, and draughtsmen, having been so *de facto* for the last 18 months. I intend to hunt up the best draughtsmen in the U.S.! —and want all the work I can get, perhaps more!”⁸³ Cassin knew the reputation carried by the class of workers at Bowen’s firm, and he intended to extend it as far as he could.

Printers, colorists, and draughtsmen were, in the end, crucial to the development of natural history illustrations in the United States. For Cassin the naturalist, this class could take his birds and render them on the printed page—making them artistically pleasing and scientifically meaningful. For Cassin the businessman, this class had such a rapport with communities, such as scientific societies, that would attract a significant amount of future work.

However important the producers of illustrations, their contributions to the work did not exist in a vacuum. In the first half of the nineteenth century, the cultural establishment of scientific institutions and of individual artists—such as the Academy of Natural Sciences of Philadelphia and John James Audubon—demonstrated clear lines of the transmission of influence.

J. T. Bowen’s prominence, gained through his connections to the ANSP by way of Nuttall, lent his shop’s illustrations credibility. The practice he gained through work with Audubon shaped his aesthetics, which influenced his illustrations for John Cassin, printed both in Cassin’s *Illustrations* and in the *Journal of the Academy of Natural Sciences in Philadelphia*. Success in developing a reputation allowed lithographers such as Bowen to become the negotiators of aesthetics in natural history illustrations. His prominence with ANSP increased his prominence in the wider culture, and his aesthetics followed. The content of the ornithology

⁸³ John Cassin to Spencer Fullerton Baird, April 5, 1858. Record Unit 7002, Box 17, Spencer F. Baird Collection, quoted in Robert McCracken Peck and John Cassin, "Introduction," in *Illustrations*, I-28.

itself was the responsibility of the naturalist, but the appearance of the accompanying, and complementary, illustration remained partly under the vision of the artisan.

Conclusion

The negotiations by Alexander Wilson, the Academy of Natural Sciences of Philadelphia, John James Audubon, J. T. Bowen, and John Cassin reached well beyond that mid-Atlantic city. For one example, in 1867, the curator of zoology for the Massachusetts State Cabinet, Edward Augustus Samuels (1836-1908), published *Ornithology and Oölogy of New England*, a compendium of illustrations and descriptions of local birds and their eggs.

Initially, the *Ornithology*'s reputation extended only to the Boston area, where it was praised in the *Boston Daily Advertiser* as "original and valuable" and "copiously illustrated."¹ By December 1869, other newspapers had recognized some value in Samuels' work, collected in the *Advertiser*.² *NY Nation* called it simply, "A very excellent Book," and the *Boston Transcript* and *Prairie Farmer* were similarly broad in their praise, calling it "Full of fascination and instruction," and "beautiful, entertaining, and instructive."³ Others were more specific in their praise, identifying the book's scientific value. *Round Table* identified it as "A valuable contribution to American ornithology," and *American Naturalist* wrote, "The illustrations of the eggs are perfect gems;" *Advance* proclaimed that the book "Has already obtained scientific repute."⁴

The contemporary success of Samuel's *Ornithology* rested on the successes of earlier American ornithological works, especially Wilson's *American Ornithology* and Audubon's *Birds of America*. Quoting at length from the publications of other ornithologists, Samuels' book aggregated previously collected information. Similarly, the illustrated plates in Samuels' work

¹ "Samuels' Ornithology and Oölogy," *Boston Daily Advertiser*, May 18, 1869.

² "Samuels' *Ornithology and Oölogy*," *Boston Daily Advertiser*, December 21, 1869.

³ "Samuels' *Ornithology and Oölogy*," *Boston Daily Advertiser*, December 21, 1869.

⁴ "Samuels' *Ornithology and Oölogy*," *Boston Daily Advertiser*, December 21, 1869.

copied Audubon's birds, though in Wilson's style. In this way, Audubon's "alive and moving" birds became flattened representations of nature, though plumper and simpler.⁵ He had negotiated directly between Audubon and Wilson, though in a way that minimized, somehow, scientific utility and artistic aesthetics. Samuels' birds were Audubon's, so they lacked all the strict ornithological characteristics that naturalists preferred. Though they were Audubon's birds, they lacked the artistic depth achieved by Audubon. His negotiation looked to both Wilson and Audubon, but it did not balance against his own ideas to make his illustrations unique.

The case of Edward Augustus Samuels' illustrations reflects the development of ornithological illustration in the nineteenth-century United States. The cultural clout carried by the artistry of Audubon's birds ensured their continued use, and it may have contributed to the popular success that Samuels' work found. But the birds also needed to conform to certain conventions of illustration in order to be satisfactory—that is, useful—to scientific communities. These aesthetic conventions of art and utility appeared to be in conflict, in the tension that continued to characterize natural history illustration.

This project began with a question about how illustrations and illustrators negotiated between scientific functionality and artistic aesthetics. I have attempted to answer by looking to Philadelphia's communities that produced ornithological illustrations. The institution of the ANSP, artist-naturalists such as Wilson and Audubon, and the printshop of J. T. Bowen & Co. negotiated styles of images through their various illustrations. All of these primary actors tended toward a particular focus in illustration, generally, toward artistry or scientific utility. As the focus shifted, it offered a new style of drawing birds, incorporating existing techniques and

⁵ John James Audubon, "My Style of Drawing Birds," in *Audubon and His Journals*, ed. Maria Rebecca Audubon and Elliott Coues (New York: Scribner's Sons, 1897), 523.

presenting innovations.

Historical treatments of image-making have largely avoided discussion of the printmakers. Historians must look toward the people who produced the illustrations, the workers who engraved images into copper or steel and who colored the stones and plates. Their work appeared bound in books; artists and naturalists only provided the initial form. These workers incorporated certain images and styles into the rest of their work, negotiating between the scientific societies that demanded scientific utility and a public that lauded artistic beauty.

This narrative has focused almost exclusively on the Philadelphia community that illustrated natural history texts. Of course, other things were happening in contemporary America. Romantic ideas became apparent through many Hudson River School paintings. Transcendentalism took hold in the Boston area with Ralph Waldo Emerson's 1836 publication of *Nature*, and his ensuing lectures on "Self Reliance" and "The American Scholar." These cultural moments, in conjunction with the bird illustrations coming out of Philadelphia, exposed an interest in an untouched nature.⁶

Illustrations from the Philadelphia area contributed to conversations or visions of nature. Audubon's birds became emblematic of true wild nature, and Bowen's work in the Royal Octavo Edition of Audubon's *Birds* made those birds more accessible. As the focus of illustrations shifted, different aspects of nature came to the front, demonstrating a fluid view of nature. The natural world could be illuminated through a variety of perspectives.

After the Civil War, illustration techniques again changed. Chromolithography replaced lithography, making coloration more efficient, more economically viable, and of a consistent

⁶ Christoph Irmscher approaches these broader cultural implications at the intersection of science, art, and literature. Christoph Irmscher, *The Poetics of Natural History: from John Bartram to William James* (New Brunswick, N.J.: Rutgers University Press, 1999).

quality. Steam-powered presses replaced the hand presses as a less-expensive technology that reduced the number of workers in a printing firm, while making the firm's output more efficient.⁷ Shortly thereafter, photography emerged as another way of representing nature, perhaps more realistically and accurately.⁸ In this timeline, then, the class of workers who mediated cultural exchange between artists and scientific societies changed dramatically. Chromolithographers quickly stepped aside for photographers, who embodied both naturalist and artist, removing the need for third parties in image production. The camera captured nature as the naturalist saw it, and the image was produced without a large firm.

In this manner, economics and technologies helped shape nineteenth-century image making. Journal publishers and printshops promoted cheaper processes for mass production, like chromolithography. Institutions interested in scientific accuracy believed that photography could capture the essence of scientific reality.⁹ In this, too, negotiation happens. Decision-makers worked within the confines of economic realities and technological capabilities to make representations of scientific knowledge that also reflected their own aesthetic styles.

Regardless of who produced the images, whether a team of professional printmakers, a dedicated artist, a trained naturalist, or an amateur photographer, it is important to remember that these images are in conversation with one another.¹⁰ Human conversation happened—and still happens—through images and across time. Negotiation is not merely a compromise between

⁷ Christopher W. Lane, "Lithographed Plates for Books and Periodicals: A Mainstay of Philadelphia Lithographers," in *Philadelphia on Stone: Commercial Lithography in Philadelphia, 1828-1878*, ed. Erika Piola (Philadelphia: Pennsylvania State University Press, 2012), 145.

⁸ A short history of nature photography, though focused on animals, appears as Matthew Brower, *Developing Animals: Wildlife and Early American Photography* (Minneapolis: University of Minnesota Press, 2011).

⁹ See Chapter 3, "Mechanical Objectivity," in Lorraine Daston and Peter Galison, *Objectivity* (New York: Zone Books, 2007), 115-190.

¹⁰ Lorraine Daston, "Speechless," in *Things that Talk: Object Lessons from Art and Science*, ed. Lorraine Daston (New York: Zone Books, 2004).

conflicting aesthetics and conventions, as Samuels had done; it is a transformation of recycled ideas. In the process of representing nature, the illustrators engaged nature itself in the negotiation. Their struggle was to present nature with integrity, reflecting nature and remaining meaningful to human interpretation.

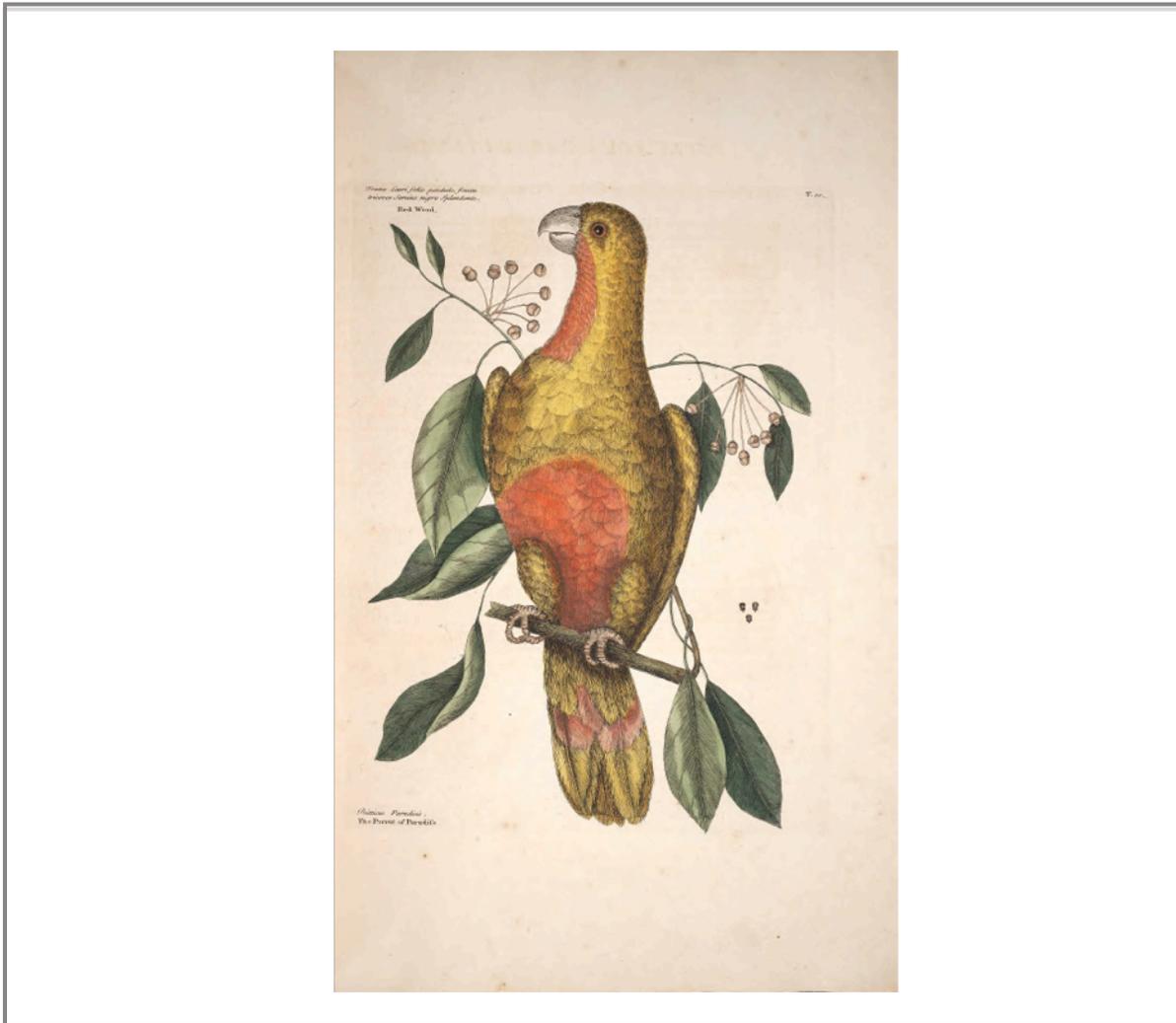
Appendix: Illustrations

1.1



Georges-Louis Leclerc, Comte de Buffon, Le Serigue, male et femelle (in *Histoire naturelle, générale et particulière*, 1749-1788 Tom. X, Pl. XLV and XLVI). The elaborate staging reflected Buffon's ideas of degeneration in natural history. Courtesy of Gallica, Bibliothèque nationale de France, Bibliothèque numérique.

1.2



Mark Catesby, The Parrot of Paradise, plate 10. Catesby's *The Natural History of Carolina, Florida and the Bahama Islands* (1754) illustrated the flora and fauna of the New World, providing a catalog for future explorers and naturalists. Courtesy of Biodiversity Heritage Library.

1.3



Alexander Wilson, plate XLVI. Engraved by Alexander Lawson for Wilson's *American Ornithology* (1808-1814), these birds followed the style of Mark Catesby, from a century earlier. Courtesy of Biodiversity Heritage Library.

2.1



John James Audubon, American Flamingo detail (plate CCCCXXI, left) and Pied Oystercatcher detail (plate CCXXIII, right). The anatomical details on these images are not present throughout *Birds of America* (1827-1834), though they are occasionally inserted. *The Birds of America, Vols. I-IV*, Special Collections, University Library System, University of Pittsburgh.

2.2



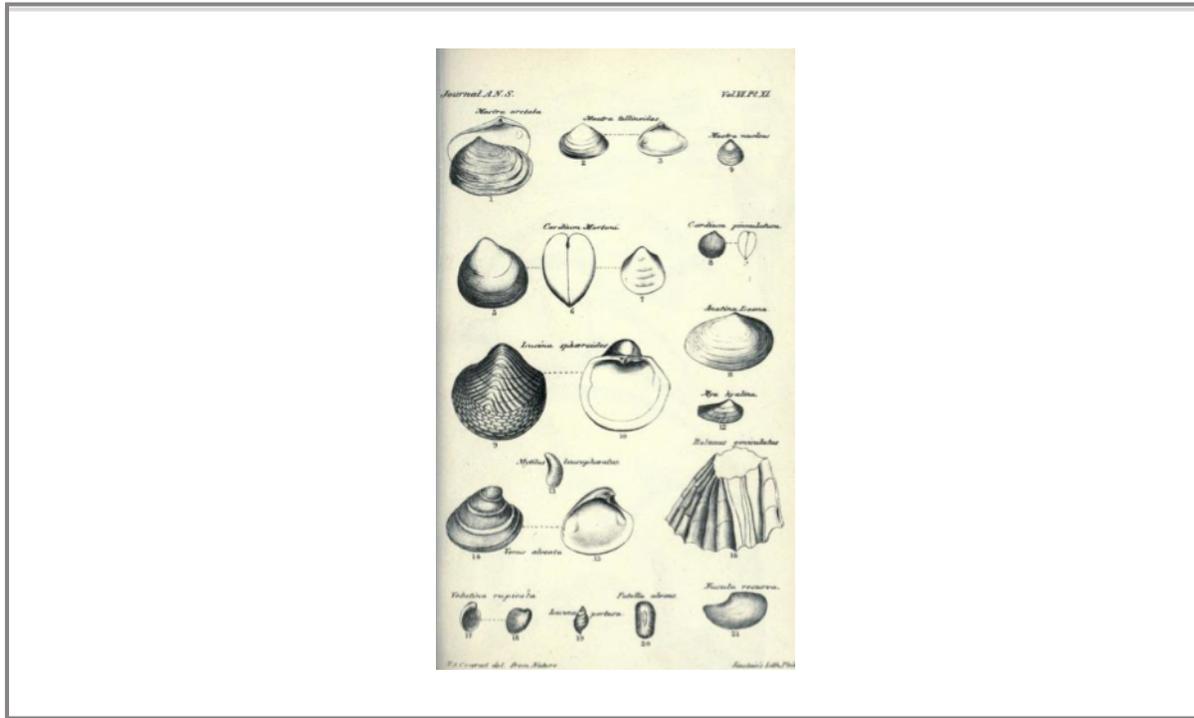
John James Audubon, Mocking Bird (plate XXI). Audubon's plate of the mockingbird provides a narrative that the entry into *Ornithological Biography* would support, as was common throughout *Birds of America* (1827-1838). *The Birds of America, Vols. I-IV*, Special Collections, University Library System, University of Pittsburgh.

2.3



Thomas Nuttall, Blue-Bird (vol. I, p. 444). Nuttall's *Manual of the Ornithology of the United States and Canada* (1832, 1834) used woodcuts printed in Boston by Carter & Andrews. Courtesy of Biodiversity Heritage Library.

3.1



Timothy Conrad, plate 11, accompanying "Description of Fifteen new species of Recent, and Three of Fossil Shells, chiefly from the coast of the U. S.," *Journal of the Academy of Natural Sciences of Philadelphia* Vol. VI (1830). Drawn by T. Sinclair's Lithography of Philadelphia, this was one of the early lithographs printed for the Academy. Courtesy of Biodiversity Heritage Library.

3.2



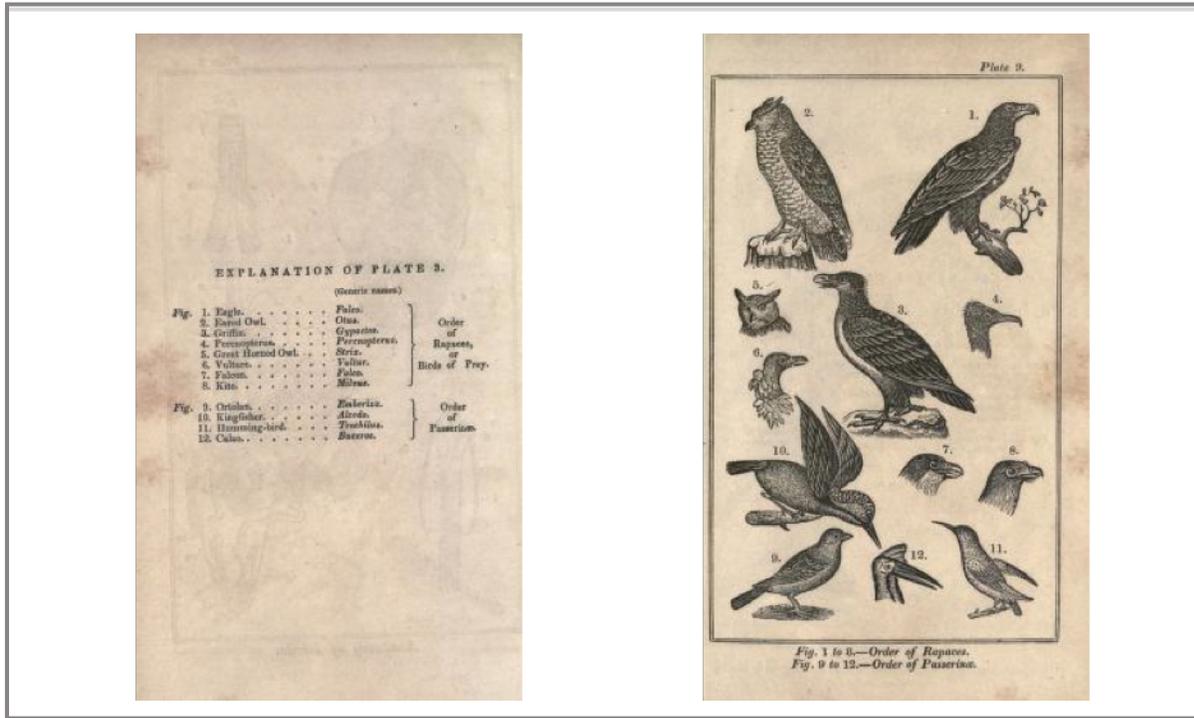
T. Delarue, Caracara Eagle, plate 4. Drawn for John Kirk Townsend's *Ornithology of the United States of North America* (1839), these lithographs were printed and published by Philadelphia firm J. B. Chevalier and Company. Courtesy of Biodiversity Heritage Library.

3.3



John James Audubon, Carolina Parakeet. The left image comes from the 1828 double elephant folio, engraved and printed by R. Havell's London shop. The right image is an 1840 lithograph from J. T. Bowen's shop in Philadelphia, for Audubon's Royal Octavo Edition. Double elephant, plate XXVI, is from *The Birds of America, Vols. I-IV*, Special Collections, University Library System, University of Pittsburgh. Royal Octavo, plate 278, is from Biodiversity Heritage Library.

3.4



W.S.W. Ruschenberger, Orders of Rapacea and Passeriae (plate 3). Grouping woodcut birds on a page, as done in Ruschenberger's *Ornithology: The Natural History of Birds* (1842), hearkened to the style of Wilson. Courtesy of Biodiversity Heritage Library.

3.5



John T. Bowen, Purple-Throated Humming Bird (plate 22, left) and Ferruginous Buzzard (plate 26, right). Illustrated for John Cassin's 1853 *Illustrations of the Birds of California, Texas, Oregon, British and Russian America*, the images resemble those of Audubon. Courtesy of Biodiversity Heritage Library.

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