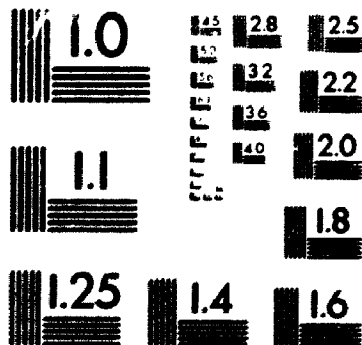


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**Drawn from Life: Science, Art and Image in the Depiction of Canada,
16th to 19th centuries**

by

Victoria Dickenson, M.A.

A thesis submitted to
the Faculty of Graduate Studies and Research
in partial fulfilment of
the requirements for the degree of

Doctor of Philosophy

Department of History

Carleton University
Ottawa, Ontario
August 9, 1995

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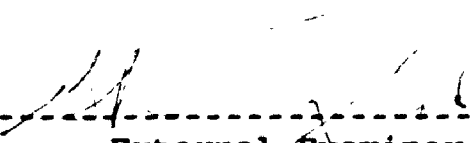
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ABSTRACT

The use of images as evidence in historical writing has been largely neglected by historians. Recent interest in the importance of visualization in scientific literature demands a reappraisal of the value of images. Images can be examined from a number of perspectives, including that of material history which seeks not only to understand the specific content of the image but also its context. Michel Foucault has suggested that images can be analyzed as discourse particularly in relation to his ideas concerning the archaeology of knowledge, which privileges persistence as much as change.

The thesis examines a particular set of images related to Canada from the sixteenth to the early nineteenth centuries. These images are of the sort traditionally identified as "scientific illustration," and include images from early maps and books, as well as representations of flora and fauna from the seventeenth and eighteenth centuries, and illustrations to expedition accounts from the nineteenth century. The way in which images define the experience of the New World for Europeans is discussed.

Of particular interest as well is the use which scientists and scholars have made of images for communication and for the visualization of complex data. Prior to the advent of colour printing in the mid-nineteenth century, many scholars relied upon manuscript or hand-coloured printed images for information. This practice is documented from the sixteenth through the eighteenth centuries.

The notion of accuracy is examined in looking at images painted "from life." Verisimilitude is not always the key criterion which determines the nature of the representation, particularly in scientific illustration. This understanding is related to current concerns among scientists working with computer graphics and the means by which digital representation and simulation are used as tools in scientific research.

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This thesis began as an exhibition for the Agnes Etherington Art Gallery at Queens University in Kingston, Ontario. *First Impressions: European Views of the Natural History of Canada* opened in 1992 and toured to a number of galleries across Canada. I owe a great debt of gratitude to the people who helped make that exhibition possible and to the librarians and curators who have continued to help with its transformation into a thesis. In particular I would like to thank Dr. Joyce Banks, former Rare Books Librarian at the National Library of Canada, Ed Dahl, Eva Major-Marothy and Gilbert Gignac of the National Archives of Canada, Eva Gavora (now retired) and William Muhwezi of the Botany Library at Agriculture Canada in Ottawa, Eleanor Maclean of the Blacker Wood Library at McGill University in Montreal, and all the others who have helped in my search after images.

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CHAPTER ONE

Introduction: The Bittern from Hudson's-Bay

It is almost twenty years ago since I first encountered an engraving of a bird by a man named George Edwards [plate 1]. The bird was a bittern, "from Hudson's-Bay." The print was obviously a page from a book; it was dated 1748, a copperplate engraving, hand-coloured. The bird itself looked strange, the plumage reasonably correct, but the stance awkward and unnatural. It was signed "Geo. Edwards." The bird was described in an accompanying text page. The author had compared this bird with one taken near London, and found that it was somewhat smaller than the European bird. "It is very much the Colour and Make of our Bittern, and hardly to be known from it but by Comparison." The bird was brought from "*Hudson's-Bay* by Mr. *Isham*." The author identified the bird as a nondescript species, and suggested that "the Curious who would compare this Description with that of our common Bittern may see it in *Willughby's Ornithology*, P. 283."

Who were Edwards, Willughby, Isham? Why was the description so detailed, the drawing so imperfect? How did the bird come from North America? In what book had this appeared? Who read it? What was the book's purpose? Since the time I first saw the Bittern from Hudson's-Bay, I have seen other birds engraved by George Edwards – ill-proportioned nighthawks perched in trees, peculiar ducks, strange flycatchers. I have also read his books and those of other eighteenth-century author-naturalists, like Mark Catesby, Eleazar Albin, Thomas Pennant. I have discovered a tradition of natural history

illustration and publication which dates from the sixteenth century, and continues today. I have also answered some of my original questions, and proposed others, which form the basis for the work to follow.

The plate of the Bittern had appeared in a *Natural History of Uncommon Birds* (1743-51). George Edwards (1694-1773) was the librarian to the College of Physicians, a colleague of Sir Hans Sloane (1660-1753), and an ardent naturalist. He travelled widely in Europe but never visited North America. He published another book, *Gleanings of Natural History* (1758-64), which also included some North American species. Francis Willughby (1635-72) was a seventeenth-century English naturalist, who with John Ray (1627-1705) travelled extensively in Britain and Northern Europe, and prepared an *Ornithology*, published in 1676. James Isham (c1716-1761) was an employee of the Hudson's Bay Company who supplied some specimens to collectors like Sir Hans Sloane and was acquainted with Edwards, who praised his "commendable curiosity."¹ The bird had probably been sent to England in a Company ship, either as a skin, or preserved whole and salted. Edwards had drawn and engraved it himself, having been taught the latter skill by Mark Catesby, who had taught himself, the cost of engravers being beyond either of their resources. Edwards was also a self-taught artist, having in his twenties decided to pursue natural history studies full-time. His biographer notes that on his return from his European travels in 1719,

Mr. Edwards closely pursued his favourite study of Natural History; applying himself to drawing and colouring such animals as fell under his notice. A strict attention to natural, more than picturesque beauty claimed his earliest care: Birds first engaged his particular attention; and having purchased some of the best pictures of these subjects, he was induced to

¹ James Isham, *James Isham's Observations on Hudson's Bay and Notes and Observations on a book entitled A Voyage to Hudson Bay in the Dobbs Galley, 1749*. Rich, E.E. and Johnson, A.M. eds. London: Hudson's Bay Record Society, 1949, p. 321.

make a few drawings of his own; which were admired by the curious, who encouraged our young naturalist to proceed, by paying a good price for his early labours.²

Edwards was admired, respected, even eulogized for his skills in depicting animals in their "natural" beauty. His books sold well, some editions sporting a bilingual French and English text, other editions appearing in English and in German. He was praised as an artist and a naturalist, and yet to the modern eye Edwards' illustrations are stilted, even inept. George Edwards was not, however, judged by his peers and colleagues a poor or incompetent artist. Linnaeus considered his works on birds one of "the miracles of our century," equal to Ehret's botanical drawings.³ Sir Hans Sloane, founder of the British Museum and great savant, hired Edwards to add to his drawing collection, procured for him an agreeable sinecure, and remained his patron.

There is here, between ourselves and the eighteenth-century authors, readers, and naturalists, a dissonance, a division which cannot be blamed on problems of skill, reproductive techniques, poor printing, or marginal interests. What is the nature of the dissonance, what has changed, and what can an examination of works like Edward's "Bittern" or other illustrations of flora, fauna and natural features tell us about science, art and the view of life held in the past? This thesis, then, begins with the image not the word. These images of birds and animals, insects and fish, flowers and trees, waterfalls and rock formations form part of what is now referred to as "scientific illustration." They were drawn primarily for the purpose of communicating information and they were included

² *Some Memoirs of the Life and Works of George Edwards, Fellow of the Royal and Antiquarian Societies*, London: Printed for J. Robson, Bookseller, 1776, pp. 6-7.

³ Linnaeus to Trew, quoted in Gerta Callman, *Ehret, Flower Painter Extraordinary: An Illustrated Life*. Oxford: Phaidon, 1977, p. 97.

on maps, in herbals and florilegia, in books of discovery and exploration, in technical manuals, and in natural histories. For the most part, we have forgotten these old images of the natural world, which for centuries flooded from the brushes and presses of Europe. They have disappeared either under the tide of landscape painting which subsumed other depictions of the landscape in the eighteenth and nineteenth centuries, or under the impact of photography with its ability to render more detail than the eye can see with casual observation. That these images fulfilled some significant need in the intellectual world cannot be doubted. Their very ubiquity is testimony to the important role they had in the shaping of knowledge, a role that has long been neglected. At the same time, the conventions and visual language that they employed, which appear foreign to contemporary eyes, suggest that the understanding of the informational value of the image has changed, or at least that the information we require from images differs from what was required by scientific thinkers and knowledgeable readers in the past.

In this thesis I will examine a certain set of these images, those which depicted some aspect of the natural landscape or biota of Canada from the days of first discovery in the fifteenth century to the early nineteenth century. The choice of this limited set is necessitated by the masses of material and the ready availability of original materials. The decision to include only "Canadian" images also permits an examination not only of the role of images in the shaping of knowledge, but also a chance to comment on the particular vision of the northern half of the new world held by Europeans from the age of first discovery and settlement to the nineteenth century. I would like to examine these images from two perspectives. The first derives from the literature of the history of science. There has been an increasing interest in the role of the scientific image in the development and diffusion of scientific ideas. In 1976,

Martin Rudwick pointed out in an article on "The Emergence of a Visual Language for Geological Science 1760-1840"⁴ that "in modern historical analysis the strong visual component of the original source-materials is generally either missing altogether or else reduced to a virtually decorative role." He attributes this lack primarily to the absence in the history of science of "any strong intellectual tradition in which visual modes of communication are accepted as essential for the historical analysis and understanding of scientific knowledge."⁵ This neglect of visual evidence is obvious in an examination of reprinted materials. Where the original work might have included a decorative and allegorical frontispiece, or several illustrations, new editions are often limited to text only. On the other hand, images from printed works, even details from larger pictures, are extracted from their original context and used as decorative footnotes to text, abrogating their contextual information value. This use of images is equivalent to the exhibition of "breakers" in the book and print trade, illustrations torn from texts and placed on sale or display for their aesthetic or curiosity value.⁶

While the historical study of visual communication in science has often been neglected by historians of science, art historians have a long tradition of interest in original and printed illustrations of science and nature. Otto Pacht wrote a pioneering article in 1950 in the *Journal of the Warburg and Courtauld Institute* on "Early Italian Nature Studies and the Early Calendar Landscape,"⁷

⁴ Martin J.S. Rudwick, "The Emergence of a Visual Language for Geological Science 1760-1840", *History of Science*, xiv (1976), pp 149-95.

⁵ See, however, Bernard Cohen's *Album of Science, From Leonardo to Lavoisier, 1450-1800*. New York: Charles Scribners Sons, 1980.

⁶ The Cumming and Quinn series on the discovery and exploration of North America, while extremely valuable for the number of images it portrays, is a particularly glaring example of this practice.

while in 1971, Francis Klingender explored *Animals in Art and Thought to the End of the Middle Ages*. Svetlana Alpers related the work of seventeenth-century Dutch artists to the science of their day in her controversial 1983 book, *The Art of Describing: Dutch Art in the Seventeenth Century*. Barbara Maria Stafford looked at travel literature in *Voyage into Substance: Art and Science and the Illustrated Travel Account, 1760-1840* (1984), Hugh Honour described images of America in *The New Golden Land* (1975), while Bernard Smith prepared a masterly exploration of the interrelationship of science and depiction in his discussion of the impact of scientific discovery on conventions of English landscape painting in *European Vision and the South Pacific* (1988).⁸ Since the late 1970s museums and libraries have also published a number of catalogues devoted to collections of both scientific illustrations and what is loosely termed "documentary art." These include the Pierpoint Morgan Library in New York (*Flowers in Books and Drawings ca 940-1850*, 1980), the Corcoran Gallery in Washington (*Views and Visions. American Landscape before 1830*, 1986), the Cleveland Museum (*The European Vision of America*, 1975), the Amon Carter Museum in Fort Worth (*The Bison in Art*, 1977), the John Carter Brown Library (*Encountering the New World, 1493 to 1800*, 1991), the British Library (*Images of Science. A History of Scientific Illustration*, 1992), and the National Library of Canada (*Passages*, 1992).⁹ In addition, historians of printed books

⁷ "Early Italian Nature Studies and the Early Calendar Landscape," *Journal of the Warburg and Courtauld Institute (JWCI)*, 1, 13 (1950), pp 13-47.

⁸ Francis Klingender, *Animals in Art and Thought to the End of the Middle Ages*. London: Routledge and Kegan Paul, 1971; Svetlana Alpers, *The Art of Describing: Dutch Art in the 17th Century*. Chicago: University of Chicago Press, 1983; Barbara Maria Stafford, *Voyage into Substance: Art and Science and the Illustrated Travel Account, 1760-1840*. Cambridge, MA: MIT Press, 1984; Hugh Honour, *The New Golden Land: European Images of America from the Discoveries to the Present Time*. New York: Pantheon Books, 1975; Bernard Smith, *European Vision and the South Pacific*. New Haven: Yale University Press, 2nd ed., 1988.

⁹ Helen B. Mules, *Flowers in Books and Drawings, ca 940-1840*. New York: J. Pierpoint Morgan Library, 1980.; Edward Nygren, *Views and Visions. American Landscape before 1830*. Washington,

and book illustrations have developed a genre of their own, which encompasses such works as Albert Bettex's *The Discovery of Nature* (1965), S. Peter Dance's *The Art of Natural History: Animal Illustrators and their Work* (1976), A.M. Lysaght's *The Book of Birds* (1975), Peyton Skipwith's *The Great Bird Illustrators, 1730-1930* (1979), and Sachervell Sitwell et al's *Fine Bird Books, 1700-1930* (1953).¹⁰ These lavishly illustrated folios, destined primarily for the lay market, are based on the more scholarly reference works of Jean Anker, Canon Raven, Wilfrid Blunt, Agnes Arber, and D.M. Knight.¹¹

Very few authors, however, attempt to analyze the role of the scientific illustration in the way in which Rudwick has suggested. One exception is William Ivins, an art historian, almost invariably described as the pioneer exponent of the critical understanding of the printed image. In his 1953 classic, *Prints and Visual Communication*, Ivins analyzed the role of the repeatable visual or pictorial statement in art history and in social history.¹² He theorized that the ability to reproduce exact copies of technical drawings made much of scientific

D.C.: Corcoran Gallery of Art, 1986; National Library of Canada, *Passages. A Treasure Trove of North American Exploration/ Passages. Un écrin des explorations de l'Amérique du Nord*. Ottawa: National Archives of Canada, 1992; Hugh Honour, *The European Vision of America. A special exhibition to honour the bicentennial of the United States...* [Cleveland]: Cleveland Museum of Art, 1975; Susan Danforth and William H. McNeill, *Encountering the New World, 1493 to 1800*. Providence, Rhode Island: John Carter Brown Library, 1991; Brian J. Ford, *Images of Science. A History of Scientific Illustration*. London: The British Library, 1992.

¹⁰ Albert Bettex, *The Discovery of Nature*. New York: Simon & Schuster, 1965; S. Peter Dance, *The Art Of Natural History. Animal Illustrators and Their Work*. Woodstock, N.Y.: The Overlook Press, 1976; A.M. Lysaght, *The Book of Birds*. London: Phaidon Press, 1975; Peyton Skipwith, *The Great Bird Illustrators and their Art, 1730-1930*. New York: A&W Publishers, 1979; S. Sitwell, H. Buchanan, and J. Fisher, *Fine Bird Books, 1700-1900*. New York: Atlantic Monthly Press, 1990.

¹¹ Jean Anker, *Bird Books and Bird Art*. Copenhagen, 1938; repr. New York: Arno Press, 1974; C.E. Raven, *English Naturalists from Neckham to Ray. A Study of the Making of the Modern World*. Cambridge: Cambridge University Press, 1947; Wilfrid Blunt, *The Art of Botanical Illustration*. 4th ed. London: Collins, 1971; Agnes Arber, *Herbals, their Origin and Evolution. A Chapter in the History of Botany, 1470-1670*. 1938, 2nd ed. Darien, Connecticut: Hafner Publishing Co., 1970; D.M. Knight, *Natural Science Books in English, 1600-1900*. London: B.T. Batsford, 1972; and *Zoological Illustration. An essay towards a history of printed zoological pictures*. Folkestone, Eng.: Dawson Archon Books, 1977.

¹² William Ivins, *Prints and Visual Communication*, Cambridge, MA: M.I.T. Press, 1985 (1953).

achievement possible. This insistence on the primary role of pictorial representation in scientific understanding and change is also reflected in a number of recent publications on the relationship between picturing and information that have emerged from the literature of computer science. Edward Tufte in *Envisioning Information* (1990) has tried to describe the impacts of various modes of adapting complex information to the two dimensions of "flat land."¹³ The editors of *Focus on Scientific Visualization* (1993) bring together a number of papers which go beyond flatland into the illusory multidimensional world of the computer screen, where the resolution of complex problems in more than three dimensions is commonplace. These scientists have turned to visualization as a means of presenting complex data, such as fluid flow systems, which they assert can be understood better visually than numerically. This insight, yet very new, and a result of an advance in technology, reasserts the fundamental role of image in the language of science. While complex mathematical calculations may form the ground of the experiment, their computer-dependent complexity prohibits them from being easily understood. "A major means to get insight is to visualize the data."¹⁴ Visualization, then, has assumed new importance in the making of science as well as in its illustration. A principal interest of this thesis, then, must be the relationship between complex information and complexity and accuracy of the representation. How important was accuracy in scientific illustration and informative images? What was the information which required visualization in the images of the sixteenth, seventeenth, eighteenth and early nineteenth centuries? How did naturalists

¹³ Edward Tufte, *Envisioning Information*. Cheshire, Connecticut: Graphics Press, 1990.

¹⁴ Ulrich Land and Michael Grave, "Data Structures in Scientific Visualization" in *Focus on Scientific Visualization*. Berlin: Springer-Verlag, 1993, p. 85.

and scientists use the visualizations in their work and in their thought? What role did the scientific image play in envisioning information about Canada and the New World for European readers?

The second perspective from which I propose to examine these varied images is derived from the study of material history. Material history has been defined as the history of mind. It is an attempt to understand the *mentalité* of a group of people, revealed in the objects they create. Material historians tend to make a distinction between art and artifacts, not simply as the result of academic disciplines but because, as Jules Prown points out, "artifacts do not lie."¹⁵ What he is referring to is the primarily utilitarian function of the artifact. While works of art are inevitably self-conscious, most artifacts are not. Rather they reflect the "underlying cultural assumptions and beliefs" that are revealed in the style of the object.¹⁶ The images chosen for this examination are not usually categorized as "works of art." In some cases they are anonymous, in others the result of a number of hands, passing from sketch to engraving to print. Their primary purpose is not to evoke aesthetic response, but rather to communicate information. Yet inherent in each image is a reflection of the style of its day. It embodies certain assumptions about the makers and the viewers of the object, their interests and their understandings, the cultural lens through which they view the image. Steven Lubar and David Kingery note in the Introduction to *History from Things*, that "By neglecting all but a narrow class of artifacts, those with writing on them, historians have missed opportunities. Artifacts are

¹⁵ Jules David Prown, "The Truth of Material Culture: History or Fiction?" in Stephen Lubar and W.D. Kingery, *History from Things: Essays on Material Culture*. Washington: Smithsonian Institution Press, 1993, p. 4.

¹⁶ Works of art can, of course, be analyzed as artifacts. Prown also notes that for some art historians, like Irving Lavin of Princeton, all things made by people are art – "art is equatable with artifacts."

remnants of the environment of earlier periods, a portion of the historical experience available for direct observation."¹⁷

Francis Haskell acknowledges that indeed historians have left the examination of the "evidence offered by art" to the "antiquarians." In his 1993 book, *History and Its Image: Art and the Interpretation of the Past*, he describes his work "as a dialogue... that has been stimulated by the claims of those who have tried to insist that an image can be seen as a valuable historical source."¹⁸ He notes that "What we choose to call art is indeed best interpreted by the historian when it is studied in conjunction with other available testimony, but it does have a 'language' of its own which can be understood by those who seek to fathom its varying purposes, conventions, styles and techniques."¹⁹ A material history analysis is one means by which to understand this "language." It generally consists of a complete description of an object, including the material from which it is made, the manner of its making, its age, culture, and where possible a description of its maker. It often relates the object to similar objects from the same culture or from others. It sometimes goes further to speculate upon the purpose for which the object is made and to discuss its iconography, the internal coherence of its decoration or depiction. The images to be examined in this thesis have almost all been embedded in text, and it is the relationship between text and image which provides ground for the most fruitful analysis. It is important to keep in mind that the specimen cannot truly be understood

¹⁷ Lubar and Kingery, *History from Things*., p.ix.

¹⁸ Francis Haskell, *History and Its Images: Art and the Interpretation of the Past*. New Haven: Yale University Press, 1993, p. 2.

¹⁹ Haskell, *History and Its Images*, pp 9-10.

without an examination of the strata in which it was found, to derive a metaphor from Rudwick's geological history.

Looking at the images as well as the words printed in books of natural history and description permits a resonance between text and image which expands the analysis and can incorporate an "analysis of the discursive field" as described by Michel Foucault in *The Archaeology of Knowledge*. Foucault suggests that the history of thought, of ideas, of science, has been too concerned with allegorical analysis – what was really being said?, and the search for origins – which was the original statement, which the banal repetition? Foucault suggests that a more fruitful approach to the analysis of discourse (in which we can include images, as Foucault himself does), is the analysis of specificity:

...we must grasp the statement in the exact specificity of its occurrence, determine its conditions of existence, fix at least its limits, establish its correlations with other statements that may be connected with it, and show what other forms of statement it excludes.²⁰

He describes this type of investigation as "archaeological," and it must be assumed that Foucault has not chosen his metaphors lightly. Archaeology is concerned with exact description, with laying out all the materials on a grid and noting location, dimension, material, substrate, prior to beginning either analysis of individual items or drawing conclusions about the site. By looking closely at things, archaeologists are indeed able to make statements about the past. Foucault has applied his archaeological method to a painting, *Las Meninas*, to demonstrate that the technique may be applied not only to textual discourse but to the discourse embodied in pigment and canvas:

²⁰ Michel Foucault, *The Archaeology of Knowledge*. London: Tavistock Publications, 1972, p. 28.

Archaeological analysis... would not set out to show that the painting is a certain way of "meaning" or "saying" that is peculiar in that it dispenses with words. It would try to show that, at least in one of its dimensions, it is discursive practice that is embodied in techniques and effects.... It is shot through – and independently of scientific knowledge (*connaissance*) and philosophical themes – with the positivity of a knowledge (*savoir*).²¹

Throughout both *The Archaeology of Knowledge* and his earlier work, *The Order of Things*, Foucault has tried to steer historians away from the view of history as linear progression, of cause and effect. Cause and effect, as the Greeks and the Indian philosophers were aware, is yet uncharted territory. Is it possible to say, except in the colloquial or common sense usage, that such an event caused another event to happen, or that such an idea gave rise to another idea? Foucault would suggest that in fact this linear causative analysis is far too simplistic, and that the domain of knowledge (*savoir*) is the true province of the historian. Knowledge is the medium in which science (or art) is set. In contradistinction to the linear progression of "science," knowledge is flat, and certainly in the eighteenth century, Foucault describes the domain as a table onto which ideas and things are laid in a highly structured order. The domain of knowledge embraces the way people see the world, and the very phenomena which they see. His view of historical change is not based on the chronology of cause and effect, but on that of shifts in the domain of knowledge: one flat discursive grid replaces or is overlaid on another, one way of knowing is subsumed beneath another, like the strata in an excavation. The following lengthy extract encapsulates his important understanding of this fundamental concept of the shift in knowledge, using an example from the seventeenth century:

²¹ Foucault, *Archaeology*, pp 193-4.

All this was of the greatest consequence to Western thought. Resemblance, which had for long been the fundamental category of knowledge - both the form and the content of what we know - became dissociated in an analysis based on terms of identity and difference; moreover, whether indirectly or by the intermediary of measurement, or directly and, as it were, on the same footing, comparison became a function of order; and lastly, comparison ceased to fulfill the function of revealing how the world is ordered, since it was now accomplished according to the order laid down by thought, progressing naturally from the simple to the complex. As a result, the entire *episteme* of Western culture found its fundamental arrangements modified. And, in particular, the empirical domain which sixteenth-century man saw as a complex of kinships, resemblances, and affinities, and in which language and things were endlessly interwoven - this whole field was to take on a new configuration. This new configuration may, I suppose, be called 'rationalism'; one might say, if one's mind is filled with ready-made concepts, that the seventeenth century marks the disappearance of the old superstitious or magical beliefs and the entry of nature, at long last, into the scientific order. But what we must grasp and attempt to reconstitute are the modifications that affected knowledge itself, at that archaic level which makes possible both knowledge itself and the mode of being of what is to be known.²²

Significantly, what Foucault is demanding of the historian is an abandonment of the idea of narration in favour of description. Narration derives from the drama; to be successful it is driven by some engine of movement to a conclusion. It is a story. Description, on the other hand, results from an attentive gaze, a close reading that attempts to view what is actually present.

Stephen Greenblatt, in his analysis of Columbus's discourse, has adopted Foucault's approach to these late fifteenth-century words and images. He writes:

...I have tried less to distinguish between true and false representations than to look attentively at the nature of the representational practices that the Europeans carried with them to America and deployed when they tried to describe to their fellow countrymen what they saw and did.²³

²² Michel Foucault, *The Order of Things: An Archaeology of the Human Sciences*. New York: Vintage Books, 1973, p. 54.

Similarly in this analysis of the discourse represented in images of natural history, I seek to understand each image in its specific creation, to describe, as Foucault and Greenblatt suggest, the discontinuities, the rifts, the particulars embedded in and surrounding each thing. The discursive archaeology that Foucault proposes is perhaps closer to material history than to traditional document-based historical analysis. By examining an array of different documents, different conclusions may in fact be drawn about the understanding of nature and the world in the past. David Knight, has pointed out in his book *Zoological Illustration*, that in looking at scientific illustration, we may encounter a new concept of scientific progress:

We do not therefore simply find progress in zoological illustrations... Indeed to approach the history of zoology through illustration, is a ready way of dropping the idea of science as cumulative progress to indubitable truth based upon some "scientific method."²⁴

In the following chapters, then, I will be undertaking at one level a material history analysis of a series of images arranged in roughly chronological order. The objects which I have chosen for this analysis are almost all two-dimensional works on paper, canvas, vellum, etc. All the objects include depictions of plants or animals, and sometimes I will treat the image as a whole and sometimes the component parts in an iconographical discussion. This material history analysis is imbued with the strictures that Foucault has laid out concerning "archaeology." Foucault recognizes that change as the engine of history is problematic. He insists that archaeological analysis "considers [that]

²³ Stephen Greenblatt, *Marvelous Possessions: The Wonder of the New World*. Chicago: University of Chicago Press, 1991, p. 7.

²⁴ Knight, *Zoological Illustration*, p. 39.

the same, the repetitive and the uninterrupted are no less problematic than the ruptures."²⁵ I am not interested in showing how artists learned to draw better bears or bison or birds, but how they used images to communicate certain understandings about the natural world, how their very depiction of the real world (and what can be more real than a particular bird or a flower?) reflected their interests and their knowledge. From the sixteenth century onwards, artists insisted that their images were "drawn from nature," "true and accurate descriptions," or "drawn from life." It is obvious even from a cursory comparison of images from Thevet's *Cosmographie universelle* (1575) or from Topsell's *History of Four-Footed Beasts and Serpents* (1658) with those from Rondelet's *De pisicbus marinis* (1554) or Ehret's *Hortus Cliffortianus* (1737/8) that "drawn from life" had very different meanings for different authors and artists. By looking attentively at what Rudwick referred to as "the strong visual component of the original source-materials,"²⁶ I hope to be able to make some contribution to an understanding of the transformation of the world of Columbus and Cartier into that of Darwin and Humboldt, and essentially into our own.

The images have been selected according to a set of criteria which developed over the course of my examination of maps, prints and drawings in collections in North America and Europe. All images contain representations of flora, fauna or natural landscape of the New World, and all were developed in the European tradition. While I attempted to confine my selection to those images with "Canadian" content, I have of necessity had to broaden the range,

²⁵ Foucault, *Archaeology*, p. 174.

²⁶ Rudwick, "Emergence of a Visual Language," p. 149.

though I have tried in almost all cases to deal only with the Nearctic as opposed to the tropical regions. Many early works, like that of White and Catesby, though they deal with the fauna and flora of what are now the southern states, were used and copied by those who explored and wrote about more northern lands. In most cases, I have also selected only those images which had a wide distribution, either in print, or through circulation among a group of specialists. Thus, I have included the works of Georg Ehret's watercolours of Newfoundland plants, not only for their delicate beauty but also because as part of Banks' collection they were open to consultation by Banks' great and influential circle of like-minded friends and acquaintances. I have also included the watercolour sketches of George Back and Robert Hood from the Franklin Overland Expedition since these were later published as engravings to illustrate the official account. I have not, however, included the manuscript drawings of the *Codex canadensis*, which though undeniably interesting, were never published until released in facsimile in 1930.

The first series of images to be examined are embedded in the early sixteenth-century maps of the northern part of the New World. While most attention was turned to what is now South America, cartographers did incorporate images of the birds, beasts and flora of the north into their works. I will also look at concomitant images of New World animals as they appeared in very early travel books and records of voyages.²⁷ The second set of images centre around botanical illustration. Scholars have always remarked on the exactness of botanical as opposed to zoological illustration in works of the sixteenth, seventeenth and early eighteenth centuries. Certainly the flora of the New World is thought to have had a profound influence on the development of

²⁷ In some cases quotations will be taken from English translations of French texts; in others the original French text is quoted, depending on the ready availability of sources.

systematic botany and the understanding of the natural world in the eighteenth century. Thirdly, I will look at the flood of images of flowers, birds, beasts and fish that emerged from the mid- to late-eighteenth century European presses, the age of George Edwards and his colleagues. This eighteenth-century tradition will be followed in another group of images which sees the culmination of the conventions of natural history observation and illustration in the early nineteenth century. The concluding chapter will attempt to draw together the threads of the analysis in a weave which examines the role of image in the understanding of nature and the logic of science.

CHAPTER TWO

Emblematic Animals

In 1492, Christopher Columbus (1451-1506) set the standard of Spain on his first landfall in the New World. When he returned, he wrote a letter to Luis de Santangel, who had helped him to find financing for the voyage, describing the journey and the lands which they had seen. The "Columbus letter" was first published in Barcelona as a broadsheet in March or April, 1493 and in the next five years had been published in at least seventeen editions, including a Latin translation, making it available to erudite readers throughout Europe. It had also been translated into 68 stanzas of Italian verse by Giuliano Dati, "meant to be sung in the streets."¹ Both the Latin version published at Basel in 1493 and the Dati poem were illustrated. The frontispiece to the Basel edition shows the *Insula hyspana* on which naked natives flee Columbus who arrives in the ship's boat bearing in his hands a jewelled cup. The publisher used woodcuts adapted with slight modifications from an earlier book on Mediterranean voyages. Hugh Honour suggests, however, that the Dati illustrations were specially commissioned. The frontispiece to the poems shows a seated king and ships approaching an island with a palm tree in the foreground and long-haired natives, the women with girdles of leaves or feathers.² Certainly Columbus mentioned palm trees specifically in his letter ("There are palm trees of six or eight kinds, which are a wonder to behold because of their beautiful variety"),

¹ William Brandon, *New Worlds for Old. Reports from the New World and their effects on the development of social thought in Europe, 1500-1800*. Athens, Ohio: Ohio University Press, 1986, p. 7.

² Hugh Honour, *The New Golden Land: European Images of America from the Discoveries to the Present Time*. New York: Pantheon Books, 1975, pp 6-7.

and the fact that some of the natives "have the custom of wearing their hair long like women."³

But neither of the frontispieces conveys the landscape so well as Columbus's written description of Cuba:

Its lands are lofty and in it there are many sierras and high mountains... All are most beautiful, of a thousand shapes, and all accessible and filled with trees of a thousand kinds and tall, and they seem to touch the sky; and I am told that they never lose their leaves, which I can believe, for I saw them as green and beautiful as they are in Spain in May, for some of them were flowering, some with fruit and some in another condition, according to their nature. And there were singing the nightingale and other little birds of a thousand kinds in the month of November, there where I went. There are palm trees of six or eight kinds...; there are marvellous pine groves, and broad fertile plains, and there is honey. There are many kinds of birds and varieties of fruit.⁴

In his *Diary* of the first voyage, Columbus also notes the fish, "so different from ours... of the finest colours of the world: blues, yellows, red, and of all colours; and others coloured in a thousand ways," and the "flocks of parrots that obscure the sun; and birds of so many kinds and sizes and so different from ours..."⁵ In these passages imagination mediates between the written description and the mental image, producing vivid representations of an exotic world in the minds of the readers whose exposure to tropical flora and fauna was conditioned by geographic location and by exposure through iconic images and imported

³ Honour, *The New Golden Land*, p. 5.

⁴ Quoted in Honour, *The New Golden Land*, p. 5.

⁵ Stephen Greenblatt, *Marvelous Possessions, The Wonder of the New World*. Chicago: University of Chicago Press, 1991, pp 76-8. The long-tailed colourful New World parrots seem particularly to have been prized and were brought back to Europe in March 1494, where they quickly made their appearance on the American section of a world map made for the Italian ambassador of the Duke of Ferrara in Lisbon in 1502. Green African parrots, often referred to as "popinjays" were already familiar domesticated birds in Europe and were featured in medieval manuscripts and illustrated prayer books of the fourteenth century. (G. Evelyn Hutchinson, "Attitudes toward Nature in Medieval England," *ISIS*, 65, 1974, p. 11.) They are shown on the African section of the same 1502 map.

specimens. The pictorial representations do not, however, realize the complexity of the text, conveying an idea (the idea of arrival, the idea of natives) rather than a physical reality [plate 2].

Columbus's initial voyage was followed by three additional voyages under his command, and his example served as inspiration not just for the Spanish court but for the Portuguese and the English, and eventually the French. In 1497, John Cabot sailed to Newfoundland under the English flag, to be followed in 1500 by Gaspar Corte Real who coasted Labrador. Amerigo Vespucci sailed for Brazil in 1499, and has been credited with the first pronouncement that the lands of the western sea were indeed "what we may rightly call a New World... a continent..."⁶ In his published letters of 1505 and 1509, Vespucci describes the cannibalistic natives with their feather ornaments, as well as the brilliant flowers, strange birds and even a dragon (most likely an iguana). Unlike Columbus and Vespucci, who quickly published accounts of their voyage, neither Cabot nor members of the Corte Real voyage wrote detailed records of their explorations. Certainly accounts of their voyages were reported to the authorities, and the native peoples and strange animals they brought back with them displayed to kings and commoners whose reactions were recorded. Alberto Cantino, the envoy of the Duke of Ferrara, for example, notes that he had "seen, touched and examined these people"⁷ kidnapped by the Portuguese expedition, and Henry VII paid "£5 to Portyngales that brought popyngais and cattis of the mountayne with other stuf to the King's grace ... of the New-found

⁶ Quoted in Honour, *The New Golden Land*, p. 12.

⁷ Quoted in W.P. Cumming et al., *The Discovery of America*. New York: American Heritage Press, 1971/2, p. 53.

Island."⁸ Cantino also commissioned a map for his employer to document the discoveries of the Portuguese and Spanish upon which the Italians were casting an apprehensive eye. In a 1501 letter to the Duke, Cantino recounts Corte-Real's voyage to Newfoundland:

...they found an abundance of the most luscious and varied fruits, and trees and pines of such measureless height and girth, that they would be too big as a mast for the largest ship that sails the seas.

In another letter, Cantino, whose descriptions embody the feeling of first-hand accounts, relates that

No corn grows there, but the people of the country say they live altogether by fishing and hunting animals, in which the land abounds, such as very large deer, covered with extremely long hair, ... and again wolves, foxes, tigers and sables. They affirm that there are, what appears to me wonderful, as many falcons as there are sparrows in our country...⁹

The Cantino Map thus shows not only the parrot-infested South American coast but also the *Terra del Rey de portugall* covered in tall trees.

Despite the natives and the blue popyngais, the cold north did not touch the European imagination in the same manner as the warm and exotic south, and by very early in the sixteenth century the dominant image of the New World was grounded on the experience of the Indies and of Central and South America. As Samuel Eliot Morison points out, after the Spanish and Portuguese voyages to India, Brazil and Venezuela, "who cared for codfish, mast trees and icebergs?"¹⁰ A procession in honour of Maximilian in 1516 shows a group of

⁸ Recorded in the Household Book of Henry VII, and noted in S.E. Morison, *The European Discovery of America. The Northern Voyages, AD 500-1600*. New York: Oxford University Press, 1971, p. 219.

⁹ Quoted in Cumming et al., *The Discovery of America*, p. 53.

¹⁰ Morison, *The European Discovery*, p. 210.

people clad in feathers, bearing parrots, prehensile-tailed monkeys, tropical fruits and sheaves of corn.¹¹ In 1520, the treasures of Montezuma were on display in Europe, and that glittering horde fixed the image of America as strange, rich, and exotic, full of peculiar beasts and wonderful plants. By the mid-sixteenth century, America was personified in countless allegorical drawings, engravings and paintings, as a young, naked woman, sometimes with feathered headdress or girdle and arm- and legbands, accompanied by a parrot, and often associated with the remains of cannibalistic feasts – severed heads and limbs, torsos on a spit, body parts in baskets – sitting on that strange new world beast, an armadillo, or perhaps an alligator, or in one case, reclining in a hammock. One reason for this lack of interest in the northern hemisphere can be explained by the almost complete absence of the exotic. As Carl O. Sauer has observed of the northern voyages, "nowhere else could they have gone so far across the sea and found so much so familiar to them."¹² While some of the flora and fauna were definitely strange, much was familiar, from the beavers, bears and falcons to the oak, fir and beeches. In his first voyage of 1534, Jacques Cartier (1491-1557) describes the coast of Prince Edward Island:

We landed that day in four places to see the trees which are wonderfully beautiful and very fragrant. We discovered that there were cedars, yew-trees, pines, white elms, ash trees, willows, and others, many of them unknown to us and all trees without fruit. The soil where there are no trees is also very rich and is covered with pease, white and red gooseberry bushes, strawberries, raspberries, and wild oats like rye, which one would say had been sown there and tilled. It is the best-tempered region one can possibly see and the heat is considerable. There

¹¹ They are called the people of Calicut, and are accompanied by fat-tailed Asiatic sheep which appear in many allegories and prints of America. The confusion between Asiatic India and the Indies of the New World continues throughout the sixteenth century. Morison suggests that Vasco da Gama's voyage to Calcutta in 1497-99 attracted more attention than Columbus's Atlantic crossing.

¹² Quoted in Douglas McManus, *European Impressions of the New England Coast 1497-1620*. Chicago: University of Chicago Department of Geography Research Paper No. 139, 1972, p. 63.

are many turtle-doves, wood-pigeons and other birds. Nothing is wanting but harbours.¹³

On the third colonising voyage of 1542, he describes the land near Cape Rouge:

More[o]ver there are great store of Okes the most excellent that ever I saw in my life, which were so laden with Mast that they cracked againe: besides this there are fairer Arables, Cedars, Beeches, and other trees, then grow in France: and hard unto this wood on the South side the ground is all covered with Vines, which we found laden with grapes as blacke as Mulberies, but they be not so kind as those of France because the Vines been not tilled, and because they grow of their owne accord. More[o]ver there are many white Thornes, which beare leaves as big as oken leaves, and fruit like unto Medlars. To bee short, it is as goode a Countrey to plow and mannure as a man should find or desire. We sowed seedes here of our Countrey, as cabages, Naveaus, Lettises, and others, which grew and sprong out of the ground in eight days.¹⁴

In his accounts Cartier is able to name many of the plants he sees. He even recognizes that with cultivation, the wild productions of this "new world" could be made to resemble those of France, and in fact, the soil seems to be suited to the produce of France, bringing seedlings out of the ground in eight days, an assertion he repeats twice. Not only is the vegetation similar but Cartier can enumerate a dozen birds, including "cranes, swans, bustards, geese, ducks, larks, pheasants, partridges, blackbirds, thrushes, turtledoves, goldfinches, canaries, linnets, nightingales, sparrows and other birds, the same as in France, and in great numbers."¹⁵ Columbus, on the other hand, cannot name what he sees. In his *Diary* he writes of an island of "many very green and very large trees... I do not know where to go first; nor do my eyes grow tired of seeing such beautiful verdure and so different from ours." The birds, too, are

¹³ Ramsay Cook, ed., *The Voyages of Jacques Cartier*. Toronto: University of Toronto Press, 1993, pp 17-18.

¹⁴ Cook, ed., *Voyages*, p. 100.

¹⁵ Quoted in Cook, ed., *Voyages*, pp 57-8.

"of so many kinds and sizes, and so different from ours, that it is a marvel."¹⁶ Even the fish of the Indies are of a thousand colours, unrecognizable, not like the baccalao, or cod, that throng the northern waters.

Cartier's narratives of his voyages were not published until the mid-sixteenth century. The second voyage was printed in Paris in 1545, while the record of both early voyages was included in Giovanni Baptisto Ramusio's compilation of 1556, *Navigazioni et Viaggi*, which included an illustrated map by Giacomo Gastaldi (c1500-c1565). Cartier's discoveries and those of Cabot were, however, incorporated on manuscript maps produced by the Dieppe hydrographers. These cartographers would have got information practically from dockside, and a series of charts dated between 1544 and 1553 and attributed to Pierre Desceliers (1487-1553) of Arques, reflect Cartier's discoveries. It was primarily from these map sources and the written narratives that accompanied them that Europeans prior to the mid-sixteenth century drew their images of the flora and fauna of the northern half of the New World. The noted cartographer, R.A. Skelton, recognizes the significance of the map as a visual representation in the development of geographic understanding. It is, he writes, "a graphic document employing visual symbols", and as such "it has made a more immediate impact on men's minds than the written word. This may be partly explained by the positiveness with which it presents geographical facts. The statements which it makes – on position, direction, distance, or extent – have an absolute character, in comparison with those written texts which can more easily be qualified."¹⁷ Early sixteenth- and seventeenth-century charts were not only used by sailors and travellers; the highly ornamented manuscript charts

¹⁶ Quoted in Greenblat, *Marvelous Possessions*, p. 78.

¹⁷ R.A. Skelton, *Explorers' Maps. Chapters in the Cartographic Record of Geographical Discovery*. London: Routledge and Kegan Paul, 1960, p. 325.

were "made by professional artist-cartographers not for the purposes of navigation, but to adorn the salons and studies of kings, cardinals and wealthy patrons of geography."¹⁸ In the absence of other visual information, the maps often afforded those interested in the recent discoveries their first glimpse of a new world. Beyond the word, then, are these early images of the country that even on the 1546 Desceliers manuscript map was designated Canada.

The Desceliers Map, 1546

The world map of 1546, now preserved in the John Rylands Library in Manchester, has been attributed to Pierre Desceliers, one of the great cartographers of Dieppe. It is based on information derived from the voyages of both Cartier and Roberval and even contains a portrait of "monsr. de Roberval" addressing his men at LE SAGNAY. The map is highly coloured, and the original was painted on parchment for Henri II. The illustration [plate 3] is taken from a nineteenth-century redrawing of the original, lithographed by E. Rembielinski and published at Paris by M. Jomard in *Monumens de la géographie*. Contrary to current conventions, north is at the bottom of the map, and the image appears to present-day viewers as upside-down. The northern seas, the MER DESPAIGNE and the MER DE FRANCE, which surround the continental mass, are populated with whales and strange fish. One vignette depicts European whalers harpooning a whale sporting long whiskers (baleen?), perhaps a reference to the activities of the Basque whalers who very early in the sixteenth century established whaling stations in Labrador and Newfoundland. In the MER DES ETILLES, there are two creatures with horse-like heads and long

¹⁸ W.F. Ganong, *Crucial Maps in the Early Cartography and Place-Nomenclature of the Atlantic Coast of Canada*. Toronto: University of Toronto Press, 1964, p. 176.

teeth, which may be the Sea morse or horse, the walrus. On land, in LA TERRE DU LABOUREUR, or Labrador, two knights meet in joust while men-at-arms watch. Here, the land is hilly with few trees, but overall the northern land is mountainous with many tall trees, as in Cartier's reports. In CANADA, on the north shore of the St. Lawrence, are two large deer, two bear and a large dark bird which might be an eagle or bustard, or the large dark falcon described by Sebastian Cabot ("there are also in this country dark-coloured falcons like crows, eagles, partridges, sandpipers, and many other birds").¹⁹ In the "campestra bergi" to the west of OCHELAGA are found a peccary or wild boar and a porcupine. Another peccary is being hunted by a native on the east coast. The east coast midway between Florida and the St. Lawrence also sports a unicorn while a white horse is found inland. Further south towards NUEVE ESPAGNE is a grouping of five animals. One resembles a pale-coloured wolf or coyote, the two brownish animals are perhaps coyotes or even foxes, while the other pale animal with a long tail appears more like a cat, perhaps a cougar? The strange, horse-shaped animal with the long tail may be an attempt to represent the bison²⁰ or perhaps the tiger or jaguar. The unicorn is the only truly exotic creature, and perhaps Desceliers has included it in the spirit in which 200 years later Michael Collinson wrote to John Bartram: "With regard to the unicorn I am rather divided in my judgment, even in respect to their present existence, in the interior region of Africa, of which at this period we are extremely ignorant."²¹ Since the unicorn no longer appeared to exist in Europe, perhaps it existed in this other

¹⁹ Quoted in Wilma George, *Animals and Maps*. Berkeley: University of California Press, 1969, p. 91. Desceliers depicted a turkey on his 1550 map.

²⁰ "The only earlier bison is, very dubiously, the tapaca of Desceliers' 1546 map." George, *Animals and Maps*, p. 94.

²¹ George, *Animals and Maps*, p. 160.

temperate continent of which so much was yet unknown. Wilma George notes, however, that before mid-century "Bears, coyotes and deer occur more frequently than any other animals on North American maps."²² Bears appear on a 1519 manuscript map along with deer and a coyote?, and on Sebastian Cabot's 1544 engraved world map. The first polar bear, however, does not appear until Desceliers's 1550 map where it is devouring fish on ice floes off the coast of Terre du Labrador. Cartier had in fact reported on his first voyage that his men found a bear on an island offshore "as big as a calf and as white as a swan that sprang into the sea in front of them."²³

The Gastaldi Map of New France, 1556

While Desceliers' manuscript maps reported the discoveries of the French explorers with a certain degree of accuracy, the first published map of New France, an illustration to Cartier's 1534 voyage in Ramusio's *Navigazioni et Viaggi*, did not in fact reflect Cartier's accounts but rather the 1524 voyage of Verrazzano. It is, however, well populated with plants, animals and natives, and depicts in schematic format the Grand Banks. The map illustrated here [plate 4] is the first of its two known states. It is a woodblock print by the Venetian cartographer Giacomo Gastaldi, and shows LA NUOVA FRANCIA, which includes TERRA DENURUMBEGA, and a group of islands identified as TERRA NUOVA and ISOLA DE DEMONI. Again the seas are inhabited by fearsome monsters, one resembling a dog, or perhaps a sea wolf, others spouting like whales. At the same time there are several vignettes of men fishing from small

²² George, *Animals and Maps*, p. 91.

²³ Quoted in Cook, *Voyages*, p. 5.

boats all around the islands of TERRA NUOVA, some with nets and others hand-lining cod. The Grand Banks are represented by a ribbon which begins in the eastern (LEVANTE) portion of the map and ends near the mainland at a head called Angoulesme, which Ganong identifies with New York.²⁴ The islands of Terra Nuova are primarily the domain of birds, though one bear is shown, and there are also birds in the water between the island. Cartier describes the bird islands off Newfoundland and is obviously impressed by the number of gannets, murre, puffins and auks. He also describes the "tinkers," small birds that fly in the air and swim in the sea.²⁵ On the ISOLA DE DEMONI, a native person shoots a bird with outstretched wings resembling an eagle or perhaps meant to represent the dark-coloured (peregrine) falcons described by Sebastian Cabot on the 1544 world map. On this northernmost island are also pictured a group of natives under a shelter of poles with a roof, similar to shelters on the mainland described briefly by Verrazzano. Strangest of all, however, is the depiction of three winged "demons" with horns and short tails who appear on the land and in the air above the "Isle of Demons." There is no mention of these strange creatures, or anything like them in Cartier's accounts. There is, however, a reference in a letter from one Lagarto to John the Third, King of Portugal, written perhaps in early 1539, which recounts a series of conversations between Lagarto and Cartier, including the following:

Greatly praising the rich novelty of the land and telling these and other tales; and that there are men who fly, having wings on their arms like bats, although they fly but little, from the ground to a tree, and from tree to tree to the ground.²⁶

²⁴ Ganong, *Crucial Maps*, p. 195.

²⁵ Razor-bill auks, Cook, ed., *Voyages*, p. 5.

²⁶ Quoted in Cook, ed., *Voyages*, p. 131. The description sounds suspiciously like flying squirrels.

While this strange fauna is never heard from again, there appear in an early seventeenth-century allegory of America by Crispijn de Passe two winged demons with long tails who hover above an altar presided over by an enthroned winged female, which Hugh Honour suggests is a depiction of Aztec sacrificial rites.²⁷ On the mainland, Gastaldi shows native activities, chiefly hunting, perhaps dancing, and conversing. Several natives are shown using bows and arrows to hunt birds and bears and perhaps a wild pig. One native is roasting a pig?, and two others are carrying home what looks to be a deer or another bear. Two fish are drying on a pole strung between two trees, and there is a depiction near the coast of what might be a weir. For the first time in any map of North America, a running rabbit or hare appears.²⁸ Finally, by an inland river, a native lies under an upturned canoe, something referred to by Cartier in his account of the first voyage.²⁹

What is perhaps most surprising on these two maps is not the animals which are depicted, but those that are not. Cartier describes several times and in detail both the walrus and the beluga whale. On the first voyage he writes that on an island near Newfoundland they came upon "many great beasts, like large oxen, which have two tusks in their jaw like elephant's tusks and swim about in the water." On the second voyage he again saw "several fish in appearance like horses which go on land at night but in the daytime remain in the water..."³⁰ It

²⁷ Honour, *The New Golden Land*, p. 88, fig. 80.

²⁸ For a discussion of the rabbit in maps, see George, *Animals and Maps*, pp 93-4. Cartier remarks that hares are so plentiful that on his Second Voyage he names an island for them.

²⁹ Cartier remarks that the natives he met in the Gaspé were the "sorriest folk there can be in the world" ... They have no other dwelling but their canoes, which they turn upside down and sleep on the ground underneath." In Cook, pp 24-5.

³⁰ Quoted in Cook, *Voyages*, pp 15 and 46.

is on the second voyage as well that he discovers "a species of fish, which none of us had ever seen or heard of...."

This fish is as large as a porpoise but has no fin. It is very similar to a greyhound about the body and head and is as white as snow, without a spot upon it. Of these there are a very large number in this river, living between the salt and the fresh water. The people of the country call them *Adhothuys* and told us they are very good to eat. They also informed us that these fish are found nowhere else in all this river and country except at this spot.³¹

Cartier, of course, has encountered the walrus and the beluga whale, once common along the Atlantic coasts and on the St. Lawrence River. The cartographers did not, however, attempt to depict these characteristic beasts (unless the horse-headed sea monsters drawn by Desceliers are indeed walruses), and probably with some justification. Even so great an artist and so sensitive an observer of the natural world as Albrecht Dürer had some problem in drawing from life the walrus. Dürer went to Zeeland in 1520 in the hopes of seeing a stranded whale, but instead found a walrus which he drew in pen and brown ink and tinted with watercolours. The inscription reads "1521/ The animal whose head I have drawn here was taken in the Netherlandish Sea and was twelve Brabant elis long and had four feet." The animal does not quite come off to contemporary eyes as a walrus, and in fact Dürer later used the study for the head of a dragon.³² Over one hundred years later, Johannes de Laët does manage to include a reasonably recognizable engraving [plate 5] of a walrus and calf in his 1633 book, *Novis orbis, seu Descriptiones Indiae Occidentales libri XVIII*. The engraving, he writes, has been drawn accurately to the life ("*Iconem hic subjicimus ad vivum accurate expressam*"), though he notes that the Walrus or

³¹ Quoted in Cook, ed., *Voyages*, p. 48.

³² Jessica Rawson, ed. *Animals in Art*. London: British Museum Publications, 1977, p. 128.

Morsh, as the vulgar call it, is difficult to capture.³³ Similarly, the cartographers do not attempt the beluga, relying instead on the host of whales and marine monsters provided in the woodcut of sea monsters inhabiting the northern oceans in Sebastian Münster's *Cosmographia*, published in Basle in 1550 and repeated in Konrad Gesner's *Icones animalium* in 1560. Similar monsters were featured on Olaus Magnus' 1539 map of the north. Why are these characteristic animals not included by the cartographers, and if included, rendered in such a bizarre manner? We will examine this question in Chapter Three.

The Representation of North America on Maps

Wilma George is the authority for the illustration of animals on maps. Early voyagers, as noted above, did bring back specimens of the flora and fauna of the lands they visited, and cartographers included these on maps, not, George insists, simply for want of other information. Jonathan Swift, in a seventeenth-century satiric poem, had suggested that

So Geographers in Afric-Maps
With Savage-Pictures fill their Gaps;
And o'er unhabitable Downs
Place Elephants for want of Towns.³⁴

George suggests that, given their strangeness, it is not "surprising that some of the cartographers, following the journals of expeditions or making their own observations on the spot, should have included as part of the land's features some of its peculiar animals, some of its plants. They were decorative but they

³³ Johannis de Laet, *Novus orbis, seu Descriptiones Indiae Occidentales libri XVIII*. Leyden: 1633, p. 38.

³⁴ Swift, quoted in George, *Animals and Maps*, p. 21.

were in all probability used diagnostically of the countries they inhabited, just as banners identified knights. If there were no towns to put on maps, it is arguable that the animals or plants were as reputable an indication of the terrain as a range of hills or a river." George goes on to argue that the distribution of the animals on world maps was not arbitrary, not "a simple desire to picture newly discovered animals," but rather an attempt to use characteristic animals to symbolize the continents.³⁵ She also notes that in terms of recognizing and depicting new fauna, the cartographers were far ahead of the naturalists. By the mid-sixteenth century, she can identify nine new animals on maps and only two wholly new animals in Konrad Gesner's celebrated *Historia animalium* (1551-8). The convention of depicting animals on maps and their subsequent incorporation into map cartouches lasts until the late seventeenth century. Two questions come to mind in reviewing the maps and George's thesis. Why did animals find a place on maps in this period and not later? And why animals?

The answers to the two questions are related. George notes that cartographers preferred to use animals rather than plants to symbolize the continents because "With outstanding exceptions, such as the cactuses, plants do not show clear-cut localisation in the world. In contrast, the localisation of animals was noticeable to the early explorers and clearly of interest to the mapmakers."³⁶ Why were animals of interest to the mapmakers and not plants? Certainly plants were of great interest in the fifteenth and sixteenth centuries, particularly as regards their medicinal use. Cartier in his *List of Men and Effects for Canada* dated September 1538, noted "Item, two Apothecaries, each with an assistant, to identify plants and determine their uses..."³⁷ Cartier also imported

³⁵ George, *Animals and Maps*, p. 23.

³⁶ George, *Animals and Maps*, p. 25.

³⁷ Cook, *Voyages*, p. 127.

plants, as well as natives and animals, and the *Thuja* in the Jardin royal at Paris came from his voyages.³⁸ The depiction of plants in printed books, particularly herbals, was also well advanced in the early sixteenth century, especially after the publication in 1530 of Otto Brunfels' *Herbarium Vivae Eicones* with woodcut illustrations by Weiditz (to be discussed in Chapter Four). Yet in the maps there are only generic "trees," vaguely deciduous, despite Cartier's descriptions of a wide variety of trees, bushes and grasses. And while it is true that the plants are not localised, neither can that be said for the animals that roam the North American cartographic world.

The map fauna from the two maps includes deer, bear, porcupine, peccaries, wolves, foxes, rabbits or hares, cougar (tiger), seabirds, and eagles or falcons, along with sea monsters and fish (cod). The Nearctic shares a large number of these with the Palæarctic, with the exception of the tree-porcupine and the cougar. While early explorers might marvel at white bears and shaggy deer, they were not unknown to travellers in the north. Olaus Magnus' 1539 map includes a frieze of characteristic northern animals including reindeer (caribou), foxes, gluttons (identified with the wolverine) and spotted lynx. Animals were, however, chosen as "diagnostic," in Wilma George's word, because they identified lands, just the way banners identified knights. It is important to note, however, and this idea will be explored later, that the diagnostic animals were not necessarily very precisely rendered. They are cookie-cutter bears, deer, and rabbits, seen in profile. George has suggested that they were like banners, and there is in that observation a clue to the use of animals on maps. There is a

³⁸ Thevet also notes that "several plants and bushes were brought back from there which today are to be seen in the royal garden at Fontainebleau." (*La Cosmographie universelle*, Robert Schlesinger and A.P. Stabler, eds. and transl. *André Thevet's North America. A Sixteenth-Century View*. Kingston: McGill-Queens University Press, 1986.)

tradition of animal illustration that found expression first in the bestiaries of the Middle Ages and continued in the emblem books of the early modern period. The medieval bestiary was a compendium of animal fables and stories descended in part from the Latin *Physiologus* with additions from Isidore of Seville, Gerald of Wales and other compilers. The bestiary was not valued as a descriptive natural history, but rather as a prescriptive guide; its authors were concerned not with facts, but with the moral and doctrinal implications of the animal tales they included. Canon Raven makes it clear, however, that the bestiary tradition did not disappear under the weight of the new scientific interest in natural history that began with the Renaissance, but co-existed with it:

...it is well to remember that during the whole period with which we are dealing the medieval outlook was still the popular *Weltanschauung*, that scientific study and the inductive method was hardly appreciated at all until the middle of the seventeenth century, and that the outlook of Bartholomew even in his most extravagant beliefs was still expounded and published not only by poets and preachers and the writers of emblem-books, but as authentic natural history.³⁹

The *De proprietatibus rerum* of Bartholomew the Englishman, to which Raven refers, was written in the twelfth-thirteenth century, yet remained the standard authority on natural history up to Shakespeare's time. Emblem-books, too, were a characteristic expression of the Renaissance. The first was published in 1531 by an Italian lawyer, Andrea Alciati, and in these illustrated books were included "the traditional images, the Pelican in its Piety, the Stork or Crane keeping vigil with a stone in its claw, the Salamander in the Flames, the Lily and the Palm," with their traditional meanings. The emblems were symbols, available to be used in art or decoration, but with the resonance of nearly 700 years of meaning.

³⁹ C.E. Raven, *English Naturalists from Neckham to Ray. A Study of the Making of the Modern World*. Cambridge: Cambridge University Press, 1947, p. 33.

Francis Quarles prefaced his 1635 book *Emblemes*: "By the knowledge of letters God was known by Hieroglyphics, and indeed what are the heavens, the earth, nay every creature, but Hieroglyphics and emblems of his glory?"⁴⁰

The animals of the bestiaries and the emblem books stood not just for themselves but as signs or marks of another reality. As such they did not have to be "true to nature;" rather they were true to the symbolic idea of the animal. Thus, on the maps appear bear, deer, and fox, familiar, recognizable animals now used in unfamiliar lands to mark the territory as part of God's creation. Foucault has discussed the concept of the "mark" or sign and its relation to language in *The Order of Things*. His archaeological analysis of the discourse of the fifteenth- and sixteenth-century naturalists and philosophers reveals a profoundly different way of knowing and a different content to the known. The natural world was a text to be read to ascertain the nature of God. Everything was relevant, and the relations were understood in terms of sympathy or resemblance. This general episteme resolved in the seventeenth century into the well-publicized doctrine of "signatures" or signs which can be revealed, as Paracelsus says, to the person who seeks:

It is not God's will that what he creates for man's benefit and what he has given us should remain hidden... And even though he has hidden certain things, he has allowed nothing to remain without exterior and visible signs in the form of special marks – just as a man who has buried a hoard of treasure marks the spot that he may find it again.⁴¹

The idea of the mark informed the understanding not just of philosophers and naturalists but that of the sailors and explorers who saw with their own eyes the

⁴⁰ Quoted in Raven, *English Naturalists*, p. 2.

⁴¹ Quoted in Michel Foucault, *The Order of Things: An Archaeology of the Human Sciences*. New York: Vintage Books, 1973, p. 21.

marks left by God in the New World. In the *Cosmographie universelle* (1575) Thevet recounts the story of the discovery of maple sap by Cartier's men:

Among others there is one called *Cotony*... As soon as it was cut to the quick a liquor came out of it in quantity. This being tasted, was found to be of such good taste that some thought it to be equal to the goodness of wine... And to see and experiment on the source of this drink, the said tree was sawed down and its trunk being on the ground a miraculous thing was discovered in the heart of the tree: a Fleur-de-lys well pictured, which was admired by all. About this some said that it was a very good presage for the French nation, which in the passage of time through the diligence and zeal of our kings could conquer and some day bring to Christianity this poor barbarous people.⁴²

We will return to the idea of the mark when we examine in more detail the depiction of animals in the pandects of Gesner, Topsell and Aldrovandi. Animals were chosen then to be banners or emblems of the new lands because they already had significance as symbols in the popular imagination. At the same time, however, that the emblem books and bestiaries still provided a system of signs and marks by which the world could be understood, a newer, more modern and more scientific viewpoint was emerging. It is perhaps this viewpoint that made Desceliers picture a white bear and a turkey on his 1550 map along with the usual fauna. As the explorers and fishermen returned with tales of the new things they had seen and the strange, if generally recognizable animals they encountered, the mapmakers began to respond. As Wilma George points out, they responded faster than the naturalists. The next section examines the response of the artists and illustrators who were faced with the depiction of the wonders described in travellers' tales and their attempts to represent the unfamiliar through the familiar.

⁴² Thevet, *Cosmographie*, in Schlesinger and Stabler, *André Thevet's North America*, p. 48.

The Representation of the New: The Works of André Thevet

While the map fauna of the early sixteenth century depicted bears, deer, and foxes, Cartier had also spoken of animals new to the explorers, walruses, "like large oxen, which have two tusks in their jaw like elephant's tusk" and beluga whales, "as white as snow and have a head like a greyhound's." He also described muskrats "which live in the water and are as large as rabbits and wonderfully good to eat..."⁴³ These animals did not appear on maps, though by the mid-seventeenth century, beavers and otters were included on nearctic maps. Why did not the artist-cartographers attempt to include the peculiar fauna of the northern hemisphere on the map, as they had that of the southern hemisphere (macaws, armadillos, llamas and capybaras)? Part of the answer lies in the lack of models from which to draw, and part in the conventions of illustration.

Brian Ford points out that "Most scientific illustrations are drawn from earlier reference images, rather than from life. The creation of 'icons' – unrealistic images that pass down from one generation to the next – is a feature of science texts."⁴⁴ Simply put, it was easier to copy the image of an animal already rendered into two dimensions than to make a portrait from life. As we have noted, even so skilled a master as Dürer encountered problems in this regard. Mapmakers after all were not expected to be animal portraitists and in the tradition of the miniature painters and manuscript illustrators, in most cases they took their decorative elements, like animals and trees, from patterns already extant in emblem and pattern books. In some cases, however, both mapmakers,

⁴³ Cook, ed., *Voyages*, pp. 14, 74, 58.

⁴⁴ Brian Ford, *Images of Science. A History of Scientific Illustration*. London: The British Library, 1992, note to p. 48.

and book illustrators and engravers, had to depict an animal never before represented. Where possible, they would draw from a live specimen or a skin, but in many cases they had to rely on verbal eye-witness reports or perhaps a scrap of hide, a beak or a feather. Their attempts to depict the new illustrate both the medieval mentality which Raven suggest underlies the common culture of the Renaissance, and also some of the first attempts to use illustration as datum as well as symbol. Again we will examine a number of images showing North American animals, following their transformations and their use from the sixteenth through the seventeenth century not only in maps, but also in printed accounts of exploration and in the first great compilations of a new group of natural historians, beginning with Konrad Gesner.

Words into Pictures: The Simivulpa, the Su and the Bison

The problem faced by early artists and cartographers in dealing with new animals is exemplified by the first depictions of the indigenous fauna of the western hemisphere for which there are no palæarctic or existing exotic equivalents (such as an elephant or a lion, which had been illustrated in manuscript since early medieval times). The works of André Thevet (1502-1590), monk and Cosmographer royal of France, are the source for a number of first images of the New World flora and fauna and it is instructive to understand both his sources and his interpretation of them. Unlike many other authors, Thevet had some first-hand experience of the New World, having made a trip to Brazil in 1551 where, however, he spent most of the time ill in bed. On the return voyage he probably coasted North America. He subsequently published two books on the New World, *Les Singularités de la France Antarctique* in 1558, and *La Cosmographie universelle* in 1575, which are devoted primarily to

descriptions of South America, but do include chapters on the northern voyages. He was also the author of a manuscript, *Grand Insulaire*, which may be earlier than the published materials.⁴⁵ Thevet has been villified by both his own contemporaries and by later historians for his "pretentious verbiage, careless composition, clerical errors, and occasional pure fiction,"⁴⁶ but Ganong has found nuggets of truth in Thevet's descriptions of "la terre de Canada" that he suggests are the result of Thevet's acquaintance with Jacques Cartier. In *La Cosmographie universelle*, Thevet claims to have stayed five months in the house of Jacques Cartier at St. Malo in Brittany, and acted as a journalist to the older explorer, recording his conversations, "albeit hampered by unfamiliarity with the strange places, objects and events concerned, by the reporter's desire to make a good story for his readers, and by personal limitations."⁴⁷

Some of the personal limitations that Ganong refers to are in many ways also the limitations of the age. Thevet is treating of phenomena that have no point of relation to anything that has gone before. The novel animals and plants of the New World are not in Pliny. The exotica of the Middle Ages – the elephants, lions, tigers, popinjays and crocodiles – were also the exotica of the Roman Empire, but the productions of the New World are new. There are things in Thevet's books which, as M. de la Porte says in the advertisement to the reader at the beginning of *Les Singularitez*, appear more monstrous than natural but are yet the products of mother Nature:

le ne doute point, Lecteur, que la description de ceste presente histoire ne te mette aucunemèt en admiration, tant pour la varieté des choses qui te font à l'oeil démontrées, que pour plusieurs autres qui de prime face te

⁴⁵ Ganong, *Crucial Maps*, p. 122.

⁴⁶ Ganong, *Crucial Maps*, pp 121-2.

⁴⁷ Ganong, *Crucial Maps*, p. 122.

semblerôt plustot monstrueuses que naturelles. Mais apres avoir meuremèt cōsideré les grâs effects de nostre mere Nature, ie croy fecement que telle opinion n'aura plus de lieu en ton esprit.⁴⁸

It is to Thevet, however, that we owe the first published illustrations of the tree sloth, the anteater (or perhaps ground sloth), and the toucan plus an interesting (though not first) image of the bison. These illustrations acted as patterns or icons for other artists, cartographers and engravers. Gesner in his pandect referred to Thevetus as an authority, and de Bry in his famous series on America appears to have copied some of his illustrations.

Thevet is the first author to provide an illustration of the "Su" [plate 6]. In *Les Singularitez*, he describes it as native to Patagonia, but in *La Cosmographie*, the Su has migrated to Florida. The lack of geographical precision by Europeans in dealing with the north and south hemispheres is reminiscent of the nineteenth-century idea of "darkest Africa," all equally jungly and fabulous from one coast to the other. Thevet relates that "This beast is very wonderful, made in a very strange fashion, wherefore I have chosen to show it in a picture."⁴⁹ Thevet did not draw the animals himself. He hired an artist⁵⁰ and engraver who worked perhaps from a skin, since he mentions the natives hunted the su for its hide. What is most remarkable about the drawing is the face, which looks a little like a monkey's, and the great plumed tail which covers the young riding on its back. Though usually interpreted as an anteater because of the plumed tail, Bernard Heuvelmans suggests that the su might have been a type of ground

⁴⁸ André Thevet, *Les Singularités de la France Antarctique...* Paris: Maurice de la Porte, 1558, np.

⁴⁹ Quoted in Bernard Heuvelmans, *On the Track of Unknown Animals*. Cambridge: MIT Press [1955/1962], 1972, p. 161.

⁵⁰ The Mannerist painter, Jean Cousin the Younger (c1525-c1594) made the drawings for a number of woodcuts in *Les Singularitez*, and those in *La Cosmographie*.

sloth, now extinct, which had survived in Patagonia.⁵¹ Sloth, anteater, or su, the animal is included in later editions of Gesner and in Topsell's re-edition of Gesner, where it has gained a fiercesome reputation. Topsell relates that he has inserted "The true image thereof as it was taken by Thevetus," and describes it, "of a very deformed shape, and monstrous presence, a great ravener and untamable wilde Beast."⁵² Unlike Thevet, he calls the su "cruel, untamable, violent, ravening, and bloody," a reputation based perhaps on its cry, which Thevet calls "terrible," and on its reported habit of killing and maiming its offspring "(as if maddened)," when caught. Here the words would appear to have served to transform the drawing from a peculiar animal to a ferocious one. Whether or not the su deserved its reputation, it appears fierce and altogether more lion-like in Matthæus Merian's 1630 engraving of a New World landscape, discussed in more detail below. Thevet's su also appeared on a number of maps including a 1592 chart of Petrus Plancius, where it was located in the far north of Canada.⁵³ It appeared in a copper re-engraving as late as 1697 in the third edition of Gaspar Schott's *Physica Curiosa sive Mirabilia Naturae et Artis*, first published in 1662.⁵⁴

Thevet also provided one of the first printed illustrations of the bison [plate 7] in the chapter on Florida in *Les Singularités*. Here Thevet likely provided his artist or artists with verbal descriptions and some material evidence. Thevet probably had access to the published accounts of the early Spanish explorers who saw the bison in their original habitats in the southern

⁵¹ Heuvelmans, *On the Track of Unknown Animals*, p. 161.

⁵² Edward Topsell, *History of Four-footed Beasts and Serpents and Insects*, Vol. I, 1658. New York: repr. Da Capo Press, 1967, p. 511.

⁵³ George, *Animals and Maps*, p. 75.

⁵⁴ Schott was Aldrovandi's pupil.

end of North America. Cabeza de Vaca travelled across Florida, Texas, and Arizona between 1528 and 1536. Oviedo published Cabeza de Vaca's description of the bison in his *Historia general* of 1547:

They have small horns like the cows of Morrocco; the hair is very long and woolly like a rug. Some are tawny, others black... They come as far as the sea coast of Florida from a northerly direction ranging through a tract of more than four hundred leagues...⁵⁵

A buffalo also appeared on a 1551 Gutierrez map, and in a book published in 1553 by Francisco Lopez de Gómara to which Thevet may or may not have had access. Thevet claimed as well to have acquired two horns– "et en apportay deux [cornes longues seulement d'un pied et demy] que i'ay encore de présent dans mon Cabinet a Paris au revoir de mon premier voyage"⁵⁶ – and noted in his description of the beast that he had seen a skin:

...lon peut voir une espece de grands taureaux, portans cornes longues seulement d'un pié, et sur le dos une tumeur ou eminence, comme un chameau: le poil long par tout le corps, duquel la couleur s'approche fort de celle d'une mule fauve, et encores l'est plus celuy qui est dessous le menton. Lon en amena une fois deux tous vifs en Espagne, de l'un desquels i'ai veu la peau, et non autre chose, et n'y peurent vivre longtemps.⁵⁷

In "Grand Insulaire," which was not published, Thevet adds that the "Buffol beste majestueuse" has a tail like a lion ("sa queue comme celle d'un Lyon"), and relates it to the "bison" of western Europe, "de telle espece s'en trouve en la Lithuanie et Pologne qu'ilz nomment Zubex, et les Tartares Roffert." He also

⁵⁵ Quoted in Wilma George, "Sources and Background to Discoveries of New Animals in the Sixteenth and Seventeenth Centuries", *History of Science*, xviii (1980), p. 89.

⁵⁶ Thevet, "Grand Insulaire," Schlesinger and Stabler, *André Thevet's North America*, p. 244.

⁵⁷ Thevet, *Les Singularités*, Schlesinger and Stabler, *André Thevet's North America*, p. 147.

attributes a medicinal property to the horns, and says they are used by "les Barbares afin d'obvier auz poisons et vermine qu'ilz recontrent souvant allant par pays et à la pescherie."⁵⁸ Thevet's 1558 illustration of the bison is somewhat improved in the 1575 *Cosmographie* which shows natives hunting bison with spear and bow and arrow.

Thevet was not the first to depict the buffalo, and it would appear that the earlier Spanish woodcut was the model for at least two other later sixteenth- and early seventeenth-century engravings. Gómara's buffao was similar to Thevet's in that it showed a long "beard" and what appears to be an udder [plate 8]. Later seventeenth and eighteenth-century engravings are almost universally male, so that it is likely that Gómara may have had access to an actual female specimen. De Bry's engravers in 1595 use the Gómara buffalo as their model in a map of Mexico,⁵⁹ as do de Laët's in 1630 [plate 9]. What is more surprising, perhaps, is that the buffalo does not appear in either Gesner or the 1658 Topsell, which includes the European bison (or wisent) and the "white Scotian Bison."

Another animal which also has a long history in print as a monstrous production of the New World is a marsupial animal, the opossum. The transformations of the simivulpa, or apish fox, as it was known in the sixteenth and seventeenth centuries provide additional insight into the role of the icon-image as used by book illustrators and artists. It is no surprise that the early explorers of South America encountered the opossum. According to mammologist Adrian Forsythe "In South and Central America, some sort of opossum can be found in almost any habitat, from wet marshy areas to dry

⁵⁸ Thevet, "Grand Insulaire," Schlesinger and Stabler, *André Thevet's North America*, p. 244.

⁵⁹ The animal appears twice, once alone, and once with a parrot, identified as *Psittacus*, on its back. The bison is called *Vacca Indica*, Indian Cow.

savannah to the edge of the tree line high in the mountains."⁶⁰ North America has only one species of opossum, the Virginia opossum, which extended its range after the last ice age, and has only in the mid-nineteenth century, since the arrival of European settlers and the elimination of many of the larger predators, moved northward into Canada. In 1499, Vicente Yáñez Pinzón captured a female opossum with young from the trees of Venezuela and brought it back to Spain. The young died on the way, but the adult survived long enough to be seen and to be described by Pinzón:

A strange monster, the foremost part resembling a fox, the hinder a monkey, the feet were like a man's, with ears like an owl; under whose Belly hung a great Bag, in which it carry'd the young, which they drop not, nor forsake till they can feed themselves. ⁶¹

The first illustration of an opossum, or apish fox, appeared as a woodcut on a 1516 *Carta Marina* by Martin Waldseemüller. The cartographer might have developed the illustration from the verbal description alone, but the accuracy with which he has drawn the head and ears would suggest that he might have seen the skin or else a drawing of the beast brought back by Pinzón or another. He has not, however, made the hind end to look like a monkey, by which Pinzón probably meant the opossum had a long prehensile tail.⁶² Nor has he made the feet look like hands, even though the opossum's feet do have distinct digits with an opposable thumb and thus resemble a human being's. The opossum has been described in relation to the familiar, but what both the

⁶⁰ Adrian Forsyth, *Mammals of the Canadian Wild*. Camden East, Ont: Camden House Publishing, 1985, p. 328.

⁶¹ Quoted in Honour, *The New Golden Land*, p. 40.

⁶² Captain John Smith in 1600 describes the Virginia Opossum as having "a taile like a Rat". Forsyth, *Mammals*, p. 330.

explorer and the artist had difficulty grasping was the marsupial pouch. It is referred to as a "great Bag" and as such it appears on every drawing. What might also suggest that Waldseemüller had at least seen some representation of an opossum is that he includes very prominent nipples. The female opossums do in fact possess elongated nipples, so that the young can suckle and yet lie outside the pouch. The Waldseemüller opossum has a long career as a graphic representation. Konrad Gesner included it, the first New World animal, in the 1551 edition of *Historia animalium*, which was copied by Topsell in his 1658 *History of Four-footed Beasts*... [plate 10]. Gesner's engraver added sucking young and reduced the opossum's toes to three. Gesner/Topsell describes the animal in the words of Pinzón:

...in the forepart like a Fox, and in the hinder part like an Ape except that it had mans feet and ears like a Bat, and underneath the common belly, there was a skin like a bag or scrip, wherein she keepeth, lodgeth, and carryeth her young ones... there was one of them with three young Whelpes taken and brought into a ship, but the Whelps died quickly: the old one living longer was brought to *Sivill*, and afterward to *Granado*, where the King of *Spain* saw it, which soon after by the change of aire and incertainty of diet, did also pine away and die.⁶³

Marcus Gheeraerts (c 1519- before 1604) appears to have based his bearish three-toed engraving of a simivulpa [plate 11] on the Gesner version, which appears also to have been used as the model in an engraving of a mythical landscape by Matthæus Merian (1593-1650) in the 1630 edition of De Bry's *Grands Voyages*, pt. XIV [plate 12]. These two early seventeenth-century engravings are of interest for their continuing use of the animal as emblem. The Marcus Gheeraerts' simivulpa was one of two almost heraldic beasts on his allegory of *America*, engraved between 1590 and 1600. The other is a goat

⁶³ Topsell, *The History of Four-footed Beasts*, p. 16.

which often features with the Asian fat-tailed sheep in depictions of the New World. A variety of parrots are included as well as two snails. Gheeraerts' allegory is interesting in that unlike a vast number of allegorical works on America it includes not only natives in feathered costumes, but also two Inuit, a man and a woman, in what appears to be an interpretation after the original watercolour studies of 1577 by John White now in the British Museum, though Hugh Honour suggests that Gheeraerts might in fact have seen the Inuit himself during a stay in England.⁶⁴ Gheeraerts has provided the Inuit woman with a weapon in the form of a club more often associated with the Brazilians, something certainly not in the White drawing nor used by Inuit. Merian's landscape shows what might be termed the monstrous productions of the New World against a background of exploding volcanoes, which are also featured on maps of Central America. Along with the apish fox are other equally bizarre creatures, including an emaciated spotted lynx, twisting, venomous snakes, scorpions, alligators, armadillos, a one-horned llama and what might be an iguana and an anteater. Balancing the simivulpa on the left of the engraving is the baleful su, also with its whelps. Like the Dutch flower painters of the same period, these artists relied on a set of images, which they manipulated to fit the demands of the required pictorial image. Animals like the su, bison and simivulpa stood for the exotic and their transformation into caricatures speaks to the value placed on accurate rendering by sixteenth- and seventeenth-century readers. The next chapter will discuss the aesthetic of naturalism and its effect on the representation of the new.

⁶⁴ Hugh Honour, *The European Vision of America*. [Cleveland]: Cleveland Museum of Art, 1975, cat. no. 92.

CHAPTER THREE

Naturalism and the Counterfeit of Nature

We have examined the use of animals as signs or marks for the new lands being explored and the development of new iconic images by authors and artists struggling to represent a creature for which they had no model. We have also looked cursorily at some of the transformations of the iconic image of a particular creature over a period of a century or more. We are left with the impression that the visual world of the sixteenth and early seventeenth centuries, at least as far as the depiction of the natural history of the New World was concerned, was dominated by either simple cartoon drawings or misshapen fantasies. This was not of course the case. The Renaissance marked a transformation from the medieval world to the modern and the changing nature and use of images reflected this transformation. The increasing importance of naturalism and the relationship between what is visible and what is known are interwoven in this period. Looking at what to our eyes appear relatively crude manuscript or map illustrations and even cruder woodcuts does not prepare the contemporary viewer for the delicacy and realism of fifteenth- and sixteenth-century painting, particularly watercolours. The accuracy that seemed not to be particularly prized in book or map illustration was certainly possible and often desired. Fernandez de Oviedo, for example, longed for the skills of famous painters to render the wonders of the New World:

It needs to be painted by the hand of a Berruguete or some other excellent painter like him, or by Leonardo da Vinci or Andrea Mantegna, famous painters whom I knew in Italy.¹

The present-day easy availability in printed form of paintings and drawings from the Renaissance should not obscure the fact that for most people living in the fifteenth and sixteenth centuries, the only access to images was through painting on display in churches and palaces, or reproduced in woodcuts or engravings in printed books. Even if Leonardo or Mantegna had been available to paint the productions of the New World, it is unlikely that the readers of Oviedo's 1535 book would have been able to appreciate their skill. This chapter, then, will examine some of the original works of art which depict the natural history of the New World, and of their transformation into printed information.

The Development of Naturalism

We have already examined the depiction on manuscript maps of animals as symbols. As David Knight points out, the animals in bestiaries or later emblem books, in "symbolic science," did not require accurate depiction: "Once their essence was known, there was little need to study them further or to draw them more accurately than the accepted image, which after all called up the required associations."² Once the graphic characteristics of the representation had been determined the animal could be copied again and again without recourse to the original, which often in the case of lions, eagles, elephants or even salamanders,

¹ Fernandez de Oviedo, *Historia General de las Indias*, 1535, quoted in Hugh Honour, *The European Vision of America*, [Cleveland]: Cleveland Museum of Art, 1975, p. 1.

² David Knight, *Zoological Illustration, An essay towards a history of printed zoological pictures*. Folkestone, Eng.: Dawson Archon Books, 1977, p. 17.

might be hard to come by.³ Lack of living models was not, however, the necessary cause for the lack of realism. Klingender suggests that "to understand how utterly remote these draughtsmen were from nature one need only turn to their illustrations of creatures they might easily have observed in the monastery garden....," such as the hedgehog.⁴ Certainly the hedgehog featured in Villard de Honnecourt's thirteenth-century sketchbook is a mere bristly caricature of the common animal. Klingender points out that "the crudest representation of a creature might be sufficient so long as it drew attention to those selected characteristics which were already associated in the reader's mind with accepted mystical, symbolic or moral ideas. A convention was thus established in which animal pictures become a kind of pictorial shorthand..."⁵ The same applied to early printed herbals based on classical manuscript models, whose increasingly debased illustrations followed not the living plant but the text.⁶ The fact that medieval illustrations of plants and animals often appeared crude and inaccurate did not mean that the artists necessarily saw this way. Any acquaintance with manuscript illumination or fourteenth-century artist's sketchbooks would dispel this view.

Paintings were often "built up" by artists from drawings in sketchbooks or pattern books. A sketchbook in a Cambridge University collection was one such

³ Matthew Paris did manage to draw an elephant from life in 1255. The elephant was a gift to Henry II from Louis IX of France and housed in the tower. In England the tower became the home for a varying menagerie throughout the medieval and Renaissance eras. It included lions, wolves, bears and a lynx (illustrated by Gesner from a drawing by Dr Cay). There are records of a giraffe and zebra in Naples at the end of the fifteenth century, and hunting cheetahs were kept by Italian courts.

⁴ Francis Klingender, *Animals in Art and Thought to the End of the Middle Ages*. London: Routledge and Kegan Paul, 1971, p. 384.

⁵ Klingender, *Animals in Art*, p. 382.

⁶ Marie Boas, *The Scientific Renaissance, 1450-1630*. New York: Harper Brothers, 1962. p. 52.

pattern book used in an English artist's workshop at the end of the fourteenth century, and includes labelled sketches of well-rendered birds, often, however, copied from even earlier medieval sources.⁷ Bird and animal designs were much in demand not only by artists and illuminators but also by embroiderers, and English work was famous on the continent.⁸ Italian sketchbooks of the same period also feature naturalistically rendered watercolours of animals observed from life. The idea, however, of painting from nature was still novel, and the fourteenth-century artist Giotto was considered a child prodigy in that he was discovered sketching a sheep from life while tending the flocks. Drawing from life was not considered an end in itself. Otto Pächt notes that the drawings in the sketchbooks were "still or stilled life rather than life." Although an artist like Giovanni de'Grassi does break with the "medieval habit of abstract invention... [and] now finds his models in nature itself, yet [he] at once turns the newly discovered material into patterns, similes, atelier formulas."⁹

This subordination of accurate rendering to pattern has convinced Klingender that there is little relationship between these pattern book and sketchbook studies and "the naturalism of the fifteenth century, which was linked with the renewed scientific revival of the Renaissance." It is the development of a new vision, based on the mastery of perspective, that allowed fifteenth-century artists to lift the animal off the page and out of the pattern to become a portrait of a living thing. By the sixteenth century the "scientifically

⁷ A.M. Lysaght, *The Book of Birds*, London: Phaidon Press, 1975, pl. 15.

⁸ Animal drawings continued to be used for embroidery. Witness the toucan embroidered by Mary Queen of Scots in 1570, probably based on Gesner, and labelled a "Byrd of America". Illustration in Brian Ford, *Images of Science. A History of Scientific Illustration*. London: The British Library, 1992, p. 58.

⁹ Otto Pächt, "Early Italian Nature Studies and the Early Calendar Landscape," *Journal of the Warburg and Courtauld Institute (JWCI)*, 1, 13 (1950), p. 17.

controlled projection of a three-dimensional world... came to be accepted in Europe... as the only mature mode of vision."¹⁰ Naturalism as a mode, however, was in the early period still a matter of details, of beautifully rendered flowers, or minutely portrayed insects, often set against a blank background. The conventions of naturalistic portrayal did, however, answer to the needs of writers like Oviedo who longed for the accurate, "true-to-life" rendering of the wonders that they saw in the New World and of the objects that they brought back to Europe. That they were not necessarily able to realize this desire was the result of a combination of both convention and technology. By briefly examining the work of three sixteenth-century artists, Albrecht Dürer, Jacopo (or Giacomo) Ligozzi and John White, the sources for their life studies and the transformation that their original images undergo in the translation to print, we will come closer to understanding the opportunities and constraints that affected not only the artistic but also the scientific community in the sixteenth and early seventeenth centuries.

Dürer, Ligozzi and White

Albrecht Dürer (1471-1528) is perhaps the best known of the German school and a master of both drawing and the woodcut. It is through the woodcuts that Dürer's work was best known but it is instructive as well to look at his watercolour studies of plants and animals. Dürer is justly famous for his highly detailed renderings of flowers and his studies of animals. He stated that his purpose was to "... study nature diligently. Be guided by nature and do not depart from it, thinking that you can do better yourself. You will be misguided

¹⁰ Klingender, *Animals in Art*, p. 483.

for truly art is hidden in nature, and he who can draw it out possesses it."¹¹ The Dürer of the watercolours, however, is not quite the same as the Dürer of the woodcuts. Svetlana Alpers notes that watercolour is a medium which "was primarily employed in the interest of immediacy of rendering." She goes on to suggest that it is also a medium "that allows drawings to display at once two normally contradictory aspects: drawing as inscription (the recording on a surface) and drawing as a picture (the evocation of something seen)."¹² In the case of the columbine, the great piece of turf (*Das Grosse Rasenstück*), or the famous rabbit, the use of watercolour allows Dürer to depict in meticulous detail the exact appearance of the particular thing. These are paintings from life, but they are not yet paintings of life. The plant or animal appears isolated on a ground, like a drawing in a sketchbook, and indeed Dürer did work some of these watercolour studies into other works. His iris, for example, appears in his painting *The Madonna with the Iris*.

The approach to the object which Dürer brought to his images of natural history differed little from that of the two later sixteenth-century artists. Dürer did most of his watercolour studies in a brief period at the beginning of the sixteenth century. Both Jacopo Ligozzi (1547-1626) and John White (fl 1577-93) worked in the 1580s. Ligozzi never travelled to the New World but he was esteemed as a painter of animals and plants. He became Court Painter to the Duke of Tuscany and later the Superintendent of the Uffizzi Gallery, but his most rewarding collaboration, as far as natural history was concerned, was with Ulisse Aldrovandi (1522-1605), founder of a natural history museum and botanic garden in Bologna and author of a number of natural history encyclopedias from

¹¹ Quoted in Martyn Rix, *The Art of the Botanist*. Guildford: Lutterworth Press, 1981, p. 27.

¹² Svetlana Alpers, *The Art of Describing: Dutch Art in the 17th Century*. Chicago: University of Chicago Press, 1983, pp 158-9.

the *Ornithologiae* (1599) to the *Dendrologiae* (published in 1668 long after his death). Ligozzi supplied many of the original illustrations for these books, though the reproduction of many of his precise paintings left something to be desired. Ligozzi prepared a number of watercolours of New World species including the first life-like picture of an agouti and a splendid parrot, which may have come from Aldrovandi's museum or the Duke's vivarium. Among his botanical studies were a pineapple, an agave and the Marvel of Peru, all of which were recently cultivated as exotics in Italy. While Ligozzi worked from specimens imported to Europe, other artists like John White recorded specimens in the field. White prepared his watercolours directly from nature during his tenure as official artist to the 1585 colonising expedition to Virginia led by Walter Raleigh.

The tradition of having an artist in the field did not begin with the voyages of discovery. The author of the *Gart der Gesundheit*, a German herbal printed in 1485, realizing "that many noble herbs did not grow in this German land," went on a spiritual and botanical pilgrimage to the Holy Sepulchre, taking with him "a painter of understanding and with a subtle and practised hand" to paint and draw the herbs in "their true colours and form."¹³ The next year, the author of a printed travel book to the Holy Land, Bernard von Brudenbach, took with him "an ingenious and learned painter," Erhard Reuwich, to record the scenery and animals "truly depicted as we saw them in the Holy Land."¹⁴ White was not even the first official artist to travel to the New World. Jacques Le

¹³ Quoted in William Ivins, *Prints and Visual Communication*, Cambridge, MA: M.I.T. Press, 1985 (1953), pp 34-6.

¹⁴ *Peregrinationes in Montem Syon* was published in 1486 and its cuts of an "ape-man" were used by Gesner, though he refused to countenance the Salamander illustration and noted that the "*Salamandrae figura falsa*." In Donald Bliss, *A History of Wood Engraving*. London: Spring Books, 1928 (1964), p. 42.

Moyne de Morgues (d. 1588) had been the artist of a colonizing expedition to Florida by René de Laudonnière in 1563-65, and the physician Francisco Hernández spent six years (1571-77) assembling notes and drawings on aspects of Mexican natural history for Philip II of Spain. The Spanish example stimulated Richard Hakluyt to insist that "a skilful painter is also to be carried with you, which the Spaniards commonly used in all their discoveries to bring the descriptions of all beasts, birds, fishes, trees, townes, etc." Apparently Sir Francis Drake on his circumnavigation (1577-80) heeded this advice and "kept a book in which he entered his navigation and in which he delineated birds, trees and sea lions. He is adept in painting and has with him a boy, a relative of his, who is a great painter."¹⁵ White knew Le Moyne de Morgues who had settled in London, and was probably acquainted with Baptista Boazio, the artist for Drake's voyage in 1585-6. While White's instructions as official expedition artist do not survive, it is likely that they were similar to those prepared for Thomas Bavin who accompanied Sir Humphrey Gilbert to New England in 1582. Bavin was instructed that he was to

...draw to lief one of each kinde of thing that is strange to us in England... all strange birdes beastes fishes plantes hearbes Trees and fruictes... also the figures & shapes of men and women in their apparell as also their manner of wepons in every place as you shall find them differing.¹⁶

The artist and his observer were to be attended by others to carry their equipment, and they were also to make "cardes" or maps depicting with symbols the variations in landscape, vegetation, location of villages etc. For the 1582 expedition, White worked with Thomas Harriot who recorded all

¹⁵ Noted in Lysaght, *The Book of Birds*, p. 19.

¹⁶ Quoted in Paul Hulton, *America 1585. The Complete Drawings of John White*. [Raleigh, NC]: University of North Carolina Press, 1984, p. 9.

observations, later published by Theodor De Bry as *A briefe and true report of the new found land of Virginia* (1590) with engravings after White's original drawings. White had been trained as a limner in England, and was familiar with the miniaturist tradition, and the importance of making a likeness of the person or object to be painted. He also had likely some experience in travel to the New World as a member of Frobisher's second expedition to the arctic in 1577. White was certainly the artist who depicted three Baffin Island Inuit brought back to England by Frobisher, and his watercolour renderings were much copied in books and engravings (see above). Whereas Oviedo had wished for an artist with the skills of a Leonardo, Raleigh at least had some one with the training to depict with a high degree of naturalism the productions of the New World. Only sixty-five of White's original watercolours have survived. Some were destroyed as they departed from Roanoke Island, when "most of all wee had, with all our Cardes, Bookes and writings, were by the Saylers cast over boord" in bad weather.¹⁷ Others were lost in the sixteenth or seventeenth century, but a set of copies was discovered by Sir Hans Sloane in the early eighteenth century and thus came into the collections of the British Museum. Between the copies and the originals there are watercolour sketches of a variety of fish, birds, some insects, several lizards and invertebrates, three wonderful turtles, and a very few plants [plate 13]. Harriot notes that even though they wanted to, they could not manage to depict all the plants and animals. He writes "we haue taken, eaten, & haue the pictures as they were drawn with the names of the inhabitants of severall strange sorts of water foule eight, and seventeene kinds more of land

¹⁷ Quoted in Hulton, *America 1585*, p. 12.

foul, although we haue seene and eaten of many more, which for want of leasure there for the purpose could not be pictured..."¹⁸

The Representation as Counterfeit

These original watercolours of plants and animals painted in the conventions of the new naturalism were used in a manner quite different from that of the artists who had relied on pattern books to add an animal to their painting or tapestry design. The illustration or image of the animal became not a cypher in a pictorial shorthand but a "true" representation of the thing itself. By the end of the sixteenth century, an Italian author could write in a *Tractate Containing the Artes of curious Paintinge* (1598), that

Painting is an arte; because it imitateth naturall thinges most precisely and is the *Counterfeiter* and (as it were) the very *Ape* of Nature: whose quantity, eminence and colours, it ever striveth to imitate... by the helpe of *Geometry, Arithmeticke, Perspective, and Naturall Philosophie*, with most infallible demonstrations.¹⁹

The publication of the herbal *Herbarum Vivae Eicones* in 1530 with illustrations by Hans Weiditz (d. c1536), Dürer's pupil, emphasized even in its title the idea of "living images." (The herbal tradition will be examined in a subsequent chapter.) The image also became a medium for the transmission of information; it stood for the specimen. With the present day prevalence of images, we take for granted easy access to the visual. In the sixteenth century, acquiring an image necessitated the use of an artist, a painter or limner, whose skill might vary from that of a Ligozzi or White to that of a hack. Ulisse Aldrovandi (1522-1605), the

¹⁸ Quoted in Hulton, *America* 1585, p. 11.

¹⁹ Walter E. Houghton Jr, "The English Virtuoso in the Seventeenth Century (II)," *Journal of the History of Ideas*, III, 2 (1942), p. 206.

sixteenth-century pandect author, worked with a number of artists besides Ligozzi and ran even his local collecting trips like expeditions, taking both draftsmen and secretaries with him when collecting insects outside the city, thus guaranteeing the accuracy of both the image and the notes. Whatever the quality of the original painted image, it became for the naturalists of the sixteenth century a means of communication.

Lynn Thorndike notes as novel the sixteenth-century phenomenon of "cooperation between different individuals. They send one another specimens or at least drawings or written descriptions of strange animals and unfamiliar herbs which they have run across... This cooperation in science by men of diverse nationalities, professions, religions and even philosophies is indeed impressive."²⁰ The increased supply of printed books had changed the nature of scholarship, encouraging isolated scholars to compare notes on the printed texts in a manner that had been impossible in the age of manuscripts. At the same time this new practice of correspondence favoured not only the exchange of textual criticism and written commentary but the exchange of images.

The need for accurate representations and the flood of hand-painted images (chiefly watercolours) that this produced has not been sufficiently appreciated. A scholar like Konrad Gesner (1516-65) benefitted a great deal from this flow of correspondence and the dried specimens or painted images that often accompanied it. Gesner acknowledged the importance of illustrations "so that students may more easily recognize objects that cannot very clearly be described in words,"²¹ and his correspondents fed his appetite for paintings

²⁰ Lynn Thorndike, *A History of Magic and Experimental Science*, VI. New York: Columbia University Press, 1961, p. 267.

²¹ Martin Rudwick, *The Meaning of Fossils. Episodes in the History of Palaeontology*. London: Macdonald, 1972, p. 6.

and specimens. Gesner remarks in *De Herbis Lunariis* (1555) that "Fifteen years ago or thereabouts... an Englishman returning from Italy greeted me...; among other pictures of the rarer plants which he had taken care to get painted, he showed me a picture of a Elleborine..."²² The Englishman was William Turner (1508-1568) to whom Gesner notes in *Historia Animalium* that he in return also sent pictures. Gesner was also in correspondence with John Caius (1510-1573), author of *De Rariorum Animalium atque Stirpium Historia* (1570) who provided him with a number of portraits of animals in their proper colours, including those of a lynx and a civet cat lodged at the Tower. Caius asserted that he had the civet cat pictured "as like to one egg as to another."²³ Caius also corresponded with Gesner concerning the marmoset which is "much set by among women." Gesner's *Historia Animalium* included an illustration of the marmoset ("This figure of the *Sagoin*, I received of *Peter Cordenberg*, a very learned apothecary at *Antwerpe*"), but "*John Cay* that famous *English* Doctor hath advertised me, that it no way resembleth the *Sagoin* it self..."²⁴ Toward the end of his life, Gesner received a shipment of dried plants from Jean Bauhin (1541-1613), brother of Gaspard (1560-1624) and student of Aldrovandi, which he spent the summer in having "painted from life" so that he could return them to their owner.²⁵ There still exist a number of Gesner's annotated watercolour paintings including one of a tobacco plant painted c1554-55. The plant is carefully drawn and coloured from roots to flower with sketched details of flowers, leaves and

²² Quoted in C.E. Raven, *English Naturalists from Neckham to Ray. A Study of the Making of the Modern World*. Cambridge: Cambridge University Press, 1947, p. 82.

²³ Quoted in Raven, *English Naturalists*, p. 141.

²⁴ Edward Topsell, *History of Four-Footed Beasts and Serpents and Insects*. Volume I. *The History of Four-footed Beasts*. 1658. New York: repr. Da Capo Press, 1967, p. 15.

²⁵ Quoted in Raven, *English Naturalists*, p. 155 and note.

fruit.²⁶ Thomas Penny (b1530), the English entomologist, also collected information on insects from his correspondents on the continent, receiving drawings from Johann Camerarius the younger (1534-98), author of a 1590 emblem book, and a picture of a Goliath beetle from the Duke of Saxony's museum.

John White's unique watercolours were in obvious demand by naturalists and compilers both during his lifetime and after. Penny received watercolour sketches of four New World insects, including a beautifully executed Tiger Swallowtail, directly from John White. White evidently also knew John Gerard (1545-1612) who made an engraving of White's watercolour of a milkweed (*Wisakon*) for his *Herball*. White's illustrations were also copied into the unpublished manuscript version of Edward Topsell's *The Fowles of Heaven* (1608-14), an incomplete translation of Aldrovandi's *Ornithologiae*. Topsell (1572-1625) had received about ten copies of White bird sketches perhaps from Hakluyt and these constitute his only significant addition to Aldrovandi.²⁷ A century and a half later, Sir Hans Sloane's copies of White's originals were consulted by Mark Catesby, who copied no fewer than seven items directly into *The Natural History of Carolina...* (1729-43). Prior to the development of well-preserved museum and herbaria collections, naturalists depended on the naturalistic image passed about among a circle of acquaintance.²⁸ The

²⁶ There is an illustration in Hugh Honour, *The New Golden Land: European Images of America from the Discoveries to the Present Time*. New York: Pantheon Books, 1975, fig. 33.

²⁷ Edward Topsell, *The Fowles of Heaven or History of Birdes*. Austin: University of Texas, 1972, p. xoodiii.

²⁸ Nicholas Barker records a portion of the correspondence of the Prince Bishop of Eichstätt, Johann Conrad von Gemmingen, concerning the "various sketches of animals, plants, herbs or other curiosities and works of art" in the Bishop's collection which were much sought after by a number of princely collectors in the early 1600s. With the help of an apothecary Basilius Besler, the Bishop's sketches were eventually worked into one of the greatest of the early florilegia, the *Hortus Eystettensis*. Wilhelm V wrote to his agent Philipp Hainhofer that "should the Bishop make excuse that he lacks people to do this for you," i.e., the copying of the Bishop's "sketches," Hainhofer was instructed that Wilhelm would "come to an arrangement with you ourselves for the copying to be

illustrations became in effect a portable museum, and the accuracy of an image taken from life was trusted. In the classification of birds, for example, Anker notes that "Right down to the close of the eighteenth century native and foreign birds were in many instances described and named from unpublished pictures..."²⁹ We will return to the importance of the original image and its relationship to classification when we look at role of vision and of the visible in Linnaean classification in the mid-eighteenth century.

Translating the Image: The Value of Repeated Pictorial Statement

While sixteenth-century naturalists had learned to trust the manuscript images which they exchanged and classified, the translation of the original image into a reproducible format, which meant either the woodblock print, or by the end of the century a copperplate engraving, was not without problems. It is on the basis of the translation of the original image with a high enough degree of resolution to communicate the intent of the artist that William Ivins developed his theories on the print as a medium of visual communication. "This means," he writes, "that, far from being merely minor works of art, prints are among the most important and powerful tools of modern life and thought."³⁰ While the adoption of perspective drawing allowed the artists to develop a new means of approaching verisimilitude in their pictorial images, the print, "the exactly

completed at the lowest possible cost." From Nicholas Barker, *Hortus Eystettensis. The Bishop's Garden and Besler's Magnificent Book*. London: The British Library, 1994.

²⁹ Jean Anker, *Bird Books and Bird Art*. Copenhagen: 1938; repr. New York: Arno Press, 1974, p. 29. Blunt notes that when ants damaged Nikolaus Joseph Jacquin's herbarium material, "... the late eighteenth century, "he therefore supplemented his description and notes on the new species with watercolour drawings. These accordingly are the equivalent of type specimens." (Wilfrid Blunt, *The Art of Botanical Illustration*. London: Collins, 1971, p. 156.)

³⁰ Ivins, *Prints and Visual Communication*, p. 3.

repeatable pictorial statement," allowed the readers to rely on picturing as well as writing. While it might be argued that the reliance on picturing was the result of the increasing verisimilitude of the new aesthetic, Elizabeth Eisenstein points out that there is a qualitative difference in the accuracy of the sketchbook rendering – the manuscript – and the widespread dissemination of an accurate printed image. In her discussion of the impact of printing technology, she takes issue with the art historians who would suggest that Leonardo da Vinci's understanding of anatomy laid the foundation for the new anatomical science: "In my view it is an exaggeration to launch modern science with the advent of perspective renderings and to regard pictorial statements as sufficient in themselves."³¹ She suggests that the ease and accuracy of modern mechanical and electronic reproduction techniques have blinded us to the fundamental change in vision and meaning that occurred when pictorial images became printed images:

...we are not accustomed to distinguish between the much-copied hand-drawn image in the much-used reference work and the freshly drawn image in the unique sketchbook or manuscript. The visual contrast between the "fine" pen drawing and "crude" woodcut is so powerful, the difference between fresh and copied handwork is especially likely to be overlooked. This is unfortunate. The difference between the hand-copied image that decays over the course of time and the repeatable engraving that can be corrected and improved is essential for understanding how visual aids were affected by print... modern reproductive techniques have been unhelpful and block our vision of an earlier process of change.³²

While Eisenstein is convincing in her arguments about the new use and value of printed documents, what is not clear in looking at the transformation from

³¹ Elizabeth Eisenstein, *The Printing Press as an Agent of Change*. Cambridge: Cambridge University Press, 1979, p. 269.

³² Eisenstein, *The Printing Press*, p. 264.

manuscript to printed image is the importance of the degree of resolution, that is, how well the printed image reflects the real thing. Naturalists had decided to accept the new naturalistic pictures as simulacra of the real world. Watercolours like those of Dürer, White and Ligozzi incorporated certain conventions in their rendering, particularly as regards perspective and colour, but these for the most part disappeared in the acceptance of the new visual language. The degree of resolution of the printed image, however, could be affected by three factors: the technology of printing and colouring; the conventions of the engravers and cutters; and the relationship of the printed image to the text.

Woodblocks were admirably suited to the first generation of printed books. Because they were relief cuts, they could be bound into the press and printed with the type. It was rare, however, that the artist who made the original drawing and the wood engraver were one and the same person. In general, the artist would make the drawings with a quill or a brush on the block. The woodcutter, or "Formschneider" as the cutter of forms was called in German, would then cut away the surface with knife and chisel, producing the image on the block. Theoretically, then, the print was not a translation but relayed the actual intention of the artist. In practice this was not always the case. Jost Amman, a formschneider, advertised his skills in the following verse on his wood engraving in 1568:

I am a good woodcutter and I cut so well with my knife every line on my blocks, that when they are printed on a sheet of paper you see clearly the very lines that the artist has traced, his drawing whether it be coarse or fine reproduced exactly line for line.³³

³³ In Bliss, *A History of Wood Engraving*, pp 2-3.

Line for line reproduction was possible when lines were few and wide. As the artists demanded greater and greater resolution of their pen and ink drawings, the number of fine lines increased, in a process that Ivins calls "informational pressure." Finely detailed blocks were very difficult to print, since the block was inked not by rollers but by leather balls soaked in ink. With very fine relief lines crammed closely together, splotches were inevitable. In addition, paper was made "good one side," so that the impression on the smooth side was more legible than that on the rough. The production of high-quality woodblock prints was thus time-consuming and expensive. Many of the naturalists like Gesner, Aldrovandi and even Fuchs avoided highly detailed cuts with a subsequent loss of information.

Because producing woodblock prints was labour-intensive, printers relied on shortcuts, often using old blocks or amending them to suit the text. As noted above in looking at the images used in the Columbus letters, a formschneider might simply recut a block to add an image or a name. Gesner's formschneider recut the engraving of the salamander that appeared in the 1486 *Peregrinationes*, though Gesner did add a note to the effect that the image was not a good one ("*Salamandra figura falsa*"). Topsell's engravers recut the images from Gesner with a degree of accuracy which suggests that they either used the old blocks or pasted the prints on to blocks and cut through them. In some cases a printer, loathe to lose the investment in cutting of a complex woodcut, might simply remove a portion that required modification, inserting a new carved plug into the block or even simply printing in the blank section. Such would appear to be the case in the 1611 reprint of *The Noble Art of Venerie or Hunting*, in which the figure of King James I is superimposed on plates from the original 1575 edition which had shown Elizabeth I. The imperfect matching of the blocks

shows distinctly as white lines in the print.³⁴ Buying a set of blocks or plates from a printer was practised a great deal as we shall see when we look at the herbal tradition in the sixteenth and seventeenth centuries. The engraver and compiler Theodor de Bry (1528-98) obviously frowned on this practice, since in the note to the reader in his edition of Harriott's *A briefe and true report of the new found land of Virginia...* (1590), he wrote:

Finallye I hartlye Request thee, that yf any seeke to Contrefaict thes my booke, (for in these days many are so malicious that they seeke to gayne by other men labours) thow wouldest giue noe credit unto suche conterfaited Drawghte. For dyuers secret marks lye hiddin in my pictures, which wil breede Confusion unless they bee well observed.³⁵

Colour is not trivial in natural history. A white bear is very different from a black bear as Descelier indicated on his highly coloured maps. Colour in flower or feather is often diagnostic and we see the pattern of colour in the red-winged blackbird or blue jay long before we define the shape. The naturalists who exchanged watercolour renderings of plants, animals and fish saw them for the most part in high colour. It is a simple enough experiment to compare the colour photograph of work of art with its black and white equivalent. Even in the works of John White, which have suffered considerably from poor handling and water damage, the colour is luminous, and in particular, in the silvery moonfish, the swallowtail and the flamingo, the use of colour is exceptional. Early prints were black and white. They imitated rendering in pen and ink, and

³⁴ Plates 5 and 7 in Roger Manning, *Hunters and Poachers. A Social and Cultural History of Unlawful Hunting in England, 1485-1640*. Oxford: Clarendon Press, 1993.

³⁵ Facsimile in Hulton, *America 1585*, fig. 4. Nevertheless, De Bry and his sons themselves re-used their original images, transplanting, for example, the same scene of deer-hunting in the new world from Newfoundland in Volume XIII (1628) to Mexico in Volume XIV (1630).

shading was not the result of deepening a hue, but of a series of closely spaced lines or even cross-hatching.

This use of line for modelling became even more pronounced in engraving and Ivins has written extensively on the "web of rationality" used by the engravers to translate the image. As artists became more adept at engraving and etching, the lack of colour was not necessarily a shortcoming in artistic depictions, but in the early attempts at naturalistic rendering of plants and animals, colour was wanted and obtained. In general colour was added by hand. In 1493 Hartman Schedel published the *Nuremberg Chronicle*, the "first great picture-book for the bourgeoisie – your money's worth of pictures – sold unbound and uncoloured at two Rhenish florin, bound and coloured at six."³⁶ The money's worth was over 1800 pictures, and colour was usually laid on with a very broad brush. Some leaves in the author's collection from a copy of Aldrovandi's *Ornithologiae* show a lavish and garish use of colour. The *lyngi congener*, which may be a Creeper (*Anglis Crepera à reptando teste Turnero*) boasts red feet, a rufous body and a purple wing. It perches on a branch of a generic tree with bright green leaves and a single red berry. The *Spipola altera cum lunco leui* is yellow with a very bright blue-green wing, and orange throat and beak and orange legs. The *Spipola alba* is all over reddish with a bright blue wing, which belies its name [plate 14]. The *lynx mas.* is cerulean blue with a red tail, legs, beak and eye. The female, despite being figured separately, is identically coloured. It is hard to say whether these leaves were painted by the publisher or by the owner. Some books came complete with instructions as to colours intended by the author. In an explanatory text to the tenth woodcut of his book, one author suggests that "if the cut be coloured the Cow may be

³⁶ Bliss, *A History of Wood Engraving*, p. 47.

painted red, since the animal he has in mind is the red Heifer of Numbers
 XIX..."³⁷

David Bland opines that the reason the colouring is often so crude in early woodcuts is that "while a skilled artist would take enormous pains over a single initial, only a hack would undertake the task of colouring up the large numbers required in a printed edition."³⁸ Not all coloured editions were so crudely daubed, as Barker discusses in his splendid volume on the *Hortus Eystettensis*, or as can be seen from some coloured versions of de Bry. A coloured and gilt copy of the de Bry edition of Le Moyne de Morgues' account of the French colony in Florida exists in the New York Public Library. De Bry's series of thirteen volumes on America was not intended as a cheap chap book for the masses. It was read by the European aristocracy and members of the court, by educated people, collectors, and by the merchants and artisans with an interest in travel and exploration.³⁹ De Bry's engravers produced fine and highly detailed engraving which was complemented by a restrained use of colour wash, likely added at the time of purchase. The colour remains, however, very vibrant, the green almost chrome, the red very vivid. Skies are not just blue, they glow with sunset colours. The native peoples are a uniform pale tan, with surprisingly bright belts of blue and red, and in one plate (XXIV) use a blue and yellow fan. Animals when they appear tend to be all one colour, either green, brown or grey, sometimes, in the case of turkeys and fish, with a splash of red.

³⁷ Campell Dodgson in a catalogue of German and Flemish painting at the British Museum, in Bliss, *A History of Wood Engraving*, p. 47.

³⁸ Bland, David *A History of Book Illustration. The Illuminated Manuscript and the Printed Book* London: Faber and Faber, 1958 [1969], p. 101.

³⁹ Bernadette Bucher, *Icon and Conquest. A Structural Analysis of the Illustrations of de Bry's Great Voyages*. Chicago: University of Chicago Press, 1981, p. 20.

The conventions of the engravers and printers also affected the way in which the image reflected the original object. Conventions were of two sorts, the technical conventions of the craft, and artistic conventions. Where in a watercolour the lines are soft and indistinct, colours shading into one another, in the print, by virtue of the medium itself, they must be hard-edged. Making a woodcut involved cutting away the wood to create raised lines and shapes. Engraving meant making lines in a metal plate. In each case the formschneider or engraver added what Ivins called a "web of rationality" on the original pictorial image. Ivins would also argue that the woodcut, since the artist drew directly on the wood, preserved the artist's intentions, while the engraving, since it was cut into metal by a craftsman following an existing image, was a translation. In both cases, however, the use of line, as opposed to colour washes and varying shading, contributed to distancing the pictorial representation "from life." In some cases, the distance was not far; in other cases it was so great that the value of the printed image as a conveyor of information was negligible. Looking at two examples of the translation of information from one medium to another, one in a woodcut, and one in an engraving, supports this assertion.

We have already discussed the use of "manuscript" images as a medium of communication among scientists in the sixteenth century. In 1515, Valentin Ferdinand, a Moravian painter sent a description and sketch (presumably coloured, but perhaps not; it does not appear to exist any longer) of a new and curious animal from Asia to a friend of Albrecht Dürer. Dürer was shown the sketch and description and later recorded an excerpt from Ferdinand's letter on his own original drawing: "On 8 May, in the year 1513, a big animal, which they call a rhinocerate, was brought from India to Lisbon for the King of Portugal,

and as it is such a curiosity, I must send you its likeness..."⁴⁰ (The year was 1515, but Dürer wrote it incorrectly; it was corrected on a Dutch version of the woodcut.) Dürer never saw the animal in the flesh. It had been presented to King Emmanuel of Portugal by the King of Cambodia, but drowned on route to Rome. Dürer was obviously intrigued enough by the likeness and the description that he produced his own pen-and-ink drawing of the "Rhinoceron." He included some of the textual description on the drawing, likely gleaned from the original letter:

It is represented here in its complete form. It has the colour of a speckled turtle. And it is almost entirely covered by a thick shell. And in size it is like the elephant but lower on its legs, and almost invulnerable. It has a sharp horn on its nose which it starts to sharpen whenever it nears stones. The stupid animal is the mortal enemy of the elephant... Because the animal is so well armed, the elephant cannot do anything to it. They say the rhinoceros is fast, lively and clever.⁴¹

Dürer also prepared a woodcut from the drawing [plate 15]. Despite never having seen the animal, Dürer managed in both drawing and woodcut to capture a likeness of the beast so vivid that it became the "reference" copy for naturalists like Gesner and Aldrovandi and other authors and printers up to the mid-eighteenth century.⁴² Dürer had great skill in preparing a drawing for the woodcut, and Ivins suggests that in preparing the cut "even so great an artist as Dürer" could not avoid the constraints of the web and the taint of virtuosity that

⁴⁰ Quoted in Jessica Rawson, ed., *Animals in Art*, London: British Museum Publications, 1977, pp 127-8.

⁴¹ Translated in Museum of Fine Arts, *Albrecht Dürer, Master Printmaker*. Boston: Museum of Fine Arts, 1971, p. 244.

⁴² In 1739, a version of the Dürer rhinoceros was cut in London for a "Print publish'd immediately upon the arrival of the Rhinoceros in 1739, by Overton without Newgate", and also engraved attacking an elephant by Francis Barlow as "A true representation of the two great masterpieces of Nature, the Elephant and the Rhinoceros, drawne after life, lately brought over from the East Indies to London..." L.C. Rookmaker, "Two collections of rhinoceros plates...", *Journal of the Society for the Bibliography of Natural History (JSBNH)*, 9, 1, 1978, p. 21.

its use implied. Use of the web was similar to the use of the "net of rationality" by geometers, "a geometrical construction that catches all the so-called rational points and lines in space but completely misses the infinitely more numerous and interesting irrational points and lines in space."⁴³ What Dürer prepared in his drawing was an outline sketch with a series of circles and overlapping arcs to indicate what are in actuality granulations imitating scales. The deep folds in the skin became distinct lines, resembling plates, and the "well-armoured" idiom was carried through in a fanciful kind of ribbing on the sides and in the flanges and twisted hornlet on the neck. In the pen-and-ink drawing these lines, circles and ribs are tentative and lightly shaded, suggestive of skin. In the cut and the innumerable engravings that reproduced it, the marking are definitive, the ribbing hard-edged, forming a boss, the legs definitively scaled. The formalization of the armoured rhinoceros could be carried to a decorative extreme by the printers, as it was in the 1708 *Voyages et aventures* of Françoise Leguat. Here are pictured five rhinoceros, based on the Dürer reference model, one of which is covered with ovals and circles representing the "armour," but looking more like a painted toy. At this point the web has produced an image closer to that of the emblem book than of the image "after life."

The conventions of the engravers and printers were also affected by the aesthetic mode of the period. The influence of contemporary artistic fashion has been pointed out by many scholars, but is particularly relevant when artists come to portray the unfamiliar. It is readily apparent in the works of John White, for example, particularly in his drawings of an Inuit man and woman made in 1577. Against all reason and in defiance of the visual reality, White indicated the navel on the portraits of an Inuit man and woman, even though it would not have

⁴³ Ivins, *Prints and Visual Communication*, pp 69-70.

been visible under heavy sealskin clothing. This Mannerist convention is derived from Roman work where the body contours are discernible under light draperies, and it was repeated in subsequent engravings after the drawings. It has often been noted as well that early engravers gave to the aboriginal peoples of America a classical look, in keeping both with Renaissance and Mannerist ideas about the nude. Hugh Honour has suggested that the style of the drawing, by the Mannerist painter Jean Cousin the Younger, and the woodcuts in Thevet's *Les singularitez* may have inspired the poetical descriptions of the Brazilians who lived in a new "Golden Age."⁴⁴ Certainly when Theodor de Bry prepared the copper engravings from White's watercolours, the classicizing influence was manifest. White himself never depicted an unattractive native, but de Bry's engravings sharpened the features (which in White's drawings were often portraits) into classical heads with a European cast. The bodies as well became more muscled and well-proportioned, the hands and feet more delicate and the hair attractively knotted. De Bry did not engrave White's animal and plant drawings per se, but he did incorporate some of them into composite engravings showing landscape, and it is worth examining both these plates and the manner in which de Bry went about his work in creating the first mass-produced picture book about the New World.

Most Europeans became acquainted with White's vision of Virginian natives and wildlife through the engravings prepared by the Flemish publisher Theodor de Bry for his 1590 publication in four languages of Thomas Harriot's *A briefe and true report of the new found land of Virginia*. This was the first volume in de Bry's series on *America*, which was followed by a publication based on the Le Moyne drawings of Florida. De Bry arrived in England in 1587 to

⁴⁴ Honour, *The European Vision of America*, fig. 61.

prepare some engravings. Here he became acquainted with both the work of White and Le Moyne and acquired sets of their original drawings. De Bry described his enterprise in the epistle "To the gentle Reader" in the English version of Harriot:

Consideringe, Therfore that yt was a thinge worthie of admiration, I was verye willinge to offer unto you the true Pictures of those people wich by the helse of Maister Richard Hakluyt of Oxford Minister of Gods Word, who first Incouraged me to publish the Worke, I creaued out of the verye original of Maister Ihon White an Englisch paynter who was sent into the countrie by the queenes Maiestye... I craeued both of them [the White and Le Moyne drawings] at London, an brought Them hither to Frankfurt, wher I and my sonnes hauen taken earnest paynes in grauinge the pictures ther of in Copper, seeing yt is a matter of roe small importance.⁴⁵

De Bry did take pains to remain largely faithful to White's originals, though the transformation effected in the translation to print went far beyond a recasting into a Mannerist aesthetic, and hints at another convention of the artists and engravers that made the representation of the actual more problematic. Plate XIII on "Their manner of fishynge in Virginia" is one of the few plates in the Harriott book to show wildlife in a more than incidental way [plate 16]. It features a number of fish and aquatic invertebrates as well as birds, and the comparison with the original watercolour is instructive.

In the original watercolour, White has shown a dugout *cannow* with four natives, two standing and two sitting by a fire in the middle of the craft. In the background is shown a fish weir and two other natives spearing fish. In the far distance is another canoe and in the sky a number of birds. Hulton notes that this is a composite drawing combining night fishing and day fishing techniques and a number of species, including an anomalous West Indian hermit crab. The

⁴⁵ Facsimile reproduced in Hulton, *America 1585*, fig. 4

fish shown, however, are recognizably a catfish, burrfish, hammerhead shark, skate or ray and perhaps a sturgeon. There is also a depiction of a rather peculiar and poorly drawn horseshoe crab (often erroneously called a king crab). A pelican, two swans and a flight of ducks are sketched in the sky. The engraving appears as the double-page plate XIII in the 1590 German edition of Harriot. All the plates in this volume are gathered at the back and the text printed along the side. In the engraving, the fish have multiplied, and the marine fauna is more varied, including a land crab (probably engraved after the White watercolour). The hermit crabs have disappeared but the king crabs sport far more formidable claws. The fish are less recognizable and have been joined by some eels or water snakes as well as by a number of turtles which would appear to copy White's loggerhead turtle drawing. He has also added to the cannon-load a sturgeon or perhaps gar-pike, which appears in a number of other engravings, poking out of baskets or roasting on grills. The birds have become generic ducks. The flowers in the foreground are more detailed but less well-realized, in that they seem to represent "posies" rather than actual plants. In the watercolour White shows clearly a tall spike of red flowers in the left foreground. This might be an early depiction of the Cardinal flower, a spectacularly scarlet spike native to North America that grows in wet places. Thus even when taking great pains to cut the image in copper, de Bry has rethought the original pictorial statement. The sea now teems with strange fish, and the peculiar-looking ray, which is barely seen in the original, is prominent in the engraving and very spotted. While White's disposition of the fish and invertebrates could not be said to be natural, in that the fish are "posed" on the water, he has managed to convey a sense of habitat which is entirely missing in de Bry's stylized and static reworking, in which birds follow one another in a line and horseshoe crabs face off like mirror images.

What has de Bry done in this translation and why has he done it? The central image of the native peoples in the canoe has remained much the same except that de Bry has replaced one of the middle figures with a female. Did women go fishing, or was this in the masculine sphere? He has also added many another canoes and additional standing figures spearing fish. Did large parties go fishing or was de Bry only concerned with filling the visual field? The fish weir has been rendered much more complex, and a number of other weirs have been added. Is this American practice or European? The waters are now crowded with fish. Since we know that White was attempting to pose a number of animals together in one composite view, was de Bry simply trying to fit as many different kinds of thing into the picture?⁴⁶ The horseshoe crabs and hammerhead sharks certainly classify as curiosities, but Europeans were familiar with rays and crabs. One explanation for de Bry's exaggeration of the claws on the horseshoe crab may be to explicate the text, which refers to them as "a certaine fishe like to a sea crabb." Why have the birds become less distinct, while the fish have become more differentiated? Perhaps while the birds for White, given his interest in natural history, were individual types, for de Bry they might have been just background. Thus, de Bry's engraving, though superficially like the original White watercolour, conveys both more and less information. It provides more variety of things, but it places them in a composition which has less veracity than the original. Bernadette Bucher in her structural analysis of de Bry terms this kind of assemblage a "bricolage:"

If, like the *bricoleur*, the engravers draw their material here and there from a repertoire of forms that they use and transform to suit their circumstance or mood, the result of this *bricolage*, the rearrangement of

⁴⁶ In Plate XX showing the Village of Secota, the original watercolour does not show particular vegetation. De Bry has added recognisable plants – sunflowers, corn in a number of stages of growth, pumpkins and tobacco – to the fields, following the textual descriptions.

those heteroclit forms into a visual narration of America, perhaps answers to an internal logic, as does myth.⁴⁷

What Bucher suggests in her study is that de Bry read into the images of America both a golden age and the persecution of the Protestants. Just as he transformed the native peoples into idealized versions of themselves, so too he transformed the landscape into a vaguely European vision, its difference marked only by the presence of the emblematic animals that identified the landscape as "new."⁴⁸

The tendency of the engraver to be a bricoleur is accentuated both by the economic considerations of the printer – it was cheaper to copy or to buy a plate than to hire an artist to create one – and also by the new relationship of text and words. The development of printing led to a rupture in the web of meanings which had surrounded text and image in the hand-copied manuscript. This is particularly apparent when the reader examines the intricate patterning of letters and images in copies of prayer books and missals with marginal decorations and embellished initials. In printing, the separation between the block and the type is not only one of kind; it is physical. The cut block exists on its own, has meaning on its own, disentangled from the text which explains or describes it. "When the graceful lines that linked text to marginal decoration were severed, pictures and words were disconnected. The former even while being reproduced were removed from their initial context and became more liable to being used indiscriminately. Relationships between text and illustration,

⁴⁷ Bucher, *Icon and Conquest*, pp 38-9.

⁴⁸ Vegetation and wildlife often appear emblematically in the cartographic bird's-eye view representations, as for example the grape vines and the deer shown in Plate II "The arrival of the Englishmen in Virginia." In the second volume of the *America* series dedicated to Le Moyne's account of the Florida colony, plate V shows a map-like illustration of Portus Regalis and features an Indian village in a park-like setting with stags, out-of-proportion squash and grape vines, and a flock of turkeys. This coloured engraving of 1591 is very similar in style to the work of mapmakers like Desceliers. Reproduced in W.P. Cumming et al., *The Discovery of North America, 1630-1776*. New York: American Heritage Press, 1971 / 2, pl. 179.

verbal description and image, were subject to complex transpositions and disruptions."⁴⁹ This is most obvious in the very early editions of printed books, such as Columbus' letters, which we have noted in a previous chapter. Here the illustrations borrowed from a book about European cities could be re-used and slightly modified to suggest the idea of discovery and the idea of the natives. Even at a later period, Dürer's rhinoceros could serve both as a representation of the King of Portugal's animal and, without accompanying text, as the true representation of an animal recently shipped from Asia over two centuries later. Thevet, as we noted in the last chapter, could relocate the su in Florida from its original home in Patagonia, by disassociating it from the text in his first book and from its context in Magellan's voyage, and providing it with a new text which authenticated it in a new location. Lest it be assumed that this disconnection between text and image only occurred rarely and in connection with the exotic, Francis Haskell's book on *History and Its Images* lists a vast number of instances when the printed image is dissociated from its original context and used in a manner not only inappropriate but often in a way which we would consider dishonest. In his discussion of the vogue for collections of historical portraits in the seventeenth century, he writes that despite the claims of the publishers,

...it is by no means simple to verify the accuracy of what was claimed to be true likeness, and opportunities for fraud were plentiful – and could be seized with great recklessness. Thus in the 1640s the London print-publisher Peter Stent arranged for a copy to be made with an etching by Rembrandt dating from only a few years earlier (believed to represent his father) and used it as a portrait of Thomas More, despite the fact that the features bore not even the faintest resemblance to those of More which were familiar enough through many versions of Holbein's portraits and even through medals.⁵⁰

⁴⁹ Eisenstein, *The Printing Press*, p. 258.

⁵⁰ Francis Haskell, *History and Its Images: Art and the Interpretation of the Past*. New Haven: Yale University Press, 1993, p. 53.

He describes as well the creation of a whole series of true "portraits" of the fifth-century kings of France, for which no contemporary medals or likenesses exist, and notes that it is not "clear whether the images they produced were actually intended to deceive rather than to evoke a general impression (based on literary sources) of an unknown world."⁵¹

There is another aspect to the relationship between text and image which is evident in this early period. There appears, and we look at this in more detail in the chapter on botanical publications, a distrust of images as true representatives of things in themselves. There remains a sense that the word itself conveys the "essence" of the thing. Gesner, Aldrovandi and other authors of the sixteenth century spend considerable time on the analysis of names, not only because lacking a common scientific nomenclature they must record as many names as possible in as many different languages to ensure that their readers will recognize the animal, but also because they retain the medieval belief in the power of the name as a sign of the thing itself. Thus, when confronted with an unfamiliar animal, the artist returns to the name or the textual description. In the *Hortus sanitatis* of 1491 which included the *Tractatus de avibus*, the artist has pictured what must be from the description a ptarmigan, as a bird with the head of a hare. The Latin name is "lagophus," which refers to the ptarmigan's feathered feet that resemble those of a rabbit or hare. In the same work is a bird with two horsehoes in its beak. This is the ostrich, which Pliny described as being able to digest iron. We can speculate that in the absence of detailed information on the rhinoceros even Dürer took his clue about the overall appearance of the hide from his correspondent's description of the beast as

⁵¹ Haskell, *History and Its Images*, p. 53.

having a "thick shell." This examination of the translation of original image into the "repeated pictorial statement" provides us with another gloss on the role of images and their relationship to knowledge in the early modern period. The next chapter examines the nature of verisimilitude – the transformation of the image and its translation into an accurate rendering of the thing itself and the origins of the "scientific illustration" in the development of botanical literature from herbals to florilegia.

CHAPTER FOUR

The Living Image

The Champlain Map: 1613

Samuel de Champlain (c1567-1635) first sailed to Canada in 1603 as an observer on a French colonizing expedition. In 1608 he returned to Canada and founded Quebec, making la Nouvelle France his second home. In 1613, he published an account of his explorations in the new world, *Les voyages du Sieur de Champlain Xaintongeois, Capitaine ordinaire pour le Roy*, subtitled *Journal tres-fidele des observations enrichi de quantité de figures...* While engravings based on Champlain's detailed sketches of native life were included in his 1620 *Voyages et decouvertes*, the 1613 volume was enriched primarily with small maps of the areas explored, as well as with one large map of eastern North America including Newfoundland and Labrador, Acadia, the St. Lawrence and beginning of the Great Lakes, and part of New England. Ganong praises Champlain for his abilities as a cartographer, but obvious as well are his skills as an artist. The large-scale map folded into the back cover of the book is exceptional for the detailed renderings of native peoples, plants and animals [plate 17].¹ The animals are figured on both seas and land, and Champlain was obviously a curious and close observer. Since many of the images are unique, it has been assumed that they are from Champlain's sketches, though the map was engraved by David Pelletier (b. 1611?).² In the sea, then, Champlain has figured

¹The small maps show, in the manner of sixteenth-century maps, tiny scattered animals – a stylized deer and rabbit, a few ducks, a fish, which might have been added by the engraver.

²W.F. Ganong, "Identity of the Animals and Plants Mentioned by the Early Voyagers to Eastern Canada and Newfoundland," *Transactions of the Royal Society of Canada*, section II, 3rd series, III

the bar (Ganong: striped bass), molue (Ganong: cod), gros chabos (Ganong: sculpin), lou marin (Ganong: seal); chien de mer (Ganong: dogfish), siguenoc (Ganong: horseshoe crab), ballame (Ganong: ballein/Greenland whale), eturgon (Ganong: sturgeon), scumisn, (but according to Ganong probably saumon or salmon), and finally the uit de mer (Ganong cannot identify this "mollusc" but it appears to resemble a sea cucumber, a number of species of which are common around the Bay of Fundy area).

On the land appear the usual set of diagnostic northern hemisphere animals, with some interesting additions. To the bear, deer, wolf and porcupine, Champlain has added the castor (beaver), the martre (Ganong: pine marten), nibachis (Ganong: a probable Micmac word for the raccoon, though the animal is placed north of the Great Lakes), and rat musque (muskrat). Afloat in the waters of the Great Lakes is another fish, the chaosarou, not identified by Ganong, but from its appearance it can be none other than a gar pike, common in the Great Lakes, and certainly a curiosity, having hard scales like the sturgeon, and a formidable set of "alligator" jaws with sharp teeth. In the seventy years since Desceliers or Gastaldi had drawn their maps, the known fauna has increased, and the depictions of very common animals like raccoons, beavers, and muskrats are recognizable and well-rendered. Where Cartier had commented on their abundance, he was unable to provide the original images which might have allowed engravers and mapmakers to include them on their maps, and perhaps more significantly, they were not part of the standard nearctic/palæarctic map fauna that identified the north. Champlain's animals are the animals of a resident. He would have had an opportunity to see them in the wild and certainly to examine their skins which were objects of trade. Interestingly, none

(1910), p. 227. Where indicated the identifications follow those made by Ganong in his 1908 paper. The rest have been made tentatively by the author.

of these animals (with the exception of a group of deer) appear on the 1632 map *Carte de la Nouvelle France*. Swift's remark on the use of animals for want of towns perhaps has some justice, since the 1632 map is dense with native settlements and shows the inland watercourses in some detail [plate 18]. The sea in this map is still, however, populated with fish and whales.

The 1613 map also includes a vignette of four native peoples, "figures des montagnais" and "figures des sauvages almouchicois," one of whom holds a ripe ear of corn and a gourd. Like the de Bry renderings of native people, the figures are classicized, though the details of clothing and accessories are distinctive. What distinguishes the Champlain map, however, is the inclusion of a border containing well-rendered plants. While early explorers like Cartier had certainly noted the abundance of trees and fruits (see above), in contradistinction to the animals, they had not been depicted except schematically on maps. Both John White and Jacques le Moyne de Morgues had included stylized grape vines on map views included in de Bry [plate 19], and their depictions of landscape showed some diversity of trees, such as cedars, palms and deciduous trees, but with the exception of crop plants (pompions, corn, sunflowers, and tobacco) and some recognizable milkweed or flowering rush and cattails included in engravings of de Morgues work [plate 20],³ few sixteenth-century illustrations of North American landscape revealed very much of the vegetative abundance which so struck the first explorers. Champlain's engraver has divided the border into three parts, on the left a number of text-identified plants, in the middle a legend to the map, and on the right more plants not identified by text. The plants on the left include two types of prunes (plums), raisins [sic] de 3 sortes (grapes), groiselle rouge (red currant), feves de

³ Both White and de Morgues were exceptionally skilled botanical artists and we will discuss their manuscript work later.

bresil (likely the Wild Bean, apparently much prized by the native peoples⁴), the chataigne (American sweet chestnut), sitroulos (citrouille, squash or gourds), and a number of roots, only one of which, the pisque penay, is identified in Ganong (ground nut, *Apios tuberosa*, and Cornut gives a good rendering of the roots with the edible tubers ranged in a row⁵). Edible roots were a staple of the native diet and it is likely that the four plants depicted with their roots were prized for that part. Ganong has been unable to identify the cachy, though its leaves resemble those of the lily or rush families, various members of which were eaten by the Amerindians. The aux is likewise unidentified and in distinction to the other plants, its leaves or flowers are poorly drawn. The astemara may resemble in name and configuration the wild ginger (asarabacca), another plant whose root was used by the natives. The plants on the right side of the border are not identified but include a cherry, strawberry, walnut, perhaps a blueberry, an acorn and an anomalous frog.

Champlain's is not the only map of the period to feature plant life. Marc Lescarbot's 1611 map, while less detailed than Champlain's, features a kind of cartouche in the bottom left hand corner showing wild grapes, ears of ripe corn and three rows of young corn plants [plate 21]. By 1600 the vegetative products of the New World were becoming, like New World animals, more common in Europe and more often depicted. We have already noted Ligozzi's very fine watercolour drawings (c 1580) of a pineapple and the Marvel of Peru, but what made it possible in 1613 for Champlain and his engraver to depict with delicacy and a fair degree of realism a variety of unfamiliar plants was the transformation in botanical literature and illustration that occurred from the mid-sixteenth to the

⁴ Oliver Medsger, *Edible Wild Plants*. New York: Collins Books, 1976 (1939), p. 122.

⁵ Jacques Philippe Cornut, *Canadensium Plantarum aliarumque nondum editarum Historia...* Paris, 1635. Caput LXXVI: *Apios americana*.

late-seventeenth century. During that period, herbals became florilegia, and the study of simples became the study of plants. In the eighteenth century the study and classification of plants was to transform the way in which people viewed the natural world. An understanding of the history and formalization of botany, in which the productions of the new world played no small part, is important to an understanding of this change in world view. By looking closely at two books, one published in 1635 and the second in 1744, which illustrate some of the flora of the northern half of the New World, we can examine both the growth of botanical knowledge and its relationship to botanical illustration.

Cornut and the *Canadensium plantarum*

Jacques-Philippe Cornut (c1606-1651) published his *Canadensium plantarum aliarumque nondum editarum Historia* in 1635 in Paris. Cornut was a medical doctor and his book described for the first time about thirty North American plants, chiefly from the gardens of the Faculty of Medicine in Paris. The book contains 86 plants, most of them illustrated with a full-page copper engraving showing the root, stem, leaves and flowers, and sometimes fruit. On some plates, as in plate XXXVIII, that of *Apocynum minus rectum Canadense* (common milkweed), details of the unique seed case, the seeds with their filamentous pappi and the flower head are added. On plate XL featuring *Edera Trifolia canadensis* (poison ivy), the fruit is enlarged and the manner in which the plant spreads is indicated by the horizontal root with stems emerging upwards [plate 22]. The roots are included on almost all plates, a reflection of their importance in medicinal use [plate 23]. The fact that the *Historia* was grounded in an understanding of medical botany is important to understanding the convention by which Cornut and his artist worked in producing and engraving the

illustrations.⁶ Cornut's work stands near the end of a very old tradition of herbal literature, and the illustrations reflect a convention established in the mid-sixteenth century. At the same time, Cornut's illustrations were not printed from woodcuts, but from engraved copper plates, and his text reflected not only medical usage but horticultural observations. The title of Cornut's work also suggests that he has at least attempted to prepare a regional flora, and he has prepared it by working with a living collection, a garden. These two aspects of Cornut's work, herbal on the one hand and regional flora on the other, mark it as a transitional work between the Renaissance and the early modern period. A close reading of the illustrations and their conventions provides insights not only to Cornut's work, but to the understanding of the use of visual information at the beginning of a period in which the role of the image in botany was to become paramount.

The Herbal Tradition

The herbal illustrated a collection of plants considered chiefly in terms of their medicinal properties. Prior to the interest in chemical remedies that begin in the sixteenth century, almost all medicines were derived from plant materials. Doctors relied for their prescriptions on the classical, that is Greek and Roman pharmacopeia, as it had been passed down, often imperfectly, through the medium of manuscript herbals. For the most part the herbals were based on *De materia medica* by the Greek physician Dioscorides, written in the first century

⁶ Cornut's artist has never been identified, but it is likely he used an artist attached to the royal gardens in Paris. The practice of making watercolour drawings or oils of plants appears to have been common. John Evelyn recorded in his diary for 1st April, 1644, that he visited the garden of Monsieur Morine (Morin, with whom Cornut was acquainted) and observed that the famous nurseryman had caused his best flowers "to be painted in miniature by rare hands, and some in oil." (John Evelyn, *The Diary of John Evelyn*, 2 vols, ed. by William Bray. London: J.M. Dent & Co., [1907]).

A.D. Much botanical writing in the medieval period was based on Dioscorides and attempts to identify plants and their cures from his brief descriptions and the corrupted much-copied illustrations. Cornut obviously had his Dioscorides as well as his Pliny and a number of other classical and contemporary authors at his side and found it appropriate to compare a particular plant to a description in Dioscorides, even though he acknowledged that in the Greek physician's time, neither Canada nor America had been discovered.⁷ It is easy to dismiss the search for authority in a 1500-year-old source, but prior to the application of a scientific method to pharmaceutical trials, the action of a particular plant could only be based on patient observation or transmitted information.⁸ The respect of Renaissance scholars for classical learning increased their confidence in these remedies of the ancients. Karen Reeds notes that "By the 1530s, then, Theophrastus, Pliny, Dioscorides and Galen were all available in up-to-date printed editions, and the Greek treatises had been freshly translated into Latin. The large number of editions and translations is a good index of the popularity of these authors and the respect in which their work was held."⁹ At the same time, however, as the printed books reinforced traditional knowledge, they also pointed out its deficiencies, both in the practice of European physicians, and in light of discoveries in the New World.

If the classical authors reiterated one point, it was the importance of field work: "Prefaces to Renaissance herbals regularly quoted the passages that showed Galen travelling to Palestine..., Dioscorides watching herbs sprout,

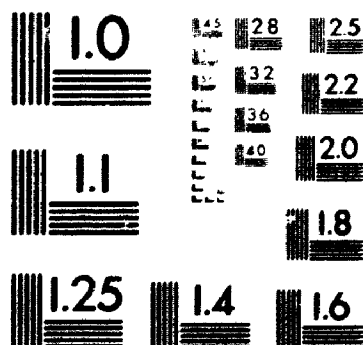
⁷ Stannard in Introduction to reprint of Cornut, *Canadensium Plantarum*, p. xv.

⁸ Even Pliny finds much to complain about in the practice of doctors in classical times: "Doctors learn by exposing us to risks, and conduct experiments at the expense of our lives. Only a doctor can kill a man with impunity." (Pliny the Elder, *Natural History: A Selection*. London: Penguin Books, 1991, p. 265.)

⁹ Karen Reeds, "Renaissance Humanism and Botany," *Annals of Science*, 33, 1976, 519-542, p. 526.

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grow, flower, fruit and die, and Pliny's friend, Antonius Castor, studying plants in his garden even after reaching his hundredth year."¹⁰ Renaissance botanists began to look with new eyes on the plants of field and garden, and as they did they realized a number of things. The first, and any glance at many late fifteenth-century printed herbals will confirm the observation, was that accurate images of plants drawn from life would greatly help in identification. Plants, like the animals in the *Physiologus* and fables, had suffered from uninformed hand-copying. When the manuscript herbals were first printed, the woodcutters followed the illustrations of the originals, reproducing schematic icons of particular plants. Ford suggests that the use of unnatural icons as reference images might be not incompetence, but rather an attempt to preserve the arcane nature of the knowledge,¹¹ whereas Boas feels that the cutters simply copied the originals faithfully because they saw the illustrations as illustrating not nature, but the text.¹² In an oral and manuscript tradition, as Eisenstein has pointed out, the reliance is on neither word nor image. The teaching is passed on from master to student, and in this case it is possible to imagine even the very corrupted images of the early printed herbals serving as *aides-memoire*. Arber's conclusion adds some confirmation to this view:

We may safely conclude that the draughtsman knew quite well... that he was not representing the plant as it was, and that he intentionally gave a conventional rendering, which did not profess to be more than an indication of certain distinctive features... For instance, a plant such as a houseleek may be represented growing on the roof of a house – the plant

¹⁰ Reeds, "Renaissance Humanism," p. 528. Pliny complains that the practice of medicine had greatly deteriorated from what it had been in Hippocrates' time: "For people find it more agreeable to sit listening in lecture theatres than to go out into lonely places searching for different plants at the appropriate season." (Pliny, *Selections*, p. 245.)

¹¹ Brian Ford, *Images of Science. A History of Scientific Illustration*. London: The British Library, 1992, p. 99n.

¹² Marie Boas, *Scientific Renaissance, 1450-1630*. New York: Harper Brothers, 1962, p. 52.

being about three times the size of the building. It is evident that the little house was introduced merely to convey graphic information as to the habitat of the plant concerned, and that the scale on which it was conceived was simply a matter of convenience. Before an art can be appreciated, its conventions must be accepted. It would be absurd to quarrel with the illustrations we have just described... as to condemn grand opera because, in real life, men and women do not converse in song.¹³

There also existed classical antecedents for a reticence about reliance on the use of image as the bearer of accurate information. Pliny condemned the use of "poutraicts":

But what certaintie could be therein? pictures (you know) are deceitful; also, in representing such a number of colours and especially expressing the lively hew of hearbs according to their nature as they grow, no marveile if they limned and drew them out, did faile and degenerate from the first pattern and originall. Besides, they come far short of the marke, setting out hearbes as they did at one onely season (to wit, either in their floure, or in seed time) for they chaunge and alter their forme and shape everie quarter of the yeere...¹⁴

Part of Pliny's criticism is attributable to the manuscript tradition in which the original image degenerates with each copy. Eisenstein and Ivins have pointed out that the technology of printing "repeated pictorial statements" allowed the repetition of images without degeneration, but the advantages of this new accuracy of reproduction were not immediately appreciated by authors and printers. In 1500, Hieronymus Braunschweig could still conclude his work on distillation by warning readers that they must pay attention to the text, since the woodcut figures had been included only "as a feast for the eyes and for the information of those who cannot read or write."¹⁵ Nevertheless, Renaissance

¹³ Agnes Arber, *Herbals, their Origin and Evolution. A Chapter in the History of Botany, 1470-1670*. 1938, 2nd ed. Darien, Connecticut: Hafner Publishing Co., 1970, p. 193.

¹⁴ Quoted from the 1601 translation by Philemon Holland in Wilfrid Blunt, *The Art of Botanical Illustration*. London: Collins, 1971, p. 2.

¹⁵ Quoted in Arber, *Herbals*, p. 201.

botanists did realize a need to improve both information and illustration. The proliferation of printed herbals meant that people began to rely on the book as a "silent teacher." It was no longer enough that the illustration only serve to remind the reader of a plant already learned. The illustration should help to identify the plant collected in the field, and by 1530 readers refused to rely on text alone. In that year Otto Brunfels (1488-1534) published a herbal entitled *Herbarum Vivae Eicones*, in which the illustrations were painted not from existing "reference" images, but from life.

It was not simply the new technology, however, that produced this new kind of herbal; it was also a new kind of sensibility regarding the objects of the natural world, discussed above. The transformation from patterning or caricature to naturalistic representation was embodied in the work of the illustrators for the new naturalists. Brunfels employed Dürer's pupil, Hans Weiditz, and it is the sensibility of Dürer's "Columbine" or "Great Piece of Turf" that informs the work of Weiditz. The watercolour image of a plant or animal had become accepted as a medium for the exchange of information among sixteenth-century naturalists, and an image "drawn from life" and printed with sufficient resolution, allowed them to spread further their discoveries and to communicate vital information about plant identification to medical practitioners. For Brunfels' *Herbal*, Weiditz prepared careful coloured drawings in the manner of his master, recording the wilted leaf, the insect damage. Brunfels included a Latin poem in which he compared the work of Weiditz to that of "Clarus Appelles," the Greek artist who Pliny asserted painted a horse so life-like that real horses neighed at it. Weiditz's drawings were widely acknowledged as superior to Brunfel's text, but were criticized for being too much portraits, and

too difficult to identify with plants in the field. Resistance to using images as information was still common even after the publication of Brunfels' herbal, and Hieronymus Bock (1498-1554) refused to have illustrations in the first 1533 edition of his herbal, *New Kreüter Buch*, fearing that they would distract the reader from the text descriptions, so clear and expressive that even Konrad Gesner, a great collector of drawings, acknowledged that no painter could describe the plant better.¹⁶ Bock's was essentially a rearguard action, likely born out of concern for the problems of translation into woodcuts as well as a Protestant objection to the use of the image over the word. In later editions, however, he changed his mind, for reasons to be discussed below, and used some of the blocks cut for Leonhart Fuchs' (1501-66) masterpiece *De historia stirpium* (1542).

Fuchs' work has been described by Charles Singer as "the highwater mark of the Renaissance herbal."¹⁷ *De Historia stirpium* was conceived by Fuchs from the beginning as an integrated work in which text and illustration would complement one another. Fuchs understood the use of accurate illustration and noted in his Preface that "It is the case with many plants that no words can describe them so they can be recognized. If, however, they are held before the eyes in a picture, then they are understood immediately at first glance."¹⁸ In an effort to ensure that the illustrations were "understood immediately," Fuchs hired the best artists and cutters and guided the entire work from painting to drawing on the block, cutting and printing. He also attempted to remedy both

¹⁶ Karen Reeds, "Renaissance Humanism," p. 531, note.

¹⁷ Singer, Charles. *From Magic to Science. Essays on the Scientific Twilight*. New York: Dover Publications, 1958, p. 197.

¹⁸ Quoted in Reeds, "Renaissance Humanism," p. 529, note.

the criticisms of Pliny and the complaint of portraiture that had been levelled at Weiditz:

As far as concerns the pictures themselves, each of which is positively delineated according to the features and likeness of the living plant, we have taken peculiar care that they should be most perfect; and moreover, we have devoted the greatest diligence to secure that every plant should be depicted with its own roots, stalks, leaves, flowers, seeds and fruits. Furthermore, we have purposely and deliberately avoided the obliteration of the natural form of the plants by shadows, and other less necessary things, by which the delineations sometimes try to win artistic glory; and we have not allowed the craftsmen to indulge their whims as to cause the drawing not to correspond accurately to the truth...¹⁹

Fuchs' illustrations were so successful that a number of them were used not only by Bock, but also by Dodoens in his Flemish herbal of 1554, by Gerard in 1597, and survived to be repinted in a botanical book published in Zurich in 1774. Dodoens' later herbals were published by Christophe Plantin of Antwerp, who amassed a large number of woodcuts printed in the works of de l'Obel and de l'Ecluse. This collection of woodcuts became extremely popular and was used in herbals well into the seventeenth century. Arber points out that "the woodcut of a clematis, which was first seen in Dodoen's *Pemptades* of 1583, reappears either in identical form, or more or less accurately copied in works by de l'Obel, de l'Ecluse, Gerard, Parkinson, Jean Bauhin, Chabraeus, and Petiver," being used for the last time in Johnson's 1636 edition of Gerard's *Herball*.²⁰ Thus, the conventions of mid-sixteenth-century herbal illustration were transmitted more or less intact to mid-seventeenth-century treatises. By the time of Cornut's publication, the inclusion of illustrations was not only accepted but expected. Cornut did not use woodcuts, but copper engravings, and as Arber points out,

¹⁹ Quoted in Blunt, *Botanical Illustration*, p. 50.

²⁰ Arber, *Herbals*, pp 232-3.

the fact that the copper plate engravings were printed separately from text contributed in the first half of the seventeenth century to the development of the picture book, or florilegium. "The consequence is that books with fine engravings appeal to the wealthy amateur, whose influence is patent in the seventeenth-century botanical books, in which the theme shows a definite shift towards horticulture."²¹ We will look now to the sources for Cornut's illustrations and the history of the depiction of the vegetable productions of the New World.

The Sea of Simples

Most of our discussion has centred around European herbals based on European plants. The realization by the herbalists that the Dioscorides text referred to plants of the Mediterranean littoral, not to those of northern Europe, led first to field trips to examine the classic flora, like that of the author of the *Gart der Gesundheit*, published at Mainz in 1485. In the preface the author speaks of his mission in publishing the herbal:

...I came to the conclusion that I could not perform any more honourable, useful or holy work or labour than to compile a book in which should be contained the virtue and nature of many herbs and other created things, together with their true colours and form, for the help of all the world and common good... But, when in the process of the work, I turned to the drawing and depicting of the herbs, I marked that there are many precious herbs which do not grow here in these German lands, so that I could not draw them with their true colours and forms, except from hearsay. Therefore I left the unfinished work that I had begun, and laid aside my pen... I took with me a painter ready of wit, and cunning and subtle of hand. And so we journeyed from Germany through Italy,... Greece, Corfu, Morea, Candia, Rhodes and Cyprus to the Promised Land... and thence through Arabia Minor to Mount Sinai,... and also Alexandria in Egypt... In wandering through these kingdoms and lands, I

²¹ Arber, *Herbals*, p. 246.

diligently sought after the herbs there, and had them depicted and drawn, with their true colour and form... And this book is called in Latin, *Ortus Sanitatis*, and in German *gart d'gesuntheyt*. In this garden are to be found the power and virtue of 435 plants and other created things, which serve for the health of man, and are commonly used in apothecaries' shops for medicine.²²

While the author of the *Gart* desired to picture the herbs of Dioscorides, other authors began to include in their herbals plants with proven medical efficacy, probably learned from the local herbwomen, that did not feature in the classical pharmacopeia.²³ The classical text was, however, so vague that many plants could be identified with the descriptions, and botanists attempted to press not only European but also American plants through the classical form. It is also important to realize that many plant genera are common to both sides of the Atlantic, and many of these are visually distinctive and easily recognized species. When Cornut discusses the use of wild ginger (*Asaron Canadense*), it is more than reasonable that he refers to the use of plants of the same genus by Galen and Dioscorides. The first plants that the explorers noted, however, were those that were not like the familiar plants at home, and it was these strange new forms, not just of different colours or slightly different shapes, but totally unknown, that made the botanists question their Dioscorides and see the New World vegetation as new, and possibly as a novel source of cures for the ailments not only of natives but of Europeans.

Unlike most animals, many plants could be removed from their native habitats and grown in Europe. Columbus had marvelled at the variety of plant life "so different from ours" in the West Indian Islands on which he made his first

²² Quoted in Arber, *Herbals*, pp 25-6.

²³ Brunfels and Weiditz included plants called "herbae nudaе," which were not mentioned by Dioscorides. The use of the term is interesting, since it points to the importance of textual description. The herbs were bare, not because they were not of use, but because they had no ascriptions, no history.

landfall, and a generation later maize was being grown throughout southern Europe. The tomato arrived in 1523 from Mexico, but was not widely used as a foodstuff except in the Mediterranean area.²⁴ Within another generation, these plants were joined by capiscum peppers, a variety of squash, tobacco, and the "african" marigold. Not only were these exotic plants propagated, they were illustrated. An ear of corn had been depicted in Oviedo in 1535, and then again, along with a prickly pear and another cactus in Ramusio's *Navigazioni e Viaggi* of 1606 [plate 24]. Fuchs included maize and a pumpkin in *De historia stirpium* in 1542, but seemed unaware of their new world origin, calling them "Turkish wheat" and "Turkish cucumber."²⁵ Dodoens pictured a tobacco plant in a herbal of 1554, and we have already noted Gesner's drawing of tobacco, dated c1544-5. The interest of the herbalists was not, however, only in the collection of new varieties and exotics but in their role as simples, or medicines.

Cartier would seem to have had a countryman's interest in plants. Much of the vegetation he saw was reminiscent of that of France, and he enumerated the various edible berries and useful trees his expedition discovered. On his 1538 voyage he included "two Apothecaries, each with an assistant, to identify plants and determine their uses."²⁶ Thevet records their delight in the novel vegetation:

²⁴ McGee, Harold *On Food and Cooking, the Science and Lore of the Kitchen*. New York: Collier Books, 1984, pp 212, 241.

²⁵ Turkeys, of course, were so called because it was assumed that they too had come from the near east. There was a long tradition, dating back to classical times, of the strange and exotic arriving vaguely from the east. The idea that new plants or animals came from Turkey fit comfortably with classical assumptions which only changed as the trickle from the western hemisphere became a flood. Gerard still shows Turkey wheat in 1636, but the new world origin of the potato and Jerusalem artichoke are noted in John Parkinson, *In sole paradisus*, 1629.

²⁶ In Ramsay Cook, ed., *The Voyages of Jacques Cartier*. Toronto: University of Toronto Press, 1993, p. 127.

Je scay que certains herboristes, qui se desbanderent pour aller un peu au dedans de l'Isle fureter les Singularitez d'icelle revindrent chargé de plusieurs plantes fort exquises, et dont ils faisoient grand cas, regrettans que la commodité ne leur permettoit d'y faire derechef un nouveau voiage.²⁷

Cartier had reason to include the apothecaries. On his previous voyage, his crew had succumbed to scurvy, saved only by the administration of a decoction of the tree Annedda. The story of the cure is interesting for the light it sheds on the discovery of a new remedy:

Thereupon Dom Agaya sent two women with our Captain to gather some of it, and they brought back nine or ten branches. They showed us how to grind the bark and the leaves, and to boil the whole in water... According to them this tree cured every kind of disease. They call it in their language Annedda.

The Captain at once ordered a drink to be prepared for the sick men but none of them would taste it. At length one or two thought they would risk a trial. As soon as they had drunk it, they felt better, which clearly must be ascribed to miraculous causes; for after drinking it two or three times they recovered health and strength and were cured of all the diseases they had ever had. And some of the sailors who had been suffering for five or six years from the French pox were by this medicine cured completely. When this became known, there was such a press for the medicine that they almost killed each other to have it first; so that in eight days a whole tree as large and as tall as any I ever saw was used up...²⁸

The annedda has been identified with the *Thuja occidentalis* L. or Northern White Cedar, also called Arbor-vitae, since it is a long-lived tree and its wood does not decay. Cartier brought the *Thuja* back with him to France where both it and the *Acer saccharum* Marsh or Sugar Maple (which Thevet notes was

²⁷ Thevet, "Grand Insulaire," in Robert Schlesinger and A.P. Stabler, eds *André Thevet's North America. A Sixteenth-Century View*. Kingston: McGill-Queens University Press, 1986, p. 245.

²⁸ In Cook, *Voyages*, p. 80.

especially signed to the French, see above) could be seen in 1575 at the Royal Garden at Fontainebleau.²⁹

Cartier was not, however, the only explorer to concern himself with plants. In the 1633 edition of Gerard's *Herball*, Johnson includes a description from de l'Ecluse (Clusius) of Drake's root, or Contra-yerua:

In the yeare (saith Clusius) 1581. the generous Knight Sir Francis Drake gave me at London certain roots with three or four Peruvian Beazor stones, which in the Autumne before (having finished his voyage...) he had brought with him, affirming them to be of high esteeme among the Peruvians: now for his sake that bestowed these roots upon me, I have given them the title *Dracena radix*, or *Drake's root*, and have mad them to be expressed in a table, as you may here see them.³⁰

Philip II of Spain sent his personal physician Francisco Hernández to Mexico in the 1570s to investigate the native pharmacopeia and to make coloured drawings of plants, some of which were engraved in 1649. The original watercolours were destroyed in a fire in 1671. In 1577, John Frampton "englished" the first Spanish book on American plants by Nicolas Monardes, calling it *Joyfull newwes out of the newe founde worlde...* The book described "the rare and singuler vertues of diverse and sund'ie Hearbes, Trees, Oyles, Plantes, and Stones, with their aplications, aswell for Physicke as Chirurgerie, the saied being well applied bryngeth suche present remedie for all diseases, as maie seme altogether incredible: notwithstanding by practize founde out to bee

²⁹ James S. Pringle, "How 'Canadian' is Cornut's *Canadensium Plantarum Historia*? A phytogeographic and historical analysis," *Canadian Horticultural History* 1:4 (1988), p. 196. John Tradescant bought two arborvita trees at Harlem in 1611 for a shilling apiece, a small price for what had once been a great rarity. Surprisingly, however, Champlain seems not to know the "Aneda" since in his 1613 account he claims to have questioned some native peoples concerning the herb but "Les sauvages ne cognoissent point cette herbe, ny ne sçauent que c'est..." (Samuel de Champlain, *Les Voyages du Sieur de Champlain Xaintongeois, Capitaine ordinaire pour le Roy... Journal tres-fidele des observations...* Paris: Chez Jean Berjon, 1613. (Ann Arbor: University Microfilms, 1966), p. 65.

³⁰ John Gerard, *The Herbal or General History of Plants*. New York: Dover, 1975 (1633), p. 1621.

true...." Frampton's book also included "the portraiture" of the plants, in woodcuts of mediocre quality, much resembling those of early herbals. The Sassafras tree resembles an effort in topiary, its trunk straight, its crown an orb patterned with its very large and distinctive leaves. Sassafras was the sixteenth-century cure-all. Monardes notes (in Frampton's translation), that he "had knowledge of this Tree [from] a French manne which had been in those partes." "Those partes" were Florida and the Frenchman likely one of the survivors of the ill-fated Huguenot colony which lasted from 1564 to 1566. The Frenchman told Monardes "how theei had cured them selves with the water of this merveilous Tree, and the manner which thei had in the usyng of it, shewed to them by the Indians, who used it to cur theim selves therewith, when thei were sicke of any grief... and it did in theim greate effectes, that it is almost incredible..."³¹ Sassafras was touted as a cure for almost anything, and its bark was noted especially for venereal disease (see *Thuja*). These claims sparked a Sassafras craze (the price in 1602 was £336 sterling the ton) and led to a 1603 venture to Virginia by Bristol merchants exclusively for the gathering of Sassafras. Its export was also written into the charter of the Jamestown colony, but since it failed to live up to its reputation as a panacea, the trade eventually died.

With both economic and medical benefits to be considered, the inclusion in a herbal of illustrations of New World plants was obviously vital. Hieronymus Bock eventually overcame his resistance to the inclusion of images partially in response to the need to examine "living images" when the actual plant was unavailable. Unfortunately very few images of North American plants painted from life existed. John White painted some from life and possibly gave

³¹ Quoted in Donald C. Peattie, *A Natural History of Trees and Eastern and Central North America*. Boston: Houghton Mifflin, 1991 (1948), pp 295-6.

personally to Gerard the drawing of a milkweed for his 1597 *Herball*. White, too, was obviously interested in plants, since Gerard also refers to him in reference to a description of the rough Binde-weed or Sarsaparilla plant as "one Mr. White an excellent painter, who carried very many people into Virginia."³² It is worth looking in some detail at John Gerard's entries on the Indian Swallow-woort, thorny Euphorbium, Sarsaparilla, and Potato, for they are revealing of the opportunities and constraints under which the sixteenth-century botanist/herbalist laboured when describing American plants.³³ Gerard identified the Indian Swallow-woort, as "a kind of Asclepias, or Swallow-woort, which the Savages call Wisanck..." Hulton points out that since he did not mention White's comment on the drawing, "The hearbe which the Sauages call Wyanke wherewith theie cure their wounds which they receaue by the poysoned arroes of theire enemyes..." Gerard must have had an uninscribed copy [plate 25].³⁴ Be that as it may, Gerard had at least some acquaintance with the plant itself ("which is kept in some gardens by the name of Virginia Silke Grasse") and he describes its silk and laments that the native peoples continue to go naked though "the earth is covered over with this silke, which dayly they tread under their feet, which were sufficient to apparell many kingdomes, if they were carefully manured and cherished." He includes for reference not only the cut of the White drawing but also that of de l'Ecluse (Clusius), and compares the two, complaining that neither is descriptive of the living plant, and "Upon the

³² Gerard, *Herbal*, pp 859-60.

³³ I have taken the quotations from the 1633 edition which has additions and amendments by Thomas Johnson, and according to the editor of the 1975 reprint, "represents in both text and pictures, a conspectus and summation of the finest research of its age."

³⁴ Paul Hulton, *America 1585. The Complete Drawings of John White*. [Raleigh, NC]: University of North Carolina Press, 1984, pl. 50.

sight of the growing and flouring plant I tooke this description..."³⁵ Gerard was fortunate in being able to view the living plant, something he could not do with "The Torch-Thistle or thorny Euphorbium." He describes it as rising "up to the height of a speare of twenty foot long, although the figure expresse not the same; the reason is, the plant when the figure was drawn came to our view broken..."[plate 26]³⁶ Here the verisimilitude of the artist is constrained by the specimen available. Much of the new world's produce arrived not for the garden, but for the apothecary shop, and Gerard as a barber surgeon and herbalist had connections with a number of apothecaries from whom he received specimens. Gerard makes an interesting comment on the trade in specimens and images of exotic plants, referring not to a New World plant but to ginger which, of course, was most familiar as a root. He had obviously enquired of a friend concerning the appearance of the living plant and the friend arranged for him to receive a drawing:

How hard and uncertain it is to describe in words the true proportion of Plants, (having no other guide than skillful, but yet deceitful formes of them, sent from friends or other meanes) they best do know who have deepliest waded in this sea of Simples. About thirty years past or more, an honest and expert Apothecarie *William Davies*, to satisfie my desire, sent me from Antwerpe to London the picture of Ginger, which he held to be true and lively drawne: I me selfe gave him credit easily, because I was not ignorant, that there had bin often Ginger roots brought greene, new, and full of juice, from the Indies to Antwerpe; and further, that the same had budded and growne in the said *Dries* Garden. But not many yeares after, I perceived that the picture which was sent me by my Friend was a counterfeit, and before that time had been drawne and set forth by an old Dutch Herbarist.³⁷

³⁵ Gerard, *Herbal*, p. 898-9.

³⁶ Gerard, *Herbal*, p. 1179.

³⁷ Gerard, *Herbal*, p. 61. "Davies" and "Dries" might both be a misspelling for De Vries.

Similarly, Gerard has a problem with the descriptions of "rough Binde-weed," a plant supposedly common to the Old World and the New. His acquaintance with rough Binde-weede or Sarsaparilla of the New World is based, not on a drawing of the whole plant, or even a dried specimen, but on its roots, the active ingredient as far as the apothecaries are concerned, and which Gerard says "are very well knowne to all." He complains that "such hath beene the carelesnesse and small providence of such as have travelled in the Indies, that heretofore not any have given instruction sufficient, either concerning the leaves, floures, or fruit..." Monardes, he says, affirms that the Sarsaparilla has long roots, which "is as much as if a great learned man should tell the simple, that the common carrion Crow were of a blacke colour. For who is so blinde that seeth the roote itself, but can easily affirme the roots to be very long?" He has received contrary reports that some say it is a vine-like plant, others a small tree, and indeed of the two types of North American plants whose present-day common names are "Sarsaparilla," one is a vine and one a small shrubby tree. He cannot in fact describe the plant with any accuracy, but at least he can comment as a herbalist on the plant's efficacy as a remedy. His comments are interesting for the manner in which the herbalist attempted to reconcile the Old World and New World plants in the pharmacopeia:

Zarzaparilla of Peru is a strange plant and is brought unto us from the Countries of the new world called America; and such things as are brought from thence, although they also seeme and are like to those that grow in Europe, notwithstanding they doe often differ in vertue and operation: for the diversitie of the soile and of the weather doth not only breed an alteration in the form, but doth most of all prevaile in making the vertues and qualities greater or lesser... so, in like manner, although *Zarzaparilla* of Peru be like to rough Binde-weed, or to Spanish *Zarzaparilla*... it is of a great deale more force than that which groweth either in Spain or in Africa.³⁸

³⁸ Gerard, *Herbal*, pp 860-1.

The Book of God's Works: The Garden in Print

Gerard's comments on the effects of soil and weather are the comments not only of a herbalist but of a gardener, and indeed Gerard was a well-known gardener, maintaining his own garden at Holborn and supervising the gardens of Lord Burghley. He comments on the Sweet potato that he "planted divers roots (that I bought at the Exchange in London) in my garden... that have flourished unto the first approach of Winter... and they brought not forth any floures at all."³⁹ Gerard also comments that he grew Yucca ("I had that plant 'brought me that groweth in my garden, by a servant of a learned and skilful apothecary of Exeter, named Mr. Tho. Edwards..."⁴⁰). In his dedication of the *Herball* to his employer, Lord Burghley, he writes of his gardens and his book:

To the large and singular furniture of this noble Iland, I have added from forren places all the varietie of herbes and flowers that I might any way obtaine, I have laboured with the soile to make it fit for the plants, and with the plants to make them delight in the soile, so that they might live and prosper under our climate, as in their native and proper countrie: what my successe hath beene, and what my furniture is, I leave to the report of them that have seene your Lordships gardens, and the little plot of my speciall care and husbandrie. But because gardens are private, and many times finding an ignorant or a negligent successor, come soone to ruine, there be that have sollicitied me first by my pen, and after by the Presse, to make my labours common, and to free them from the dangers whereunto a garden is subject.⁴¹

³⁹ Gerard, *Herbal*, p. 1543.

⁴⁰ Gerard, *Herbal*, p. 926.

⁴¹ Quoted in Margery Corbett, "The engraved title-page to John Gerarde's *Herball* or *Generall Historie of Plantes*, 1597," *Journal of the Society for the Bibliography of Natural History*, 8, 3 (1977), p. 227.

The impetus to preserve a garden in print grew in strength throughout the seventeenth century as the study of plants moved out of the apothecaries shop and into the garden.⁴² John Prest, in his history of botanic gardens, suggests that the discovery of the New World dealt a fatal blow to classical authors and turned botanists to the garden: "...as textbooks to the natural world the classics could never recover, and the result was to throw men forward into new observations in what was known as the book of God's works."⁴³ The gardens were divided into four quarters, each representing a continent, and here the understanding of plant geography and the influences of "soile and weather" began to grow as gardeners attempted to nurture the exotics which began to flood into Europe not just from the New World, but from the Middle East. The fashion for gardens affected the way in which plants were studied, the content of the descriptions and the accuracy of the images which appeared in books. We will examine in another chapter the development of the eighteenth-century florilegia with their sumptuous hand-coloured engravings. For the present it is important to understand that despite his preface, Gerard is not concerned with making an original descriptive or pictorial statement about the plants of his gardens. His text is based on that of Doedens (though much amended and enlarged in the Johnson edition), and the illustrations, as we have noted,

⁴² In 1629, John Parkinson published *In sole paradisus*, the first book in English to be devoted entirely to plants valued for their beauty as opposed to their use or medicinal value, though most of his illustrations are of the traditional herbal variety.

⁴³ John Prest, *The Garden of Eden. The Botanic Garden and the Re-Creation of Paradise*. New Haven: Yale University Press, 1981, p. 38. The seventeenth-century botanic gardens carried a strong religious connotation. It had been assumed in the Middle Ages that the Garden of Eden had survived the flood, and early explorers still sought the First Garden. Columbus sees in the West Indies "the earthly paradise," and the banana is often referred to as Adam's Apple, the tree of the fruit of knowledge of good and evil. The discovery of America allowed all the scattered plants of the original garden to be brought back together, so that God's works might be seen intact, at least in Europe.

derived from earlier works. Whereas Gerard delved into the common stock of images, other gardeners and botanists, like Cornut, required original work.

The first catalogue of the plants in the Jardin royal, established in the late sixteenth century, was prepared in 1601 by Jean Robin (1550-1629), curator of the botanical garden of the Paris Faculty of Medicine where Cornut trained. Botanical gardens had become attached to a number of medical schools, the earliest having been that founded at Padua in 1545, and the one at Paris first laid out by Jean Robin in 1597. The development of botanic gardens was accompanied by the establishment of the *hortus siccus*, dried garden or herbarium. The first was thought to be developed by Lucas Ghini (d. 1556) at Bologna and included 300 specimens. Here the plants were preserved pressed on sheets of paper, and it is not clear when sixteenth-century naturalists speak of receiving the image of a plant whether they are referring to a drawing or a dried plant on a sheet. Herbarium specimens, of course, while preserving the actual plant also distorted it, twisting the shape and in most cases losing the colour. Pierandreo Mattioli (1501-77), author of a re-edition of Dioscorides, had resorted to soaking dried specimens in warm water to revive their true colours and shapes, but the results had not always been successful. Preserving the garden in print as Gerard suggested, gave rise to printed text catalogues, but preserving the flowers after life required a different approach. The only method which could truly render the flower's appearance, including the stages of life, details of the bud, flower or fruit, and true colour was a coloured drawing from nature. In this the French botanists excelled, working with skilled artists who committed their works not to paper, but to vellum (vélin), a long-lasting parchment which when prepared correctly offered a finish as smooth as paper and on which the opaque body colours stood out, remaining fresh and true. The collection of vélins began in the early seventeenth century with the works of

Pierre Vallet, court painter. He was succeeded by Daniel Rabel (1579-1631) followed by Nicholas Robert (1614-85). Rabel published his images in the *Theatrum Florae* of 1624, a work in which a number of French poets offered what appear now to be exaggerated praise of the artist, but in the days when images were produced not mechanically but by human skill, the verisimilitude for which Rabel was famous was celebrated. Scudery suggested that the birds painted in miniature by this artist were so life-like that if the window were opened they would fly away. Malherbe wrote a sonnet to the flower painter:

Quelques louanges non pareilles
 Qh'ayt Appelle encore aujourd'huy
 Cet ouvrage plein de merveilles
 Met Rabel au-dessus de luy.
 L'Art y surmonte la Nature
 Et si mon Jugement n'est vain,
 Flore lui conduisoit la main
 Quand il faisoit cette peinture...⁴⁴

Once again a contemporary painter is being compared to the famous Apelles, but this time he has bested the classical master.

The painted image became the simulacrum of the flower, and the collection of vélins stood for the ephemeral flowers of the royal gardens. It was not only royalty, however, who desired representations of flowers, and books destined for the large market of amateurs and enthusiasts were produced for those whose gardens were more modest. One of the earliest of these florilegia was the *Hortus Floridus*, engraved by Crispijn de Passe the Younger, one of a famous family of engravers. De Passe's "Garden of Flowers" was printed in 1614, and was available in Latin, French, Dutch and English versions. The

⁴⁴ Quoted in Blunt, *Botanical Illustration*, p. 107.

Frontispiece to the First Book is not an elaborate allegory (as it is in Gerard⁴⁵) but a scene of a lady in her walled garden, tending plots bearing tulips, lilies and daffodils and watched by a gentleman from a rose-covered balcony [plate 27]. The *Hortus Floridus* is a book of flowers not for the apothecary's dusty cabinets, but for the lady's garden. The main section of the book is divided into four parts, corresponding to the four seasons, and unlike the illustrations for the herbals, the plants are presented as if growing in the soil, attended by butterflies and other insects [plate 28]. The illustrations often show plants at various stages of their growth, so that the gardener might recognize them. Thus, the illustration of crocuses shows a bulb lying on the ground, while behind it the first tentative spear emerges, then a flower just unfolding, and finally the full-blown bloom. The plates are decorative, and the text brief and descriptive. In the English version, the title describes the "almost incredible laboure and paine" with which the diligent Author "hath very Labouriously compiled, and most excellently performed, both in their perfect Lineaments in representing them in their copper plates." The *Hortus* also includes detailed instructions for "a most exquisite manner and methode in teachinge the practisioner to painte them even to the liffe." The copper engravings were not issued in a coloured state, so that the author felt obliged to ensure that the "practisioner" was provided with enough information to do justice to the plates. The instructions concerning the painting of marigolds are precise:

The leaves that stand round about are of a high masticott coloure, and if the masticot be not of a high-coloure, it must be tempered with a little lack, made shyninge, and shadowved with sad yellow, the innermost must be of a berry yellow there must be regard had in toppinge the starrs vvith the former coloure, the cowne within is the saddest of all, the leaues that come after the yellovv leaues, must very evidently appeare, because they

⁴⁵ See the discussion by Margery Corbett, "The engraved title-page..."

are greene, these leaues and the steale must be shadowed vvith sad yellow and ashcoloure, and topt with white and masticott. ⁴⁶

The author has added a verse before each season, and the verse for Summer suggests that since the engraver has used such care in describing the colours, the artist should "In painefull paintings of the same / Good reader use no lesse."⁴⁷ The author also warned against "blotts and blurs" which would spoil the finished product, and generally harangued the reader to do justice to his original careful work. The harangue was perhaps necessary, since it had not been the practice in decorative works to give flowers their proper colours. The trompe-l'oeil flowers that grace the borders of sixteenth-century manuscripts decorated in the style of Bruges, while painted to look as if the living bloom had been dropped upon a page, did not necessarily sport true-to-life colours. Colour was subordinated to style and decorative appearance, and we have noted that sixteenth-century woodcuts were often crudely daubed with what can only be described as gaudy colours. The coloured frontispiece to a 1597 copy of Gerard also reveals this practice. "In this example some flowers indeed have their rightful colours, in others truth to nature has been sacrificed to decorative ideas; all the irises of whatever species are painted in the same shades of blue, while the Madonna lily, unmistakeable from its form, is mauve blending to orange with its bulb bright red."⁴⁸ We are again confronting the problems of resolution. The

⁴⁶ Quoted in Blunt, *Botanical Illustration*, pp 100-1.

⁴⁷ Quoted in Blunt, *Botanical Illustration*, p. 101.

⁴⁸ Corbett, "The engraved title-page...", p. 226. De Passe may have been sensitive to correct colouring because it has been suggested by Hulton that he worked from the watercolours of an eminent plant painter and colourist, Jacques Le Moyne de Morgues. Little of Le Moyne's original North American material remains, but de Bry's engravings reveal that he must have included carefully rendered plants. De Bry's engravers often add generic plants in the foreground of the engraving, but in at least one plate (XLI), the background vegetation captures something of North American habitat, featuring as it does cattails and perhaps a milkweed or flowering rush. In England, however, Le Moyne had a chance to display his skills as a flower painter, when he prepared drawings for a book entitled *La Clef des Champs* (1586). *La Clef* was conceived primarily as a pattern book for jewellery, painting, embroidery, tapestry and all kinds of needlework. Le Moyne

engravers are as a rule working either from their own coloured studies or from those of others.⁴⁹ The black-and-white engraving can only hint at the original full-colour drawing. In Dodart's *Mémoires pour servir à l'Histoire des Plantes*, published in 1675, the plates were engraved after the exquisite watercolour drawings by Nicholas Robert. Dodart notes that the engravers have attempted to indicate colours through a new technique:

Since printing in colour is not employed yet, and since painters waste much time and are not always successful, we thought we could, in future, supply to some extent what was lacking in engraving by taking care to indicate, as far as is feasible, the depth of colour. Thus, a distinction would be made between brownish-green and pale green, between white and dark-coloured flowers.⁵⁰

Achieving true colour became important in the context of gardening, since gardeners often valued colour as much as shape. During the tulip craze which afflicted seventeenth-century Holland the flower was prized for the varieties of its colour and it became important to make these distinctions in the florilegia. De Passe remarks in relation to his figure of the "Broad-Leaved Tulip Called Palton" that "So great is the variety of Tulips year by year as very often to mock or surpass the desires of growers, and so it is very difficult even for one who is expert to express them in words." Despite his protest De Passe goes on to attempt to describe the colour in words: "this first Tulip can rightly be called *flammea*, its whole flower is resplendent, decorated with flames of sulphur-

draws on many earlier "patterns" for the animal and bird figures, but the flowers are cut after his own drawings, which are extraordinarily life-like and delicately coloured.

⁴⁹ Weiditz's original colour studies were located in the herbarium of Felix Platter in Bern, Switzerland. Arber suggests that the watercolour studies were prepared both as a guide to the engravers and as a model for coloured copies by the publishers (p. 207). Arber also notes that Plantin employed "certain women illuminators to colour by hand the botanical books which he produced." (p. 215)

⁵⁰ Quoted in Blunt, *Botanical Illustration*, p. 112.

yellow..."⁵¹ In addition, as Arber has pointed out, the technology of copper engraving allowed the plates to be separated from the descriptions, and the plates became available for wealthy collectors and gardeners, who could look on the flower books as indoor gardens, the equivalent of the herbalist's *hortus siccus*.

Cornut and Charlevoix

While not exactly a gardening book, the illustrations for Cornut's 1632 Canadian flora are original, drawn from life in the gardens of Paris and engraved, according to Blunt, in the style of Paul Reneaulme (1560-1624). Cornut's researches were not, however, limited to the Jardin royal and the botanic garden. He also mentions the Morin gardens, which were not so much gardens as plant nurseries, and the Morins' practice of having their stock depicted in watercolours or oils has been noted above. Cornut refers not only to the works of Dioscorides and Pliny, but also to the culture of the living flowers which he sees in these gardens. Where did the Robins and Morins acquire their Canadian plants? Cartier did indeed bring back some plants, but the gardens benefitted most from the establishment in the early seventeenth century of permanent French and English settlements in North America. The 1601 catalogue cited two Canadian plants; the 1636 catalogue shows 50 American plants. Some were undoubtedly sent by Louis Hébert (c1575-1627), an apothecary who lived first at Port-Royal then at Quebec, also by Marc Lescarbot (c1570-1642), who had been in charge of the gardens at Port-Royal, and possibly by others, including Jesuit

⁵¹ Crispin De Pass, *Hortus Floridus*. 2 vols. London: The Cresset Press, 1929, pl. xxxii.

missionaries.⁵² Others arrived via exchanges with the Tradescants of London and other gardeners. Cornut's book was not simply then a depiction of the plants in a particular garden,⁵³ but an attempt, however imperfect, to describe a regional flora. The etchings do not appear to have been coloured, since they were to serve primarily for information, not for "injoyment" as de Passe would have the flowers in his *Hortus*.

As informative images, then, Cornut's illustrations were reused over a century later in Pierre-François Xavier de Charlevoix's (1682-1761) *Histoire et description generale de la Nouvelle France...*, published in 1744. Charlevoix was not for the most part describing things seen in the New World for the first time; rather, in the words of M. Fournier, he "utilise, ordonne, souvent récrit" the works of earlier missionaries and other authors.⁵⁴ His descriptions of plants owe much, however, to his own observations, which were obviously recorded in a journal. In a series of "letters"⁵⁵ dated 1720-22 and published as Volume I of the 1761 edition, he describes himself as "a traveller, rambling over the forests and plains of Canada, and who is diverted with every thing which presents itself to his view. But what could you expect from one who travels through such a country as this."⁵⁶ In Letter IX, which is devoted primarily to natural history,

⁵² Pringle, "How 'Canadian'," pp 205-6.

⁵³ It should be noted that Cumming et al. in *The Exploration of North America, 1630-1776*. Toronto: McClelland and Stewart, 1974, suggest that Cornut's drawings were from dried specimens sent from Québec. This assertion is contradicted by Rousseau (p. 151), and the fact that Cornut frequently refers to the horticulture of plants would suggest that he could observe them living, and that at least some of them were drawn from life.

⁵⁴ P. Fournier, *Les voyageurs naturalistes du clergé français avant la Révolution*. Paris: Paul Lechevalier & Fils, 1932, p. 50.

⁵⁵ The letters addressed to the Duchess of Lesdiguières are a literary device and were not written on the spot and sent at the time of writing but worked up from notes for publication.

⁵⁶ P.-F.-X. de Charlevoix, *Journal of a Voyage to North-America Undertaken by Order of the French King containing The Geographical Description and Natural History of that Country, particularly Canada... in two volumes*. London: R. and J. Dodsley, 1761 (Ann Arbor: University Microfilms, 1966), p. 251.

he notes the distribution of trees, the manner in which Indians eat the local produce, the remedies created from bark, seed or fruit, and the odours of plants. The second volume of the 1744 quarto edition is, however, along the lines of a regional flora, and includes a number of folded plates with engravings of plants, forty of which are copied in reverse and reduced from Cornut [plate 29]. In most cases, Charlevoix has also translated Cornut's original Latin text into French while occasionally adding his own observations. To this core, he has added an additional fifty-eight plants, incorporating information from Joseph-François Lafitau, Michel Sarrasin, François Hernandez, Bauhin, Tournefort, even Mark Catesby. The illustration of gin-seng has been copied from Lafitau's memoir on the Canadian plant published in 1718, and Charlevoix notes that as early as 1721 Canadian gin-seng was being processed in China. Many of the other plants included in Charlevoix's North American flora are native to the southern states in which Charlevoix travelled on his expedition from Canada to New Orleans. The illustrations of the additional entries differ little in style from those of Cornut. The plants show roots, some detail of flowers and fruits, and in many cases appear to be engraved after life. Charlevoix notes, however, that even where the notes in his own journal differ, he prefers to follow the existing illustrations ("Dans la figure que j'en donne ici, j'ai représenté les feuilles comme Bauhin et Catesby les ont fait graver").⁵⁷ It would seem that Charlevoix worked on his book over the twenty years after his return to France, since Catesby began to publish in 1731. Most significantly, however, for our understanding of the role of images, is Charlevoix's ready acceptance of the inclusion of illustrations prepared over a century previously. The standards of accuracy in rendering which Charlevoix, his publisher, and presumably his readers are ready to accept,

⁵⁷ P.-F.-X. de Charlevoix, *Historie et description générale de la Nouvelle France*. Paris, 1744, pl. LXIII.

has not changed in one hundred years. While it cannot be denied that Cornut's illustrations are clear and often engaging, they are not engraved to the same standard as the botanical works of Charlevoix's contemporaries. The mid-eighteenth century was the age of Ehret, who has been described as the world's greatest flower painter, and his illustrations for the *Hortus Cliffortianus* of Linnaeus (1737/8) speak of a different convention and a different standard to the one used by Cornut and re-used by Charlevoix. It can only be presumed that Charlevoix felt that for his purposes the illustrations of these North American plants would do very well. He was, after all, not a botanist or a taxonomist, but a curious and rambling traveller, typical of his era, and his book was not intended as a florilegium but as a description of the country and its productions. The re-engraved Cornut plates thus met the requirements, and revealed that even in the century of Linnaeus the difficulties inherent in producing original graphic materials could condition the use of the images and their value as information.

We have referred in both this chapter and a previous one to the idea of the mark, and of Thevet's suggestion that the maple had been "marked" for the French by the inclusion of a fleur de lis in its centre. This use of botanical markings did not disappear in the seventeenth century. The doctrine of signatures suggested that the curative properties of each plant were revealed through some outward mark or signature so that knowledgeable people could recognize God's provision of natural remedies. The walnut, for example, was assumed to be good for ailments of the brain, since the kernel resembled the brain itself.⁵⁸ The idea that certain marks revealed in the visible forms were also portents or omens as Thevet suggested, came under scrutiny by the more

⁵⁸ "...the Kernel hath the very figure of the Brain, and therefore it is very profitable for the Brain." From Coles, *Adam in Eden: or Nature's Paradise* (1657) quoted in Prest, *The Garden of Eden*, p. 63.

skeptical seventeenth-century thinkers. Svetlana Alpers includes two Dutch prints concerning the "marks" discovered in the core of an apple tree.⁵⁹ The first print shows a schematic view of an apple tree whose hollow core has taken the shape supposedly of a nun or priest. Holland at this time was still at war with Catholic Spain, and the threat of invasion was present. Not long after the appearance of this first print in 1628, a second was published by Pieter Saenredam, entitled "A Print to Belie Rumors about the Images Found in an Apple Tree." This etching with text refuted the interpretation of the shapes of the hollow core as recognizable images of nuns and priests, and showed instead a dark abstract shape. Alpers cites this as evidence of the Dutch view that the production of images was to show the true testimony of sight and not the misleading interpretation, or clouded view of the thing itself. The dichotomy of these two prints, however, can also be used as evidence to show that though the idea of the mark, of God's will revealed in natural markings, still had strong hold over people's imaginations, a new view of rational interpretation of evidence, and of accurate depiction was also present. This emphasis on accurate drawing after nature was certainly part of the tradition of botanical illustration which emerged in the sixteenth and early seventeenth centuries.

⁵⁹ Svetlana Alpers, *The Art of Describing: Dutch Art in the 17th Century*. Chicago: University of Chicago Press, 1933, pp 80-1.

CHAPTER FIVE

The Redefinition of Landscape

"La plus effroyable Cascade"

The curious voyage of Louis Hennepin (1626-c1705) began in 1676 when he arrived in Canada as a Recollet missionary. He spent eleven years in North America, travelling through much of la Nouvelle France and visiting Louisiana. His description of his travels in Louisiana appeared in 1683, and the *Nouvelle découverte d'un tres grand pays*, was first published in 1697. Various editions of these works comprising additional information from other published works on North America were printed in a total of 46 editions in French, Dutch, German, Spanish, Italian and English before the middle of the eighteenth century.¹ The *Nouvelle découverte* had a number of illustrations, including in the first edition of 1697, an engraved frontispiece and two etchings, one of a bison and one of Niagara Falls. While the bison had often appeared before in print, this was the first published illustration of Niagara Falls for a European audience. Waterfalls and rapids exercised a particular hold on the European imagination that strengthened in the era of the picturesque, of which untamed falls were an outstanding exemplar. Champlain had heard reports of the falls from the native peoples, but had not himself visited them. He did, however, describe his inspection of the Saut St-Louis near Montreal, where one of his company was lost while shooting the rapids with native companions:

¹ For the complex publishing history, see N-E Dionne, *Hennepin, ses voyages et ses oeuvres*. Montréal: Les éditions canadiennes, n.d., pp 19-40.

...Le lendemain ie fus dans vn autre canot audit saut avec le sauage... & vous assure que quand il me monstra le lieu les cheueux me herisserent en la teste, de voir ce lieu si espouventable, & m'estonnois comme les deffuncts auoient esté si hors de iugement de passer vn lieu si effroyable, pouuant aller par ailleurs...& vne partie dudit saut estoit toute blâche d'escume, qui môtroit le lieu plus effroyable, avec vn bruit si grand que l'on eut dit que c'estoit vn tonnerre, comme l'air retentissoit du bruit de ces cataraques.²

Champlain, as did all voyagers and explorers, became accustomed to rapids, but nothing could accustom most Europeans for the sight of Niagara. Hennepin did visit the falls with his native guides and his description of them is one of the highlights of his book. Hennepin advises his readers at the outset of the 1704 edition of *Nouvelle découverte* that the publisher had enriched this new edition with all the maps and etchings necessary "pour donner une Idée nette de certaines choses qui se comprennent mieux, quand on en a quelque représentation devant les yeux." He goes on to say that the reader would see "sur tout une description du Grand Saut de Niagara, qui est la plus belle & tout ensemble la plus effroyable Cascade, qui soit dans tout l'Univers." In case the readers would not believe his eye-witness account, he adjured, "Je vous protests ici devant Dieu, que me Rélacion est fidèle & sincere, & que vous pouvez ajoûter foi à tout ce qui y est rapporté."³ He described Niagara in Chapter VII:

Entre le Lac Ontario & le Lac Erié il y a un grand et prodigieux Saut, dont la chute d'eau est tout-à-fait surprenante. Il n'a pas son pareil dans tout l'Univers. On en voit quelques-uns en Italie; il s'en trouve même encore dans le Royaume de Suede; mais on peut dire, que ce ne font que de fort foibles échantillons de celui, dount nous parlons ici.

• • •

Elle est même si rapide au dessus de grand Saut, qu'elle entraîne violemment toutes les bêtes sauvages, qui la veulent traverser pour aller

² Samuel de Champlain, *Les voyages du Sieur de Champlain*. Ann Arbor: University Microfilms, 1966, pp 291-2.

³ Louis Hennepin, *Voyage curieux du R P Louis Hennepin, Missionnaire Recollect, & Notaire Apostolique, qui contient Une Nouvelle Decouverte d'un Tres Grand Pays, Situé dans l'Amerique...* Leide (Leiden): Chez Pierre Vander Aa, 1704, "Avis au Lecteur", n.p.

pâture dans les terres... Alors elles sont précipitées de plus de six cents pieds de haut.... Les eaux qui tombent de cette grande hauteur, écument & bouillonnent de la manière du monde la plus épouvantable. Elles font un bruit terrible, plus fort que la tonnerre. Quand le vent souffle au Sud, on entend cet effroyable mugissement à plus de quinze lieues.⁴

The falls were without equal in the universe, they were "suprenant," "prodigieux," "épouvantable," "effroyable." All other falls were but feeble reflections of this wonder of the world. Hennepin obviously felt that the readers would only appreciate this phenomenon by aid of an illustration, and the 1697 etching was for many Europeans their first "eye-witness" vision of the landscape of Canada. The etching was of course executed by a European artist, likely the Dutch artist Jan van Vianen (1660-1726), and it is possible that Hennepin may have had a sketch or even supervised the original work, since the illustration does resemble the falls, the appearance of which is not precisely described in the text [plate 30].

The countryside in the etching was heavily treed, as all reports agreed, with pine trees in evidence, as befit a northern country. The river that could produce so great a cataract was itself enormous, stretching to the far and mountainous horizon. The falls were shown as great uninterrupted cascades of water, divided by a rocky island. The "horseshoe" shape of the Canadian Falls obviously gave the artist some difficulty, or perhaps the distinctive shape was obscured by the "third fall," which according to a later account eventually disappeared (see below). The vantage point of the view is from the American shore, at a level with the top of the falls, but despite Hennepin's assertion that the falls were 600 feet high, the artist could not come to terms with the scale, and from the measure of the two tiny figures perched on in the middle ground on

⁴ Hennepin, *Voyage curieux*, pp 44-8.

the brink of the American Falls, the cascade would appear to be about half the height of Hennepin's estimate.⁵ The artist did, however, attempt to develop a visual metaphor for Hennepin's language in the expression of the beholders. Four figures in European dress are in the right foreground. Two gaze upon the falls, their arms spread wide in amazement. The other two cover their ears, one with an expression of pain at the terrible noise ("plus fort que la tonnerre") of the falling water. On the opposite shore, tiny figures, probably natives, since one carries a spear, stand about near the edge of the river.

The image created by Hennepin's artist was enormously successful, since it remained in the printer's repertoire for over a century, last appearing in James Wyld's *The United States* published in 1817.⁶ Shortly after it first appeared in print, the mapmaker Nicolas de Fer issued a large wall map of North and South America which included engraved vignettes by Nicolas Guérard. Hennepin's Niagara forms the background of a subsequently famous vignette in the top left-hand corner, which shows a horde of busy beavers building a dam [plate 31], and which will be discussed below. The beavers, which resemble small, flat-tailed lions, and the image of Niagara are copied in reverse on the better-known map published by Herman Moll in 1715.⁷ Pehr Kalm's account of the falls in *The*

⁵ The Falls are in fact about 160 feet high, closer to Pehr Kalm's mid-eighteenth-century estimate of 135 French feet. Kalm insisted that in Canada, Hennepin was known by the name of "The great Liar."

⁶ Jeremy Elwell Adamson, *Niagara. Two Centuries of Changing Attitudes, 1697-1901*. Washington, D.C.: Corcoran Gallery of Art, 1985, p. 18. For an excellent analysis of images of Niagara, see Christopher W. Lane, *Impressions of Niagara, The Charles Rand Penney Collection...* [Philadelphia]: The Philadelphia Print Shop, 1993.

⁷ Edward Dahl, "The Original Beaver Map - De Fer's 1698 Wall Map of America" in *The Map Collector* 29 (December 1984), p. 24. The myths surrounding the beaver's industry and their modes of organization and work persist into the eighteenth century. Dahl suggests they began with Sagard's 1632 account, though it would appear to date back even further. The idea of the beaver as the master craftsman of the animal kingdom is found in the works of the twelfth-century writer, Gerald of Wales, who describes beavers using their tails like sledges. Sagard's descriptions is certainly repeated in Denys and in Charlevoix's 1741 account of their habits, though Hearne (1795) heaps scorn on these "fictions."

Gentleman's Magazine of 1751 was illustrated by a version of the Hennepin illustration, despite Kalm's disparagement of Hennepin's description, and it would appear that a hand-coloured print by Robert Hancock published in 1794 combined Kalm's description with the Hennepin-based image to present an exotic Niagara to a European audience delighting in the picturesque [plate 32].⁸ By far the most peculiar of the images featuring what became an eighteenth-century image-clé was that produced by the French engraver Sébastien Leclerc (1637-1714) in 1705 [plate 33]. Leclerc produces a spectacular etching in which the truly enormous cataract becomes the backdrop for the ascent into heaven of Elijah in his chariot of fire.⁹ Here the Old Testament prophet has been transported from the banks of the river Jordan to the banks of the Niagara, and a New World whirlwind bends the trees and swirls the clouds masking his ascent. The two tiny figures on the rocks below are astounded not by the chariot of fire but by the equally miraculous falls thundering before them. Niagara has become a visual symbol of the wonders of creation, an acknowledgement that truly all the earth was the Lord's, even so strange a landscape as that of the New World.

The Conventions of Landscape

Niagara became a symbol of the strangeness of the Canadian landscape, and a metaphor for its vast expanse. Hennepin's 1697 view was not, however, the first

⁸ Hancock's image features a group of fashionable Europeans and their dog, to whom the wonders of the falls are described by a half-naked and very dark "savage," clad in a loin cloth and what might be an attempt at a "feather" crown which characterized "America" in the seventeenth century. The Europeans are accompanied by two elderly gentlemen in what appears to be Oriental dress. On the opposite shore a line of naked savages carry large burdens on their backs down a steep path.

⁹ 2 Kings 2, verse 9 (King James Version). *And as they still went on and talked, behold, a chariot of fire and horses of fire separated the two of them. And Elijah went up by a whirlwind into heaven.*

North American scene that Europeans had viewed, though with the exception of some of de Bry's translations of John White's drawings, it was the most true to nature. While the animals and plants of the northern half of the new world had been figured in maps and early works, the appearance of the new land had been depicted only in the sketchiest and often most symbolic forms. Gastaldi in his early maps provided rolling hills and stylized trees. In his woodcut of a winter hunt on oddly angular snowshoes, Thevet's artist had shown only generic snow-covered landscape with sparse deciduous trees.

Landscape *per se* was not in fact of great interest to the Europeans who first encountered the New World. Kenneth Clark makes the point in his study of the development of landscape painting, that "People who have given the matter no thought are apt to assume that the appreciation of natural beauty and the painting of landscape is a normal and enduring part of our spiritual activity." He suggests, rather, that landscape painting was the chief artistic creation of the nineteenth century.¹⁰ He does not mean by this that people did not depict the countryside before the nineteenth century, only that it was not the focus of their attention. Renaissance artists, who could paint flowers, birds and Turkish carpets with high realism, would often show a landscape of stylized rocks to suggest mountains, or isolated trees for forests. Their interest was in the scene not the scenery. Similarly, early mapmakers and artists illustrating texts emphasized those parts of the description their patrons and publishers felt of the greatest interest – the native people and their costumes and customs, the animals, interesting or unusual events. The landscape was sketched in like a scenic backdrop, only the most obvious features represented. Since the landscape was not seen as information, artists could afford to use generic

¹⁰ Kenneth Clark, *Landscape into Art*. London: John Murray, 1949; new ed., 1976, p. viii.

sketchbook trees and plants for New World species, and figure hilly terrains and high mountains whether they existed or not. Clark notes that what he calls the Gothic landscape is a landscape of symbol, not of fact, a landscape where heaps of rocks could represent mountains, and three trees make a forest. Some sense of the symbolic nature of the landscape would appear to have been retained by the mapmakers and early artists, like John White, who continued to make use of the conventions of manuscript illumination in their work.

The depiction of landscape began to change, however, in the late fifteenth century, reaching a new level of realism in the works of seventeenth-century Holland. The clarity of vision which permeates Dutch landscapes of the period should not, however, be confused with accurate rendering of nature. Like Dutch flower painting of the same period, many of the landscapes were studio pieces where the studies observed from nature were reworked into the landscapes.¹¹ For Clark the views of cities and countryside are portraits, the landscape of fact the portrayal of "recognizable experiences."¹² When the European artists came to depict this new and largely unfamiliar landscape of the New World, they were forced to rely almost wholly on studio or printing shop images, on the reworking of old ideas into fresh assemblages representing the new scenery. Since the scenery was still only backdrop, however, the need for factual depiction was overridden by the need for consistent style and ease of reproduction.¹³ Thus the landscape of the New World was recreated in the

¹¹ John Walsh, "Skies and Reality in Dutch Landscape" in David Freedberg and Jan de Vries, eds. *Art in History, History in Art. Studies in Seventeenth-Century Dutch Culture*. Santa Monica, CA: The Getty Center for the History of Art and the Humanities, 1991, p. 106.

¹² Clark, *Landscape into Art*, p. 59.

¹³ William C. Sturtevant, "The Sources of European Imagery of Native Americans" in Rachel Doggett, ed. *New World of Wonders. European Images of the Americas, 1492-1700*. Washington D.C.: Folger Shakespeare Library, 1992, p. 32: "Although accuracy was certainly a goal of artists in the sixteenth and seventeenth centuries, it was very often subordinated to stylistic and compositional considerations and was influenced by efforts to address the expectations of the audience."

familiar language of European illustration, and even the representation of Niagara was not so much a picture of the scenery as the portrait of a natural wonder, an emblem of unfamiliarity.

While landscape was not a focus of either textual or pictorial description, the new land did imbue all accounts with the force of its presence. The first reports described only small islands and coastlines, and in Cartier's narrative became almost an Arcadia, at least when viewed in summer. As the explorers penetrated further inland and established settlements, they began to describe the country and to depict both its strangeness and wonders, like Niagara or the beluga whales at the mouth of the Saguenay, as well as its familiar aspects. It should be noted once again that the northern half of the New World did not exhibit the same wrenching exoticism for Europeans as did tropical America. Many of the plants and animals were identical or very similar to those in northern Europe. The European response to the landscape then was not to see it as bizarre, but if not similar then at least recognizable. The artists used European conventions to depict the landscape not only because they had no other first-hand studies, but also because they fit with the landscape that the writers described.

The Deer Park

As in most other areas, de Bry and his sons have provided the most informative early illustrations of landscape, and two plates from the later volumes in the *America* series permit insight into the seventeenth-century understanding of the paysage of the New World. Volume X of *Les grands voyages*, published in 1618 with illustrations by Johann Theodor de Bry (1561-1623), includes John Smith's accounts of Virginia. Plate XI is a hunting scene, showing the English

explorers hawking, shooting, deer hunting and fishing. In the left foreground, a hound laps at a spring of freshwater, his master sits astride a well-groomed horse, his hawk on his wrist [plate 34]. A huntsman on foot with a long gun and a sword and carrying a brace of birds walks toward his fellow. Another huntsman with his hound is releasing his hawk from the jesses, while another hawk attacks a heron, bringing it to the ground. In the midground two more huntsmen with hawks are seen, one striding elegantly along, dressed in tall hat, starched ruff and sword, hawk on his wrist, the other gesturing to the prey his hawk has brought to earth. Near them a man fishes with a long pole, his anticipated catch not any small fry, but two monster fish, similar to those which populate the oceans on maps of the same period. In the distance against a background of mature deciduous trees, a mounted hunter, with drawn sword and companion dog, chases a stag. The sky is alive with birds wheeling and diving. It would seem that the New World offers game aplenty for the sportsman, though as the Plymouth Pilgrims would discover, the plenty could be illusory and starvation rather than sustenance the rule.¹⁴

The idea of a New World of plenty, however, underlay the illustration showing native caribou hunting in De Bry's edition of Sir Richard Whitbourne's discourse on the New-Found-Land [plate 35]. The fact that de Bry later uses the same engraving by Matthæus Merian to represent deer hunting in Mexico (Volume XIV, 1630) does not detract from its use in representing a "typical" Newfoundland scene. The engraving on page 15 of Volume XIII, published in 1628, supposedly illustrates the method by which natives hunt the caribou. In

¹⁴ Wayne Franklin, *Discoverers, Explorers, Settlers. The Diligent Writers of Early America*. Chicago: University of Chicago Press, 1979, note to Plate 1. William Wood also notes that conditions were not so idyllic as they might appear. He writes in *New England's Prospect* (1634), that "there be so many old trees, rotten stumps, and Indian barns, that a dog cannot run well without being shouldershot." (William Wood, "Excerpts from *New England's Prospect*" in Thomas J. Lyon, ed. *This Incomperable Land. A Book of American Nature Writing*. New York: Penguin Books, 1989).

the right foreground stands a caribou in profile, recognizable by its peculiar antlers and shaggy mane over the shoulders. It stands on a grassy slope, sprinkled with flowers and backed by conifers which resemble European cypresses more than North American firs. Laiden grape vines grow along the hills. In the middle ground two natives lounge beside a lake fringed with reeds, while another dries the fish he has caught, spreading them on the ground. In the background is the scene of the hunt. The natives have set fire to a small tree-clad island, chasing the caribou into the water, where they pursue them in dug-out canoes, shooting them with bow and arrow. Birds fly to the trees. The peaceful foreground contrasts sharply with activity of the hunt behind it, but the image of Arcadia, where little effort yields great return, is clear. One other early image from de Bry illustrating native methods of hunting is cut after a drawing by Le Moyne and appears in the second volume of *America* issued in 1591. Here the natives disguise themselves in deerskins, luring the stags from the forest. The stags have come to drink at a meandering stream fringed with rushes. The forest in the background is thick but the trees are large and there is little underbrush. The deer are magnificent, high-stepping animals, and the heads of both the decoy deer and the stag lured to the water are reflected in the calm stream. Again the scene is classical in its imagery, man and deerskin blending into one another, the animals of the hunt coming innocent and trusting to their deaths.¹⁵

¹⁵ Howard Mumford Jones acknowledges that "The New World offered the illustrator unique problems." Jones is most concerned about the depiction of the native but his comments on the Arcadian view of North and Central America are worth repeating: "Such, then, are the principal elements in the image of the New World formed by Europe at the end of the fifteenth century as enriched by the sixteenth. First, the component of wonder, incarnated as it were, in the concept of islands where men do not die unless they want to, where it is always summer, where food is plentiful, and where nobody works.... These idyllic promises were crossed by tales of derring-do, and the New World image absorbed as well the enchanted fairyland of chivalric romance. Finally... the pictorial imagination of the Mediterranean Renaissance turned naked Indians into gods and goddesses, warriors and nymphs, and what had risen out of a dream of antiquity became a mode of picturing actuality." (*O Strange New World. American Culture: The Formative Years*. New York: Viking Press, 1964, pp 28-33.)

Hunting was an important and sometimes central preoccupation of many Europeans. Both hawking and hunting possessed a notable literature dating to classical times and widely disseminated among the aristocracy of the period.¹⁶ Keith Thomas in his masterly study of attitudes to nature in England, *Man and the Natural World*, quotes James Cleland, an early seventeenth-century English author, that "he cannot be a gentleman which loveth not hawking and hunting."¹⁷ Thomas Cockaine, author of *A Discourse of Hunting* (1591) notes in his preface "To the Gentlemen Readers" that he could say "much more in praise of this notable exercise of hunting: by which in many other Countries men haue been and yet are often deliuered from the rauine & spoile of many wild beasts; as namely of Lyons, of Beares, of Woolues, and of other such beasts of pray..."¹⁸ The gentlemen adventurers and explorers took their "notable exercise" with them to the New World. Sir Walter Raleigh described the country of Guiana with a huntsman's eye:

There is no countrey which yieldeth more pleasure to the Inhabitants, either for their common delights of hunting, hawking, fishing, fowling, and the rest, than Guiana doth. It hath so many plaines, cleare rivers, abundance of Pheasants, Partridges, Quailes, Rayles, Cranes, Herons and all other fowle; Deare of all sorts, Porkes, Hares, Lyons, Tygers, leopards, and diuers other sortes of beastes, eyther for chace, or foode.¹⁹

¹⁶ Note Xenophon *On Hunting* (Cynegeticus); Frederick II, *De Arte Venandi cum Avibus*; Gaston Phébus, *Livre de chasse*; Tuberville and Cockaine (cited below).

¹⁷ Keith Thomas, *Man and the Natural World. Changing Attitudes in England 1500-1800*. Harmondsworth: Penguin, 1984, p. 145.

¹⁸ Thomas Cockaine, *A Short Treatise of Hunting, 1591*, with an introduction by W.R. Halliday. [Oxford]: Humphrey Milford, Oxford University Press, 1932.

¹⁹ Franklin, *Discoverers, Explorers, Settlers.*, pp 23-4.

Morison notes that John Davis (c1550-1605), the discoverer of Davis Strait, took hounds for hunting on his voyage of 1587.²⁰ William Wood (fl.1629-35) encourages prospective settlers in New England to bring their dogs: "Yet would I not dissuade any from carrying good dogs, for in the wintertime they be very useful..."²¹ Although Wood refuses to "speak much of the hawks" for fear of censure from experienced falconers, he does wish the New England hawks "well mewed in England, for they make havoc of hens, partridges, heathcocks, and ducks, often hindering the fowler of his long looked-for shoot."²²

The same passion for the chase animated the French explorers. Champlain visits the bird island and is astounded at the number and variety of birds, but finds time to enjoy as well "plaisir de la chasse."²³ Marc Lescarbot dedicates much of his long poem *A-Dieu a la Nouvelle France* (1607) to a description of the birds, beasts and fish available to the French at Port-Royal.²⁴ Of all the early authors on la Nouvelle France, however, few can match the enthusiasm for the hunt shown by the Baron Louis-Armand de Lom d'Arce de Lahontan (1667-1715). His *Voyages dans l'Amerique septentrionale* were proved so popular that they were republished well into the eighteenth century in English, German, and Dutch editions as well as reprints of the original French.

²⁰ Samuel Morison, *The European Discovery. The Northern Voyages AD 500-1600*. New York: Oxford University Press, 1971, p. 594. Davis, in the account of his first voyage in 1585, describes a polar bear hunt: "... but when wee came neere the shore, wee found them to be white beares of a montrous bignesse: we being desirous of fresh victual and the sport, began to assault them..." Quoted in W.P. Cumming et al, *The Discovery of North America 1630-1776*. New York: American Heritage Press, 1971/2, p. 235.

²¹ "Of the Beasts that Live on the Land", in Wood, "Excerpts," p. 98.

²² In "Of the Birds and Fowls Both of Land and Water", from Wood, "Excerpts," p. 103.

²³ Champlain, *Les voyages*, Premier voyage, 1604, p. 13.

²⁴ The description of such natural plenty is similar to the image portrayed by White and it would be difficult to guess from Lescarbot's rhapsody on the abundant fish and game that scurvy ravaged the settlement in the winter.

The 1705 edition of the *Voyages* is in two volumes, and the chapters of the first volume are in the form of a series of letters to a correspondent in France, a literary conceit popular at the time. De Lahontan arrives in North America as a young nobleman and divides his time, it would appear, between military campaigns and the hunt, chiefly in the company of the natives. He is, as the author of the Preface makes him, "un Gentilhomme curieux & de bon sense... Jeune & plein de feu... la fatigue & le peril ne le rebutoient point... Pendant ces voyages il tenoit registre de tout ce qui est à la portée d'u Cavalier d'esprit..."²⁵ His Lettre X describes a moose hunt, and Lettre XI, "Autre chasse curieuse de divers Animaux." De Lahontan writes to his European correspondent:

Si bien donc que mes Originaux vous ont fait plaisir. J'en ai de la ioye, & cela, m'engage à vous rendre compte de mes autres chasses. Je me figure bien, en effet, que ces sortes de Relations sont de vôtre goût, car vous aimez la chasse; & je vous connois pour un grand exterminateur de gros & de petits pieds.²⁶

De Lahontan then goes on to describe his "expédition meurtriere" with the native peoples in the hunt for ducks and geese, passenger pigeons, muskrats, groundhogs, wolverine, porcupine, otters, deer, and partridge. In his second volume he describes in more detail the animals and birds he has encountered, and in particular the beaver.

Hunting, in fact, occupied a good deal of time for early European settlers, and Marc Lescarbot notes that under his supervision each man worked only three hours a day in the gardens or habitation, spending the rest of the time

²⁵ Mr. le Baron de La Hontan, *Voyages du Baron La Hontan dans l'Amérique septentrionale*, tome premier. Amsterdam: Chez François l'Honoré, 1705 (Montréal: Editions Elysée, 1974), Preface.

²⁶ De La Hontan, *Voyages*, I, pp 92-3.

hunting and fishing.²⁷ This hunting was, as Raleigh noted, as much for food as for chase. Champlain describes the site of Montreal as a kind of hunters' paradise where nothing is lacking, though Champlain also lingers on the description of plants and the possibility of gardens, revealing as always a more than common pleasure in growing things:

Et proches de ladite place Royale y a une petite riuere qui va assez auât dedans les terres, tout le long de laquelle y a plus de 60. arpens de terre desertés qui sont comme prairies, où l'on pourroit semer des grains, & y faire des iardinages. ... Il y a aussi grâde quâtité d'autres bestail que l'on voudra: & de toutes les sortes de bois qu'auons en nos forests de pardeça: avec quantité de vignes, noyers, prunes, serizes, fraises, & autres sortes qui sont très-bonnes à manger... La Pesche de poisson y est fort abôdâte, & de toutes les especes que nous auons en France, & de beaucoup d'autres que nous n'auons point, qui sont tres-bons: comme aussi la chasse des oiseaux aussi de diferétes especes: & celle des Cerfs, Daims, Cheureuls, Caribous, Lapins, Loups-seruiers, Ours, Castors, & autres petites bestes qui y sont en telle quantité, que durant que nous fusmes audit saut, nous n'en manquasmes aucunement.²⁸

Twentieth-century palates are probably unused to the wide variety of birds and beasts considered fit for human consumption in the past. John White and Thomas Harriot recorded that they not only shot and sketched the strange New World wildlife, they also ate it. Without the huge commercial herds of cattle, swine and sheep and the battery flocks of chickens and turkeys upon which the present-day meat industry depends, people were dependent upon the animals they could raise on their own holdings or those they could hunt or snare in the surrounding woods. The young man of Champlain's troop who died in the rapids had gone to hunt herons for the table. Nicolas Denys (1598-1688) in his *Description and Natural History of North America*, is of all the early

²⁷ Biggar, in Introduction to Marc Lescarbot, *The History of New France*, 3 vols. Toronto: The Champlain Society, 1914, p. xi.

²⁸ Champlain, *Voyages*, Livre second, 1608-12, pp 286-7.

writers an evident gourmet. His catalogue of the birds and beasts of Atlantic Canada is as much a guide to cuisine as it is to natural history. He savours almost every bird or animal in the region, and its gastronomic possibilities are as important a characteristic as its size, colour and habitat. He declares the common Porpoise "good to eat. Black puddings and chitterlings are made from their tripe; the pluck is excellent fried; its head is better than that of mutton, but not so good as that of veal."²⁹ The Soles are "eaten with vinegar, being themselves so fat", though Denys also like them "on a short boiling with good herbs and an orange."³⁰ He also samples skates and dolphins, sturgeons and squids, swordfish and dogfish as well as trout and turtles ("Being boiled, the shell is removed: then it is skinned. It is cut into pieces and served as a stew or fricassee with a white sauce. There are no pullets which are as good as this."³¹) Denys does not restrict his diet to every imaginable fish, but also eats muskrat roasted or fried with white sauce, boiled or fried beaver, young bear ("of very excellent taste"), lynx, porcupine ("as good as suckling pig"), crows ("as good to eat as chicken"), robins ("not bad to eat"), terns and gulls. He prefers young to old herons, but draws the line at cormorants.³² Gabriel Sagard (d. 1650) wrote in his *The Long Journey to the Country of the Hurons*, that he also ate great auk (as did countless other sailors and explorers), which he noted was "not inferior

²⁹ Nicolas Denys, *The Description and Natural History of the Coast of North America*. Toronto: The Champlain Society, 1908, p. 351.

³⁰ Denys, *Description*, pp. 352-3.

³¹ Denys, *Description*, p. 359.

³² William Wood also disliked cormorants which he comments "be not worth the shooting because they are the worst of fowls for meat, tasting rank and fishy." He did not, however, turn his nose up at Great Horned Owl, which he pronounced "being as good meat as a partridge." In "Of the Birds and Fowls Both of Land and Water," from Wood, "Excerpts," p. 105.

to any game we have."³³ He also sampled the larks from the Isle aux Alouettes near Saguenay which tasted, he said, the same as those in France.³⁴

Keith Thomas notes that Europeans were exceptionally carnivorous compared to other cultures, and, though he refers in particular to England, he notes that flesh-eating was considered part of a healthy regime. Britons were noted for their taste for meat,³⁵ but it is obvious from the relish with which Denys, Sagard, the Baron de Lahontan and Charlevoix all describe the fish, fowl and flesh which they consume, that meat-eating was also highly regarded. Admittedly the French wax eloquently over fish as well as deer, rabbit and bear, and Lahontan remarks that the egg of the American Eider (*Moyaque*) "est si épais qu'on est obligé d'y mettre de l'eau pour en faire des omelettes."³⁶ Charlevoix also notes that "We have cranes of two colours; some quite white, and others of a light grey. They all make excellent soup."³⁷

The taste for flesh in all its forms and the relative abundance of game made the New World seem to many like a promised land, or a well-stocked deer park. Enclosed deer parks were common features of sixteenth- and seventeenth-century Europe, and managed woods and forests were more common than wildwood. John Manwood's definition of a forest in a *Treatise and Discourse of the Lawes of the Forrest* (1598), is quoted by Thomas: "a certain

³³ Gabriel Sagard, *The Long Journey to the Country of the Hurons*, ed. G.M. Wrong, Toronto: Champlain Society, 1939, p. 38.

³⁴ Sagard, *The Long Journey*, p. 47.

³⁵ Thomas calculates that half the population at the end of the seventeenth century ate over 147 lb of meat per annum. Thomas, *Man and the Natural World*, p. 26.

³⁶ De La Hontan, *Voyages*, II, p. 51.

³⁷ P.-F.-X. de Charlevoix, *Journal of a Voyage to North-America Undertaken by Order of the French King containing The Geographical Description and Natural History of that Country, particularly Canada... in two volumes*. London: R. and J. Dodsley, 1761 (Ann Arbor: University Microfilms, 1966), p. 239.

territory of woody grounds and fruitful pastures, privileged for wild beasts and fowls of forest, chase and warren to abide in, in the safe protection of the king, for his princely delight and pleasure."³⁸ The forest was by law the property of the sovereign, but nobles with a taste for hunting could empark large areas by enclosing them with a fence or ditch to maintain a herd of deer. The descriptive texts and the rare illustrations encouraged this perception of the New World as a park, turning the densely forested North American landscape into something familiar to the European eye, the wood or enclosed chase, not, however, restricted only to the aristocrat, but open to all and managed by the aristocrats of the forests, the savages. Lahontan records the natives' view of the French, and their appreciation of their own condition:

...ils se raille de la grande subordination qu'ils remarquent parmi nous. Ils nous traitent d'esclaves, ils disent que nous sommes des misérables dont la vie ne tient à rien, que nous nous dégradons de nôtre condition, en nous réduisant à la servitude d'un seul homme qui peut tout, & qui n'a d'autre loi que sa volonté... Mais que parmi eux, il faut pour être homme avoir le talent de bien courir, chasser, pêcher, tirer un coup de flèche & de fusil, conduire un Canot, savoir faire la guerre, connoître les Forêts...³⁹

And the forest was filled with game: "Je ne saurois d'ailleurs vous exprimer la quantité de bêtes fauves & de Poulets d'Inde qu'on voit dans ces bois..."⁴⁰

De Bry and his engravers did not have to search very far for the graphic images which conveyed these text descriptions of hunting in the forests of the New World. The engraved scenes in *America* are very reminiscent of the images of the hunt which decorated numerous tracts dedicated to the chase published in Europe. The 1618 engraving, in particular, resembles in the disposition of the

³⁸ Thomas, *Man and the Natural World*, pp 200-1.

³⁹ De La Hontan, *Voyages*, II, pp 100-1.

⁴⁰ De La Hontan, *Voyages*, I, p. 22.

figures and the open park-like scenery, the vignette on the title page of *Les Edicts et ordonnances des roys...* by Saint-Yon, the Lieutenant général des Eaux et forêts under Henri IV, published in Paris in 1610.⁴¹ The image of the hawk attacking a heron in this same de Bry plate is common and would appear to derive from a sketchbook or patternbook original since it appears in an almost identical form [plate 36] in 1575 in *The Booke of Faulconrie or Hauking* by George Turberuile (1540?-1610?).⁴² While the deer in the De Bry plate are well-rendered, following the depictions of European harts and stags,⁴³ in other illustrations to exploration accounts, like those of Champlain and Lahontan, the deer appear as emblematic animals in schematic landscapes.

In the etching of a native hunt described by Champlain, deer and fox flee through an open park, chased by natives beating bones together, into an arrow-shaped enclosure of neat palings [plate 37]. On the other side of the enclosure wait the huntsmen with spears. Also illustrated are two snares, one holding a fox, the other a deer. Not surprisingly these illustrations are very reminiscent of those in one of the classics of hunting literature, the *Livre de Chasse* of Gaston Phébus. In this fourteenth-century manuscript, illuminations show wattle fences in a similar triangular formation leading game to the waiting huntsmen armed with spears. Another illumination shows a fox (wolf?) caught in a snare to which it has been led by the same type of wattle fencing.⁴⁴ The illustration of the deer

⁴¹ Plate in volume I, Michel Devèze, *La vie de la forêt française au XVI^e siècle*, 2 vols. [Paris]: Ecole pratique des hautes études, VI^e section; S.E.V.P.E.N., 1961.

⁴² George Turberuile, *The Booke of Faulconrie or Hauking, for the onely delight and pleasure of all Noblemen and Gentlemen*, London 1575. (The English Experience, Number 93, Amsterdam / New York: Da Capo Press / Theatrum orbis terrarum Ltd., 1969, p. 112.) Also see plate 10 in A.M. Lysaght, *The Book of Birds*, London: Phaidon Press, 1975. Lysaght notes that the watercolour of the hawk and mallard in a similar configuration is frequently found in illuminated manuscripts and embroideries.

⁴³ See Edward Topsell, *History of Four-Footed Beasts and Serpents and Insects*. Volume I. *The History of Four-footed Beasts*. 1658. New York: repr. Da Capo Press, 1967, p. 96.

⁴⁴ Gunnar Tillander, ed. *Gaston Phébus Livre de Chasse*. Karlshamn, 1971, p. 257 and p. 261.

hunt in Lahontan is abstracted even further and the fence appears as schematic line [plate 38], labelled in the English edition of 1703 "THE PARK." Here the deer, each animal more or less identical – emblematic stags –, enter in rows, driven by orderly ranks of natives armed with bows. The inscription reads, "Stags block'd up in a park, after being pursued by ye Savages." The bison hunt, which has no European prototype, appears in another engraving in a strangely achronological rendering, showing a herd of docile and almost identical bison walking in rows with vignettes of various methods of attacking the animals [plate 39]. These schematic depictions are more akin to map illustrations than proper engravings, and although Lahontan did complain that in the English edition of his work he had had to correct "almost all the Cuts of the Holland Impression, for the Dutch Gravers had murder'd 'em, by not understanding their Explications, which were all in Franch,"⁴⁵ he did not refer to the quality of the illustrations but to the accuracy with which they followed his text.

The Imposition of Order

Portraying the forest as a deer park or open wood was one way in which the authors and artists could comprehend the strange, heavily treed landscape of the New World.⁴⁶ True wildwood was rarely encountered in England or France, though it of course existed in the north and the east of Europe;

⁴⁵ W.P. Cumming et al., *The Exploration of North America, 1630-1776*. Toronto: McClelland and Stewart, 1974, p. 201n.

⁴⁶ The fact that the natives often burnt the woods to drive game or provide clearings also bolstered the illusion of a familiar managed landscape, and one wonders if beavers would have been considered such wonders of the world were it not for their ability to manage the watercourses and create meadows.

moreover, as a type of landscape, wilderness was not greatly valued in the seventeenth and early eighteenth centuries. As Thomas notes, when Elizabethans spoke of a wilderness they did not mean a barren wasteland, but a "dense, uncultivated wood, like Shakespeare's Forest of Arden." The New England colonists founded Plymouth in a "hideous and desolate wilderness... full of beasts and wild men... and the whole country full of woods and thickets." They destroyed the trees with vigour to make "'habitable' what Cotton Mather regarded as 'dismal thickets'."⁴⁷

The strange familiarity of the northern part of the New World landscape, where Europeans could recognize trees, fruits, flowers, and animals, seems to have encouraged early explorers and settlers to attempt to see it as an Old World in the rough. They noted every meadow and clearing, every aspect that seemed to indicate that the landscape had been modified by human intervention, or that it resembled that of Europe. At Place Royale Champlain noted that there were "60. arpents de terre desertés qui font comme prairies, où l'on pourroit semer des grains, & y faire des jardinages,"⁴⁸ and that a particular lake was surrounded by fine trees, "de mesme especes que nous auons en France, avec force vignes plus belles qu'en aucun lieu qu'i'eusse veu..."⁴⁹ Even on his arduous journeys through the thick forests of what is now eastern Ontario, Champlain would comment on a lake "rempli de belles & grâdes isles, qui ne sont que prairies, où il y a plaisir de chasser, la venaison & le gibier y estans en abondance..."⁵⁰ Gabriel Sagard also praised the country of the Hurons in comparison with the wilder lands he had passed through:

⁴⁷ Thomas, *Man and the Natural World*, p. 194.

⁴⁸ Champlain, *Les Voyages*, Second voyage, 1610, p. 289.

⁴⁹ Champlain, *Les Voyages*, Livre second, 1608-12, p. 225.

⁵⁰ Champlain, *Les Voyages*, Quatriesme voyage, 1613, p. 18.

It is a well-cleared country, pretty and pleasant, and crossed by streams which empty into the great lake. There is no ugly surface of great rocks and barren mountains such as one sees in many places in Canadian and Algonquin territory. The country is full of fine hills, open fields, very beautiful broad meadows...⁵¹

Such pleasant open ground contrasted with the dense woods, where Champlain says they could not even carry their canoes "à cause de l'épaisseur du bois,"⁵² and where a short passage of two-and-a-half "lieuës" was rendered almost unbearable by the mosquitoes that molested them, "l'importunité desquelles est si étrange qui est impossible d'en pouvoir faire la description."⁵³ Sagard concurs with Champlain on the difficulty of passage through the woods:

Sometimes also one has great difficulty in making a passage through dense woods, in which also a great number of trees that have rotted and fallen on one another are met with, and these one must step over. That there are rocks and stones and other obstacles which add to the toil of the trail, besides the innumerable mosquitoes which incessantly waged most cruel and vexatious war upon us...⁵⁴

⁵¹ Sagard, *The Long Journey*, p. 90.

⁵² Champlain, *Les Voyages*, Quatriesme voyage, 1613, p. 19.

⁵³ Champlain, *Les Voyages*, Quatriesme voyage, 1613, p. 27. Champlain was not the first explorer to complain bitterly about the mosquitoes and flies that filled the Canadian summer. Dionyse Settle in his account of Franklin's voyage in 1577, found occasion to remark on "certain stinging Gnattes, which bites so fiercely, that the place where they bite, shortly after swelleth and itcheth very sore." (Dionyse Settle, *Last Voyage into the West and Northwest Regions*, London: 1577/1969, n.p.) John Davis noted on his voyage of 1585-7 that "a flie which is called Atuskyte... did sting grievously." (In Morison, *The European Discovery*, p. 594.) Jens Munk, who sailed to Hudson Bay in 1619-20, also remarked on the "quantity of gnats...unbearable in calm weather." (W.A. Kenyon, ed., *The Journal of Jens Munk*, Toronto: Royal Ontario Museum, 1980, n.p.) Father Hennepin, whose journeys took him in more southerly directions, also met up with the "maringouïns, ou petites mouches, qui regnent fort dans le Canada..." (Hennepin, *Voyage curieux*, p. 195.)

⁵⁴ Sagard, *The Long Journey*, p. 83. Sagard describes the "piece of thin stuff" he wore over his face for protection from the mosquitoes, "since these fierce creatures would have blinded me many times, as I had been warned." (p. 83)

For some of the French brothers sent to Canada, the forests were not only thick and impenetrable, they were truly the work of the devil. Father Pierre Biard wrote that "... all this region, though capable of the same prosperity as ours, nevertheless through Satan's malevolence, which reigns there, is only a horrible wilderness..."⁵⁵ François du Creux (b. 1596) writes in the introduction to his history of New France, that some of his brethren even discouraged his attempts to write about Canada which they indeed felt had no history:

When first I undertook to compose the history of New France, many of those who have much influence with me and for whose opinion I have great respect, endeavoured to divert me from my purpose, alleging that time and labour would be lost should I select a subject at once so meagre and so grim... it would be impossible to describe cities when cities there were none; or to mention palaces when there were no buildings but the huts of nomads, and of these but few; or to introduce well-watered gardens, pipes, canals and aqueducts when these did not exist in a land where the horror and immensity of woods and prairies occupied everything.⁵⁶

The wildness of the New World, its disorder, and its lack of human monuments challenged the descriptive powers of seventeenth-century writers. For the most part, they simply ignored the landscape, concentrating on the narration of exploration and conquest and the customs of the natives. When they did describe the lands and its plants and animals, they made catalogues of them, after the manner of the herbals and the pandects. The artists and engravers, even further removed from the original landscape, found it difficult to convey the chaotic nature of "virgin forest" or even of landscape subjected to native agricultural improvement. The depiction of homogenous trees in neat rows, or corn planted in serried ranks in the town of Secota as engraved by de

⁵⁵ From the Jesuit Relations, Volume I, quoted in Jones, *O Strange New World*, p. 56.

⁵⁶ François Du Creux, *The History of Canada or New France*. James B. Conacher, ed., Percy J. Robinson, transl. Toronto: Champlain Society, 1951, p. 15.

Bry in 1590 [plate 40], was not simple artistic convention, it also revealed a desire to bring order to the disorder of the forests that had never felt the hand of man. Thomas notes the imposition of orderly rows of trees and straight avenues over the English countryside as "a particularly obvious way of subjecting a whole district to the authority of a great house." The English embraced tree-planting in Elizabethan times on the grand scale, and one of the features of a great house was "a so-called 'wilderness': a dense plantation of trees, which, despite its name, was laid out in an orderly and geometrical fashion."⁵⁷ This feeling for ordered wilderness was also expressed in the delight in an agrarian landscape with tilled fields, broad meadows, and orchards and gardens. To most Englishmen in the seventeenth century, "a tamed inhabited and productive landscape *was* beautiful."⁵⁸ The title page of the *Hortus Floridus* (see above) reveals the order of the enclosed continental garden, while Bacon laid down his precepts on the ideal princely garden:

For gardens (speaking of those which are indeed prince-like...), the contents ought not well to be under thirty acres of ground, and to be divided into three parts: a green in the entrance; a heath or desert in the going forth; and the main garden in the midst... The garden is best to be square, encompassed on all the four sides with a stately arched hedge... For fountains, they are a great beauty and refreshment; but pools mar all, and make the garden unwholesome and full of flies and frogs... For the heath,... I wish it to be framed, as much as may be, to a natural wildness. Trees I would have none in it, but some thickets, made only of sweet briar and some honeysuckle, and some wild vine amongst;... I also like little heaps,... to be set with wild thyme... Part of which heaps to be with standards of little bushes pricked upon their top, and part without... But these standards to be kept with cutting, that they grow not out of course.⁵⁹

⁵⁷ Thomas, *Man and the Natural World*, pp 207-8.

⁵⁸ Thomas, *Man and the Natural World*, p. 255.

⁵⁹ Francis Bacon, "Of Gardens", in John Pitcher, ed. *The Essays*. Harmondsworth: Penguin, 1987, pp 199-201.

Bacon approved of a natural wildness as long as the bushes did not grow randomly.

The illustrations for the *Historiae canadensis* of François du Creux, while not schematic, portray perhaps even more strongly than those of de Bry, the sense of a managed, pastoral landscape. Du Creux was a Jesuit who prepared a ten-volume history of New France from 1625 to 1656, based on the Jesuit Relations. The history was published in Paris in 1664 and included in the first volume a double-page frontispiece and sixteen full-page engraved plates. Five of these plates are concerned with the natural history of Canada, and several of them convey a sense of the landscape. More so even than the Champlain or Lahontan illustrations, the cuts are peculiarly artificial, the animals depicted in them emblematic and static.⁶⁰ While the *chaosarou* or garpike appears against a blank background and the mule-faced *alce* or moose [plate 41] against a barren landscape of rock (which might be an attempt at snow, as suggested by the text), the plate of the *fiber* or beaver shows a New World stream lined with tall trees [plate 42]. The lodge seems to be a round dome in the water in the middle ground, while the dam is an ordered barricade across the stream. The beaver themselves resemble sheared sheep, or "mouton tondu" as Sagard (one of du Creux's important sources) describes them, with fish-scale tails, and strange three-toed bird-like feet (meant to be webbed). It is the vista of trees and rolling hills, however, that lends the engraving its European aspect. The same vista, complete with rustic cabin, appears in plate VI of the *Avis prædatrix*, or

⁶⁰ Where Champlain had described the *chaosarou*, and it had been depicted with some degree of felicity on the 1620 map, du Creux accompanies his description (derived from Champlain) with a plate which appears to have been copied from a mounted specimen. The fish is seen from a dorsal view with the fins correctly placed. The head appears skeletal and it is likely that the flesh would have not been preserved on the bony head while the "armoured" skin might survive a specimen's long journey to France. The *Alce*, or Elk, which is probably a moose, is unrecognizable as such, and the stiffly prancing animal resembles a generic deer, familiar in the illustrations of books on the hunt and on maps.

predatory bird, in which du Creux relates that this bird, which in the engraving resembles a goose, is "about as large as a hen, which is dun-coloured and white and black underneath. One of its feet has talons like an eagle, the other is webbed like a duck; with the latter it swims, with the former it dives into the water and brings out fish to eat, a hitherto unheard of dexterity."⁶¹ [plate 43] The illustrator has made the strange landscape conventional, the bird, also a European species, a rarity, and this despite the author's description of the "rough and dense forests, which clothe the banks with their beautiful foliage."⁶²

There is only one late seventeenth-century image that hints at the true nature of the New World forests, and that is by the same artist who appreciated the great height and breadth of Niagara. The illustrator of Hennepin's *Voyage curieux* by some means, either the accuracy of Hennepin's sketches, or perhaps even his own experience, managed to convey with some degree of accuracy the features of a genuine landscape. The engraving of the bison in the 1704 edition shows a number of interesting features [plate 44]. The bison itself, while appearing too taurine, reflects accurately Hennepin's description, right down to "des crins noirs, qui leur tombent sur les yeux, et qui les rendent affreux."⁶³ The opossum hanging from a tree is recognizably an opossum, not a simivulpa, and the pelican holds its wings in a characteristic fashion. It is in the background,

⁶¹ Du Creux, *The History of Canada*, p. 80. Of the five predatory birds, one is shown dabbling like a duck, one grasps a large fish with beak and talon, another eats a fish on the shore (the different feet are clearly seen), while two float serenely in profile. Du Creux is describing the osprey, a common bird along the St. Lawrence, but his description of the bird's anatomical peculiarities was a hoary legend that had already been rejected in 1570 by John Caius, the Dr. Cay with whom Gesner corresponded. Though Caius rejected the tale of the osprey's feet, Topsell included the story in *The Fowles of Heaven*, calling the bird "Amphibion." Topsell probably found his precedent in the writings of Gerald of Wales in the twelfth century. Ford illustrates one of the manuscript drawings from the *Topographia Hibernica* (1188) which shows a bird with one webbed and one taloned foot diving into the water at some fish. (Brian Ford, *Images of Science. A History of Scientific Illustration*. London: The British Library, 1992, p. 61.)

⁶² Du Creux, *The History of Canada*, p. 72.

⁶³ Hennepin, *Voyage curieux*, p. 188.

hardwoods, but a mixed lot of palms of two sorts, an evergreen, and deciduous trees. The woods appear thick and dark, and we can just see the last bison emerging from the cover. While the engraving is obviously a portrait of animals mentioned in the book, it has become more. It conveys the sense of the Louisiana countryside, the scrubby subtropical forests of the southern United States.

While for most writers the North American forests were wildwood, for some they were vast woodlots awaiting harvest. Again the fact that both eastern and western hemispheres shared many species made a walk through the northern woods at least somewhat familiar. Cartier recognized and named a number of trees, and was amazed at single trees large enough for naval masts. Lahontan notes that the "Pins" are extremely tall, and "On prétend qu'il y en a d'assez grands pour mâter d'une seule piece les Vaisseaux du premier rang."⁶⁴ The Baron describes the "Arbres & Fruits des Païs Méridionaux du Canada" and the "Arbres & Fruits des Païs Septentrionaux du Canada," commenting on their edible fruits and the quality and uses of their timber. He praised the charming aspect of the shores of Lake Erie, "le plus beau qui soit sur la terre," lined with "des Chênes, des Ormeaux, des Chataigniers, des Noyers, des Pommiers, des Pruniers, & des Treilles, qui portent leurs belles grapes jusqu'au sommet des Arbres..."⁶⁵ Charlevoix's descriptions of the individual species are much the same and also include horticultural and pharmacological information. Charlevoix, however, also comments on the forests as a whole and his description, published in the mid-eighteenth century, reveals the beginnings of a

⁶⁴ De La Hontan, *Voyages*, II, p. 65.

⁶⁵ De La Hontan, *Voyages*, II, p. 22.

description, published in the mid-eighteenth century, reveals the beginnings of a change in attitude to the wildwood and its riches that will be examined more closely in a subsequent chapter:

I don't know, Madam, whither I ought to entertain you with an account of the forests of Canada. We are here surrounded with the vastest woods in the whole world; in all appearance, they are as ancient as the world itself, and were never planted by the hand of man. Nothing can present a nobler or more magnificent prospect to the eyes, the trees hide their tops in the clouds, and the variety of different species of them is so prodigious, that even amongst all those who have most applied themselves to the knowledge of them, there is not perhaps one who is not ignorant of at least half of them. As to their quality and their uses to which they may be applied, their sentiments are so different, both in the country in which we now are, as well as in that where your grace is, that I despair of ever being ever able to give you the information I could desire on this head. ⁶⁶

For Charlevoix, these New World forests, unlike the managed woodlots of the Old World, were never planted by the hand of man. They are part of the original creation, noble, magnificent, not habitat of Satan, but a treasure trove which Europeans in the eighteenth century might begin to put to good use.

Meta Incognita

There was one landscape, however, to which most Europeans would never become accustomed. While much of North America in the middle latitudes was reminiscent of Old World habitat, the arctic regions presented as strange a picture to most European explorers as did the tropics. Dionyse Settle authored *A true reporte of the laste voyage into the West and Northwest regions...*, *worthily achieved by Capteine Frobisher...* in 1577 and warned his readers that

⁶⁶ Charlevoix, *Journal of a Voyage*, I, p. 245.

Whoso maketh Navigations to these contries, hath not only extreme winds, and furious Seas, to encounter withall, but also many monstrous and great Islands of yce: a thing both rare, wonderfull, and greatly to be regarded...

When they arrived, they would find "very little plaine ground, and no grasse, except a little... There is no wood at all. To be briefe, there is nothing fitte, or profitable for the use of man, which that Countrie with roote yieldeth, or bringeth forthe..." Settle noted that they did find spiders, "(which, as many affirme, are signes of great store of Golde)."⁶⁷ A number of editions of Settle's book were illustrated with a woodcut probably after a drawing by John White or the Flemish painter Lukas de Heere (1534-84). White had painted watercolours of the Inuit who had been brought back to England by Frobisher and either he or de Heere recorded their manner of hunting with spearthrower in a kayak in Bristol Harbour. The 1577 woodcut shows an imaginary arctic landscape of piled rocks, the sea full of duck-like birds. The Inuit costume, the kayak, and even the use of sled dogs is rendered with reasonable accuracy, but undergoes remarkable modifications in subsequent copies. The 1580 cut which appears in both a Latin edition printed in England and a German version printed at Nürnberg shows significant changes in the disposition of figures and birds, and in the softening of the landscape from crags to shrubbery-crowned rocks. An engraving to illustrate Drake's voyages, published in 1768, shows "Inhabitants of North America, near Hudson's Bay, with their manner of killing Wild Fowl" [plate 45]. Here the arctic landscape, which at least in the Settle illustrations was relatively rocky and barren, has been transformed into a far more lush and temperate scene. The central figure in the kayak repeats the Settle/White image, but the other inhabitants no longer wear the traditional skin

⁶⁷ Settle, *Laste Voyage to the West and Northwest Regions*, n.p.

clothing, but a version of ragged fur coat and cloth caps. The waterway is lined with rushes, and behind a large tent is a mass of foliage and what appears to be a palm tree, but may be an attempt at a pine. The illustrator of Jens Munk's *Journal* of his 1619-20 voyage, shows a barren landscape and what appear to be lumps of ice floating in the sea, but his native peoples, rather than being clothed, are naked, as the savages of the tropics had been depicted [plate 46].

One of the more interesting plates which accompanied another version of the Frobisher voyages was the illustration in Thomas Ellis' *A True Report of the Third and Last Voyage into Meta Incognita* [plate 47]. The formschneider here depicted an iceberg, and though schematic in its rendering, the variable appearance suggests a cut after original sketches. The illustration comprises four views of the berg with labels, showing the iceberg's appearance as the ship first sighted it, then passed it. Perhaps it is the iceberg's strangeness, the lack of a traditional graphic vocabulary, which permitted this diagrammatic and very idiosyncratic illustration. This is not a generic but a particular object, and this explicit particularity presages the importance of accurate representation that became necessary in a number of the natural sciences including geology and microscopy.

The arctic regions impressed seventeenth-century Europeans with their absolute otherness, and continued to astound most travellers in these regions until well into the nineteenth century when their exotic scenery became a decoration on a popular series of transfer-printed British tableware. The wildwood, however, was tamed much sooner than many seventeenth-century travellers would have expected. Only the waterfalls and rapids choked rivers remained a challenge to the European imagination and a much-pictured element of the landscape.

CHAPTER SIX

The Classification of the Visible: Part One

The Edwards Frontispiece

In 1743, George Edwards published the first of a series of illustrated books. It was entitled *A Natural History of Birds. Most of which have not been figur'd or describ'd, and others very little known from obscure or too brief Descriptions without Figures, or from Figures very ill design'd...* The History was dedicated to God.¹ Part I included "The Figures of Sixty Birds and Two Quadrupeds, engrav'd on Fifty-two Copper Plates, after curious Original Drawings from Life, and exactly colour'd." It was followed in 1747 by Part II, which contained illustrations of 61 birds and two quadrupeds in 53 copper engravings, in 1750 by Part III with 59 birds, and in 1751 by Part IV with 39 birds and sixteen animals on 53 plates.² The last two parts were published together as *Gleanings of Natural History*. All four parts were reissued in 1776 as *A Natural History of Uncommon Birds* (see Bibliography). For *A Natural History of Birds*, Edwards, a self-taught artist and engraver, prepared an allegorical frontispiece which to contemporary eyes seems perhaps incongruous for a book of bird illustrations, but is most significant for what it reveals about Edwards and his view of the work of a natural history illustrator [plate 48].

¹ "I dedicate this piece to GOD, in humble gratitude for all the good things I have received from him in this World..." in The Preface to George Edwards, *A Natural History of Birds* (1743), Part I in *A Natural History of Uncommon Birds*. London: J. Robson, 1805-6.

² Edwards refers to his plates as engravings, but they are in fact etchings, and he provides instructions of his technique in Part IV: "Some brief Instructions for ETCHING or ENGRAVING on Copper Plates with Aqua Fortis."

In the frontispiece George Edwards, clothed in classical toga and sandals, sits at his easel. The easel is supported on the wings of a large bird. Before the easel sits Father Time, facing away from the viewer, while Minerva, goddess of wisdom, leans over Edwards' shoulder, guiding his hand on the drawing paper. Above them Juno reclines on a cloud surrounded not only by her peacock, but also by a green lizard, a king vulture, an eagle, a touraco and another exotic bird, all of whom are featured in plates in the work. A rainbow appears in the sky behind Juno, while in the background rain falls on a tall mountain, perhaps Ararat, a reminder of the flood? At Edwards' feet are the instruments of his craft – a notebook, a sketchpad, a sheet of copper and graving tools. Two cherubs play with brightly coloured parrots. This central image is surrounded by an elaborate roccoco frame ornamented with fruits and foliage as well as feathers, including the tail feathers of the peacock pheasant seen with Juno, and a bird of paradise. Several exotic birds, including a parrot and a swift, perch on the top of the frame, while the bottom bears the Latin inscription: "GEORGII EDVARDI ORNITHOLOGIA NOVA."

Just as the emblematic frontispieces of an earlier period, like that for John Gerard's *Herbal*, were rich in hidden meanings, so does Edwards' neoclassical work repay careful analysis. Edwards' dress signals him as heir to the tradition of the great classical naturalists like Pliny the Elder and Aristotle. At the same time, the exotic birds that perch and flutter around the figures are reminders of the impact that the exploration of the New World (and exotic parts of the Old, like Africa and China) has had on classical ornithology, creating an "*Ornithologia nova*," a new ornithology. Finally there is the figure of Father Time. He looks away, for Edwards is setting down, with pencil and burin, the multitudinous and varied figures of life, preserving them in inks and washes "for the help and information of those in future generations, that may be curious or studious in

natural history."³ These three themes – the classical tradition, the exploration of the New World, and the importance of preservation – are important themes in the development of natural history and its images throughout the eighteenth century. Edwards' frontispiece is a blithe early rendering of what Bernard Smith calls the "heroic" undertaking of the descriptive phase of the natural sciences, when Europeans set themselves the task of "the assembling of a systematic, empirical, and faithful graphic account of all the principal kinds of rocks, plants, animals, and peoples of the world."⁴

The Classical Tradition

While by 1700 it was obvious to most scholars that the knowledge of classical authors did not span much beyond the Mediterranean world, many were reluctant to lose the connections with the golden age. Latin was still the language of scholarship and many of the most important works in natural history continued to be written in the language of Pliny, chief among these the works of Carl Linné or Linnæus (1707-78). The taxonomic system developed by Linnæus (to be discussed in more detail later) relied on Latin and sometimes Greek words for its binomial names, but this "system of nature" was subject to criticism by scholars concerned with the preservation of classical learning. Johann Jakob Dillenius (1687-1747), keeper of the Oxford Botanic Garden, wrote to Linnæus in 1737 that he was displeased with the *Critica Botanica* (which Linnæus had dedicated to him):

³ *Some Memoirs of the Life and Works of George Edwards, Fellow of the Royal and Antiquarian Societies*. London: Printed for J. Robson, Bookseller, 1776, p. 16n.

⁴ Bernard Smith, *European Vision and the South Pacific*. New Haven and London: Yale University Press, 1988, p. 339.

We all know that botanical nomenclature is an Augean stable which ... even Gesner was unable to cleanse... I don't object to Greek words, especially in compound names; but I think that the names of the Ancients ought not to be transferred rashly and indiscriminately to our new genera or to those of the New World. The time may perhaps come when the plants of Theophrastus and Dioscorides will be identified...⁵

It is hard to know how many botanists shared Dillenius' faith in the omniscience of ancient authors, but for early eighteenth-century naturalists the botanical knowledge that began with Dioscorides ran in an unbroken chain through the centuries. We have noted how Cornut and Gerard cited the classical authorities, and though the flood of exotic species would challenge the traditional schemata of botanical knowledge, it did not undermine the transmitted information that had since Fuchs and Weiditz been the basis of the *materia medica* and the study of plants. While new and strange specimens of animals and birds from the tropics challenged the learning of the ancients, naturalists like John Ray (1627-1705) could continue to mine their works because, as Ray noted in discussing the problems of migration in birds (an issue which would obsess Edwards and many of his colleagues), little advance had been made in some observations over the last 1600 years.⁶ The reports of careful observers in the New World were beginning to be incorporated into European works of natural history in the seventeenth century, but it was the incredible increase in the flow of specimens and materials, as well as correspondence, across the Atlantic in the eighteenth

⁵ Wilfrid Blunt, *The Compleat Naturalist. A Life of Linnaeus*. London: Collins, 1971, p. 120.

⁶ A.M. Lysaght, *Joseph Banks in Newfoundland & Labrador, 1766, His Diary, Manuscripts and Collections*. Berkeley: University of California Press, 1971, p. 80. James Edward Smith in "Introductory Discourse on the rise and progress of Natural History" written for the first volume of the *Transactions of the Linnaean Society* in 1791, notes the paucity of sources for the study of animals: "It is remarkable that a part of natural history, so evidently the most important and most interesting to man, who is himself at the head of animal creation, should have lain so long uncultivated. From the time of Aristotle to Gesner and Aldrovandus, little or no improvements were made in the knowledge of animals, nor with respect to classification was any alteration attempted till the time of Ray."

century that demanded the development of new instruments of understanding, of which the works of Edwards are prime examples.

Though clad in classical robes, Edwards' works truly comprise a "New Ornithology," in that they break away from reliance on textual authorities and unsupported evidence. Edwards has taken Bacon to heart, and relies for his information on the thing itself, which he documents with "full and accurate Descriptions" and "curious Original Drawings from Life, exactly colour'd." Edwards' descriptions, for example, have none of the fables about the anatomy of the osprey that marked Topsell's account in the *Fowles of Heaven* or are incorporated into du Creux's *Historiae canadensis* (see above). For Edwards, first-hand accounts and accurate illustration were what distinguished his works from those of his predecessors, and as he noted "Everyone who consults ancient authors is very sensible of their deficiencies in the want of figures."⁷ It is the importance of illustration to Edwards and his patrons that not only distinguishes the "new ornithology" from the old, but also suggests a new understanding of notions of representation that is prefigured in the use of manuscript drawings by the sixteenth-century pandect authors like Gesner and Aldrovandi, whose works were still very much part of the reference base in the mid-eighteenth century.

Edwards refers to Aldrovandi in particular throughout his works, and Dillenius also invoked to Linnaeus the name of Konrad Gesner. Certainly in the early eighteenth century Gesner (in English, Topsell's translation, *A History of Four-Footed Beasts*) and Aldrovandi continued to be the only illustrated natural histories widely available.⁸ While much of their work was based on the

⁷ Edwards, *A Natural History*, Part I, p. xiv.

⁸ Willughby did include uncoloured illustrations in his *Ornithologiae Libri Tres* of 1676, and engravings were featured in the work of some seventeenth-century continental naturalists.

observations of classical authors, both Gesner and Aldrovandi developed a large correspondence and relied on colleagues for identifications, descriptions and new specimens. Their medium of transmission, particularly for zoological specimens, was the coloured manuscript drawing, and Gesner records an instance of this practice in relation to the identification of a fish by Dr. Turner (c1508-1568):

When I sent the picture of this fish to the excellent doctor William Turner of England, asking his opinion of these matters, he replied: "The illustration that you sent me is plainly of our native Lumpus, but the two rear fins are superfluous, for none such were evident in the fish I recently saw caught, and afterwards ate."⁹

The practice of the reliance on the coloured manuscript drawing for information exchange between naturalists continued uninterrupted from Gesner's day to Edwards'. George Edwards began his career as an artist for Sir Hans Sloane, whom he described as "the good Sir Hans Sloane, Bart. who employed me for a great number of years, in drawing miniature figures of animals, &c. after nature, in watercolours, to encrease his very great collection of fine drawings by other hands..."¹⁰ Sloane's was not the only collection of natural history drawings in eighteenth-century England. John Fothergill (1712-80), Peter Collinson (1693-1768), Joseph Banks (1744-1820), Taylor White (1701-72), and Dr. Richard Mead (1673-1754), to name only a few, amassed large collections of watercolour drawings, employing, like Sloane, full-time artists to depict plants and animals. Dr. John Fothergill had the largest private garden in England, and Joseph Banks noted that in the interests of science

⁹ Konrad Gesner in *Historia Animalium, Libri IIII* (1558), in Alyne Wheeler et al., "William Turner's (C1508-1568) notes on fishes in his letter to Conrad Gesner," *Archives of Natural History*, 1986, 13 (3), p. 298.

¹⁰ *Some Memoirs of the Life and Works of George Edwards*, p. 16n.

...when a plant [Fothergill] had cultivated should die, he liberally paid the best artist the country afforded to draw the new ones as they came to perfection... so numerous were they at last, that he found it necessary to employ more artists than one, in order to keep pace with their increase.¹¹

In a letter to Gilbert White (1720-93) in 1772, the Rev. William Sheffield (1742-95) described in turn Banks' "collection of drawings in Natural History" as

...the choicest... that perhaps ever enriched any cabinet, public or private:- 987 plants drawn and coloured by Parkinson; and 1300 or 1400 more drawn with each of them a flower, leaf, and a portion of the stalk, coloured by the same hand; besides a number of other drawings of animals, birds, fish etc.¹²

On the continent, the Margrave Karl III Wilhelm of Baden-Durlach collected over 6000 sheets of flower paintings and drawings. Georg Ehret (1708-70) worked for a number of European collectors, in a single year (1729) producing 500 figures of plants for one ardent gardener. At the Jardin du Roy, the collection of vélins increased steadily as a result of the work of the Peintres au Cabinet du Roy, like Claude Aubriet (1651-1742), the illustrator of Sebastien Vaillant's *Botanicon parisiense* (1727).

From the sixteenth century on, the coloured drawing had become accepted by naturalists as a simulacrum of the thing itself and a medium for the exchange of information. It is instructive to quote in full Edwards' comments about the importance of illustration as identifier of the thing itself:

Natural History cannot in any degree, be perfect without figures; therefore I think we should promote drawing, in all such young people as seem to have a liking to it. No one need think it an amusement beneath

¹¹ Quoted in Joseph Ewan, *William Bartram: Botanical and Zoological Drawings, 1756-1788*. Philadelphia: The American Philosophical Society, 1968, p. 6.

¹² Letter, December 1772 in Lysaght, *Joseph Banks*, p. 255.

his dignity... Everyone who consults ancient authors is very sensible of their deficiencies in the want of the figures; for many things are mentioned by a bare name, without any description or figure;... but there is no certain marks to shew what things in nature were called by those names, we have now wholly lost them: therefore authors, naturalists especially, should consult, first of all, the outward forms of things, in order to explain them by descriptions and other marks, and to deliver them to posterity; so as to free them, as far as human nature is capable of, from the losses and injuries they may sustain from time.¹³

Edwards' remarks return us to the subject of his frontispiece. He is not simply heir to the classical traditions of the ancient and Renaissance scholars, he is the new Pliny, guided by the hand of Wisdom herself to draw and grave the perishable works of nature to preserve them against the ravages of Time's scythe. But while Pliny scorned the use of mere pictures over words, Edwards defends the role of art, which is not simply an amusement beneath the dignity of the naturalist. "Art and nature, like two sisters, should always walk hand in hand, that so they may reciprocally aid and assist each other."¹⁴ Edwards' respect for the role of art in the depiction of nature is conditioned by his confrontation with the problem of the nondescript, for which no textual referents exist. Like the herbalists before him who had to classify the "*herbae nuda*," Edwards must rely on the evidence of his eyes and his informants, with no previous authorities upon which to base his description. The problem of the nondescript was exacerbated during Edwards' day by the almost incredible trans-oceanic trade in rare specimens for the curious, and his descriptions often end with the statement that he has found no previous mention of his specimen.

¹³ Edwards, *A Natural History*, Part I, pp xiv-xv.

¹⁴ Edwards, *A Natural History*, Part I, p. xi.

The Exploration of the New World

It is almost as if up until 1700, North America was visualized only in black and white. With the exception of some of the coloured editions of de Bry and Marcgraf and Piso,¹⁵ the majority of seventeenth-century readers viewed the productions of the New World in uncoloured engravings. More significantly, from the point of view of natural history (other than botany), the information they gleaned from most books could only be described as incidental. Even Hennepin, whose engraved bison comes closest to a real animal, manages only a brief description of the animal's appearance, its gustatory qualities and its migratory behaviour. As with Lahontan and other authors, the chief interest is in animals as objects of the chase and in the native methods of hunting. In general, only the beaver is considered worthy of lengthy behavioural description, not surprising given its economic importance. In 1705, everything changes with the publication in Amsterdam of Maria Sibylla Merian's *Dissertatio de Generatione et Metamorphosis Insectorum Surinamensium*.

Maria Sibylla Merian (1647-1717) was the daughter of Matthæus Merian the engraver, who in 1630 had provided de Bry with such a fierce New World landscape (see plate 12). She was trained in watercolours, however, by her stepfather Jacob Marrel, a German painter who followed the High Renaissance style of Dürer. In 1660 Maria Merian became fascinated with insects, and notes in her journal that she collected all the caterpillars she could find to study their metamorphosis: "I therefore withdrew from society and devoted

¹⁵ *Historia Naturalis Brasiliae*, published in 1648. Freedberg notes that "... in many copies they are coloured with extraordinary exquisiteness and accuracy..." in David Freedberg, "Science, Commerce and Art: Neglected Topics at the Junction of History and Art History" in Freedberg and J. de Vries, eds *Art in history, History in Art.. Studies in Seventeenth-Century Dutch Culture*. Santa Monica, CA: The Getty Center for the History of Art and the Humanities, 1991, p. 393.

myself to these investigations."¹⁶ In 1699, Merian and her youngest daughter made a two-year expedition to Surinam where she recorded the rich insect and reptile life of the tropical forests. Her Surinam experience resulted in the 60 plates of the *Metamorphosis*, a florilegium with insects, and one of the great illustrated books of the eighteenth century [plate 49]. Merian was forced to publish the *Metamorphosis* with her own funds, at the urging of "a number of amateurs of such things" who thought her insects and flowers "the most superior and most beautiful of all the works ever painted in America."¹⁷ She explained her motives in publishing:

In putting together this book, I have not sought to make money. I was simply content to cover my costs. Nor have I spared any expense to bring the work to completion. I have taken care to have the plates engraved by the most skilled artists, and to this end I have sought out the very best paper; so that I might respond not only to those who are knowledgeable about art but to all students of insects and plants. And if I find that I have achieved this goal and have satisfied and not displeased such readers, then I will indeed rejoice.¹⁸

Merian's efforts did not displease her designated audience, and her drawings and printed works were in the collections of Hans Sloane, Richard Mead and James Petiver (1663-1718). The illustrations to the *Metamorphosis* are spectacular full-page renditions of butterflies, moths, beetles and flies with their larvae on the appropriate food plants. They are, as Merian says, "all observed by me in America and drawn from life, with only a few exceptions, which I have

¹⁶ Sharon Valiant, "Questioning the Caterpillar," *Natural History*, 1992, 12, p. 50.

¹⁷ From the preface to *Metamorphosis*, quoted in Freedberg, "Science, Commerce and Art," p. 379. James Edward Smith, writing in the inaugural volume of *Transactions of the Linnaean Society* in 1791, described Madam Merian's "excellent work on the Surinam Insects, one of the most splendid in natural history, ... a monument of female perseverance and enthusiasm."

¹⁸ From the preface to *Metamorphosis*, quoted in Freedberg, "Science, Commerce and Art," pp 379-80.

added based on the oral testimony of the Indians."¹⁹ Her work was well-known in the eighteenth century, and cited over a hundred times by Linnaeus, and also used as a reference by Edwards.²⁰ It was a brilliant and artistic example of what might be expected in works of natural history dealing with the New World, and its imitators were not long in coming.

In 1729, Mark Catesby (1682/3-1749) began the publication of the first fully illustrated catalogue of the natural history of North America. *The Natural History of Carolina, Florida and the Bahama Islands, Containing two hundred and twenty figures of Birds, Beasts, Fishes, Serpents, Insects and Plants* was issued in two volumes and an Appendix, its publication completed in 1747. Mark Catesby was born in Essex, but when his sister moved to America he followed, making his first trip from 1712 to 1719. He was a friend of John Ray and had a more than cursory interest in natural history. He made a second trip from 1722 until 1725, this time with the sponsorship of a dozen patrons of natural history, returning finally to London in 1726. Catesby's work owes much to the European enthusiasm for cabinets, gardening and rare plants. James Petiver, Maria Merian's correspondent, was an avaricious and indiscriminate collector of rarities, and member of a London society (the Temple Bar Club) which sponsored plant and curio collectors in America, like John Banister, John Lawson, and Mark Catesby. In 1700 Petiver published a broadside entitled "Brief Directions for the easie making and preserving collections of all natural curiosities," and advertised his interests to overseas travellers:

¹⁹ From the preface to *Metamorphosis*, quoted in Freedberg, "Science, Commerce and Art," p. 379.

²⁰ "Merian's figures are slightly copied in the annexed plate," in a reprint of "The Frog-Fish of Surinam" from the *Philosophical Transactions*, included in *A Natural History of Uncommon Birds*, p. 30.

I humbly entreat that all practitioners in Physick, Sea-Surgeons or other curious persons, who travel into foreign countries, will be pleased to make collections for me of whatever plants, shells, insects &c they shall meet with, preserving them according to directions that I have made so easie as the meanest is capable to perform, the which I am ready to give to such as shall desire them.²¹

Catesby was more than capable, and his patrons were delighted.

The extent of the American trade in ethnographic specimens, seeds, plants, animals, skins, eggs, insects, and minerals was enormous, but most of the objects found their way into private collections, to be pictured in the manuscript drawings, but rarely published. Nehemiah Grew did prepare the collections of the Royal Society for publication in 1681, but the unadorned engravings of heterogenous rarities could not command the public interest that a book like Catesby's received. Catesby's friend, Cromwell Mortimer, Secretary of the Royal Society, announced in the *Philosophical Transactions* that *The Natural History of Carolina* was "the most magnificent Work I know of since the Art of Printing has been discovered."²² While Mortimer's praise might be seen as the admiration of a close friend, Kastner asserts that "The *Natural History* was received as a "noble work," bought by the Queens of England and Sweden, by dozens of British peers, by Continental noblemen and, in America, by six colonial governors."²³ The interest was partly the result of the popular enthusiasm for natural history that had been growing throughout the seventeenth century, and partly the new way in which the animals and plants were portrayed. Like Merian's, the plates were large, handsome and gorgeously coloured. Catesby was also the first to pose his birds and beasts

²¹ Quoted in Richard Altick, *The Shows of London*. Cambridge, Mass: The Belknap Press, 1978, p. 13.

²² Quoted in Mark Catesby, *The Natural History of Carolina*. Notes by Joseph Ewan. Savannah, GA: Beehive Press, 1974, p. ix.

²³ Joseph Kastner, *A Species of Eternity*. New York: Alfred A. Knopf, 1977, pp 17-18.

against botanical backgrounds, not, however, in so scientific a manner as Maria Merian. Catesby's diminutive buffalo rubs against an oversize pseudoacacia, whose flower and leaves sprout from a single branch of a dead stump [plate 50]. His flamingo stands straight-necked on a beach in front of an enormous and anomalous branched gorgonian coral, whose natural height does not exceed two feet [plate 51]. Dr. Alexander Garden (c1730-91), a distinguished American physician and naturalist, correspondent of John Ellis (?1705-76) was very critical of Catesby's efforts:

... it is sufficiently evident that his sole object was to make showy figures of the productions of nature, rather than to give correct and accurate representations. This is rather to invent than to describe; it is indulging the fancies of his own brain, instead of contemplating and observing the beautiful works of God.²⁴

To some extent Garden's criticisms were justified. Not all Catesby's birds can be identified with current species, and certainly his contention that the birds were pictured with the plants "of which they feed on and frequent"²⁵ was not always the case. In addition, there were problems with the colouring of some editions after his death. As noted above, Catesby did not render all his subjects directly after life, copying seven drawings directly from John White's originals, which were then housed in the Sloane collection. Some of his problems with "correct and accurate representation," however, were no doubt the result of his lack of formal training as an artist. Catesby taught himself both how to paint, and later when he realized the cost of seeing his watercolours transformed into engravings, also how to engrave. He wrote an apology in his introduction, and

²⁴ Quoted in Catesby, *The Natural History of Carolina*, pp 89-90.

²⁵ Catesby, *The Natural History of Carolina*, p. iv. Lysaght in *The Book of Birds*, London: Phaidon Press, 1975 (pl 46), notes that the Prairie Chicken is pictured next to a Dodecatheon, and that while the chicken is to be found in the grasslands, the flower grows in the woods.

it is worth quoting from it at some length, for Catesby was not the last of the self-taught artists whose works were to transform the depiction of natural history:

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 that Plants and other Things done in a Flat, 'tho exact manner, may serve the Purpose of Natural History, better in some Measure than in a more bold and Painter-like Way.

Similarly he excused his particular style of engraving:

... 'tho I may not have done in a Graver-like manner, choosing rather to omit their method of cross-Hatching, and to follow the humour of the Feathers, which is more laborious, and I hope has proved more to the purpose.

Finally, he noted some of the problems in hand-colouring:

Of the Paints, particularly Greens, used in the illumination of figures, I had principally a regard to those most resembling Nature..., Yet give me leave to observe there is no degree of Green, but what some Plants are possess'd of at different times o' the year, and the same Plant changes its Colour gradually with it's Age:... What I infer from this, that by comparing a Painting with a living Plant, the difference of colour, if any, may proceed from the above-mentioned cause.²⁶

Catesby is concerned that his readers and purchasers understand his techniques for rendering the living subject on to the printed page, not only because some of his subscribers might hasten to the garden to compare their cultivated Dodecatheon with the printed one, but also because he is convinced of the importance of the illustration as a means of conveying information about plants and animals. Like Merian before him and Edwards after him, Catesby

²⁶ Catesby, *The Natural History of Carolina*, p. vi-vii.

acknowledges that the representation can speak more clearly than textual description:

The Illuminating of Natural History is so particularly essential to the perfect understanding of it, that I may aver a clearer Idea may be conceived 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 Description, judging it unnecessary to tire the reader with describing every Feather yet, I hope I have said enough to distinguish them without confusion.²⁷

Catesby's defence of the worth of figures "in their proper colours" calls to mind the assertions that Leonhart Fuchs made in *De historia stirpium* (1542). Fuchs supervised the work of the artists to ensure that the pictures were "most perfect," and his craftsmen "purposely and deliberately avoided the obliteration of the natural form of the plants by shadows, and other less necessary things by which the delineations sometimes try to win artistic glory."²⁸ The "Flat, 'tho exact" and "un-Painter-like manner" advocated by Catesby echoes the ideal of the sixteenth-century botanical draftsmen, and like the earlier botanical compilers, Catesby was concerned with rendering unfamiliar genera to a European audience. His birds and fish and reptiles were like the *herbae nudaе* of the herbalists, and he noted that "Very few of the Birds have names assigned them in the country, except some which had *Indian* names."²⁹ Despite its deficiencies, Catesby's work set a new standard in illustrated natural history books published in English, and his work remained a reference for American natural history even into the nineteenth century. Joseph Banks took Catesby with him on his trip to Newfoundland in 1762, Pennant quotes him in *The Arctic*

²⁷ Catesby, *The Natural History of Carolina*, p. vi-vii.

²⁸ Quoted in Wilfrid Blunt, *The Art of Botanical Illustration*. 4th ed. London: Collins, 1971, p. 50.

²⁹ Catesby, *The Natural History of Carolina*, p. vii.

Zoology (1792), and "Catesby's Carolina" was among the books that in 1817 Charles Fothergill, grandson to John, wished "to consult when putting my Canadian researches together."³⁰

George Edwards also made extensive reference to Catesby's work, and though he specifically notes that he has "not drawn or described any thing that was done before in any tolerable degree of perfection," he does redraw a number of Catesby's birds, with apologies to his friend and teacher.³¹ Catesby became acquainted with Edwards through the circle of curious gentlemen and women interested in natural history. Both Edwards and Catesby were self-taught and self-published and the cost of hiring engravers was beyond their means. Catesby provided Edwards with specimens, and instructed him in the art of engraving or etching on copper. Like Catesby, Edwards adopted a style which he felt was best suited to the accurate portrayal of specimens which, as he reiterates, are either hitherto undescribed or have not before been figured.³² Where Merian's elaborate drawings recall Weiditz's curled and withered leaves and the verisimilitude of Dürer, Catesby and Edwards are attempting to develop a new style best suited to the description of things. Catesby described his attempts as "Flat, 'tho exact." Edwards was more eloquent and also perhaps better acquainted with the prevailing aesthetic:

³⁰ Charles Fothergill, "Canadian Researches Chiefly in Natural History," Manuscript journal, 1816-21, n.p. The manuscript is in the Fisher Rare Book Room of the Robarts Library at the University of Toronto.

³¹ Edwards also notes in his re-drawing of the Ground Squirrel, that even though Catesby had provided an excellent likeness, he has included his own illustration, since "as that expensive Work will fall into but a few Hands, I hope this Figure will prove acceptable to most of my encouragers." (Edwards, *A Natural History*, Part IV, pl. 181.) Catesby's ground squirrel or chipmunk is by far the more felicitous rendering, most likely owing to the fact that Catesby had seen the animal alive in its native habitat.

³² The majority of his plates are of birds from North America, Africa, India, and China, with a few unusual European species. McAtee notes that in all Edwards figures 100 North American species of birds, from a grand total of 394 birds and beasts. McAtee, W. "North American Birds of George Edwards," *Journal of the Society for the Bibliography of Natural History (JSBNH)*, 1950, 2 (5), 194-205.

Those who draw after nature, on account of natural historians, should represent things justly, and according to nature, and not strive to exalt or raise her above herself; for by so doing, instead of instructing, they will lead the world into errors;... The historical painter, especially he that would represent the fiction of poets, may take greater liberties....: yet every one who reads natural history, and sees figures and descriptions of things in nature, supposes they are, or ought to have been, immediately drawn and described from nature... But in the drawing after nature, a most religious and scrupulous strictness is to be observed; and by these means we can demonstrate, that nature is or is not the same through all times. If natural historians, or they who draw for them, would carefully observe these rules, some of them might produce figures that would be deemed perfect by the knowing naturalists of these times, and escape their censure; then like the celebrated statues of Greeks and Romans, might they pass down models to future ages, as things justly and truly representing nature; but these things are rather to be wished than expected.³³

Edwards' "religious and scrupulous strictness" is expressed both in his desire for accurate textual description and detailed notes on sources for both information and specimens, but also in his rejection of some of the common stratagems employed by painters not so concerned with just representation. While he is not against posing his birds in different attitudes to add pleasing variety to his pages (in response to critics of an earlier work, possibly Albin's *A Natural History of Birds*, 1731-38), he recommends that "...many such actions, turns, and fore-shortenings, which make up the agreeable variety of masterly compositions, must be avoided, less they hide what is most conspicuous in the natural descriptions."³⁴

Throughout his works, Edwards expresses frustration with his predecessors who have not clearly depicted a bird or animal, or who made mistakes in their rendering. Eleazar Albin (fl. 1713-59) in particular is singled out for criticism, but Catesy and Merian are also corrected, though more gently.

³³ Edwards, *A Natural History*, Part I, pp xvi-xvii.

³⁴ Edwards, *A Natural History*, Part II, p. 113

Edwards wants to render the animal so exactly that like the perfection of classical sculptures his images will stand as the models for future generations. He wishes to be not only the new Pliny but also the new Apelles, whose renditions were so life-like they fooled the viewer into mistaking painted images for real things. He notes that he often re-worked his images, as new information and new specimens came to light. But his desires were not to be realized, since despite his best efforts the renditions could not capture the essence of life. In Part II of the *Natural History*, he wrote "I formerly imagined it possible, by the highest perfection in the art of painting to deceive the eye, by performing what might be taken for nature; but, ... I plainly discover it to be impracticable."³⁵ Note that Edwards says "impracticable" not impossible. Edwards' work in depicting the nondescript is hampered both by the materials from which he must work and the problems of rendering them on to the printed page. In the next section, we will examine again the problems of resolution which had plagued natural history illustrators since the sixteenth century.

The Importance of Preservation

The ideal for most natural history illustrators was to paint from the living specimen. Both Catesby and Merian note that they have observed and painted their subjects in their native environment. In Merian's case, she made watercolour studies of individual insects and flowers on site in Surinam, many of which are preserved in the Leningrad collections acquired by Peter the Great. She also collected and pinned butterflies in small round boxes, depicted in the frontispiece to the 1771 Paris edition of her works, which she packed in crates to

³⁵ Edwards, *A Natural History*, Part II, p. 114.

ship home on her return. Merian completed her drawings much in the manner of the Dutch flower painters, building up a composition from individual sketches. On his excursions, Catesby had "an *Indian* to carry [his] Box" with his "Paper and materials for Painting,"³⁶ and drew "the Animals, particularly the Birds... while alive (except a very few)."³⁷ George Edwards, on the other hand, never visited the New World. He was, in fact, a closet or cabinet naturalist, the Librarian to the College of Physicians and Surgeons, with a large and far-flung acquaintance that catered to his passion for painting natural history subjects, particularly birds. He managed in twenty-odd years to depict almost 400 animals and birds, and the means by which he achieved this reveal a great deal about both the specimen trade and the problems of accurate representation that so vexed him.

An examination of Edwards' frontispiece reveals something of both his subjects and his method. Birds perch and pose on the clouds surrounding Juno, and indeed for a painter who rarely left the London area Edwards had access to a surprising number of live birds as sitters. Some, like the parrot in the iron hoop, were exotic pets. Sailors had been bringing back popinjays from Africa and America for hundreds of years, but more recently they had also returned with even stranger birds, such as the touraco (depicted next to the pheasant peacock on Juno's cloud) and the mynah. Edwards had painted the touraco truly from life at "Colonel Lowther's house in St. James Park,"³⁸ while he had painted the mynah for Dr. George Wharton's lady, whose pet it was.³⁹ With Dr.

³⁶ Catesby, *The Natural History of Carolina*, p. iv.

³⁷ Catesby, *The Natural History of Carolina*, p. vi. The very few are probably those he copied from John White.

³⁸ Edwards, *A Natural History*, Part I, pl. 7.

³⁹ Edwards, *A Natural History*, Part I, pl. 17.

and Mrs. Wharton's permission he also took a likeness for his own collection. From his account, it would appear that Edwards was well-known as an animal painter and often invited to draw an unusual bird in someone's collection. He was also not shy about asking permission to paint the rarities maintained by the curious gentlemen of the great houses, or the more lowly bird fanciers. He painted the portrait of another mynah at a "dealer in curious birds," whom he visited regularly. The Great Horned Owl of the Mourning Bush Tavern also sat for a study, but his chief sources for live sitters were the menageries of the gentry and aristocrats, like the Earl of Burlington who kept another Great Horned Owl from Virginia alive in his park.⁴⁰ Edwards' patron, Sir Hans Sloane, also maintained a live collection and from it Edwards painted the King of Vultures,⁴¹ and the Arab Bustard.⁴² He also relied on Dr. R.M. Massey of Stepney for the living specimens of the White-tailed Eagle,⁴³ and the Spotted Hawk or Falcon,⁴⁴ both from Hudson Bay. He visited the Right Honourable Lady Anson, who "obliged [him] with the sight of a cage of these birds," the Painted Finches from North America.⁴⁵ While Edwards did not include a flamingo (Catesby had drawn one), this tropical native did live for some time in the kitchen of Sir Robert Walpole's house.⁴⁶ A "Black Hawk or Falcon" which had "pitched on a

⁴⁰ Edwards, *A Natural History*, Part II, pl. 60.

⁴¹ Edwards, *A Natural History*, Part I, pl. 2.

⁴² Edwards, *A Natural History*, Part I, pl. 12.

⁴³ Edwards, *A Natural History*, Part I, pl. 1.

⁴⁴ Edwards, *A Natural History*, Part I, pl. 2.

⁴⁵ Edwards, *A Natural History*, Part III, pl. 130.

⁴⁶ Lysaght, *Joseph Banks*, p. 92.

ship belonging to the Hudson's-Bay Company, in August 1739... and lived in London all the hard winter, 1739" also came to Edward's attention.⁴⁷

Birds were the most common exotic animals kept in England, partially because, as Catesby remarks, "... there is a greater variety of the feather'd kind than of any other Animals (at least to be come at)."⁴⁸ Birds were relatively easy to observe and catch (or shoot and preserve), and they were also attractive, or as Catesby noted, "they excel in the Beauty of their Colours."⁴⁹ They were not, however, the only exotic creatures to be found in and around London. Sir Hans Sloane, who must have maintained an unusual house, also played host to the Quick-Hatch or Wolverine from Hudson Bay,⁵⁰ and the Monax or Marmot from Maryland.⁵¹ In the late 1760s, after the fall of Quebec, a fashion for moose swept London society, judging by the number of animals imported to game parks. Two females were housed in Yorkshire and Bedfordshire respectively, two others briefly with the Duke of Richmond, while two young males were presented by General Carleton to the Duke of Richmond in 1770 and 1773 respectively.⁵² Some introductions were more serendipitous. A Scarlet Locust

⁴⁷ Edwards, *A Natural History*, Part I, pl. 4.

⁴⁸ Catesby, *The Natural History of Carolina*, p. iv.

⁴⁹ Catesby, *The Natural History of Carolina*, p. iv. Even for the observer on the spot, fish were notoriously hard to render. Catesby mentioned that he was forced to procure a succession of live fish, to paint one after the other, since unlike birds, fish "do not retain their Colours when out of their Element."

⁵⁰ Edwards, *A Natural History*, Part II, pl. 103.

⁵¹ Edwards, *A Natural History*, Part II, pl. 104.

⁵² Noted by William Hunter (1718-83). Moose were painted and drawn by George Stubbs in 1770 and 1773, and an engraved portrait of one of Stubbs' moose is included in Thomas Pennant's *Arctic Zoology* (1792). See W.D.I. Rolfe, "William Hunter on Irish 'elk' and Stubb's Moose", *Archives of Natural History*, 1983, 11 (2), p. 263.

was brought "accidentally alive from the West Indies in a basket of pineapples,"⁵³ and its portrait secured by Edwards.

Edwards was not, however, always so fortunate as to have his subjects alive and squawking, and he was well aware of how far short his representation might fall when his only materials were a few feathers and a beak. He notes several times that he has improved a drawing originally made from a skin, when he had access to a live specimen:

I have not always copied servilely from draughts which I designed from nature, because some of these were drawn from dead subjects, in which I could not consider the actions and gestures of them while living; yet, after having made drawings,... I had frequently opportunity of seeing these same birds, or birds of the like genus, from which I sketched outlines, as I had opportunity, in my visits to curious gentlemen in the neighbourhood of London.⁵⁴

This close reading of Edwards provides a gloss on his representation of a bittern which began this enquiry. "The Bittern from Hudson's-Bay" (see plate 1) is a misshapen sort of bird, accurately coloured but in no way alive. This in itself is surprising, given that the bittern is also a European bird. What becomes clear, however, in reading Edwards, is that he is not a field naturalist. He is interested in depiction and in description, and by description he means surface characteristics. Edwards rarely includes information on behaviour, food, nesting habits, or song, and indeed he could not, when his subject was newly or long dead. No one who has viewed a bittern could fail to remark on its hunched shoulders, or its deep booming voice. Edwards' interest was not in the bird itself, but in the specimen, and his plate is an accurate representation of the bird

⁵³ Edwards, *A Natural History*, Part I, pl. 22.

⁵⁴ Edwards, *A Natural History*, Part II, p. 113.

skin that James Isham sent him from Hudson Bay. It is a drawing after nature, not after life.⁵⁵

The demand for specimens was far greater than the demand for live animals. (In the case of live importations, one cannot help but think that live transport simply saved the cost of preparation, for sooner or later, the live animal would die and become a specimen. This was particularly the case with large mammals, which were not easily preserved for shipment.) Specimens were meant for ca'binets, for the study collections of the curious, to be consulted, painted, even set up and exhibited. Specimens could be prepared and shipped in a variety of different ways, depending on their nature, the availability of preservatives, and the skill and training of the field collector.⁵⁶ Collecting in the New World was rife with difficulties, as the Reverend John Clayton made clear in his note "On the Beasts of Virginia" (1688):

⁵⁵ Edwards did not in fact see himself as a natural historian; rather he identified himself first and foremost as a painter of specimens. In the description of the Black Hawk or Falcon, he writes, "Whether this and the foregoing be male and female, I leave to the judgment of those who understand natural history." (Edwards, *A Natural History*, Part I, pl. 4.)

⁵⁶ Plants were, of course, the exception, since most plant collectors wished to grow their own examples of new genera, and much effort was expended on shipping viable samples as well as herbarium specimens. Procedures for collecting botanical materials were well-established by the seventeenth century, and the Royal Society's 1669 recommendations to Edward Diggs, who was setting out for Virginia, describe the method: "To send all sorts of Berries, Grasses, Grains and Herbs, growing in Virginia, and to wrapp up the Seeds very dry in paper, to send Seeds or Berrys, when they are ready to dropp off, with as much husk and skins upon ym, as may be. to wrap up Roots in Mosse or light Earth, and to keep them from any dashing of Sea-water in the voyage; to gather ye smaller fruits, and dry ym in ye Air and in the Shade, to open fruits of a larger kind and ys Stones and Kernels being taken out, to dry ym; to set Plants or young Trees in half Tubbs of Earth, arched over with hoops, and cover'd with matts, to preserve ym from the dashing of Sea-water, giving then Air every day, ve weather being fair, and watering ym with fresh water every day." (Quoted in Stearns, R. P. *Science in the British Colonies of America*. Urbana: University of Illinois Press, 1970, p. 697.) Despite their best care, many plant shipments suffered mightily on route by the hazards of sea passage. Joseph Banks complained that "on the fifth of Nov^r we had a very hard Gale of Wind of the Western Islands which has almost ruind me in the Course of it we shipp'd a Sea which Stove in our Quarter & almost Fild the Cabbin with water in an instant where it washed backward & forward with such rapidity that it Broke in peices Every chair & table in the Place among other things that Sufferd my Poor Box of Seeds was one which was intirely demolish'd as was my Box of Earth with Plants in it which Stood upon Deck." Banks' journal entry, in Lysaght, *Joseph Banks*, p. 151.

And indeed by Sea I lost my Books, Chymical Instruments, Glasses and Microscopes, which rendered me incapable of making those Remarks and Observations I had designed, they were all cast away in Captain Wins Ship, as they were to follow me; and Virginia being a Country where one cannot furnish ones self again with such things, I was discouraged from making so diligent a Scruteny as otherwise I might have done, so that I took very few Minutes down in Writing.

If the loss of his instruments were not enough, Clayton also suffered from ill health which hampered his collecting:

I had indeed begun once whilst in that Country to have made a Collection of the Birds, but falling sick of the Griping of the Guts, some of them for want of care Corrupted, which made them fling others away that I had thoroughly aired; for I was past taking care of them my self, there remaining but small hopes of my Life.⁵⁷

Even almost a century later, Pierre Poivre (1719-86), supplier of bird specimens to René-Antoine Réaumur (1688-1757) in Paris, complained that the colonies in which he collected were destitute of all the recommended preparations for preserving specimens:

...vous seres surpris que j'aie encore suivre mon ancienne methode pour la conservation des oiseaux, et que je n'aie pas Suivre celle que vous m'avés apprise par vous derniers lettres: mais vous m'excuserés quand vous sçaurés que cette methode est impracticable dans les païs surtout ou j'ai faites mes collections on n'y trouve ni baril ni tonellier, ni alum ni Sel. on a bien de la peine a avoir le dernier article pour le besoin de la vie, et nos colonies manquent absolument de tout, point d'alum, point d'esprit de vin, point de drogues, etc.⁵⁸

Poivre's peevish reply must have been a trifle galling to Réaumur, author of a pamphlet on bird preservation, which was also reprinted in English in

⁵⁷ Quoted in W. McAtee, "North American Bird Records in the 'Philosophical Transactions', 1665-1800," *JSBNH*, 1953, 3 (1), p. 57.

⁵⁸ Quoted in Paul L. Farber, "The Development of Taxidermy and the History of Ornithology," *ISIS*, 1977, 68 (244), p. 552n.

Philosophical Transactions (1748). Réaumur noted that there were three principal methods for preparing bird specimens for shipment. The first involved stuffing a cleaned bird skin with either a soft or a hard mold. This required no little skill, but when done well was an excellent preparation. Alexander Wilson praised William Bartram's mastery of the art of mounting specimens with a note in their correspondence: "Thanks for your bird, so neatly stuffed, that I was just about to skin it."⁵⁹ Much simpler was the second method which required gutting and washing the bird, wrapping it carefully, then placing it in a barrel or glass jar full of brandy. Kastner remarks that some specimens suffered when unscrupulous sailors drank the brandy en route to their destination,⁶⁰ while Joseph Banks complained that illness prevented him from examining the specimens brought to him systematically and "has made my Bird tub a Chaos of which I Cannot Give so good an account as I could wish...".⁶¹ After eight days, birds might be removed from the brandy then sealed in boxes to keep out pests. Finally, field collectors could embalm their birds by emptying the skin, then filling it with aromatic spices or a drying agent such as alum or lime. Mark Catesby apparently sprinkled snuff inside his birds then dried them in an oven and added more snuff to keep out the insects.⁶² Peter Collinson, the London merchant and correspondent of John Bartram suggested that Bartram try Catesby's method:

F[riend] John: Mr. Catesby Desposes that thou wilt look after a night Bird call'd Wippei-Will – if this can be shot and sent in its Feathers being first,

⁵⁹ Quoted in Charlotte Porter, "The drawings of William Bartram (1739-1823), *American Naturalist*," *Archives of Natural History*, 1989, 16 (3), p. 291.

⁶⁰ Kastner, *Species of Eternity*, p. 49.

⁶¹ From Banks' journal entry for August 2,3, 1762 in Lysaght, *Joseph Banks*, p. 129.

⁶² Note in Farber, "The Development of Taxidermy," p. 552n.

bowel'd, & Dry'd in a [brick] oven, & then Tied up in Tobacco Leaves or pack'd up in Tobacco Dust...⁶³

Edwards received his specimens in all manner of conditions. He notes that the Smallest Green and Red Indian Perroquet was kept in camphorated spirits in the collection of Cromwell Mortimer. Birds in spirits lost much of their colour, and Edwards observed that when he removed this bird, which had appeared brown, and washed and dried it, the feathers showed green and orange as in his coloured etching.⁶⁴ Edwards documented his methods for others:

If one would draw a bird preserved in spirits, let him take it out, wash it pretty well in warm water, and rinse it in a good quantity of cold, and let it dry gradually, and he will restore the true colour of the feathers as far as can be; for some feathers, in the glasses of spirits, I have observed to appear of colours very contrary to the true colours they are of before they were put in.⁶⁵

A number of birds from Hudson Bay were sent "preserved dry" or as "a stuffed skin well preserved" by Alexander Light who had been sent to Hudson Bay in 1741 on account of his interest in natural history. James Isham, an employee of the Hudson's Bay Company, "obliged [Edwards] extremely by furnishing... more than thirty different species of birds... the far greatest part of them being Non-Descripts." Isham brought his birds back to London in 1745 "stuffed and

⁶³ Letter from Peter Collinson to William Bartram, 24 April, 1742, in Catesby, *Natural History of Carolina*, note to Plate 18.

⁶⁴ Edwards, *A Natural History*, Part I, pl. 6. The same occurred with other specimens in spirits. Peter Collinson wrote to John Bartram that Mark Catesby would "thank thee very kindly for the fruit; and come they either dry, or in spirits, they will lose their colour: so pray describe it as well as thee can, that he may be qualified to paint it." (26 January, 1738/9). Quoted in Catesby, *Natural History of Carolina*, p. 98.

⁶⁵ Edwards, *A Natural History*, Part I, pl. 9.

preserved very clean and perfect,"⁶⁶ and among them was the Bittern. Though some of the awkwardness in its depiction might be laid to Edwards' lack of field observation, the condition of the specimen often made it difficult to achieve the correct proportions. As Edwards wrote in regard to the Little Black and White Duck from Newfoundland (which he obtained from another collector), "One cannot with certainty give the length and breadth of dried and stuffed birds when the bodies are taken out of their skins."⁶⁷ There were other problems with prepared specimens. When he drew the Toucan, he noted that "After this bird was dead, the colours in the bill were wholly lost and obscured, and the bare space around the eye turned black."⁶⁸ He preferred to receive his specimens newly dead and noted with pleasure when a gentleman sent him a Bustard Cock "fresh and in fine order."⁶⁹ Sometimes he had to make do with specimens far less perfect, and in the case of the Argus Pheasant he illustrated for *Philosophical Transactions*, he noted that "The head and legs were supplied from the curious drawing that was sent from Canton, with the bird's skin, to Dr. Fothergill, which had neither feet nor head adhering to it."⁷⁰ Finally, Edwards was fortunate in receiving some specimens at all. Shipments of specimens were part of the spoils of war, and Edwards dedicated the third part of his magnum opus to Earl Ferrars, formerly Captain Shirley "as an acknowledgement for his kind

⁶⁶ Edwards, *A Natural History*, Part III, pl. 107.

⁶⁷ Edwards, *A Natural History*, Part II, pl. 100.

⁶⁸ Edwards, *A Natural History*, Part II, pl. 64.

⁶⁹ Edwards, *A Natural History*, Part II, pl. 73.

⁷⁰ Edwards, *A Natural History*, Part I, p. 33. Birds often arrived from the orient minus heads and feet (likely to prevent deterioration), and in the sixteenth century many theories were advanced as to why the Bird of Paradise was legless. Edwards refers a number of times to curious drawings from China, and he also relied on drawings made by other respected natural history painters like Catesby and William Bartram.

assistance in contributing a great number of birds intended for Madam Popmpadour, and taken by the Captain in a *French* prize."⁷¹

Edwards laboured under the problems of his materials, but he also was thwarted in his desire to establish models by the problems of his method. He found it impracticable to produce illustrations of "what might be taken for nature," not for lack of his own skills but for lack of the tools of reproduction that would allow him to "deceive the eye," to reach a degree of resolution that would mirror the life-like effects of which painting was capable.⁷² Edwards blamed the techniques of reproduction then available. He was taught the art of engraving by Mark Catesby, and made a virtue from the necessity of engraving his own plates. Although he acknowledges that "The gravings of these figures lie under some disadvantage; because, till of late years, I had no knowledge of etching or engraving....," he also recognizes that reliance on professional engravers created problems in true rendering:

...yet, by doing them myself, I have retained in the prints some perfections, which would have been wanting, had I given my original draughts to engravers to copy; for they often, through want of a just understanding of the meaning of those who gave them first draughts, go a little from the author's designs, and will take some little bend and turns of strokes for the lapse of a pencil, which they will, as they purpose, correct; which sometimes robs a figure of what the author designed as its chief distinguishing mark: so that it is, in some sort, better that the original designer works such drawings on copper himself; because a man cannot so easily go from his own meaning in copying, as a second person may mistake him...

⁷¹ *Some Memoirs*, pp 10-11.

⁷² Like earlier authors (see Chapter Three), Edwards saw art as the imitation of nature. He acknowledged the importance of an understanding of perspective: "A Theory of this Sort is absolutely necessary in every Painter who would Imitate Nature in almost any respect." (*A Natural History*, Part IV, p. 213.)

Edwards went on to note that accuracy was particularly important in the depiction of the "extreme parts of birds, such as the bills, and feet, and other parts" since species distinction depended on "such little niceties." He remarked how difficult it was for someone "not versed in the nature of these things, to keep up a due observation and distinction of them, in copying from drawings." Exact rendering was vital, because even with accompanying textual description, "it is altogether impossible for a description to give so just an idea of figures, as lines which precisely express the thing you treat of."⁷³ In his later works, Edwards had developed enough skill to draw directly on the copper plate, but he still encountered problems in the application of what Ivins referred to as the "web of rationality." Not having been professionally trained, Edwards learned the art of the engraver by trial and error. He notes that his strokes in shadowing are "not so closely and evenly laid" as those of professional engravers.⁷⁴ More significantly, he has had to develop a technique which permits the final illustration to be coloured:

In etching plates which are afterwards to be coloured, I have discovered, that they should be done in a manner different from such things as are to continue in black and white;... Prints that are not worked with a direct design for colouring, cannot so easily be brought to that beauty; they must be laboured and painted with body colours to make them look tolerably.⁷⁵

Edwards is aware, in a way very distinct from his predecessors in the sixteenth and seventeenth centuries, of the importance of true colour in printed illustrations. Colour in natural history is, as we have observed, not trivial, and

⁷³ Edwards, *A Natural History*, Part II, p. 112.

⁷⁴ Edwards, *A Natural History*, Part II, p. 112.

⁷⁵ Edwards, *A Natural History*, Part I, pp xix-xx.

wrong colouring was as much an affront to nature as wrong lines. He wrote in his last work, *Gleanings of Natural History*, that

In illuminated works of this kind, the value of the performance depends on the skill, diligence, and care of the author; for there is a very great difference; nay even an impossibility, precisely to express by words all the different degrees, shades, and mixtures of colours, so as exactly to convey your ideas to others: this can be done by no other way than by giving the colours themselves.⁷⁶

Unlike Crispijn de Passe he was not content simply to pass along instructions to his readers, rather he attempted to insure that all editions of his works were properly "illuminated." In his early work, he notes that he does not "propose to part with any of the prints uncoloured while I live, lest they should afterwards be coloured by unskillful people, which might be a blemish to the work, ..." ⁷⁷ He lodged a complete coloured copy of his work at the Royal College Library to serve as a standard, and he included detailed colouring information in all his textual descriptions, in case readers might be forced to colour the plates themselves. Finally, in May 1769, he disposed of his works to James Robson, the Bookseller who printed the 1776 edition, and left instructions that in order ... "that my labours be handed down to posterity with integrity, truth, and exactness, I have delivered into his hands a complete set of the plates, highly coloured by myself, as a standard to those Artists who may be employed in colouring them for the Future."⁷⁸ Edwards was then 75 years old.

No matter how skillful his strokes, however, Edwards was aware that he could not render in print the living creature. The shadows become too dark and

⁷⁶ Edwards, *A Natural History, Gleanings*, Part III, p. x.

⁷⁷ Edwards, *A Natural History*, Part I, p. xx.

⁷⁸ *Some Memoirs of the Life and Works of George Edwards...*, p. 21n.

the highlights were never exact. The printing process would not allow him to achieve the degree of resolution required to imitate nature. Despite the limitations in his coloured engravings that appear glaring to contemporary eyes – the stiff and unnatural poses, the awkward proportions, and the less-than-perfect colouring – in 1764 Edwards could reflect with some satisfaction that he had "gone on pretty smoothly, without any competitors." More significantly, the publication of his *Natural History of Birds* had been greeted with almost universal praise, without "any considerable cavils raised against it, or criticisms made upon it."⁷⁹ Edwards' Birds were in fact described as one of the "miracles of our century in the natural sciences... nothing equal was seen in the past and will be in the future."⁸⁰ High praise indeed, particularly when its author was Carolus Linnæus, the "Prince of Botanists" and the founder of modern taxonomic systems. The next chapter will explore the relation between illustration, taxonomy, and the beginning of the modern understanding of the natural world.

⁷⁹ Edwards, *A Natural History, Gleanings*, Part III, p. viii-ix.

⁸⁰ Linnaeus to Trew, quoted in Gerta Callmann, Ehret. *Flower Painter Extraordinary*. Oxford: Phaidon, 1977, p. 97.

CHAPTER SEVEN

The Classification of the Visible: Part Two

Copiers of Nature

It is easy to dismiss George Edwards and his generation as mere daubers, producers of charming portraits of pets and colourful curiosities. That is not, however, how Edwards and his circle saw his work or the work of their colleagues. As Edwards noted, he had in twenty years met with little criticism or cavil against his books; rather, he had received honour and praise. Sir Hans Sloane had secured for him his position as Librarian to the Royal College of Physicians and Surgeons. In 1750 he won the Copley Gold Medal from the Royal Society, and in the mid-1750s was elected a Fellow of both the Royal Society and the Society of Antiquaries. Both his books were published in French editions (*Gleanings* in parallel columns of French and English), "for the use of foreigners,"¹ and had some influence on French natural history artists like Martinet. Edwards' works were also reissued in German (1749-76) with re-engravings by Johann Seligmann, and in Dutch (1772-81).² His designs were re-interpreted in the popular arts of his day, and Edwards complained that "several of our manufacturers that imitate China ware, several print-sellers, and printers of linen and cotton cloths, have filled the shops in London with images, pictures and prints, modelled, copied, drawn, and coloured after the figures in

¹ *Some Memoirs of the Life and Works of George Edwards, Fellow of the Royal and Antiquarian Societies*. London: Printed for J. Robson, Bookseller, 1776, p. 9.

² For the publication history, see S. Sitwell, *Fine Bird Books, 1700-1900*. New York: Atlantic Monthly Press, 1990, p. 93.

my History of Birds, most of which are sadly represented as to shape and colouring."³ Imitation may be the sincerest form of flattery, and this imitative use of his original drawings of birds points both to the popularity of natural history motifs among the public, and also to the widespread acceptance and familiarity of his work.

In many cases, however, the works of Edwards' fellow artists were at best pedestrian or even misleading. The peculiar caribou of Peter Paillou (fl. 1744-84) [plate 52] and the distorted raccoon of Charles Collins [plate 53] belie their reputations and their employment by two of the great naturalist-collectors of their day, Taylor White (1701-72) and Thomas Pennant (1726-98), both friends of Sir Joseph Banks. Taylor White retained a number of artists between 1730 and 1760 to paint his collections, including both Paillou and Collins, as well as Georg Ehret, the celebrated flower painter whose work will be discussed below in more detail. The paintings were drawn from life and at White's death numbered nearly a thousand. White employed Paillou from about 1744 to the early 1760s when he went to work for Pennant on his *British Zoology*. Pennant complained that while Paillou was "an excellent artist," he was too fond of "giving gaudy colours to his subjects."⁴ Nevertheless, Pennant had Paillou paint for his hall at Downing "several pictures of birds and animals, attended with suitable landscapes. Four were intended to represent the climates. The frigid zone and an *European* scene of a farm yard, are particularly well done..."⁵ Pennant also

³ George Edwards, *A Natural History of Uncommon Birds and Some Other Rare and Undescribed Animals, Quadrupeds, Reptiles, Fishes, Insects, etc. In Seven Parts...* 4 vols. (includes *Gleanings of Natural History*) London: J. Robson, 1805-6, Pt. IV, p. xxx.

⁴ Quoted in A.M. Lysaght, *Joseph Banks in Newfoundland & Labrador, 1766, His Diary, Manuscripts and Collections*. Berkeley: University of California Press, 1971, p. 104.

⁵ From Pennant's *Literary Life*, quoted in: Smith, Bernard. *European Vision and the South Pacific*. New Haven: Yale University Press, 2nd ed., 1988, pp 11-12.

employed his Welsh servant, Moses Griffith (1747-c1809), as an artist, though he had received, like Catesby and Edwards before him, no formal training. Despite his lack of training, Griffith's watercolours, which ornament the margins of Pennant's own copy of the *Arctic Zoology* (1792) now in the Blacker Wood Library at McGill University, are wonderfully executed, the birds natural and the colours fresh, detailed with the skill of miniaturist, since none of the marginalia exceeds about 10 cm in width. The work of Collins, Paillou and Griffith, however, all suffered from the same problems experienced by Edwards. Forced to use skins, mounted specimens, or animals preserved in spirits, the poor condition of their materials combined with their lack of formal training in anatomy and the dearth of living models often resulted in poor representations. The depiction of large mammals was especially difficult – Edwards had certainly done strange things to a caribou in Part IV of *Gleanings* – and Paillou's caribou, which he probably did paint from life, betrays his inexperience.⁶

The difficulty in painting the larger mammals was undoubtedly the reason that George Stubbs (1724-1806), whom Bernard Smith calls "that eighteenth-century master of visual empiricism,"⁷ became a much-sought-after artist by those interested in exotic animals. Stubbs painted a moose for William Hunter (1718-83), the anatomist, and a kangaroo and dingo for Joseph Banks. Stubbs' work was grounded in the study of animal anatomy and few would doubt his ability to render exactly any animal brought before him. His oil painting of the Duke of Richmond's moose was made in 1770 at Hunter's request and Hunter relates that "no pains was spared by that great Artist to exhibit an exact resemblance both of the young animal itself, and of a pair of Horns of the full grown Animal, which

⁶ Lysaght notes that according to Taylor White a pair of caribou were brought to England in 1769. In Lysaght, *Joseph Banks*, p. 167, n108.

⁷ Smith, *European Vision and the South Pacific*, p. 14.

the General had likewise brought from Quebec and presented to the Duke."⁸ Stubbs had no living model when he painted the kangaroo, probably working from a mounted, or Smith suggests, an inflated skin, but he managed to achieve a remarkable likeness to the animal and to the Australian landscape (likely based on a watercolour sketch by Parkinson). Unfortunately Stubbs was not well served by his engraver, Peter Mazell (fl. 1761-97), who worked for Pennant, and both his moose and his kangaroo suffer from the translation to the engraving, the moose (*Arctic Zoology*, Vol. I, pl. VIII) acquiring inordinately long lashes [plate 54] and the kangaroo being transformed from an animal with muscular jumping feet to a misshapen creature with improbable clawed feet and unnatural haunches (*History of Quadrupeds*, 1793).

While Edwards and the other artists who painted for the curious were esteemed by their patrons and by the public, in the words of Sir Joshua Reynolds, they were not seen by the artistic community as anything other than "copier[s] of nature." Art was not about "the imitation of nature" according to Sir Joshua, and the "mere copier of nature can never produce anything great..."⁹ Writing in the same year that Stubbs painted the moose, Reynolds dismisses the work of natural history artists:

He [the student] will permit the lower painter, like the florist or collector of shells, to exhibit the minute discriminations, which distinguish one object of the same species from another; while he, like the philosopher, will consider nature in the abstract, and represent in everyone of his figures the character of its species.¹⁰

⁸ W.D. Ian Rolfe, "William Hunter (1718-1783) on Irish 'elk' and Stubbs's Moose," *Archives of Natural History*, 11, 2, 1983, p. 265.

⁹ Reynolds, Sir Joshua. Discourse III, 1770, 14-21, in *Discourses on Art*, New Haven: Yale University Press, 1975, p. 41.

¹⁰ Reynolds, Discourse III, 1770, 287-91, in *Discourses*, p. 50.

Twelve years later, when Edwards has published *Gleanings* and Pennant has issued the first edition of *History of the Quadrupeds*, Reynolds asserts that the "detail of particulars" is not the business of the artist but "presupposes *nicety* and *research*, which are only the business of the curious and attentive, and therefore does not speak to the general sense of the whole species..."¹¹ He goes on to lecture the students at the Academy that although

A Landscape-Painter certainly ought to study anatomically (if I may use the expression) all the objects which he paints; but when he is to turn his studies to use, his skill, as a Man of Genius, will be displayed in shewing the general effect, preserving the same degree of hardness and softness which the objects have in nature; for he applies himself to the imagination, not to the curiosity, and works not for the Virtuoso or the Naturalist, but for the common observer of life and nature.¹²

It was precisely "nicety" and "research" which were so prized by the Naturalists, and by those who drew "after Nature" or "from Life." We have noted in the last chapter that to draw after nature did not necessarily mean to use a living model; rather the artist who drew from nature worked according to a special set of rules by which the specimen might be transformed for its better preservation and study into the illustration. Edwards noted that he was at first reluctant to publish some of his drawings because he had very little information on the birds themselves, in many cases not even knowing the country of origin. His friends answered, "that as I had taken the draughts from nature, and that it would be well attested, and the like birds might perhaps never be met with again, it was better to preserve the figures without knowing their countries than not at all."¹³ What was important, then, was not the quality of information about

¹¹ Reynolds, Discourse XI, 1782, 55-63, in *Discourses*, p. 192.

¹² Reynolds, Discourse XI, 1782, 273-279, in *Discourses*, p. 199.

¹³ Edwards, *A Natural History*, Part I, p. xviii.

the bird, but the publication of the image itself. These were truly copies of nature, as his friends could attest, and not, as had been the case in the past, simply drawings from memory, from the realm of the imagination rather than from that of the trained curiosity. Hunter contrasted the work of artists like Stubbs and Edwards with those who had worked for Aldrovandi in depicting the European elk or *Alce*:

His figures are done with so little Art, and are so little like our Original, that we dare not pronounce them to have been copied from the same species. I should guess the Male figure to be ideal, and the female to have been done [by] some person who had seen the Animal, and who had made the design afterwards from memory. In the figure of the Male there is no expression of the Character and proportions of the Animal, and the mane is flowing. The female figure expresses the Character of the Animal; but the Mane is vastly too small and is continued all the way to the Tail. We cannot suppose that the painter saw the Animal at the time he made the design.¹⁴

Hunter then goes on to criticize the figures of elk and original in French publications, and adds, "It is to be hoped that the Naturalists of the Northern Countries will give us such faithfull and expressive figures of the Elk and other animals as to leave us no longer in doubt."¹⁵ The eye-witness account of an animal is vital, for as Hunter notes, the ideal image or that done from memory is inadequate for the purposes of science; moreover, the images must be executed with some "Art," so that they correspond visually to the living creature. Hunter also makes a curious observation on the "Character" of the animal. The figure of the Male does not exhibit the character, while that of the female exhibits the character, but is still in overall appearance incorrect. Reynolds has also made allusion to the representation in the figures of the landscape painter of the

¹⁴ Rolfe, "William Hunter," *ANH*, 1983, 11 (2), p. 272.

¹⁵ Rolfe, "William Hunter," *ANH*, 1983, 11 (2), p. 273.

character of the species. What is this "character" that both refer to and in each case must represent the essence of that which is depicted?

The Invention of the Present Age

"Character" becomes a significant word in the eighteenth-century context. No matter whether it is used in a discourse on aesthetics or in a critique of natural history, it is freighted with Linnaean connotations. In much of Europe, Carolus Linnæus was the most celebrated naturalist of his day. Through his own writings and the work of his many pupils and followers, the system which he advocated was applied first to plants, then to all manner of living things, which by being named were brought within the scientific understanding of a generation. Any appreciation of the role of illustration in this period must be seen within the Linnaean context and system.

Linnaeus first published his *Systema Naturae* in 1735. In the brief two years that followed, he also published the *Fundamenta botanica* and the *Bibliotheca botanica* in 1735, followed in 1737 by the *Genera plantarum*, the *Flora lapponica*, and the *Critica botanica*. In addition to these works, he authored an illustrated catalogue of George Clifford's gardens at Hartekamp. The *Hortus Cliffortianus*, with drawings by Ehret and Jan Wandelaar was engraved and printed at Amsterdam in late 1737. It is no wonder that the young Swedish botanist fell seriously ill in the winter of 1737-8, and was nursed back to health at the home of Clifford, for whom he had produced such a magnificent and important catalogue. The *Hortus* itself is a large folio-sized work, written in Latin, and is subtitled "*Plantas exhibens quas in Hortistam Vivis quam Siccis Hartecampi in Hollandia.*" The plants in Clifford's gardens were by no means

the everyday plants of most Dutch gardens and Linnæus described in his rather florid style the impression which Hartekamp made on him:

The fame of Your Garden, illustrious Clifford, was on the lips of a few men, but less constantly than it deserved to be, and I was persuaded that Your Garden was only a Tantalus or Hesperides, such as cover almost the whole of the intensely cultivated land of Holland; I hardly considered it worth visiting, but the actuality surpassed all expectation... Dumbstruck I gazed. It pierced my heartstrings through.¹⁶

The allegorical frontispiece by Jan Wandelaar (1690-1759) shows Europa seated on a lion and accepting the horticultural tributes of America, Africa and Asia [plate 55]. The young Linnæus (represented as Apollo) hovers over Europe. Behind them is the entrance to the Garden itself, to their left grows a banana tree, which Linnæus managed to nurture into flower and fruit during his stay at the garden. Below Apollo's feet is the vanquished hydra, representing the faked specimen of a many-headed monster whose authenticity Linnæus had dismissed during a visit to Hamburg. Also pictured are Cupids who sport with a watering can, brazier, and garden plan as well as with a Celsius thermometer, which Linnæus had some claim to have invented. The *Hortus* lists the explorers ("Peregrinatores") from whom Linnæus has sought his information and among whom he notes Monardus, Plumier, Catesby, Marcgrave and Piso, and Merian, then proceeds to the plates and their descriptions. Here the *Hortus* differs considerably from the work of Cornut, or from another describer of Parisian botany, Sébastien Vaillant (1669-1722), author of *Botanicon parisiense* (1727). Cornut's listing of plants appears to follow a random order,¹⁷ while Vaillant lists his plants in alphabetical order. Cornut's engravings show the entire plant with

¹⁶ Quoted in Stafleu, Frans A. *Linnaeus and the Linnaeans. The Spreading of Their Ideas in Systematic Botany, 1735-1789*. Utrecht: Oostnoek's Uitgeversmaatschappij N.V., 1971, pp 11-12.

¹⁷ It is likely that it follows the traditional order of the pharmacopoeia, given Cornut's background.

details of flower, fruit and root, enough to be recognizable by the herbalist. Vaillant's illustrations, by Claude Aubriet, engraved by Wandelaar, are crowded together, many to a page, with details of the flowers. The illustrations prepared by Ehret and Wandelaar for the *Hortus*, on the other hand, are printed one to a page, and the number of details has increased. For example, on Plate VI, a *Colinsonia* by Ehret, are included a. *Flos magnitudine naturali*, b. *Idem a tergo visus*, c. *Calyx sub florecentia constitutus*, d. *Idem fructu prægnans*, and e. *German* [plate 56]. The *Itura* from Mexico is pictured a. in its pot as an "*arbor sexpedum*," with details of b. its stem, c. the stem with leaves at the top, d. the flowers, though in October 1737, "*flores tamen imperfecti decidue*," e. a leaf of natural size (lightly engraved in the background), and finally a flower dissected. Some plants like the *Bauhinia* could only be shown without flower or fruit as the plant had been just one year growing. The details added to Ehret's and Wandelaar's plates are not simply those which would catch the eye of the artist or the gardener, rather they are inserted because they are diagnostic. They determine the character of the plant, its species and genus. The informational value of the illustration has increased substantially.

The *Hortus Cliffortianus* exemplifies Linnæus's new approach to the organization of botany. It is important to realize that Linnæus's most salient characteristic was his taste for order, and that one of the great problems in eighteenth-century natural history was the chaos that reigned in the naming and description of plants. In his *Philosophia botanica* published in 1751, Linnæus relates in a series of aphorisms, his understanding of the history of botany. A laconic "Discovery of America 1492" underlines Linnæus's realization that the upsurge in botany in the sixteenth century was the direct result of the increase in the number of new and exotic plants. That increase had not slowed down in the early eighteenth century, and gardeners like Clifford, Peter Collinson and John

Fothergill in England, and Alexander Garden in America, were always on the look-out for rarities. How were these to be named, to be systematized? Would new plants have to remain *herbae nuda*, unconnected with each other? What was the basis by which plants could be grouped and known? Linnæus's system for plant identification was the equivalent of "Ariadne's clew for botany without which all [the kingdom of plants] is chaos."¹⁸ With his clew, Linnæus could unravel the most difficult problems:

Take for instance an unknown plant from the Indies, a 'botanophile' will look through descriptions, illustrations, all indexes, but he will not find its name except by pure chance; a taxonomist, however, will soon establish the genus, whether the old one or the new.¹⁹

Linnæus was the taxonomist, whose system was based on a logical method by which one could at a glance determine the true character, the essence of the plant. Linnæus dismissed as irrelevant other attempts at systems which he referred to as heterodox. These included botanists who classified plants by generic name (the alphabetics), by root (the rhizotomi), shape of leaf (the phyllophiles), by flowering time (the chroniclers), by habitat (the topophiles), by medicinal properties (the empiricists) and by the order of the traditional pharmacopoeia (the pharmacists). The correct or orthodox way to classify plants was by their fructification. Not only is it an essential part of the plant, it is, as Stafleu says, morphologically complex and amenable to mathematical classification. Linnæus lists the seven parts of the fructification: the calyx, the corolla, the stamen, the pistil, the pericarp, the seed, and the receptacle. These are the diagnostic parts of the plant. It is these which must be included in any

¹⁸ Stafleu, *Linnaeus and the Linnaeans*, p. 62.

¹⁹ Stafleu, *Linnaeus and the Linnaeans*, p. 62.

illustration and which will then allow determination of genus. They give the plant's character.

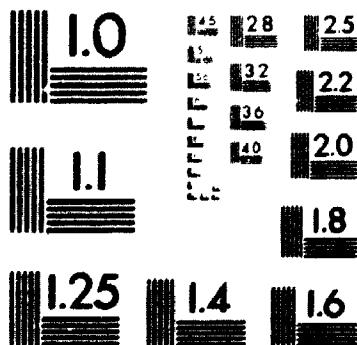
The Linnaean system was not a natural system. As Linnæus states in the *Philosophia*, botany is "that part of the natural sciences by the help of which one obtains happily and easily a knowledge of plants and by which one remembers this knowledge." It is a device to register, remember, to store and retrieve.²⁰ All botanists should remember the genera, which are fixed, and thus the recognition of a new plant is as simple as counting the parts of its fructification and assigning it to an existing genus, or creating a new one. Linnæus used his new method to bring order to the confusion of botanic names. Where Cornut had identified the columbine as *Aquilegia pumila praecox canadensis*, Linnæus would usually permit only two names, a generic and a specific. His aim was to establish a series of euphonic, easily remembered generic names, based (for the most part) on Latin and Greek roots. He wrote that his "Genera Plantarum is a work such as no one before him had done, which describes all parts of the fructification in the species exactly and thereon makes the characters, so that a genus not described according to Linnæus's method is incompletely known."²¹ Not everyone agreed with Linnæus, accusing him of wanting to be a second Adam, but his system proved useful, and was championed by the British botanist and first President of the Linnaean Society, James Edward Smith (1759-1828), as the best artificial system to be devised until a natural system could be implemented. Without this simple system, Smith asserted, the "celebrated DR. GARDEN who studied by it,

²⁰ Stafleu, *Linnaeus and the Linnaeans*, p. 33.

²¹ W.T. Stearn, "Notes on Linnaeus's 'Genera Plantarum'," in C. Linnaeus, *Genera Plantarum* fifth edition 1754. Facsimile reprint Weinheim: 1960, p. ix

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assured me that... he would probably have given up the science in despair, had not the works of LINNÆUS fallen in his way."²²

The Linnaean system was not universally accepted, but Linnæus' idea of using binomial names for plants and animals rapidly caught on. Linnæus was the eighteenth-century pandect. Like Gesner he had his contacts throughout Europe and beyond, depending on a veritable army of students and correspondents to send him dried plants, skins, books and drawings. His pupil Pehr Kalm, for example, whose account of his travels in North America from 1748-51 were translated into English as early as 1751, supplied him with many North American plants. In all he developed binomial and internationally usable names for 4400 species of animals and 7700 species of plants. England became a champion of the Linnaean system and its application had a great impact on the work of English naturalists and explorers. In England Linnæus had long been in contact with Peter Collinson, John Fothergill and John Ellis, though his system was not taught at the universities until 1762. George Edwards included the Linnaean classifications in later editions of his work in an attached catalogue of the birds made by Linnæus himself, dated "Upsala 1775." John Ellis wrote to Linnæus on the occasion of Cook's expedition in the *Endeavour*, that "No people ever went to sea better fitted out for the purpose of Natural History. They have got a fine library of Natural History... They have two painters and draughtsmen... All this is owing to you and your writings."²³ His *Systema Vegetabilium* was translated into English in 1783 by a "Botanical Society at Lichfield," and it is worth quoting a passage in full which shows the supposed ease by which Linnæus' system, with its key, could in fact identify plants:

²² Stearn, "Notes", p. xiii.

²³ Stafleu, *Linnaeus and the Linnaeans*, p. 228.

The BOTANIST, in following the *Classifications*, is [led] to the named *Genus* by the *Characters* of the displayed plant or flower; to the appellation of the *Species* by the *Differences* of the Larva or herb; and thence to its *Synonymies*; from these to the *Authors*, and thence to *every thing*, which has come to us from our ancestors on the subject. Thus the plant itself tells us its Name and its History amid such a multitude of species, and of individuals; this is the great purpose of Botany, the invention of the present age, to the completion of which all true Botanists will contribute their labour.

The passage goes on to note that "true BOTANISTS will labour to increase this lovely Science: will construct Fundamental DESCRIPTIONS in characteristics words..." and "Will add FIGURES, if they are able, which represent the perfect Plant..."²⁴

For Linnæus, the work of the illustrator was significant, and he notes in *Philosophia botanica* that "A painter, an engraver and a botanist are all equally necessary to produce a good illustration; if one of them goes wrong, the illustration will be wrong in some respect. Hence botanists who have practiced the arts of painting and engraving along with botany have left us the most outstanding illustrations."²⁵ He also observes that all illustrations should be of natural size, and as noted above in the description of the *Hortus*, placing a six-foot plant on a folio sheet involved some manipulation by the artist. It should be remarked, however, that to the botanist, the herbarium was primary. Linnæus stated that "A herbarium is better than any illustration; every botanist should

²⁴ C. Linnæus, *A System of Vegetables... Translated from the Thirteenth edition (as published by Dr. Murray) of the Systema Vegetabilium...* Lichfield: John Jackson for Leigh and Sotheby, London, 1783. Linnæus' sentiments were not necessarily original and these words echo the prescriptions of Sébastien Vaillant in *Botanicon parisiense*: "Enfin on peut dire que la gloire de la Botanique s'augmente surtout en ce tems, ou de toutes parts des hommes habiles et nés pour de tels misteres, observent dans les lieux, ou ils demeurent, chaque plante en particulier, qu'ils les marquent, les decrivent, en donnent des desseins, et les conservent entre deux feuilles de papier, en fin que par là ils augmentent les monumens immortels d'un art, qui ne perira jamais." (*Botanicon parisiense, ou Denombrement par ordre alphabetique des Plantes Qui se trouvent aux environs de Paris*. Leiden and Amsterdam: Jean and Herman Verbeek; Balthazar Lakemen, 1727, Preface, np).

²⁵ Stafleu, *Linnaeus and the Linnaeans*, pp 77-8.

make one."²⁶ Unfortunately herbarium specimens were subject to the same deprivations of insects, mould, and pests as stuffed skins and dried birds. Nikolaus Joseph Jacquin (1727-1817) collected West Indian and Central American plants, but in the 1780s "Ants damaged Jacquin's herbarium material, and he therefore supplemented his descriptions and notes on the new species with watercolour drawings. These accordingly are the equivalent of type-specimens."²⁷ It made sense then that botanists should attempt to protect their specimens not only in herbaria but also in illustrations, which when engraved and coloured could be widely disseminated. In Blunt's biography of Linnæus, there are two plates which reveal two aspects of the use of engravings of plants. In a painting by Jacob de Wit (1695-1754), now in the Orangery at Uppsala, entitled "Three People Displaying a copy of Linnæus' *Hortus Cliffortianus*," two older gentlemen and a young woman look intently at one of the plates. A herbarium specimen lies on the table, and one of the older men appears to be explaining something to the others. The woman is well-dressed with pearl jewellery, an indication that the purchase of a book like the *Hortus* was not for the impecunious. A second plate shows photographs of two rooms in Linnæus' house at Hammarby in Sweden. The walls are literally papered with coloured engravings, folio-size, of plants. A contemporary observer visiting Hammarby in 1765 noted that "The walls of Linnæus's rooms at Hammarby were covered with botanical prints taken from the finest volumes of Sloane, Ehret, etc., and pasted on them so that they looked just like wall-paper..."²⁸

²⁶ Stafleu, *Linnaeus and the Linnaeans*, p. 38.

²⁷ Wilfrid Blunt, *The Art of Botanical Illustration*. 4th ed. London: Collins, 1971, p. 156.

²⁸ Wilfrid Blunt, *The Compleat Naturalist: A Life of Linnaeus*. London: Collins, 1971, p. 173.

It is no surprise, then, that Linnæus also accounted Ehret's flowers a miracle of the century, and that Ehret was almost continuously employed throughout his life by collectors and naturalists. Georg Dionysus Ehret was the most famous flower painter of his age, and like Edwards, worked for a number of the great European collectors, including the Margrave Karl III Wilhelm of Baden-Durlach, whose gardens at Karlsruhe were famous, Dr. C.J. Trew of Nuremberg, Ehret's lifelong friend and patron, and Joseph Banks. Banks' patronage revealed his embrace of Linnaean methods, encouraged by his first librarian and curator, Daniel Solander (1733-82), one of Linnæus' pupils, sent to Britain in 1760 at the request of Collinson and Ellis. Ehret was hired by Banks to prepare a number of watercolours from the dried specimens he had brought back from his 1766 expedition to Newfoundland and Labrador. Ehret had been identified with Linnæus and his method since the publication of the *Hortus* in 1737. In addition, Ehret had published a "Tabella" of the Linnaean system, which he had learned from Linnæus: "Linnæus and I were the best of friends: he showed me his new method of examining the stamens, which I easily understood, and privately resolved to bring out a Tabella of it." He published the plate in Leyden and its sale proved quite profitable, "for I sold it for 2 Dutch gulden a piece and almost all the botanists in Holland bought it of me."²⁹ For Banks, Ehret painted 23 of the Newfoundland plants on vellum, and like all Ehret's work they are delicate, lively and true [plate 57]. They differ fundamentally, however, from the gorgeous tropical growths of Merian and the flat, if exact designs of Catesby. The difference is in their value as information, and this value stems from the adoption of Linnean classification and the delineation of the characters.

²⁹ Blunt, *The Compleat Naturalist*, p. 107.

The Universal Language

Plants were not the only living things to have a "character." Linnæus had published the *Systema naturae* in 1735, outlining a zoological classification system. The tenth edition published in 1758 provides binomial names for all known animal species, and is internationally accepted as the starting point for modern zoological nomenclature. William Hunter included "Linnæus Description" in his unpublished account of the moose, noting "The Characteristics given by Linnæus will apply to the Original..."³⁰ Hunter's own description (originally in Latin) provides a good example of the "character" for an animal:

Deer with long horns, short neck, big head, gibbous nose. Guttural caruncle slender, mane erect, shaggy and dense; almost no tail.³¹

While this description might act as a key to distinguishing the moose as a specimen from other specimens of deer, elk, or caribou, it is not of great help in identifying an actual animal if the naturalist had never seen one. Thus, Hunter had commissioned Stubbs to provide the painting in 1770, and when he sought to compare a second moose with the first, he and Daniel Solander and several others went to visit the Duke of Richmond's recent arrival on 4 October 1773, "carrying with us Mr. Stubbs's picture."³² It is hard for contemporary North Americans to imagine not carrying around a mental picture of a moose and being able to recognize it instantly when the real animal appears, but in eighteenth-

³⁰ Rolfe, "William Hunter," p. 275.

³¹ Rolfe, "William Hunter," p. 284n

³² Rolfe, "William Hunter," p. 266.

century England, not only were living moose a rarity, but their images were just as rare, and thus a group of naturalists was forced to carry with them an oil portrait in order to ascertain the differences, if any, between the first and second moose.³³

Hunter was well aware of the importance of accurate illustration. He included in his essay a section called "Reflections" in which he discussed the work of other previous authors on the nature of the Original. He opens the discussion by stating the problems with textual description alone: "This subject shews us how vague our Ideas of natural productions are when made out by descriptions only. Any person who has seen this Animal, or even this picture only of him, would know him again at one glance if he should meet with him in any part of the world." Hunter credited illustration as a universal language and it is worth quoting his "Introduction to Reflexions" in full:

All Men educated to study lament the variety and confusion of Tongues; & while they are sensible of the advantages which would arise from one language being universal, they see that they must ever regret the want of that blessing. Yet for many purposes, especially in the Arts, and in natural History there is a language which is both easily acquired, & tho not so copious, is more expressive than any language in the world, and at the same time so plain that the unlearned as well as the learned, understand it at first sight: I mean the art of drawing. What pity it is that it had not been sooner introduced, and more generally used.

As descriptions in this Language are so expressive, so precise and well determined, they have more credit than descriptions in common language; especially too as they are all presumed to be taken from life. Thence impositions and misrepresentations are more unpardonable in

³³ Hunter and his party spent some time measuring the second moose and observing his behaviour, noting the differences. In July 1772, Hunter had another opportunity to see a male moose and recorded that "As far as I could distinguish with the Eye there was no material difference between him and this of the D. of Richmond..." Hunter's careful observations were an attempt to understand the species, to distinguish it from European elk, to determine if moose had existed at some time in Europe. Both moose and European elk belong to the genus *Alces*, and some zoologists believe they differ only in race. Both were spread over the greater part of Europe at the end of the last Ice Age. (Léon Bertin et al. *Larousse Encyclopedia of Animal Life*. London: Hamlyn, 1967 (1971), p. 600.)

this way: for in as much as they have more credit, they do more mischief...³⁴

Several years earlier, George Edwards had written in a similar vein concerning the value of illustration in natural history in the Preface to *Gleanings*:

Where accurate figures are given, much pains may be spared in verbal descriptions, by referring to the figures, which lineally describe the minutest parts of them, and such as would be very doubtfully understood by words only: indeed, the figures in this work cannot be deemed perfect without their descriptions, and the descriptions as nothing without the figures;... The prints through this work, when truly illuminated, may be considered as a book legible to people of all nations and languages, whether learned or illiterate: real representations of animals &c. properly delineated and coloured, are characters that all nations are taught by nature to understand; and in many respects, good figures from nature surpass the best verbal descriptions.³⁵

Art is the universal language, and careful drawings after life are made in the image of nature itself, universally accessible to all. Those who would study the book of nature do not require Latin to read the characters, to determine the essence of the living thing; it can be read in line and paint. Thirty years later in 1796, Joseph Banks, now President of the Royal Society, wrote an appreciation of Franz Bauer's *Delineations of Exotick Plants cultivated in the Royal gardens at Kew*, and authoritatively pronounced that "Every Botanist will agree, when he has examined the plates with attention, that it would have been a useless task to have compiled, and a superfluous expence to have printed, any kind of explanation concerning them; each figure is intended to answer itself every question a Botanist can wish to ask respecting the structure of the plant it

³⁴ Rolfe, "William Hunter," p. 270.

³⁵ Edwards, *A Natural History*, Part III, p. x.

represents."³⁶ Despite his own admission that the reproduction of his works could never truly imitate nature, Edwards, and naturalists like Hunter and Banks, were convinced that coloured figures could be executed in a style whose conventions were the conventions of nature itself. The manuscript drawing, the medium of exchange between naturalists for centuries, had attained a new scientific authority as a result of two sometimes conflicting ideas about the nature of scientific truth, the first allied to the importance of observation, and the second to the belief in essential reality.

Truth and Observation

Linnaeus ended both his *Fundamenta* of 1736 and his *Philosophia botanica* of 1751 with these words: "In natural science the principles of truth ought to be confirmed by observation."³⁷ George Edwards was throughout his works concerned with the nature of truth and falsehood, particularly in the description of animals. "Man," he wrote "ought to set before his intellectual mind the ideas of truth and falsehood, and endeavour to find out, in the most strict and absolute sense what they are; and when he hath found them he ought to govern all his actions by the former, and avoid the latter but it is exceedingly hard to discover what truth is in a world of falsehood and controversy, where all of us suck in error with our mother's milk... it is a firm and fixed article of my private faith, that God has given us our senses as touchstone of truth."³⁸ Edwards' meticulous

³⁶ Quoted in Richard Mabey, *The Flowering of Kew. 200 Years of Flower Paintings from the Royal Botanic Gardens*. London: Century, 198, p. 27. Franz Bauer had been one of Jacquin's artists for the *Icones plantarum rariorum* (1781-93).

³⁷ Stafleu, *Linnaeus and the Linnaeans*, p. 31.

³⁸ Quoted in Lysaght, *Joseph Banks*, pp 91-2.

textual descriptions and his insistence on reporting only first-hand observation reflect this private faith in the value of sensory evidence. He had harsh words for the showmen, "who shew foreign birds and beasts." In a habit that reaches far back into the world of the bestiaries and is continued in the works of the sixteenth-century pandects (see above on the nature of the su), Edwards maintains that "to make them seem more rare, [showmen] often pretend them to be natives of places very distant and unknown...; and, to strike us with surprize, they pretend that to be fierce, savage, and untameable creature, which in its real nature is very gentle and harmless."³⁹ Edwards give as an example the slow-moving porcupine, which some claim to be fierce and able to shoot its quills, which Edwards repudiates, illustrating a quill of its natural length as well as a detail of the barbed end [plate 58].⁴⁰

The emphasis on observation of the thing itself was shared by other illustrators of natural history. Eleazar Albin, for all that Edwards criticized his birds, was an acute observer of other species, especially insects and spiders on which he published *A Natural History of Spiders and Other Curious Insects* in 1736. He noted in his preface To the Reader that

But as the world, in intricacies of nature are commonly dubious of the facts related, I assure the reader that the accounts I have here given have been from my own ocular observation, having made it my particular care to be

³⁹ Edwards, *A Natural History*, Part I, p. 111.

⁴⁰ Edwards' porcupine, engraved in 1742, was a much imitated animal. Henry Ellis copied the engraving in his account of *A Voyage to Hudson's Bay by the Dobbs Galley and California...*, published in London in 1748 [plate 59]. It was also copied in reverse by Moses Harris on "A Plan of the Harbour of Chebucto and Town of Halifax" published in London in the February 1750 issue of *The Gentleman's Magazine* [plate 60]. Here the porcupine is accompanied by several insects, and Moses Harris (1730-88?) presumably went on to author *The Aurelian* (1766). An interesting note accompanies the issue stating that at the print shop in St. Martin's Lane "may be seen the real butterflies brought from new Halifax." It should be noted that Harris did not copy the drawing from Ellis as started by W.K. Morison in an article on "The Procupine Map" [sic] in the *ACML Bulletin*, March 1987, No. 62, p. 18. The quill detailed by Edwards and depicted in the Harris map is missing from the Ellis engraving.

extraordinary exact in the collections and observations I have made concerning this Insect.

...
Each particular species of this little insect (of which I have with great pains and labour collected near 200) is here represented, and (for such as desire it) beautified in its proper colours, that the reader may have his curiosity satisfied at one view, by what has taken me up a great deal of time and labour, to put so exactly together.⁴¹

Paillou included the measurements of birds on his watercolours for Taylor White, who insisted they be painted life-size. In 1737 Ehret travelled every day for several weeks to Sir Charles Wager's garden in Fulham to observe each stage in the flowering of the *Magnolia grandiflora* (included in Catesby's *Natural History of Carolina*). Edwards accepted William Bartram's drawing of a Marsh Hawk, executed in Pennsylvania, because though he had not seen the bird itself, "I have great reason to think Mr. Bartram is very correct in his drawing, and exact in his colouring, having compared many of his drawings with his natural subjects, and found a very good agreement between them."⁴²

For the naturalists, "ocular observation," relying, as Edwards had suggested, on the touchstone of the senses, had completely replaced reliance on ideal images, memory images, translations of textual description, or copying of iconic images. The constant checking against nature, which is so evident in the works of Edwards and Ehret, meant that for the first time naturalists had access to a large body of reliable pictorial evidence about plants and animals. It should be re-emphasized, however, that drawing after nature did not guarantee an image of the living animal. Drawing from the specimen guaranteed only a likeness of the specimen, and therefore, Edwards' figure of the porcupine, distorted to contemporary eyes, is a reliable scientific illustration for the

⁴¹ Eleazar Albin, *A Natural History of Spiders, and Other Curious Insects*. London: 1736, np.

⁴² Edwards, *A Natural History*, Part III, pl. 291.

naturalists of the day, because it meets their requirements for information. The information that many naturalists required after mid-century was that which would allow them to determine the character of the plant or animal according to the Linnaean system, and that system was based on appearance as the key classificatory factor.

The Linnaean system, as was apparent to many naturalists at the time, is not a natural system. Natural systems classify plants and animals according to their affinities as observed in nature. The burgeoning importation of new species into Europe in the eighteenth century made the possibility of developing true natural systems seem highly unlikely. An artificial system could at least provide some order until natural affinities had been determined. Linnæus had to choose an element of the plant or animal that would allow rapid and efficient categorization. He rejected the classifications based on the internal properties of the plants, such as cross-sections of roots, or inherent medicinal properties; in forming specific diagnoses he also rejected those that were "inconstant, purely quantitative, ecological or geographical... He banned as misleading, indefinite or unhelpful characteristics those of size, resemblance to other genera, locality, time of development, colour, smell, taste, uses, sex, monstrosities, hairiness, duration and increase in number of parts." Similarly, in regard to animal species, he rejected many of the fortuitous characteristics that had been used by earlier authors, such as usefulness to man, but "made much use of colour, particularly in birds and insects, and also of habitats and hosts in insects."⁴³ The characteristics which he declared most salient were in fact those most amenable to observation in collections of specimens or in illustrations. The artificial nature of Linnæus's system was to a certain degree dependant upon the artificiality of his materials.

⁴³ Stearn, "Linnean Classification, Nomenclature and Method," p. 247. Since animals have the power of locomotion, the inclusion of habitat in diagnosis made good sense.

While Linnæus did maintain a garden, he primarily relied for information about exotic species of plants on preserved and dried specimens. For example, he prepared his *Flora Zeylanica* (Flora of Ceylon, 1747) on a collection of dried specimens made by Paul Hermann between 1670 and 1677. He was delighted with the gift from the King of Sweden in 1775 of "sixteen great chests containing plants preserved in spirits of wine – just as they grow, with the flowers and fruit. There they were, so well preserved that they looked as though they had been just gathered... There is all the difference in the world between seeing plants pressed and dried and seeing them as they grow."⁴⁴ Similarly he classified Edwards' birds on the basis of their coloured figures, which as we have discussed were primarily prepared from dried or stuffed skins. Appearance, then, not structure, behaviour, or even reproductive exclusivity, was the key classificatory factor for Linnæus's artificial system. It is interesting to note here Martin Kemp's assertion "that there were special kinds of affinity between the central intellectual and observational concerns in the visual arts and sciences in Europe from the Renaissance to the nineteenth century. The affinities centred upon a belief that the direct study of nature through the faculty of vision was essential if the rules underlying the structure of the world were to be understood."⁴⁵ While Linnæus developed his system to be almost an aide-memoire for the botanist, he did not regard it as wholly distinct from nature. For Linnæus, the genus was a fixed part of the first Creation. Stafleu has characterized Linnaean thought as Aristotelian and Thomistic, and there did exist for Linnæus a knowable "essence" of an ideal plant. This was the genus, and the description of the character reveals the essence of the genus. By

⁴⁴ Blunt, *The Compleat Naturalist*, p. 232.

⁴⁵ Martin Kemp, *The Science of Art. Optical themes in western art from Brunelleschi to Seurat*. New Haven: Yale University Press, 1990, p.1.

selecting the fructification, whose function was so important, indeed essential, in maintaining the type, Linnæus was reflecting the natural order of the world. By describing and figuring the actual plants in the Linnean manner, the naturalist is providing not just a realistic representation of a living thing, but also a representation of its very essence as expressed through its character. Understanding the essence is in a sense seeing into the mind of God.

This connection between visual reality and the true nature of the world underlies much of what might appear to us as the peculiarly moral and religious language of a number of eighteenth-century naturalists.⁴⁶ Edwards, as we have already noted, dedicated his first work to God, and believed that God had given him his senses as touchstones of truth. His works must be as exact as humanly possible, for in illustrating the birds and animals he is attempting to understand the mind of the Creator. This recognition of the connection between illustration and revealed truth explains Hunter's almost religious zeal in condemning those who would misrepresent animals (see above), or Thomas Pennant's ardent desire for a representation of Banks' Patagonian penguin:

Let me hope that the Patagonian Penguin had set for its picture, that Mr. Brooks' Percnopterus will not depart this life without having its image preserved to be transmitted to posterity by Mr. Paillou's pencil; that the image of these and many others may for the benefit of the curious and making of proselytes to our divine science be multiplied by engraving and that we may with unabated zeal pursue the path we have begun by our four plates.

⁴⁶ Michael Aaron Denis, in a brilliant essay on Robert Hooke's *Micrographia*, discusses how Hooke and other members of the Royal Society saw representation as a hermeneutic. For Hooke, "Seeing and representing *was* understanding." (p. 335) Thus the plates in *Micrographia* were "central, rather than supplementary elements in the book." (p. 345) Hooke would use the new instruments like the microscope to see further, to recover an Adamic ability to read the "micrographia" inscribed by God. "Adam simply saw and knew; man would do the same, as his microscopes and telescopes improved and he understood more about the (re)production of form." See Michael A. Denis, "Graphic Understanding: Instruments and Interpretation in Robert Hooke's *Micrographia*," *Science in Context*, 3, 2 (1989) 309-64.

Impatient for receipt of the image, Pennant wrote again to Banks: "Is your Penguin drawn? I dream, I rave of it?"⁴⁷ Preserving images for posterity, hoping for proselytes, seeing Edwards' birds and Ehret's flowers as miracles, dedicating books of illustrations to God, all these are evidence of the importance which the naturalists and their artists assigned to the depiction of the natural world. Their work was not simply the illustration of collections, it was the illustration of Creation, and through correct and exact illustration, they might come closer to the essence of things themselves. This sense of purpose helps to explain the extraordinary petition written by George Edwards and included in the *Memoirs*:

My petition to God (if petitions to God are not presumptuous) is, that he would remove from me all desire of pursuing Natural History, or any other study... What my condition may be in futurity is known only to the wise disperser of all things; yet my present desires are (perhaps vain and inconsistent with the nature of things!) that I may become an intelligent spirit, void of gross matter, gravity and levity, endowed with a voluntary motive power, either to pierce infinitely into boundless etherial space, or into solid bodies; to see and know, how the parts of the great Universe are connected with each other, and by what amazing mechanism they are put and kept in regular, and perpetual motion.⁴⁸

It would remain for another British naturalist nearly a century later to unravel the amazing mechanism of selection by which the parts of the living universe were connected one with another.

⁴⁷ Quoted in Smith, *European Vision and the South Pacific*, p. 11.

⁴⁸ *Some Memoirs*, pp 13-14.

CHAPTER EIGHT

A Country Observed

Observation was one of the watchwords of the eighteenth century. In the English-speaking world, John Bartram published his *Observations on the Inhabitants, Climate, Soil, Rivers, Productions, Animals*, etc. in 1751. James Isham, George Edward's correspondent from Hudson Bay, wrote his *Observations* in 1743, while we have already noted Albin's assurances to his readers of his skill in "ocular observation." Daines Barrington (1727-1800), correspondent of Gilbert White, urged naturalists to keep a journal where they could record the "Many other particulars [that] daily offer themselves to the observer" in the hope that "from many such journals kept in different parts of the kingdom, perhaps the very best and accurate materials for a General Natural History of Great Britain may in time be expected..."¹ Barrington, George Edwards, Joseph Banks, Thomas Pennant and other members of the Royal Society were imbued with the passionate desire for observable facts that had been at the heart of the Society since its foundation. The Society's stated purpose was "to study *Nature* rather than *Books*, and from the Observations, made of the *Phaenomena* and Effects she presents, to compose such a History of Her, as may hereafter serve to build a Solid and Useful Philosophy upon..."²

The observation of nature which the Society espoused confronted, in true Baconian fashion, the reliance on authority which had been the mainstay of early naturalists. The observations now required were of a different order from the

¹ Quoted in Richard Mabey, *Gilbert White*. London: Century, 1986, p. 109.

² "Directions for Sea-men, bound for far Voyages, 1662-3" in Raymond P. Stearns, *Science in the British Colonies of America*. Urbana: University of Illinois Press, 1970, p. 687.

casual notes of the learned Dr. Cay on the Lumpus, quoted in the last chapter. Observations were to be scientific, measurable, and accurate. The standard was not the authority of the scholar, but the objectivity of the observer. This new reliance on objective observation broadened the scientific community, allowing it to incorporate within its bounds any literate correspondent with a taste for natural history and proven reliability. From the 1660s on, the Royal Society provided sets of Directions or Inquiries for seamen, settlers and others travelling to foreign parts. They requested observations on everything from tides and weather to height of trees, quality of soil, type of crops and kinds of animals. They demanded confirmation of travellers' tales and unusual stories, and provided detailed instructions on how to collect data and even how to construct appropriate collecting tools and instruments. This zeal for data collection diminished little with time, fuelled as it was not only by the desire for new knowledge but by the conviction that knowledge of the observable world would lead to knowledge of God. Fifty years after the Society's founding, William Derham, writing in *Physico-Theology* (1711-12), reiterated the new agenda for natural history on the global scale:

Let us ransack the globe, let us with the greatest accuracy inspect every part thereof, search out the innermost secrets of any of the creatures, let us examine them with our gauges... pry into them with all our microscopes and most exquisite instruments, till we find them to bear testimony to their infinite workman.³

The broadening of the circle of observers and the development of objective measures for observation had enormous impacts on the compilation of the natural history of North America, giving new authority and meaning to the

³ Quoted in Mabey, *Gilbert White.*, p. 87.

work of the resident naturalists of the New World, particularly in relation to zoology. With the notable exception of Banks, the majority of the European naturalists stayed firmly in their cabinets, at the most making local excursions to remoter areas of Europe, such as Thomas Pennant's trip to Scotland or Linnæus' Lapland journey. They relied on their correspondents to "ransack the globe," and established far-flung networks of collectors and informants who shared their enthusiasms and their scientific method. These observers in foreign parts fell into four groups: residents, like John and William Bartram; military or naval officers on a tour of duty, like Thomas Davies (c1737-1812); travellers and explorers, like Linnæus' pupil Pehr Kalm (1716-1779) or Samuel Hearne (1745-92); and resident employees of the Hudson's Bay Company, like Isham, and later Andrew Graham (d.1815) and Thomas Hutchins (d. 1790). Some of these observers like Kalm were highly trained, others like Thomas Davies were gifted amateur naturalists, while others, particularly the Hudson's Bay Company factors who undertook their collecting activities at the request of the Company and the Royal Society, found in them both a diversion and a sense of purpose that helped maintain their spirits during the long northern winters.⁴ The care with which these resident naturalists made their observations is obvious in their journals and, in the case of Davies, in his meticulous watercolour drawings. Their dedicated inspection which involved making their own observations, querying native hunters and employees, examining stomach contents and in the case of

⁴ James Isham, the factor who on his return to England in 1748 presented George Edwards with some 30 specimens, wrote to the Deputy Governor and Commissioners of the Hudson's Bay Company that he had undertaken his "Observations" to promote his mental health: "Being in a Disconsolate part of the world, where there is Little conversation or Divertisment to be had, I was dubious of that too common Malady the Vapour's, which is frequently the forerunner of other Distempers, therefore to prevent such if possable, I have in cold Days and Long Winter nights, amusd. my self with the following Observations..." (James Isham, *Isham's Observations and Notes, 1743-1749*. London: Hudson's Bay Record Society, 1949, np.)

Hearne, dissecting specimens and examining them under a microscope⁵ (as Derham had advised) meant that even far from the centres of science, they could make meaningful contributions to the marvellous enterprise of natural history. Their contributions changed not only the content but the direction of natural history at the end of the eighteenth century, leading to a new appreciation for field observation, and to a new kind of science based not on the cabinet or the herbarium but on nature observed.

No extravagant wonders...

Pehr or Peter Kalm undertook a trip to North America between 1748 and 1751. Kalm was one of Linnæus' star pupils, and the source of much of his master's North American material. His account of the expedition was published in Swedish, but a letter in English to John Bartram about Kalm's trip to Niagara Falls was appended to Bartram's 1751 *Observations*. The letter, dated 1750, also appeared in the *Gentleman's Magazine*, with an accompanying illustration that appeared in a subsequent issue. Kalm assures his readers that he has provided "a short but exact description of this famous Niagara cataract." He goes on to protest his veracity:

...you may depend on the truth of what I write. You must excuse me if you find in my account no extravagant wonders. I cannot make nature otherwise than I find it. I had rather it should be said of me in time to

⁵ In a note on the swans included in Chapter X of *Journey*, Hearne comments on the formation of the windpipe in the two types of swans that frequent Hudson Bay (p. 281n). In the same chapter, Hearne also notes that he attempted to examine the lice of a mouse: "At that time I had an excellent microscope, and endeavoured to examine them, and to ascertain their form, but the weather was so exceedingly cold, that the glass became damp with the moisture of my breath before I could get a single sight." (p. 249). From Samuel Hearne, *A Journey from Prince of Wales's Fort in Hudson's Bay to the Northern Ocean 1769, 1770, 1771, 1772*. Toronto: Macmillan, 1958.

come, that I related things as they were, and that all is found to agree with my Description; than to be esteemed a false Relater.⁶

Kalm approached the Falls with some scepticism: "I had read formerly almost all the authors that have wrote any thing about this Fall; and the last year in *Canada*, had made so many enquiries about it, that I thought I had a pretty good Idea of it... But as I found by experience in my other travels, that very few observe nature's works with accuracy, or report the truth precisely, I cannot now be entirely satisfied without seeing with my own eyes whenever 'tis in my power..."⁷ Once he arrives at the Falls, Kalm reports his observations with careful attention to objective description: "Half an hour past 10 in the morning we came to the great Fall, which I found as follows. to the river (or rather strait,) runs here from S.S.E. to N.N.W. and the rocks of the great Fall crosses it, not in a right line; but forming almost the figure of a semicircle or horseshoe..." He goes on to describe the division of the waters by the island at the brink, and their swiftness, then at last gives in to a touch of amazement: "When all this water comes to the very Fall, there it throws itself down perpendicular! It is beyond all belief the surprize when you see this! I cannot with words express how amazing it is!" He disputes Father Hennepin's measurements, however, calling him "*The great Liar*," and notes that for his part, he is "not fond of the *Marvellous*, I like to see things just as they are, and so relate them."⁸ He does, however, report some of the observations of "the French gentlemen," who relate that "when birds come flying into this fog or smoak of the fall, they fall down and perish in the Water." Others maintain that it is rather water birds like swans, geese, ducks

⁶ In John Bartram, *Observations on the Inhabitants, Climate, Soil, Rivers, Productions, Animals...* London: J. Whiston and B. White, 1751, p. 94.

⁷ In Bartram, *Observations*, p. 81.

⁸ In Bartram, *Observations*, pp 83-4.

and teal that float along the water until "they are driven down the precipice." The numbers of these dead birds are so great that "In the months of September and October, such abundant quantities of dead waterfowl are found every morning below the Fall, on the shore, that the garrison of the fort for a long time live chiefly upon them..."⁹ Kalm also relates the story of two natives who were stranded on the island in the midst of the falls and attempted to escape by building a wooden ladder down to the river.

Despite his care in preparing an accurate textual description, the truth value of Kalm's account is negated by the illustration that follows it in the *Gentleman's Magazine* [plate 61]. This figure is yet another re-engraving of a version¹⁰ of Hennepin's view of Niagara, almost a century and a half after it was first published. Thus, despite Kalm's dismissal of the account of the "Great Liar," the image of Niagara in Hennepin's book, which even a cursory reading of Kalm would show was inaccurate, remained the one most available to Europeans. Several details have, however, been added or changed by the engraver to the original, to correspond more plainly with Kalm's account. There is an attempt as well to make the illustration more "scientific" by the addition of a letter code, designating specific details (like the codes on Ehret's plant drawings). For example, "a" indicates "The Place where a Piece of Rock was broken from which while standing turned the Water obliquely across ye Fall as in Popple's Map;" "b" shows "Two Men passing over ye east Stream with Staves;" while "c" The Indians reascending their Ladder." As in the earlier engraving, Europeans stand to the left, amazed, while on the right a line of natives toils over the portage

⁹ In Bartram, *Observations*, pp 87-8.

¹⁰ Henry Popple published a twenty-sheet "Map of the British Empire in America" in 1773, which includes an inset of Niagara. The Kalm illustration is based on this re-engraving of the Hennepin image.

which Kalm describes. In keeping with Kalm's remarks on the height of the falls, some attempt has been made to change the scale of the image, so that the falls appear less lofty. The fir trees, rather than standing in straight lines, as in the Hennepin engraving, are now bent at an angle, a convention indicating wilderness. The veracity of Kalm's first-hand observation of Niagara was, however, seriously diminished by the distortions necessitated by re-using an image that was not created by an observer on the spot. For example, the image shows a second stream entering the falls from the left which is not in the Hennepin image, but seems to have been added by Henry Popple in his 1773 version. Unlike Edwards who could claim that the figure and the description are in essence one and the same, the illustration for Kalm's account matches the textual description only in the ascription of what are essentially narrative details, where an improbable ladder can stand for a tale of near disaster, a group of tiny figures for an example of ingenuity, and a geometric flock of emblematic birds for a natural phenomenon. Despite Kalm's attempts to introduce a scientific objectivity into his description, the accompanying image is inaccurate and in essence untrue, a schematic representing the *idea* of the falls rather than an accurately observed depiction of them. The understanding of what was required in the accurate depiction of landscape was rapidly changing, however, with the work of the English watercolourists and draftsmen who were now being called upon to picture the homes and estates of the landed gentry, and the coastlines and fortifications of foreign lands with some degree of verisimilitude.¹¹

¹¹ Knight's remark that the history of science would be written with a different chronology if it were based on images holds true in the depictions of landscape as well. The Hennepin, or in this case, the *Gentleman's Magazine* engraving is repeated again toward the end of the century by Robert Hancock (1730-1817), who produced a hand-coloured engraving with inscription in French and English (see above, Chapter Five).

Seventeen years after Kalm's article was printed, Thomas Davies issued a portfolio of engravings of six North American waterfalls, including an engraving of Niagara very different from the image presented in the *Gentleman's Magazine*. Davies' Niagara is the result of personal observation, and is executed with the kind of fidelity to things as they are which was part of Davies' training as a topographical artist. Thomas Davies was a graduate of the Royal Military College at Woolwich, where the development of some skill in draftsmanship was part of the curriculum. Military officials had long been aware of the importance of ensuring that their graduates be able to render plans, sketch maps and some descriptive views. The inspector general of the Marlow Military College stated the purpose of this training succinctly: "Everything which is put down in writing of necessity takes on some colour from the opinion of the writer. A sketch map allows of no opinion."¹² Davies was likely trained in painting by Gamaliel Massot, a relatively obscure artist who was succeeded in 1768 by Paul Sandby (1731-1809), known as "the Father of the English School of Watercolour,"¹³ with whom Davies came in contact during his periodic returns to Woolwich. At the request of his superiors, Davies produced views of fortifications, plans and elevations of vessels, schematic figures of artillery formations, and records of battles. He also painted to please himself and to record both the landscape and the wildlife of the new world. Waterfalls were a particular passion,¹⁴ and between 1760, after the capture of Montreal, and 1766,

¹² Quoted in Didier Prioul, "British Landscape Artists in Quebec: From Documentary Views to a Poetic Vision," in Mario Béland, ed., *Painting in Quebec, 1820-1850*. [Quebec]: Musée du Québec, 1992, p. 53.

¹³ R.H. Hubbard, *Thomas Davies, c. 1737-1812*. [Ottawa]: National Gallery of Canada, 1972, p. 12.

¹⁴ Waterfalls and cascades were one of the subjects sought by admirers of picturesque landscape. The picturesque eye demanded a certain "roughness," and according to William Gilpin in *Three Essays* (London: R. Balmire, 2nd ed. 1792), "We seek it among the all the ingredients of landscape – trees – rocks – broken-grounds – woods – rivers – lakes – plains – vallies – mountains – and distances." (p. 42). Waterfalls and rapids were also particularly important in Canada were so much of

Davies travelled extensively through Canada and the northeastern United States, painting the six waterfalls he later had engraved in England in 1768. He made the sketch of Niagara that was to serve as the model for the 1768 engraving in 1762, and about four years later, he painted two additional watercolours of the great falls.

All of Davies' views are remarkable, providing for the first time an accurate representation of the falls. The 1762 view is entitled "An East View of the Great Cataract of Niagara," and includes the information "The Perpendicular height of the Fall 162 feet/Done on the spot by Thomas Davies Capt Royal Artillery/The Variety of Colours in the Woods shew the true Nature of the Country." Dismissed by Hubbard as "too perfunctory to be of much artistic interest,"¹⁵ this view is nevertheless of great interest from the perspective of the understanding of the illustration as information. Not only are the falls depicted in their correct horseshoe configuration, but their height is given with reasonable accuracy and the woods are shown in their autumn colours. Hubbard suggests this may be the first appearance in art of the colours of the Canadian mixed forest in the fall, and Davies feels obliged to add a note, perhaps in case his viewers feel the colour is imaginary, that "The variety of Colours in the Woods shew the true Nature of the Country."¹⁶ The engraving by Ignace Fougerson (fl. c1760-8) is surprisingly faithful to the original watercolour sketch, and distorts very little Davies' representation [plate 62]. Two natives in elaborate dress stand to the right on the edge of the river, gesturing perhaps at the geometrically precise rainbow that arches over the river. The "smoak" which Kalm described

transport was by river. They were thus objects to be named and remembered not only for their picturesque beauty but also for their punctuation of a river voyage.

¹⁵ Hubbard, *Thomas Davies*, p. 28.

¹⁶ Hubbard, *Thomas Davies*, p. 28.

rises over the falls, the trees come down close to the water's edge and form a mixed forest, with some conifers, typical of southern Ontario. The surface of the river shows strange flat rocks, rather like large lily pads. Rocks are also visible at the base of the American falls. The two other watercolours, neither of which appears to have been engraved, were both executed around 1766 and show different views of the falls. One is from below and again features native people in the foreground. The other view, "Niagara Falls from Above," provides a strange perspective, as if the viewer is standing (along with a native chieftain and a woman) on one of the small islands in the river above the horseshoe falls. Soaring over the waters are two bald eagles; a third is perched on the limb of a tree. The eagles are surprisingly well-executed, presaging Davies' skill as a painter of animals and birds in his later years [plate 63].

Davies' interest in natural history was obvious even in his earliest watercolour sketches like that of the siege of Louisbourg in 1758 (plate 2 in Hubbard), where the foreground shows a large variety of plants. It is no surprise to learn that three of the engravings in Davies' waterfall series were executed by Peter Mazell, Pennant's engraver, and Mazell may have been the link that first introduced Davies to Pennant, as well as to John Ellis, Joseph Banks, and Dr. John Latham (1740-1837). From 1767 on, when he returned to England after his second North American tour of duty, Davies became one of the circle of correspondents and informants of the European naturalists. In 1770 he prepared a paper on preserving birds which was sent to John Ellis and read at the Royal Society, then published in *Philosophical Transactions*. At some point in the next few years he must have begun to assemble the specimens for his private museum which according to John Latham, contained "many scarce specimens, especially from North America, which he has been at pains to collect

and arrange himself."¹⁷ He had also begun to paint exclusively natural history subjects, showing a selection of paintings of North American wildflowers at the Royal Academy in 1771.¹⁸ In 1781, he was elected a member of the Royal Society. In 1784, he wrote to Joseph Banks from his post in Gibraltar concerning the amount of rainfall. At some point before the second edition of Pennant's *Arctic Zoology* was published in 1792, Davies had shown Pennant a "Horned Owl from Quebec," and Pennant included its description as an addendum.¹⁹ He had also begun to paint his specimens of birds, and the Earl of Derby's collection boasted a portfolio of 126 paintings of birds with names and localities, executed by Davies between 1763 and 1812. A number of his paintings also ended up in the collections of Dr. Latham. He published several of his bird paintings in *Transactions of the Linnaean Society* in the 1790s, and also published "An Account of the Jumping Mouse of Canada" in the same journal in 1798. He had observed this relatively rare mouse (Meadow Jumping Mouse, *Zapus hudsonius*) during his last stay in Canada, and had painted it from life. An engraving accompanies the article [plate 64].

Davies' style has been described as that of an eighteenth-century Rousseau,²⁰ but it cannot be categorized as either naive or primitive. Rather the way in which Davies depicts his views and the information they contain is allied

¹⁷ Quoted in Hubbard, *Thomas Davies*, p. 62.

¹⁸ Davies seemed to have been inordinately fond of plantains, which appear in many of his paintings. The native peoples referred to the plantain as "white man's foot," since it is an alien and sprang up wherever white people had settled. Davies also pictured sunflowers in a 1760 watercolour of Fort La Galette (plate 12 in Hubbard), wild cucumber in a view of the Falls of the "Seneca River" (plate 16 in Hubbard), grape vines in a 1762 watercolour of Montreal (Plate 18 in Hubbard), and prickly pear in a 1778 view of New York, Long Island (plate 31 in Hubbard).

¹⁹ Thomas Pennant, *Arctic Zoology*. London: Robert Faulder, 1792, vol. II, p. 418. "In a second of these, which he [Davies] had alive, he observed that it frequently set up two feathers over the eyes... He had this bird alive some time, but could not make it tame."

²⁰ Hubbard, *Thomas Davies*, p. 18.

not just to the topographic style of the military artists, but to the approach of accurate observation which characterized the work of natural history illustrators like Edwards. Davies' watercolours of Niagara Falls betray the same conventions that colour Edwards' birds, and these conventions are to a certain extent also those which characterized the English school of watercolour begun by Paul Sandby. Sandby, with whom Davies was acquainted and whose works define the new approach to depiction of landscape, was interested, according to his son, in "giving his drawings the appearance of nature as seen in a camera obscura." Gainsborough acknowledged Sandby as "the only Man of Genius" to paint "*real views* from Nature in this country."²¹ Just as Edwards and Paillou and Griffith worked "from Nature" when they produced accurate drawings of specimens, so did Sandby and the watercolourists with whom he was associated strive to paint accurate views of the countryside.²² Davies' watercolours show the artist himself seated on the rocks by the river, pencil in hand, sketching the scene before him [plate 65].²³ Views like those produced by Davies are not fanciful studio illustrations of idealized scenery but accurate renderings of nature observed, the landscape laid down in such a way that it is both recognizable and informative.

This was in essence the goal of both scientific and military draftsmanship – the use of the image as a medium for information. Thomas Falconer (1738-1792), friend to both Banks and Pennant, wrote to Banks that if he planned to make

²¹ Hubbard, *Thomas Davies*, p. 16.

²² It should be noted that Sandby accompanied Joseph Banks and Daniel Solander on a plant-hunting expedition to Wales in 1773. (A.M. Lysaght, *Joseph Banks in Newfoundland & Labrador, 1766, His Diary, Manuscripts and Collections*. Berkeley: University of California Press, 1971, p. 51.)

²³ Davies shows himself seated sketching before the Falls of the Seneca in 1761 (plate 16 in Hubbard), and again on the rocks by *The Falls of Chaudière near Quebec*, executed in 1787 (plate 48 in Hubbard).

any excursions on to foreign soil, he would do well to take with him a "designer," not to paint "Towns or Churches," but to illustrate the landscape: "and if your designer would stain his drawing, it would point out the colour of the Soil and verdure, with the nature of the Rocks, and would enable us here to have a full idea of the Country, which no description possibly can."²⁴ Falconer later praised Banks for his use of artists during his expedition to the Hebrides:

Your precision of measures, and the advantage of able artists, are a great point, for when we judge by description we form an opinion through the medium of another man's understanding, who generally compares it with something else he has seen... What an assistance is it then to truth to have the objects delineated by one common measure which speaks universally to all mankind.²⁵

Again, art is the universal language, or common measure, within which science, or at least the scientific perspective, can be expressed. The illustration accords with a precise textual description, which is not a subjective account of the viewer's feelings but an accurate account of observations made on the spot. The inclusion of "measures," noted by Falconer, is significant, for it implies an ability to make objective descriptions of the scene; thus, Kalm spares no pains to measure the falls, and Davies includes the perpendicular height in the text accompanying his engravings, just as Paillou ensured that the exact measurements of the specimen were included on his watercolours. As Derham noted, those who ransacked the globe and its productions should be prepared to "examine them with our gauges..."

Topographic artists, like natural history painters, were not working in the tradition of landscape advocated by Sir Joshua Reynolds, painting an idealized

²⁴ Quoted in Bernard Smith, *European Vision and the South Pacific*. New Haven: Yale University Press, 2nd ed., 1988, p. 12.

²⁵ Quoted in Smith, *European Vision*, p. 14.

scene; rather, they were engaged in producing accurate and recognizable landmarks, for other observers whose interest in "truth" outweighed their desire for beauty. Davies is an early practitioner of a way of rendering landscape scientifically, of producing not beautiful scenes but formal and accurate views which stood to textual description in the same relation that Davies' truthful rendering of a bird stood to the careful and formalized textual description of the specimen. Davies paints Niagara from three very different perspectives, both in an attempt to come to terms with the immensity of the phenomenon, but also in the manner of the illustrator of the specimen, who presents a number of different views for the reader, so that no information is lost. There is as well a quality in Davies' paintings of falls that make them appear curiously stilled. Painting moving water is difficult, but Davies' formal rendering of the currents is akin to the manner in which he depicts rock formations, showing the strata with great precision. Bernard Smith notes a similar approach to impressive and unusual scenery in Mazell's engravings of John Frederick Miller's (fl. 1785) drawings of basalt formations in Staffa, Scotland: "It is to be noted... how Miller, the draughtsman and Mazell, a specialist in engraving subjects of natural history, have rendered the shape and articulation of the basaltic pillars with the same care and precision that they were accustomed to expend upon the illustration of a new species of plant or animal. The landscape is, in one sense, a scientific diagram..."²⁶ The symmetrical arcs of the rainbow, the curved lines of water and the strictly parallel strata of the rocks in Davies' paintings of falls recall the engraved feathers of Catesby's birds and the precise contours of engraved shells. Davies' landscape is not a drawing of a cascade with its fugitive light,

²⁶ Smith, *European Vision*, p. 34.

bewildering movement, and overpowering noise; it is a drawing of a specimen, a waterfall catalogued and described in an inventory of the falls of Canada.

Animated Nature

The Arctic Zoology

When Thomas Pennant wrote the *Arctic Zoology*, he relied, as we have noted, on the collections and field observations of a number of correspondents resident in North America.²⁷ The information that came from this new group of observers was to a certain extent responsible for changing the emphasis in the writing of natural history. Lacking access to extensive libraries, herbaria or collections of specimens, they nevertheless had the advantage of first-hand observation, as well as native informants (who were, however, due to their rules of hospitality and courtesy, not necessarily reliable). As a result, there is after 1770, at least in the natural history literature published in English about North America, a shift from the simple documentation of the physical appearance of the specimen to an interest that goes beyond taxonomy and provides a true natural history of a new species. When Edwards published his "Gleanings" of natural history, illustrating birds whose provenance was unclear, his purpose was the simple documentation of their appearance in a printed format, to aid other naturalists in identification. Pennant was still concerned with identification, but he could access a much broader base of material. He included in the *Birds*

²⁷ Pennant acknowledges the help of Dr. Alexander Garden and Mrs. Anna Blackburn, whose brother Ashton was settled in the New York area, as well as Hearne, Graham and Hutchins. We have noted above the use of Davies' specimens. He also makes reference to the records and specimens from the Cook voyages, as well as the works of Cadwallader Colden, Mark Catesby, Pehr Kalm, Henry Ellis, Bartram, Charlevoix, Lahontan, DesBarres, and Josselyn, among others.

section of *Arctic Zoology* information on Name and Synonyms and any text references, plus Description (Character), including Varieties, then Place or habitat, Song, the appearance of Nests, and Food, – what Pennant called "manners." This information could not be derived from the perusal of the specimen alone, nor from research into European literature. This was new data, derived from the accurate inspection of new species by observers on the spot. Pennant's work is also one of the first published examples of a zoogeographical approach to understanding natural history. The difficulties of acquiring and preserving birds, animals, fish, etc. had made assembling a representative selection of a region's animal life extremely difficult. By the combination of literature review, reports from resident observers and examination of both living animals and documented specimens, Pennant was able to achieve a remarkable picture of the animal life in the polar and subarctic regions. His work includes a table showing distribution of quadrupeds in the old world and the new, and acknowledges that more information is wanting on migration of birds and mammals. A zoogeographic approach demanded new methods of collection, and Pennant complained, for example, that on Cook's third circumnavigation, "It was a great misfortune, in this voyage, that the fishes were promiscuously flung into one common case, so that it is impossible to ascertain the species belonging to each country."²⁸

More than the works of any cabinet naturalist, then, Pennant's *Arctic Zoology* depended on the observations and collections of the amateur field naturalists, whom Pennant pays tribute to as the "gentlemen or writers who have paid no small attention to their [the specimens'] manners."²⁹ Pennant's field

²⁸ Thomas Pennant, *Introduction to the Arctic Zoology*, 2nd ed. London, Robert Faulder, 1792, p. cxxiii

²⁹ Pennant, *Introduction to the Arctic Zoology*, Advertisement, np.

informants worked, however, under some disadvantages. None of them had received formal training in natural history, but many were eager, like Thomas Hutchins, who acknowledged his own lack of training, but happily presented his remarks to the Company as an accompaniment to a collection prepared by Andrew Graham and himself:

The following sheets were not wrote by one who is skilled in zoological affairs, but by a young person seeking after knowledge and improvement, who would think himself extremely happy to be of service to the learned, and is proud of every opportunity of demonstrating his gratitude for favours received from the Hudson's Bay Company.³⁰

Humphrey Marten, who arrived in Hudson Bay in 1750 and remained with the Company until his retirement in 1786, sent a collection of birds to the Royal Society in 1772, with an explanation of his "willing mind and weak ability." His comments on the life of the collector deserve to be repeated at some length, since they so accurately reflect some of the difficulties under which these willing servants of the Company and natural history laboured:

I hope those Gentlemen that inspect the aforewritten history of birds will observe, that I do not absolutely declare all I have set down to be truth... I was obliged to have the best Indian intelligence I could get. I trusted not to assertions of any single person, let his age or experience be what it would, therefore hope that I am near the truth, if not quite so. I could have wished that when I received orders from my masters to make a collection of birds etc. that the Naturalists' Journal, as also the British Zoology, had been sent to me, for which I could have paid with thanks; fine seed shot, birdlime, glass bottles with ingredients for making the preparing liquor, would have enabled me to have given more satisfaction to the gentlemen concerned as well as myself than it is possible for me now to do. Wire, beads of all sizes and colours that resemble the eyes, I presume should have been sent: as not a soul I believe in Hudson's Bay knows anything of painting either in oil or water colours.³¹

³⁰ Andrew Graham, *Notes and Observations on Hudson's Bay, 1767-91*. London: Hudson's Bay Record Society, 1969, p. 389. Glyndur Williams goes to some trouble to correct the impression fostered by both Hutchins and Pennant that Hutchins was the prime informant. The "manuscript observations in a large folio volume" were primarily the work of Graham.

³¹ Quoted by Williams in Graham, *Notes and Observation*, p. 81n.

Some of the observers were more able than others, and Samuel Hearne in particular stands out as being very able indeed. When the Comte de La Pérouse took Churchill for the French in 1782, he captured not only Hearne but his journals. So impressed was the count with the journals that he returned them to Hearne on condition that he publish them. Hearne's journals were published in 1795 after his death as *A Journey from Prince of Wales's Fort in Hudson's Bay to the Northern Ocean 1769, 1770, 1771, 1772*. Included in the book are a number of corrections to Pennant's work. Pennant had obviously had access to Hearne's manuscript notes for he frequently cites his observations and the descriptions of "his elegant pen."³² Pennant did not, however, check everything against Hearne's first-hand knowledge since, according to Hearne, a number of false observations have "crept into Mr. Pennant['s] Arctic Zoology... that elegant work..."³³ Pennant was aware of some of the shortcomings of his methods, and apologized in his Advertisement that his reliance on amateurs had of necessity made his work less perfect. He regretted that a brilliant and trained naturalist like Willughby had failed to achieve his planned voyage to the New World: "What he [Willughby] would have performed, from an actual inspection in the native country of the several subjects under consideration, I must content myself to do, in a less perfect manner, from preserved specimens transmitted to me..."³⁴ Reinhold Forster, who prepared some of Graham's specimens for

³² Pennant, *Introduction to the Arctic Zoology*, p. ccxviii.

³³ Hearne, *Journey*, p. 230. One of the hoariest old chestnuts is the tale of beavers using their tails in the manner of masons with trowels. Hearne writes that he "cannot refrain from smiling, when I read the accounts of different Authors who have written on the oeconomy of those animals, as there seems to be a contest between them, who shall most exceed in fiction." (p. 149)

³⁴ Pennant, *Introduction to the Arctic Zoology*, p. a2.

publication in *Philosophical Transactions*, also noted some of the problems in working with the untrained amateur:

It is however presumed, that though Mr. Graham has shown himself a careful observer, and an indefatigable collector, yet, not being a naturalist, he could not enter into any minute examination about the species to which each goose belongs, nor from mere recollection know, that his grey goose was actually to be met with in England. A natural historian, by examination, often finds material differences which would escape a person unacquainted with natural history. The wish, therefore, of seeing specimens of these species of geese, must occur to every lover of science.³⁵

Despite the new information on animal behaviour and geographic range which Pennant was able to include as a result of his correspondents' efforts, the lack, as Marten noted, of trained artists seriously precluded the depicting of animals and birds in their environment with any degree of accuracy. Pennant was forced to rely on the depiction of mounted specimens, though it is obvious from the marginalia by Mercatti and Giffith included in his personal copy of his work (now in the Blacker Wood Library at McGill University), that he could have wished for more felicitous renderings of both scenery and animals. The frontispiece to the *Introduction* by Peter Paillou does, however, make an attempt to depict the arctic wastes with their characteristic inhabitants [plate 66]. Paillou, it should be remembered had painted Pennant's hall at Downing with "several pictures of birds and animals, attended with suitable landscapes,"³⁶ and it may be that one of these served as model for the frontispiece. The frontispiece is described as "a winter scene in *Lapland*, with *Aurora Borealis*: the ARCTIC FOX, ERMINE, SNOWLY OWL, WHITE GROUS." But just as Pennant's book is panarctic, so the frontispiece stands for a generic arctic landscape. The engraving shows a

³⁵ Graham, *Notes and Observation*, p. 42n. Graham did, of course, send back specimens which were figured by Pennant's artists in *Arctic Zoology*.

³⁶ Lysaght, *Joseph Banks*, p. 104.

rocky crag, and perched on it is a snowy owl, talons clenched firmly around the body of the "grouse" (ptarmigan). Below the owl squirms a pale arctic fox in a contorted position beneath a rock. Another owl mantles to the left of the fox while at the bottom right an ermine slips by the ensemble.³⁷ The northern lights glimmer in the background where can barely be seen a lake and a Lapp village. There is an obvious staging in the dramatic poses of the animals on their rocky hillside, reminiscent of the manner in which a variety of mounted birds were perched inside glass domes or cabinets. The ensemble lacks the casual realism of Davies' eagles soaring above the falls, and points out the importance not only of the trained observer but of the trained artist making drawings "on the spot." Getting the animal "right" by painting from a prepared specimen was one thing, but fitting the animal or animals into their habitat and understanding their relations one to another required another sort of understanding altogether, one that could not be achieved by either the cabinet naturalist or the studio artist. As with Kalm's account of Niagara, so Pennant's natural history was hampered by the limitations of the illustrations which accompanied it, the sixteen plates (fourteen of which are obviously mounted birds) recording specimens, not "manners." The dissociation between text and illustration could only be remedied by the kind of artistic and scientific collaboration that had made James Cook's (1728-78) circumnavigations milestones in the development of natural history.³⁸

³⁷ All animals are shown in winter coats and plumage and there was at the time some controversy over the nature of winter colour change in northern animals and birds. See the notes in Lysaght, *Joseph Banks*, pp 79-83.

³⁸ Pennant noted in *Introduction to the Arctic Zoology*, that in one of the plates accompanying Cook's voyages, "is given the only accurate figure of walrus I have ever seen." (p. ccdvii) The walrus was painted by John Webber, perhaps at Cook's urging, and Cook himself had noted in his journal that he "had no were seen a good drawing of one." Quoted in Bernard Smith, *The Art of Captain Cook's Voyages*. 3 vols. Melbourne: Oxford University Press, 1985, p. 116.

Joseph Banks and the Cook Expeditions

Cooks' first circumnavigation was promoted by the Royal Society and one of its purposes was to observe the transit of Venus in 1769. The inclusion of the party of scientists and artists organized by Joseph Banks (elected a member of the Society just before his departure for Newfoundland) was at the request of the Society. It is possible that Cook and Banks had met in 1766 in Newfoundland, when Cook had been charged with the Newfoundland coastal survey, but it was Banks' voyage to the island and Labrador that prepared him for the much more extensive exploration two years later in the *Endeavour*. For his Newfoundland trip with his friend Constantine John Phipps (1744-92), he took with him a small library which included works of Linnæus, Edwards and Catesby as well as assorted collecting equipment such as nets and trawls, butterfly nets and plant presses, as well as a keg of spirits to preserve animals and birds. Banks must have realized from this voyage the disadvantages to accurate rendering which resulted from the lack of an artist. Some of his plant specimens were not properly dried due to haste and illness, others were destroyed in heavy seas. Although Ehret's watercolours on vellum of the Newfoundland plants are remarkable in their accuracy, considering that they were prepared from dried specimens, mistakes did occur when painting from herbarium material. The *Dryas integrifolia*, for example, is painted with yellow flowers [plate 67]. The flowers are actually white, having turned yellow when dried. Sydney Parkinson (1745-71) was responsible for painting the bird specimens from the trip, and succeeded so well in rendering the preserved specimens that Banks employed him as the natural history artist on his round-the-world expedition, on which Parkinson died. Parkinson was only one of two artists on the voyage, the other being Alexander Buchan, a topographical artist. Buchan, too, died shortly after

the expedition arrived at Tahiti, and Banks wrote in his *Journal* that "His loss to me is irretrievable, my airy dreams of entertaining my friends in England with the scenes I am to see here have vanished. No account of the figures and dresses of the natives can be satisfactory unless illustrated by figures..."³⁹ Luckily Parkinson was able to fill the void left by Buchan's death and both Daniel Solander and Herman Spöring, the two naturalists, also drew scenes and specimens.

Banks' enterprise in ensuring a scientific and above all illustrative record of the circumnavigation was not lost on the navy. As early as mid-century, Richard Walter in a popular edition of Anson's *Voyage* had pointed out how much had been lost by not ensuring better visual records of important voyages:

...I cannot ... but lament, how very imperfect many of our accounts of distant countries are rendered by the relators being unskilled in drawing, and in the general principles of surveying;... Had more of our travellers been initiated in these acquirements... we should by this time have seen the geography of the globe much correcter, than we now find it; the dangers of navigation would have been considerably lessened, and the manners, arts and produce of foreign countries would have been much better known to us, than they are. Indeed, when I consider, the strong incitements that all travellers have to acquire some part at least of these qualifications, especially drawing; when I consider how much it would facilitate their observations, assist and strengthen their memories, and of how tedious, and often unintelligible, a load of description it would rid them, I cannot but wonder that any person, that intends to visit distant countries, with a view of informing either himself or others, should be unfurnished with so useful a piece of skill.⁴⁰

Drawing had been included in the curriculum of the Portsmouth Naval Academy in 1733, and as a result of the publication of Anson's *Voyages*, commanders were given orders to ensure that "officers skilled in draughtsmanship" would take

³⁹ Quoted in Smith, *European Vision*, pp 16-18.

⁴⁰ Quoted in Smith, *European Vision*, p. 6. Walter's concerns echo George Edwards. Banks took a copy of Walter's edition with him on his voyage to the Pacific.

wherever possible, coastal profiles and plans of harbours, fortifications and anchorages [plate 68].⁴¹ The inclusion of artists and naturalists, or at least of naval officers trained in science and art, became customary on the major exploratory voyages of not only the British, but also the French, Spanish, and Russians [plate 69]. The paintings and sketches provided by these artists were made not only to accompany the specimen collections, but with an eye to subsequent publication. Bernard Smith chronicles the depiction of Australia and its natural productions by naval artists, but in North America, with the exception of the west coast, most of the illustrations to travel accounts were the result of the activities of the military artists like Davies. Even the coastal survey of the east coast relied on the talents of an infantry officer trained at Woolwich. Joseph Frederick DesBarres (1721-1824) was drafted into a naval survey of the coasts of Nova Scotia which resulted in the *Atlantic Neptune* (c1777-81), a survey still in use (as were many of Cook's charts) until well into the nineteenth century. DesBarres included a series of views in the publication, such as the windswept image of the surveying camp on Sable Island, complete with wild horses and monstrous sand hills rising like sugar loaves over the scene [plate 70].⁴² The exception to the predominance of soldier-artists was in the depiction of the arctic regions, where the navy had declared its interest. Almost forty years after Pennant had first published his record of the manners of the beasts and birds of the region, and had wished for the "potent emanations of a Linnæus" to inspire the efforts of an "American philosopher,"⁴³ trained artists and naturalists at last

⁴¹ Smith, *European Vision*, p. 9.

⁴² Pennant also used information from DesBarres, and the watercolour of Sable Island in the 1792 personal edition is similar to the DesBarres drawing.

⁴³ Pennant, *Introduction to the Arctic Zoology*, Advertisement, np.

provided the figurative counterpart to the detailed text descriptions of Graham and Hutchins and the "elegant pen" of Hearne.

The First Franklin Overland Expedition, 1819-22

By the end of the eighteenth century, coastal surveys of the east and west coasts had been completed by Cook and Vancouver, but the arctic coasts were still uncharted and the Northwest passage, so ardently sought since the age of Elizabeth, remained a mystery. For most Europeans the very appearance of Hudson Bay and the arctic islands was equally mysterious. Mention should be made again of the 1768 published engraving of "Inhabitants of North America near Hudsons Bay..." which was based, albeit loosely, on John White's engraving of two centuries earlier (see above, Chapter Five). A number of expeditions in search of the Northwest passage had recorded the icy landscapes, and Henry Ellis' account of an expedition in 1746-7 in the *Dobbs Galley and California*,⁴⁴ included some illustrations of the landscape as well as the bird and animal life. The "cuts" of the landscape were at best crude schematic depictions of points in the narrative, while most of the illustrations of animals were culled from George Edwards, to whom Ellis gives appropriate credit. Samuel Hearne and Alexander Mackenzie had both made major overland expeditions in the late eighteenth century, and Hearne's observations had provided at least some knowledge of the Arctic coastline around the mouth of the Coppermine River. As has been noted, Hearne was a careful and meticulous observer, but his book contains only a single illustration which may have been engraved after Hearne's own sketch, or might have been prepared by the

⁴⁴ Henry Ellis, *A Voyage to Hudson's Bay by the Dobbs Galley and California....* London: H. Whitridge, 1748.

engraver from textual description alone. Certainly the engraving of a "Winter View of Athapuscow Lake" [plate 71] captures something of the nature of the northern lands, though as Maclaren notes, the trees are far too symmetrical and disproportionate to be a true representation of the scene.⁴⁵

In the second decade of the nineteenth century, the Royal Navy, underemployed after the end of the Napoleonic Wars, turned its attention to the Canadian arctic. The success of the Cook expeditions had not been forgotten, and participants in many of the arctic voyages were selected as much for their artistic and scientific abilities as for their seamanship. In 1818, John Ross (1777-1856) was sent to re-survey Baffin Island, and a year later another expedition under Parry and Liddon sought the Passage by sea, but at the same time, in a departure from custom, the Navy embarked on an overland expedition using naval officers. Led by Lieutenant John Franklin (1786-1847), the surveying party included two midshipmen, George Back (1796-1878) and Robert Hood (1796-1821), and a naval surgeon, Dr. John Richardson (1787-1865). Richardson's assigned duties were to "collect and preserve specimens of minerals, plants and animals,"⁴⁶ while Back and Hood were charged with making accurate observations and providing the illustrative records of the expedition. Both Back and Hood were employed making charts of the expedition's progress, recording temperatures and observing the weather, but it is obvious from their journals and their original sketchbooks and watercolours, that Hood was the more expert in depicting natural history, and Back the better at rendering

⁴⁵ I.S. Maclaren, "The Aesthetics of Back's Writing and Painting from the First Overland Expedition," in C. Stuart Houston, *Arctic Artist. The Journals and Paintings of George Back, Midshipman with Franklin, 1819-1822*. Montreal: McGill-Queen's University Press, 1994, p. 298.

⁴⁶ Secretary of the Admiralty to Richardson, 25 March 1819, in C. Stuart Houston, *Arctic Ordeal. The Journal of John Richardson, Surgeon-Naturalist with Franklin, 1820-1822*. Kingston: McGill-Queen's University Press, 1984, xxiii.

landscape views. Back's two sketchbooks from the expedition include 57 watercolours and pen-and-ink drawings, and a number of these form the basis for the engravings by Edward Finden which illustrated Franklin's account of the expedition. Back's sketchbooks also included maps with notations of topographical and geological features as well as compass directions, temperature records (many taken from Hood), and distance travelled. Hood's sketchbooks appear to be no longer extant, perhaps having been lost with Franklin's writing desk and papers in the crossing of a river on the disastrous return trip from the shores of the Arctic Sea.⁴⁷ A number of Hood's full-size watercolours survive, however, having likely been included with a packet of materials sent to England in March or July 1821.⁴⁸ Hood's watercolours were also used by the engravers for the Franklin expedition publication.

The great naval voyages of the eighteenth and early nineteenth centuries made an enormous impact on natural history due in part to the quantity of specimens collected and illustrated, and the number of observations and records made. This success was in many ways the result of their mode of transport. A naval ship was like a floating laboratory, well-equipped to house the specimen kegs and plant presses, and carrying adequate stores of paper both for herbarium sheets and watercolours. It also provided shelter and space for the artists, and during the long passages from landing to landing, an opportunity to produce finished sketches. Circumstances were very different during an overland expedition, particularly one to the far north, and artists like Hood and Back were faced with great difficulties both in keeping their journals and in

⁴⁷ Noted in Back's journal account on September 14, 1821. (*Arctic Artist*, p. 172.)

⁴⁸ Noted in Back's journal in Houston, *Arctic Artist*, p. 117, and in Richardson's journal in Houston, *Arctic Ordeal*, p. 83.

making their records. Back's surviving sketchbooks from the 1819-22 expedition show something of the way he and Hood must have worked.

Back's sketchbooks are small, the largest being 11.43 x 19.05 cm. One is a journal but the other a formal sketchbook, with glazed paper separating the heavier leaves. Back used both for maps, sketches, watercolours and notations. He worked in the style of most watercolour artists, making first a pencil sketch than laying either washes or full body colour over the pencil lines. Maclaren notes that Back was no doubt aware of the engraver's requirements for defined separations between light and dark areas, and prepared his works accordingly, in hopes of inclusion in the official printed record.⁴⁹ (It is obvious from the style of their journals that Hood, Back and Richardson all looked forward to publication, since the expedition was supported by the British government.) Pencil sketches were often made on the spot, as can be seen in the ink drawings of a buffalo showing the head, hoof, and detail of hindquarters, which may be the record of a buffalo shot on 6 February 1820, when Back noted "I took a sketch of it directly."⁵⁰ Back also notes that in some cases he made sketches outdoors, such as the one of Fort Carleton made on 7 February of the same year, and he depicts himself, in much the same way as Davies, sketching by the side of the Upper Falls of Wilberforce Falls [plate 72] and by a rapid in the Coppermine (July 2, 1821). On the spot records were not, however, always possible, both for reasons of the extreme cold and of the incessant swarms of insects. On 29 December 1820, Back records in his journal the crossing of a series of portages. Normally responsive to the picturesque views presented by waterfalls (as Davies and a horde of other watercolourists of the period were), Back notes that

⁴⁹ Maclaren, "Aesthetics," p. 302.

⁵⁰ Noted in Back's journal in Houston, *Arctic Artist*, p. 42.

"when a person can just prevent himself from freezing – he has no great relish even for the finest views."⁵¹ If it was not the cold, it was the insects. On 10 July, 1821 on the shores of the Coppermine River, Back recorded that he returned with the others to their tents "amongst myriads of mosquito's, which in spite of veils – gloves – or handkerchiefs stung us in a most unmerciful manner – and quite prevented any attempt to sketch."⁵² Maclaren observes that Back's sketchbooks do not show any signs of insect kills, and notes that Back may have mixed in his colours a bitter substance called Coloquintida, sometimes used by watercolourists to prevent insects from landing on drawings.⁵³

Sketches were finished in larger format during the long stretches when the expedition was forced to remain idle awaiting supplies, or for the lakes to freeze for winter travelling, or the rivers to thaw for travel by canoe. Back's sketchbooks bear evidence of his forethought for the completion of finished watercolours. The colours are often included on the glazed paper. Beside a sketch of White Falls, he notes the following information: "Rocks grey with light green. Tint of Red ochre and Gamboge. Rocks to the right, a hint of Lake. Fresh Bright tints. Much foam and spray about the nature further to the right." On another drawing executed on 13 February, 1821 at the Petite Portage on the Slave River, he notes the colour instructions with a comment on the absent foreground – "Dogs and train passing." Similarly in a sketch of Portage La Loche, he writes, "the foreground omitted here, but it is drawn in the picture

⁵¹ Noted in Back's journal in Houston, *Arctic Artist*, p. 106.

⁵² Noted in Back's journal in Houston, *Arctic Artist*, p. 138.

⁵³ Maclaren, "Aesthetics," p. 297. Hawkesworth notes in his account of the first Cook expedition at Tahiti in April 1769, that the flies made it almost impossible for "Mr. Parkinson, Mr. Banks', natural history painter, to work: for they not only covered his subject so that no part of its surface could be seen, but even eat the colour off the paper as fast as he could lay it on." (Quoted in E.C. Sawyer, "Some natural history drawings made during Captain Cook's first voyage round the world," *JSBNH*, 1949 (2), 5, p. 190.

sent home. It forms a part of the hill road by which you descend." A pen-and-ink outline is included in the corner.⁵⁴ Back notes that they passed a quiet early spring at Cumberland House – "Nothing particular occurred till May when the lake began to open" – but their time "was fully occupied in bringing up the Chart Drawings &c."⁵⁵

It can be assumed that a number of Hood's initial sketches were completed in larger format during the fall and winter of 1819-20, during this period of "full occupation," when the expedition waited out the winter at Cumberland House. Even when under shelter, arctic artists had problems. Hood noted that despite keeping "the chimneys in a constant blaze," their "pens and brushes were frozen to the paper."⁵⁶ Hood also described other problems encountered by the natural history artist in the field. Towards the end of March 1820, Hood, "desirous of obtaining a drawing of a moose deer," sets off with some native hunters who on 2 April kill a moose. Only by offering the natives their own provisions do Hood and his companions manage to "suspend the work of destruction until the next day." The natives had already removed the entrails and the fetal moose, and Hood prepared to sketch the carcass. His account of the episode is worth detailing:

I had scarcely secured myself by a lodge of branches from the snow, and placed the moose in a position for my sketch, when we were stormed by a troop of women and children, with their sledges and dogs. We obtained another short respite from the Indians, but our blows could not drive, nor their caresses entice, the hungry dogs from the tempting feast before them.⁵⁷

⁵⁴ All included in Sketchbook No. 1, NAC.

⁵⁵ Noted in Back's journal in Houston, *Arctic Artist*, p. 60.

⁵⁶ Noted in Hood's journal in C. Stuart Houston. *To the Arctic by Canoe, 1819-1821. The Journal and Paintings of Robert Hood, Midshipman with Franklin*. Montreal: McGill-Queens University Press, 1974, p. 13.

⁵⁷ Noted in Hood's journal in Houston, *To the Arctic by Canoe*, p. 58.

It is no wonder that the resulting watercolour of the sketch made under such conditions presents a very stiff-legged and peculiarly proportioned doe moose munching on a tree against a snowy countryside. Hood's watercolour is supplemented by his journal entry which gives measurements of the moose, its weight, colour, and habits as learned from the native peoples. Hood notes that "As the American moose deer is an animal of which I have not seen any perfect account, I shall add to what is already known, the information procured on this occasion."⁵⁸ During the stay at Cumberland House, Hood also figured a wolverene, lynx, fisher, buffalo (of which Back also prepared a drawing), otter, and ermine as well as composite sketches of birds. It would appear that Hood sketched the birds individually from dead specimens, then re-painted them onto a background of trees or water. In the case of a series of winter birds, Hood has actually cut out the individual sketches and pasted them on a grey sheet. While the colouration is adequate, it is obvious from the attitudes in which the birds are posed that Hood had not thought of Audubon's trick of wiring the dead specimens into lifelike postures. The birds are stiff, unnatural, the wings spread too wide, the necks stretched too far.⁵⁹ At Fort Enterprise in 1821, Hood painted a white wolf and a series of fish. Hood also turned his hand to landscape, and completed a number of views of falls and lakes. Before his death, Hood managed to finish 28 paintings. Back was more prolific, despite the

⁵⁸ Richardson's journal contains only a few references to the moose. The expedition carried a copy of the 1817 edition of Cuvier's *Le Règne Animal*.

⁵⁹ One would be hard put to agree with Houston's estimation that "Hood's paintings are much superior to the contemporary American bird paintings of the famous Alexander Wilson." (p. 168) Wilson's painting, while stiff, proceed from a profound understanding of the bird itself, and a number of them were copied by Audubon. The scope of Wilson's work is also immeasurably greater.

fact that his winter journey of over 1100 miles on snowshoes in 1820-21 prevented him from completing more drawings.

Back and Hood approached their assignments from two very different perspectives but in a complementary manner. Both were trained in the topographical tradition of naval documentation. Back likely learned his skills from senior officers during his time as a prisoner of war in France, while Hood may have learned how to record landscape on board ship. Both are confronting an entirely new kind of landscape and have been required to depict it faithfully, and Back at least expresses confidence in his journal entries that accurate drawing is equivalent, if not superior to, textual description: "The description of it will be better explained in a drawing than in any other manner..."⁶⁰ Bernard Smith in his exposition on the art of Cook's voyages, *European Vision and the South Pacific*, underlines the importance of topographically trained artists in creating the depiction of the "typical" landscape, the view which laid out the "character" of the country, in the same manner that a properly executed drawing of a flower could show its character at a glance. Smith defines the typical landscape as "a form of landscape the component parts of which were carefully selected in order to express the essential qualities of a particular kind of geographical environment."⁶¹ The typical landscape is the antithesis of the idealized landscape, and the "component parts" are selected as much on the basis of their explanatory power as for their aesthetic or picturesque appearance. Smith relates this view of nature with its emphasis on particularity to the ideas on "geographical environment" espoused by Alexander von Humboldt in a series of works published in the early 1800s. Whether Hood or

⁶⁰ Noted in Back's journal in Houston, *Arctic Artist*, p. 137.

⁶¹ Smith, *European Vision*, p. 4.

Back or even Richardson had access to these works, it is impossible to know, but the popularity of Humboldt's *Personal Narrative* and subsequent works was evidence of the changing perspective on the study of natural history that was apparent even in *Arctic Zoology*.⁶² Humboldt's works were concerned with physical geography, with the description of characteristic climatic zones. Smith quotes from the English translation by Mrs. Sabine of Humboldt's *Aspects of Nature*, which was first published in 1808:

The azure of the sky, the lights and shadows, the haze resting on the distance, the forms of animals, the succulency of plants and herbage, the brightness of the foliage, the outline of the mountains, are all elements which determine the total impression characteristic of each district or region.⁶³

In the paintings of both men is reflected, then, this new approach to landscape which Smith sees as derived by necessity from the confrontation between the European-trained artists and the unfamiliarity of exotic terrains. Next to the tropics, the arctic was probably the landscape most likely to challenge the conventions of contemporary artistic depiction, and both Hood and Back responded from the background of their training and their interests to depict the northern landscape and its natural productions and create a "total impression" of a new landscape.

Hood's portraits of both animals and native people reveal an awkwardness, but his interest in the habits of the natives and the indigenous wildlife was genuine. He began a section of his journal on "Animals" but

⁶² *Personal Narrative of Travels to the Equinoctial Regions of America during the years 1799-1804* was translated into English between 1814 and 1826.

⁶³ Quoted in Smith, *European Vision*, pp 203-4. Mrs. Sabine was presumably the wife of Edward Sabine (1788-1883) who made two Arctic voyages and recorded the observations from a worldwide magnetic survey, first suggested to the Royal Society by Humboldt.

managed only to complete an entry on the buffalo, noting that "other occupations have frustrated the design at present."⁶⁴ His observations on the mosquito, which he compares to the mosquitos of Africa and Europe, show as much interest in describing their natural history as Back had shown in describing their torments.⁶⁵ Hood showed a sensitivity to nature that is quite profound and his description of an arctic spring is reminiscent of Linnæus's paen to the northern spring:

By the 21st [May], the elevated grounds were perfectly dry, and teeming with the offspring of the season. When the snow melted, the earth was covered with the fallen leaves of the last year, and already it was green with the strawberry plant, and the bursting buds of the gooseberry, raspberry and rose bushes, soon variegated by the rose and the blossoms of the chokecherry. The gifts of nature are disregarded and undervalued till they are withdrawn, and in the hideous regions of the arctic zone, she would make a convert of him for whom the gardens of Europe had no charms or the mild beauties of a southern climate had bloomed in vain.⁶⁶

It is this sensitivity to the natural world that infuses Hood's depictions of the countryside and distinguishes them fundamentally from Back's. Hood's view of Marten Lake is perhaps the most visionary view of the Canadian north painted throughout the first half of the nineteenth century [plate 73]. It is both the rendition of a moment in the narrative of the expedition and an incredibly powerful descriptive statement about the nature of the arctic lands. Almost half the large watercolour is sky. Light streams through the clouds in separate beams

⁶⁴ Noted in Hood's journal in Houston, *To the Arctic by Canoe*, p. 93n.

⁶⁵ Noted in Hood's journal in Houston, *To the Arctic by Canoe*, p. 116.

⁶⁶ Noted in Hood's journal in Houston, *To the Arctic by Canoe*, p. 64. Linnaeus' paper to Celsius on the sexuality of plants begins with the words, "In spring, when the bright sun comes nearer to our zenith, he awakens in all bodies the life that has lain stifled during the chill winter. See how all the creatures become lively and gay, who through the winter were dull and sluggish! See how every bird, all the long winter silent, bursts into song! See how all the insects come forth from their hiding-places where they have lain half dead, how all the plants push through the soil, how all the trees which in winter were dormant now break into leaf!..." (Quoted in Wilfrid Blunt, *The Compleat Naturalist: A Life of Linnaeus*. London: Collins, 1971, p. 34.)

onto the still surface of the lake. To the right on a rocky hill, a small group of caribou stand. Below them, gliding silent through the reflection of the hill, is a voyageur canoe. One of the expedition members stands in the canoe, ready to fire on a caribou swimming for the shore. The movement has alarmed a flock of snow geese who rise skywards in two parallel rows into the beams of light. In the foreground, two native hunters crouch behind cover eyeing a wary herd of caribou on the left. The animals are magnificent with full spread of antlers. The watercolour has faded from exposure to light, but it remains clear, pure and mystical, filled with acute observation and immense appreciation for the landscape. But it is Hood's inclusion of the animal and bird life of Marten Lake that marks the watercolour as remarkable. In all his depiction of animals, Hood uses the landscape not as background but as habitat. The buffalo kicks up the dirt of the prairie, the otter slips into a frozen stream, the lynx attacks a hare near the forest edge. To Hood the arctic is an inhabited world, and his watercolours presage the ecological depiction of birds and other species that are the hallmark of the work of Audubon and later of John Gould.

While Richardson's journal is a relatively terse account with detailed notes on plants and animals encountered and extensive recording of geological information, Hood's journal entries also include purely descriptive passages which reveal not just the naturalist's but the artist's eye:

We were prepared to expect an extensive prospect, but the magnificent scene before us was so superior to what the nature of the country had promised, that it banished even our sense of suffering from the mosquitoes which hovered in clouds about our heads. Two parallel chains of hills extended towards the setting sun, their various projecting outlines exhibiting the several gradations of distance, and the opposite bases closing at the horizon. On the nearest eminence, the objects were clearly defined by their dark shadows; the yellow rays blended their softening hues with brilliant green on the next, and beyond it, all distinction melted into grey and purple... Impatient as we were, and blinded with pain, we paid a tribute of admiration which this beautiful landscape is capable of

exciting, unaided by the borrowed charms of a calm atmosphere glowing with the vivid tints of evening.⁶⁷

It is interesting to compare Hood's relatively restrained if sensitive description of the view with that of Back, taken from a similar vantage point:

Breaking through the thick foliage of pine and cypress – he stands at once on the summit of an immense precipice – and like one bewildered in some vast labyrinth – knows not where to fix his eye – The view is that of a valley some thousand feet beneath you, in length upwards of 30 miles – in breadth three or four – and in the centre a meandering river holds its course near, covered with snow – farther distant, less light – decreasing in brightness – till it becomes insensibly lost in the deep blue mist of the distant perspective – it is bounded on each side by immense hills – the fragments of gigantic mountains – irregularly broken – like to the confusion of an earthquake – undiscribly [sic] grand – the one side is burnished over with the luxuriant foliage of the pine and cypress – the other with the cold and sterile poplar – half lost in snow – while here and there on the summit – scattered promiscuously – dark towering forests hang half suspended... I do not pretend to describe the beauties of this view – the pencil being a more powerful vehicle than the pen for that purpose, for the whole is apt to vanish before the minute parts can be described...⁶⁸

Back's description is part instruction to the artist and part romantic gloss.

Maclaren notes that Back's carefully contrived watercolours (pine trees are practised in the sketchbooks [plate 74]) of typical northern landscapes are at odds with his descriptions of wild, savage country.⁶⁹ Earthquakes, cold, sterile poplars, luxuriant foliage, dark towering forests – this is the language of romanticism, a view of the arctic as a place of mystery and beauty. This type of description was at odds both with Back's training and his ability to depict landscape. It is, however, revealing about an aspect of Back's personality, and his response to landscape. To the naturalist like Richardson, every scene has its

⁶⁷ Noted in Hood's journal in Houston, *To the Arctic by Canoe*, pp 115-6.

⁶⁸ Noted in Back's journal in Houston, *Arctic Artist*, p. 55.

⁶⁹ Maclaren, "Aesthetics," pp 294-5.

observations and its specimens. It was obvious to Richardson, however, that Back appreciated particular kinds of scenery. In a letter from Richardson to Back, Richardson writes, "Amongst these hills you may observe some curious basins, but nowhere did I see anything worthy of your pencil. So much for the country. It is a barren subject, and deserves to be thus briefly dismissed."⁷⁰ From his journals and his sketchbooks, it is obvious that Back responded most strongly to a distinctive type of scenery, "diversified," with "singularity," that might "catch the eye of the traveller."⁷¹ Clumps of willows on the great plains, in his opinion, "gave some relief to the continual evenness [sic] of the scene...;"⁷² otherwise, as he noted en route to Fort Chipewyan from Fort Enterprise, "The scenery is so like what we had already passed that I cannot imagine how one part is distinguished from the other."⁷³ Like the picturesque traveller, Back is on the lookout for "views," and his choice of what he paints often reveals this bias. Falls and rapids figure largely among his sketches, and his illustrations of the arctic sea passage in canoe show towering cliffs, stormy seas and lowering skies. As a trained observer, however, not all Back's sketches are of spectacular scenery. In November 1820 he paints a panorama of Great Slave Lake, with a view to the northeast, to the southeast and to the southwest [plate 75]. Back completes the set in 1821, with a view to the northwest. He also paints two rocks covered in Tripe de roche, which featured so greatly in the survival of the party, as well as pencil and pen and ink sketches of beaver and muskrat, studies of caribou skulls and antlers, and depictions of typical plants – crowberry,

⁷⁰ Richardson to Back, June 9, 1821, in Houston, *Arctic Artist*, p. xxix.

⁷¹ Noted in Back's journal in Houston, *Arctic Artist*, p. 19.

⁷² Noted in Back's journal in Houston, *Arctic Artist*, p. 38.

⁷³ Noted in Back's journal in Houston, *Arctic Artist*, p. 105.

blueberry and swamp tea. Even in his rapids and waterfalls, Back's paintings are more than simple picturesque views. Like Hood's they include with precision and care the typical features of the new landscape in all its particularity.

Hood's watercolour of evening on Marten Lake was a record of the typical landscape of northern Canada, complete with "the forms of animals, the succulency of plants and herbage, the brightness of the foliage, the outline of the mountains" characteristic of the region, but it was also something more. It showed a country of incredible beauty far removed from the European scenes in which both Hood and Back had grown up. The fact that both men could depict this new landscape with sensitivity and a regard to particularity indicates a fundamental change from the understanding of the country expressed two hundred years earlier by du Creux, when he wrote that many people had tried to discourage him from writing a history of Canada, "a subject at once so meagre and so grim..." How could there be anything to describe, any history, in a land devoid of cities, palaces, gardens, canals and aqueducts? What were its landmarks, its monuments?⁷⁴ The illustration of natural history, and by extension of habitat, provided Europeans with a new understanding of the meaning of place. They were able to give to du Creux's "immensity of woods and prairies" a shape which they could define and describe, from which they could isolate a landscape of meaning. By using the conventions of natural history, painters like Back and Hood could render the unfamiliar and the new into a readable document for the eye of the observer.

⁷⁴ Du Creux, *The History of Canada or New France*. James B. Conacher, ed., Percy J. Robinson, transl. Toronto: Champlain Society, 1951, p. 15.

Chapter Nine

Conclusion: The Visualization of Complex Data

I began this enquiry with a series of questions about a single image. Looking at that particular and singular image of "The Bittern from Hudson's-Bay" led me to a more general examination of an entire class of images, and an attempt to comprehend the ways in which these images had been created, used and understood by their viewers, or some might say, their readers.¹ This thesis, then, has dealt with the examination of the role of images in natural history, and the nature of representation itself. As stated in the Introduction, the images included in this enquiry have been subjected both to a material history analysis and an archaeological review, as suggested by Foucault. I have tried throughout to tease as many threads as possible out of each image, to link the visual and contextual fields of the image both forward and backward through time, tracing relationships, antecedents, persistence and change. This methodology has provided some unique insights and posed a number of problems, which I cannot claim to have resolved in this relatively brief discourse. The use of visual materials as the ground for analysis is important, however, and, as Martin Rudwick suggested, very necessary and timely. The neglect of visual evidence by historians is longstanding, but there are indications from a number of quarters that the era of neglect is ending.

¹ "To use human-made objects as sources for history and other social sciences, we have to 'read them,' a metaphor for interpreting them." From Jacques Maquet, "Objects as Instruments, Objects as Signs," in S. Lubar and W.D. Kingery, *History from Things: Essays on Material Culture*. Washington: Smithsonian Institution Press, 1993, p. 39.

It was Rudwick's contention nearly twenty years ago that the study of illustrations in the history of science had been ignored by most historians for very unscientific reasons. He suggested that "In the hierarchy of our educational institutions, visual thinking is simply not valued as highly as verbal or mathematical dexterity..."² As a result, he prepared his article in the hope that

A study of the conceptual uses of visual images in an early nineteenth century science may help in a small way to counter the common but intellectually arrogant assumption that visual modes of communication are either a sop to the less intelligent or a way of pandering to a generation soaked in television.³

Rudwick's contemporaries were not, however, the first to make an "intellectually arrogant assumption" about the use of images. Mary G. Winkler and Albert Van Helden suggest that the Renaissance astronomer Galileo was also guilty of a similar assumption about the value of illustration. Despite the fact that both anatomy and botany had become visual disciplines in the sixteenth century, astronomy was still very much linked to mathematics, relying on the word, not the image. Although Galileo used naturalistic representations in his early works, *Sidereus nuncius* (1610) and his *Letters on Sunspots* (1613), he included only diagrams in later works. Winkler and Van Helden attribute Galileo's reluctance to include images to his desire for prominence at court, and the urge to distance himself from the appellation of artisan. Telescope makers and artists worked with their hands, and their status was lower than that of the scholar. Even in the earlier texts, Galileo had "sacrificed the accuracy of the visual representations (which were, finally, visual aids) to the demands of text, which carried the real –

² Martin J.S. Rudwick, "The Emergence of a Visual Language for Geological Science, 1760–1840," *History of Science*, xiv (1976), p. 150.

³ Rudwick, "The Emergence of a Visual Language," p. 150.

and accurate – message. To Galileo one picture was not necessarily worth a thousand words."⁴ This ambivalence concerning the use of images reflects the criticisms levelled by Pliny in the first century at artists and copyists who could never realize a flower as it was throughout its life, nor accurately reproduce the best image (see above, Chapter Four). We have noted it as well in Hieronymus Bock, but we have also observed the defence of the value of the pictorial image by Renaissance scholars like Gesner⁵ and Agricola,⁶ and later by Catesby and Edwards, and the ready acceptance of the image as counterfeit by eighteenth-century naturalists like Linnæus and Banks.

It is important to note, however, that the techniques of naturalistic representation first developed in the Renaissance, and to which later artists were heir, could be used to dissimulate as well as to record. As Martin Kemp points out, naturalistic representation is "a distinctly double-edged sword. An imaginary animal can be depicted with a credibility no less sharp than an existing one."⁷ Francis Haskell's discussion of the haphazard use of portraits by engravers and publishers is reflected in the words of another eighteenth-century savant, Daniel Defoe, who on a visit to Holyrood House in 1726, examined the portrait gallery:

⁴ Mary G. Winkler and Albert Van Helden, "Representing the Heavens. Galileo and Visual Astronomy," *ISIS*, 83, 1992, pp 208-9.

⁵ Illustrations were to be used "so that students may more easily recognize objects that cannot be very clearly described in words." (1558) Quoted in Bernard Cohen, *Album of Science. From Leonardo to Lavoisier, 1450-1800*. New York: Charles Scribners Sons, 1980, p. 150.

⁶ Agricola used illustrations "lest description which are conveyed by words should either not be understood by men of our own times, or should cause difficulty to posterity." From *De re metallica*, which included 291 illustrations. Quoted in Harry Robin, *The Scientific Image. From Cave to Computer*. New York, Harry H. Abrams Inc., 1992, p. 98.

⁷ Martin Kemp, "Taking it on trust: form and meaning in naturalistic representation," *Archives of Natural History* (1990), 17 (2), p. 128.

The North Side is taken up with one large Gallery, reaching the whole Length of the House, famous for having the Pictures of all the Kings of Scotland... But, in my opinion, as the Pictures cannot be, and are not supposed to be Originals, but just a Face and Dress left to the Discretion of the Limner, and so are all Guess-work, I see no Rarity, or, indeed, any Thing Valuable in it.⁸

Gombrich has taken this understanding even further. "Pictures," he writes, "cannot assert. While a verbal account need leave us in no doubt that it claims to describe an existing state of affairs, the uncaptioned pictorial representation may just as easily refer to an existing building as to a memory, a plan or a fantasy."⁹

The dual nature of naturalistic representation may perhaps explain the widespread and recurrent mistrust of illustration, which has led to a suspicion, at least in some circles, of the information value of the picture. Neil Harris, in a thoughtful analysis of the "halftone revolution" of the late nineteenth century, notes that contemporary critics complained that the easy availability of photographic reproductions had led to a "rage for illustration," which would in time undermine the truth value of the text. Harris quotes C.F. Tucker Brooke, who wrote to the editor of the *Dial* to alert readers that "pictures irresponsibly selected, and inserted without adequate investigation, can easily lead to more serious misapprehension than would result from glaring error in the letterpress."¹⁰ Not only might a picture lie, but it might lie more forcibly than text. A 1911 editorial in *Harper's Weekly*, which had used half-tone illustrations since the 1880s, suggested that illustrations improperly used became "a mental drug." The editorial continued: "It would be safe to say that a young mind, overfed

⁸ Francis Haskell, *History and Its Images: Art and the Interpretation of the Past*. New Haven: Yale University Press, 1993, p. 79.

⁹ Sir Ernest Gombrich, "Mirror and Map: Theories of Pictorial Representation," *Philosophical Transactions of the Royal Society*, CCLXX, 903, 1974, p. 122.

¹⁰ Quoted in Neil Harris, *Cultural Excursions. Marketing Appetites and Cultural Tastes in Modern America*. Chicago and London: University of Chicago Press, 1993, p. 312.

pictorially, will scarcely be likely to do any original thinking."¹¹ Harris has attributed to the lingering echo of these old debates some of the reluctance of his colleagues, contemporary intellectual historians, to engage themselves in the analysis of the impact of the "halftone revolution." Much as Rudwick had suggested in respect to historians of science, intellectual historians, "[a]s students of the word, with a large investment in careful verbal analysis... have tended to deprecate surrogates thrown up the Industrial Revolution, surrogates that threatened the primacy of printed communication and menaced the very concept of authenticity itself."¹²

Art historians, on the other hand, have never been reluctant to engage the image. From their researches and new multidisciplinary studies have come some of the freshest insights into the significance of the image and its role in the history of thought. In 1938, William Ivins asserted that "sight has today become the principal avenue of the sensuous awarenesses upon which systematic thought about nature is based."¹³ His understanding of the role of visual images in the creation of science has now been amplified by a number of writers. Eugene Ferguson contends that to understand the development of Western technology, we must appreciate nonverbal thinking. The heavily illustrated codices of the fifteenth and sixteenth centuries relied on illustrations, not text, to transmit knowledge about mechanical and technological processes and machinery. The encyclopedists of the eighteenth century also recognized the value of illustrations when recording the work of the ateliers of France. Despite a tradition of pictorial representation in engineering history, Ferguson, like Rudwick,

¹¹ Harris, *Cultural Excursions*, p. 313.

¹² Harris, *Cultural Excursions*, p. 308.

¹³ William M. Ivins, *On the Rationalization of Sight, with an examination of the Renaissance texts on perspective*. New York: Metropolitan Museum of Art Papers No. 8, 1938, p. 13.

acknowledges that "Because perceptive processes are not assumed to entail 'hard thinking,' it has been customary to consider nonverbal thought among the more primitive stages in the development of cognitive processes and inferior to verbal and mathematical thought."¹⁴ Historians of science, like Robert Scott Root-Bernstein and Michael Lynch, are also beginning to examine the role of representation in the genesis of scientific thinking. Root-Bernstein's work with scientists has suggested to him that "One thing seems certain. Most eminent scientists agree that nonverbal forms of thought are much more important to their work than verbal ones."¹⁵ Lynch observes that in the development of scientific ideas, "In many cases there is no way to compare a representation of a biological phenomenon to the 'real' thing, since the thing becomes coherently visible only as a function of the representational work."¹⁶ Thus, not only do scientists think in pictures, in some cases their thinking must take the form of a picture before it can be understood and communicated at all. (See the discussion on Robert Hooke's *Micrographia* in the preceding chapter notes.)

This apprehension of the significance of pictorial representation in science is important for the understanding of contemporary theories in the visualization of complex data. Edward Tufte has explored in a number of works the problems of envisioning information. He observes that "All communication between the readers of an image and the makers of an image must now take place on a two-dimensional surface. Escaping this flatland is the essential task of envisioning information – for all the interesting worlds (physical, biological,

¹⁴ Eugene S. Ferguson, "The Mind's Eye: Nonverbal Thought in Technology", *Science*, Vol. 197, no. 4306, 26 August, 1977, p. 834.

¹⁵ Robert S. Root-Bernstein, "Visual Thinking: The Art of Imagining Reality," *The Visual Arts and Sciences: Transactions of the American Philosophical Society*, 75, Pt. 6, 1985, 50-67, p. 53.

¹⁶ Michael Lynch, "Science in the Age of Mechanical Reproduction: Moral and Epistemic Relations between Diagrams and Photographs," *Biology and Philosophy*, 6, 2, April 1991, p. 208.

imaginar ; human) that we seek to understand are multivariate in nature."¹⁷

Tufte has examined primarily the graphic representation of three-dimensional space (maps) and time (schedules, astronomical observations) in two-dimensional media, but he acknowledges that new technologies give rise to new possibilities of representation. Scientific visualization using digital media ("computer vision") makes possible the representation in three or more dimensions of complex data. Ulrich Lang and Michel Grave suggest that the increase in available data necessitates new methods of perception:

The amount of scientific data produced by different sources is dramatically increasing. The large amounts of data are not an aim in itself, the aim is to get insight into the behaviour of systems, to predict future developments or to control and influence them. Together with the increase in data volume, the need for better tools to get insight into the data rises too. A major means to get insight is to visualize the data.¹⁸

The type of data to which Ulrich and Graves refer ranges from that describing complex flow systems to financial forecasting. Current visualization programmes take advantage of "the broad bandwidth of the human sensory system" and use graphical displays to map complex and rapidly changing inputs such as world exchange rates. These new methods of displaying data acknowledge the primacy of vision:

Since vision dominates our sensory input, strong efforts have been made to bring the power of mathematical abstraction and modeling to our eyes through the medium of computer graphics.¹⁹

¹⁷ Edward R. Tufte, *Envisioning Information*. Cheshire, Conn.: Graphics Press, 1990, p. 13.

¹⁸ Ulrich Lang and Michel Grave. "Data Structures in Scientific Visualization," in H. Hagen et al., *Focus on Scientific Visualization*. Berlin: Springer-Verlag, 1993, p. 85.

¹⁹ Hagen et al., *Focus on Scientific Visualization*, Preface, p. v.

It is the art historian Barbara Stafford, however, with her interests in the conjunction of representation and knowledge, who has understood the historical significance of this new kind of vision. For her the advent and widespread use of electronic media with its graphical interfaces and easy access to imagery marks a renaissance of "visual aptitude," eclipsed in the modern era. She too acknowledges the scant attention paid to the "mind-shaping powers of ocular, kinesthetic, and auditory skills... scarcely articulated in the tale of Western civilization's turn to the cultivation of the interior..." The rediscovery of visualization is for her at the core of a new understanding of the history of science and art:

Uncovering this lost epistemological dimension of the informed and performative gaze, and with it the complex interface of early modern nature and artifice revealed in moments of enlightening recreation, seems all the more important in our computer era. Now old intellectual traditions based on crayons, loose-leaf paper, and paste are also being replaced by playful high-tech tools and visually appealing programs. The rise of electronic media casts print culture, as well as the histories of art and science on which these disciplines are grounded, in sharp relief.²⁰

She goes on to advocate a new approach to the study of pictorial representation:

We need, therefore, to get beyond the artificial dichotomy presently entrenched in our society between higher cognitive function and the supposedly merely physical manufacture of "pretty pictures." In the integrated (not just interdisciplinary) research of the future, the traditional fields studying the development and techniques of representation will have to merge with the ongoing inquiry into visualization. In light of the present electronic upheaval, the historical understanding of images must form part of a continuum looking at the production, function, and meaning of every kind of design.²¹

²⁰ Barbara Maria Stafford, *Artful Science. Enlightenment Entertainment and the Eclipse of Visual Education*. Cambridge, MA: M.I.T. Press, 1994, p. xxii.

²¹ Stafford, *Artful Science*, p. xxv.

This current inquiry, then, is a partial and preliminary attempt to come to grips with an integrated study of images in light of new thinking about the importance of the visual in the creation of understanding of phenomena. The examination of this set of images has led to the revelation of three different aspects of the study of representation which demand comment.

Chronology

Martin Rudwick, in another work in the history of science, *The Great Devonian Controversy*, points out the importance of strict chronology:

If scientific knowledge is to be studied *in the making*, the closest attention must be paid to strict chronology, not only in description but also in analysis.

...
The risk is that the description and analysis may be irreparably distorted by the historian's or the reader's knowledge of the outcome of the episode or the "correct" solution of the controversy. Narrative in the service of understanding the shaping of knowledge must rigorously and self-consciously avoid hindsight.²²

Just as visual thinking has been seen as a more "primitive," or less precise, version of verbal thought, so have images been used by historians in a far less rigorous manner than texts. Images have been treated as "illustrative material," added to text more often for decoration than for illumination. This tendency has been compounded by the practice of museums which tend to arrange material in only vague chronologies, positioning works for aesthetic resonance

²² Martin Rudwick, *The Great Devonian Controversy. The Shaping of Scientific Knowledge among Gentlemen Specialists*. Chicago: University of Chicago Press, 1985, pp 11-12.

rather than intellectual coherence.²³ Rudwick's understanding of strict chronology means that images, as well as texts, must be seen in relation to their position in time. History, after all, is concerned with what went before and what came after. Rudwick, like Foucault, however, warns against the tendency to see outcomes, to posit directional relationships on the material. This is a strong temptation when examining naturalistic representation, since with hindsight we ask, why is this image distorted? When do artists learn how to paint what is actually there, what we see? These were the questions with which this thesis began, and part of the work in this discourse has been to attempt to understand the image in its own context. David Knight more than once observes that

There is no proper way of drawing any animal, and two excellent pictures of the same creature may look very different... We do not therefore simply find progress in zoological illustrations... Indeed to approach the history of zoology through illustration, is a ready way of dropping the idea of science as cumulative progress to indubitable truth based upon some "scientific method."²⁴

An appreciation of chronology, of sequence, has informed this work. By placing all images in the correct order, certain patterns have become visible. In some cases these patterns allow us to make hypotheses about broad discontinuities or displacements of one system of thought by another. Thus, we can see that the use of emblematic animals as signs or marks of countries disappears, but at the same time the animal as mark becomes transmuted to what Ford has called the "reference image," the way the animal looks as the definition of itself. What is significant about these reference images is their longevity. As

²³ A prime example of this practice is the order of works in A.M. Lysaght's catalogue, *The Book of Birds*, London: Phaidon Press, 1975, which mixes periods, styles, and cultures with no discernible order.

²⁴ David Knight, *Zoological Illustration. An essay towards a history of printed zoological pictures*. Folkestone, Eng.: Dawson Archon Books, 1977, p. 39.

Foucault has noted, "the same, the repetition, and the uninterrupted are no less problematic than the ruptures."²⁵

What can we understand about the repeated use over time of a particular image? Dürer's drawing and woodblock print of the rhinoceros is so convincing that it becomes accepted as an image of the real thing. It is satisfying as a work of art and its value as accurate portrayal was likely enhanced by Dürer's reputation as a painter of animals and plants. In addition the original cut is accompanied by text, sometimes reproduced in subsequent re-engravings, but often omitted, that adds the veracity of words to the image. Not only does the animal look like this, it looks like its description says it should look. For both Dürer and his audience, then, there was no dissonance between the pictorial image of the rhinoceros and the rhinoceros itself. This reference image fixed for over two-and-a-half centuries how the rhinoceros should look. What does this repetition of image, this fixity of representation, imply for the understanding of the making of scientific knowledge? Elizabeth Eisenstein has maintained that typographical fixity was "a basic requirement for the rapid advancement of learning,"²⁶ since errors could be corrected in subsequent editions. While this may well apply to text, and she maintains it applies as well to images, such as the cuts for Vesalius' second edition, we should not ignore the lesson of Dürer's rhinoceros. The typographic fixity of the image has become an iconographical fixity; in the age of Linnæus, the Renaissance rhinoceros with the "hornlet" remains an emblem of a species.

²⁵ Michel Foucault, *The Archaeology of Knowledge*, transl. by A.M. Sheridan Smith. London: Tavistock Publications, 1972, p. 174.

²⁶ E. Eisenstein, *The Printing Press as an Agent of Change. Communication and cultural transformations in early modern Europe*. Cambridge: Cambridge University Press, 1979, p. 113.

Dürer's representation of the rhinoceros agreed with its textual description, but we have seen how the Hennepin reference image of Niagara first issued in 1697, became the iconographic template for "eye-witness" description until well into the nineteenth century. The rupture between text and image requires further exploration. J.A. Lohne has examined with care "The Increasing Corruption of Newton's Diagrams." Despite the fact that Newton himself executed the original drawings which documented his experiments with care, in the manner expected of members of the Royal Society, the artists and editors who prepared the printed texts paid less than adequate attention to their reproduction. As a result, Lohne points out that once engraved, the diagrams were seen as reference images, reused in subsequent editions without correction, even though "their diagrams [are] often violating fundamental optical laws."²⁷ John Levene examines several editions of Descartes' *La dioptrique*, noting that the image reproduced in "modern ophthalmic literature" is incorrect, being reproduced from an 1824 French edition with a diagram which distorts the original and correct engraving prepared under Descartes' supervision.²⁸ Root-Bernstein has observed that "visual and other nonverbal forms of thinking proffer to philosophers vast wildernesses in need of exploration,"²⁹ and it is obvious as well that conclusions drawn about the importance of typographical fixity by an examination of text alone must be revised.

²⁷ J.A. Lohne, "The increasing corruption of Newton's diagrams," *History of Science*, 6, 1967, p. 72.

²⁸ John Levene, "Sources of confusion in Descartes's illustrations, with reference to the history of contact lenses," *History of Science*, 6, 1967, pp 91-2.

²⁹ Root-Bernstein, "Visual Thinking," p. 62.

Dominant Purpose

If hindsight is to be avoided in examining the role of the image, even more important is to examine what Gombrich calls the dominant purpose of the image:

...the great variety of styles we encounter in the images of past and present civilizations cannot be assessed and interpreted without a clear understanding of the dominant purpose they are intended to serve. It is the neglect of this dimension which has suggested to some critics that the range of representational styles must somehow reflect a variety of ways in which the world is seen. There is only one step from this assumption to the assertion of a complete cultural relativism which denies that there are standards of accuracy in visual representation because it is all a matter of convention.³⁰

The issue of dominant purpose becomes extremely significant when examining the use of naturalistic representations. How else to explain in the age of Ligozzi the appearance of the su and the simivulpa? Martin Kemp has also explored the intersection between natural history and art and points out the utter dependence of the viewer of an image on "prior knowledge, automatic expectation, illustrative technique, emotional context and the given framework of verbal information, if we are able to read an image in a meaningful way."³¹ Comparing the exquisite watercolour portrait of a mandrake plant by Ligozzi, with an engraving of the same plant "humanized" by Abraham Bosse, Kemp observes that

Bosse was not simply being stupid. His representation was locked into a system of beliefs in which form and meaning might be regarded as inseparable – a system in which accidental configurations of mandragora

³⁰ Gombrich, "Mirror and Map," p. 130.

³¹ Kemp, "Taking it on trust," p. 128.

roots could indeed act as an effective talisman, with or without the assistance of a human sculptor.³²

It was not that Bosse did not know how mandrakes looked in the wild, or that he could not, if he turned his hand to it, execute a competent engraving of the plant (the flowers and leaves are lifelike), it was that the representation of the plant as a portrait was not his purpose, as it had been Ligozzi's. Accuracy in naturalistic representation might be subordinated to concern for style, for viewer's expectations, or, as in de Bry's case in some of the engravings in *America*, with a concern to show "all the facts" in a single composite image.

It is at this interface between purpose and representation that one can begin to explore the notion of what Foucault has referred to as "savoir," not what is known but the domain in which knowing takes place. Style is in effect a reflection of savoir. How the artist depicts information, how the data are configured visually, is intimately related not simply to the content, but to the ability to control and direct the content. To "know how" is to obtain mastery and in the field of visual representation (and one suspects in text), savoir is linked to the ascription of meaning. I have configured the information in this way because it has meaning for me. Thus, the New World resembles a deer park because not only is it a familiar and recognizable image, but it is also an expression of order and mastery. Similarly, Davies and Edwards can turn waterfalls and birds into specimen portraits because classification is a means of knowing the order of the universe. Edwards in his petition to God does not want to gain more information (connaissance); rather he wants to lose all desire for natural history, so that he "may become an intelligent spirit" which may "see and know how the parts of the great Universe are connected with each

³² Kemp, "Taking it on trust," p. 129.

other..."³³ In the material history analysis of the image, then, style is not simply the external shell under which true meaning is hidden; it is in itself redolent with the artist's understanding of meaning.³⁴ Understanding and analyzing style in images is as significant for an understanding of "the making of science" as close reading of text.

Context

Context means "with text," and the final aspect which requires some comment in conclusion is that of the contextual appearance of the images examined. Modern methods of reproduction – the "halftone revolution" – have made it difficult for contemporary viewers and readers to appreciate the importance of the context in which the image is physically presented. Elizabeth Eisenstein commented on the rupture between text and image which occurred when hand-illuminated manuscripts were replaced by printed volumes. With rare exception, the text and image no longer interpenetrated one another, supporting and informing each other. The "copper-plate revolution" completed this rupture, making it simpler to print letterpress separately from image, and one has only to think of perhaps the greatest illustrated book of the nineteenth century, Audubon's *The Birds of America*, which was published without text (the text was printed later as a separate volume), to realize how far the rift had widened. Too often, images are examined by scholars bereft of their context. I have tried, whenever

³³ *Some Memoirs of the Life and Works of George Edwards, Fellow of the Royal and Antiquarian Societies*. London: Printed for J. Robson, Bookseller, 1776, p. 14.

³⁴ Jules Prown writes in "The Truth of Material Culture," that "Because underlying cultural assumptions and beliefs are taken for granted or repressed, they are not visible in what a society says, or does, or makes – its self-conscious expressions. They are, however, detectable in the way things are said, or done, or made – that is, in their style. The analysis of style, I believe, is one key to cultural understanding." From Lubar and Kingery, eds. *History from Things*, p. 4.

possible, to examine an original edition, or at least a facsimile reproduction, so that I was able to understand the often complex relationship between text and image. The repetition of images by de Bry is as significant for what it has to tell us about the reader's demand for veracity as for what it says about the publisher's economies. Most artists and engravers did not expect to see their images stand alone and they worked to the demands of author and publisher. Ehret's watercolours are what they are because they are used to illustrate a particular kind of text. Even where no printed text exists, as in the Newfoundland watercolours, Ehret insured that his images corresponded not only to the dried plant fixed on the sheet but to the herbarium notes. These works, then, cannot be seen, though they often are, as "works of art" that answer to an inner aesthetic of the artist. As pleasing to the eye as they may be, these images answer to the needs of the context in which they were created, a context of words, specimens and specialized understanding. Even Pierre Desceliers, whose manuscript map was destined to decorate the wall of a princely chamber, attended to the details of context, placing, as did the other cartographers studied by Wilma George, the correct animals on his map.

Those who would study images as evidence must also be conscious of the artifacts of reproduction, or what Peter Taylor and Ann Blum call printing features: "We would argue that 'printing features' are not separable from the meanings of graphic representation."³⁵ Looking at images reproduced in modern books as black-and-white halftones destroys preceptions of scale, texture, and colour. There is something truly amazing in turning the leaves of a book the size of Postels' *Illustrationes Algarum in itinere circa orbem jussu imperatoris Nicolai I.* Its very massiveness (69.0 cm in height) forces one to

³⁵ Peter J. Taylor and Ann S. Blum. "Pictorial Representation in Biology," *Biology and Philosophy*, 6, 2, April 1991, p. 130.

confront the issue of the use of these books, the readership, the whole economy which supported publications of this nature. By contrast, handling the sketchbooks of George Back which survived the vicissitudes of his arctic journeys, provides information about the way in which the artist saw the landscape and its inhabitants and the way in which he composed it to give it personal meaning. Similarly, the "feel" of old paper, the observation of how the ink sets on it, or the way in which colour either sinks into or stands up on the page are important considerations in making sense of the complex interrelationship between the technology of printing and the nature of representation. What is possible as a watercolour has not always been possible in print, as George Edwards found to his dismay. Finally, we have noted that colour, for so many centuries achieved with such great pains, is not a trivial matter. Problems of accurate colour reproduction plagued artists like de Passe, Merian, Catesby, and Edwards, and the whole history of the colouring trade, which involved large numbers of women and young children, has been relatively little explored. Understanding the presence or lack of colour, then, means being aware of the social and economic conditions of the time and the purposes of the artist or author.

Cognitive Anchorage

Given some of the difficulties in studying images noted above, why should the analysis of representation form part of historical enquiry? Doesn't the analysis of text supercede the analysis of image, since text is often the descriptor and interpreter of the image? While acknowledging that the examination of visual representation is a neglected part of historical discourse, is there a need to privilege images for special consideration? I would like to suggest, as some of

those cited above have observed, that visual thinking is of a different order from verbal thinking, and that the understanding of representation is an entrée to an understanding of a different order. What is the function of the image in thought and more particularly, in scientific thought? While this thesis cannot presume to examine this question in a more than cursory way, there are certain indications that images have a unique function in the creation of knowledge.

It has long been acknowledged, particularly by those examining the work of scientists, that diagrams, doodlings, visual symbols and the like have an important function in the creative process. In a discussion on the eliminability of scientific diagrams, James Griesemer poses the question: "But are diagrams mere scaffolding to express ideas as conveniently as possible or are they fundamental to the practice of science?"³⁶ He answers his own question by suggesting that while diagrams which have been used to formulate concepts might be thrown away once the concept itself is reformulated in sentences, "even if diagrams are logically eliminable in a formal reductionist sense they can nevertheless be heuristic in a strong sense as well."³⁷ The idea of representation as heuristic returns us to Hooke and *Micrographia* and to Edwards. The thing must be seen before it can be known.

This sense that representation permits interpretation is part of Michael Lynch's careful analysis of the relationship between diagrams, photographs and digital imagery in science,³⁸ and the foundation of the notion that visualization of complex data not only provides understanding but also mastery. While more

³⁶ James R. Griesemer, "Must Scientific Diagrams be Elimenable? The Case of Path Analysis," *Biology and Philosophy*, 6, 2, April 1991, p. 156.

³⁷ Griesemer, "Must Scientific Diagrams be Elimenable?," p. 161.

³⁸ Michael Lynch, "Science in the Age of Mechanical Reproduction: Moral and Epistemic Relations between Diagrams and Photographs," *Biology and Philosophy*, 6, 2, April 1991, 205-226.

work needs to be done, it is tempting to postulate that the use of images as information occurs at points when the data is too complex for simple verbal transcription. How was de Bry to explain in words the actual appearance of the New World? What fixed images could European readers use to understand the appearance of corn, sunflowers, turkeys or native peoples? Only by representing the manuscript drawings of eye-witness observers could de Bry hope to convey the true strangeness, the otherness of America. For the early scientific botanists, who had no verbal agreement on the definition of sepal, pericarp or stamen, the representation was the necessary condition for knowledge about the plant and its uses. By encoding complex data in visualizations, scientists are able to record new knowledge in such a way that incremental discovery can be grafted easily to the base of the known. Thus, Hunter and his colleagues take Stubbs' painting with them in their first essay into comparative anatomy of the moose. The heroic enterprise of eighteenth century science, which Bernard Smith describes, consisted primarily in making a visual record of the known world. Once the record was mostly complete, new ways of looking at the world, such as the theoretical approaches of Humboldt, could be developed on a firm foundation of visualized understanding. Sir Ernest Gombrich refers to our consistent perception of the visual world as "the cognitive anchorage we need in our effort after meaning."³⁹ I would like to suggest that the image, the visual representation of the thing, is indeed at the foundation of much of our cognition of the world. Vision is our primary sense, and it is through visual apprehension that we attempt to comprehend the order of things. To make sense of the ways in which knowledge has been formed and reformed, the examination of its visualization over time is worthy of study.

³⁹ Gombrich, "Mirror and Map," p. 142.

THE PLATES

PLATE ONE

George Edwards
(1694-1773)

The Bittern from Hudson's-Bay

1748

Etching, hand-coloured

26.5 x 31.0 cm (sight)

Inscription: *The Bittern from Hudsons Bay Geo Edwards 1748*

From George Edwards, *A Natural History of Uncommon Birds*, Part III, plate 136.

Edwards received the skin of this bird from James Isham, an employee of the Hudson's Bay Company who amassed a large collection of North American bird and animal skins that he shared with British collectors and with Edwards.

Collection of the author.

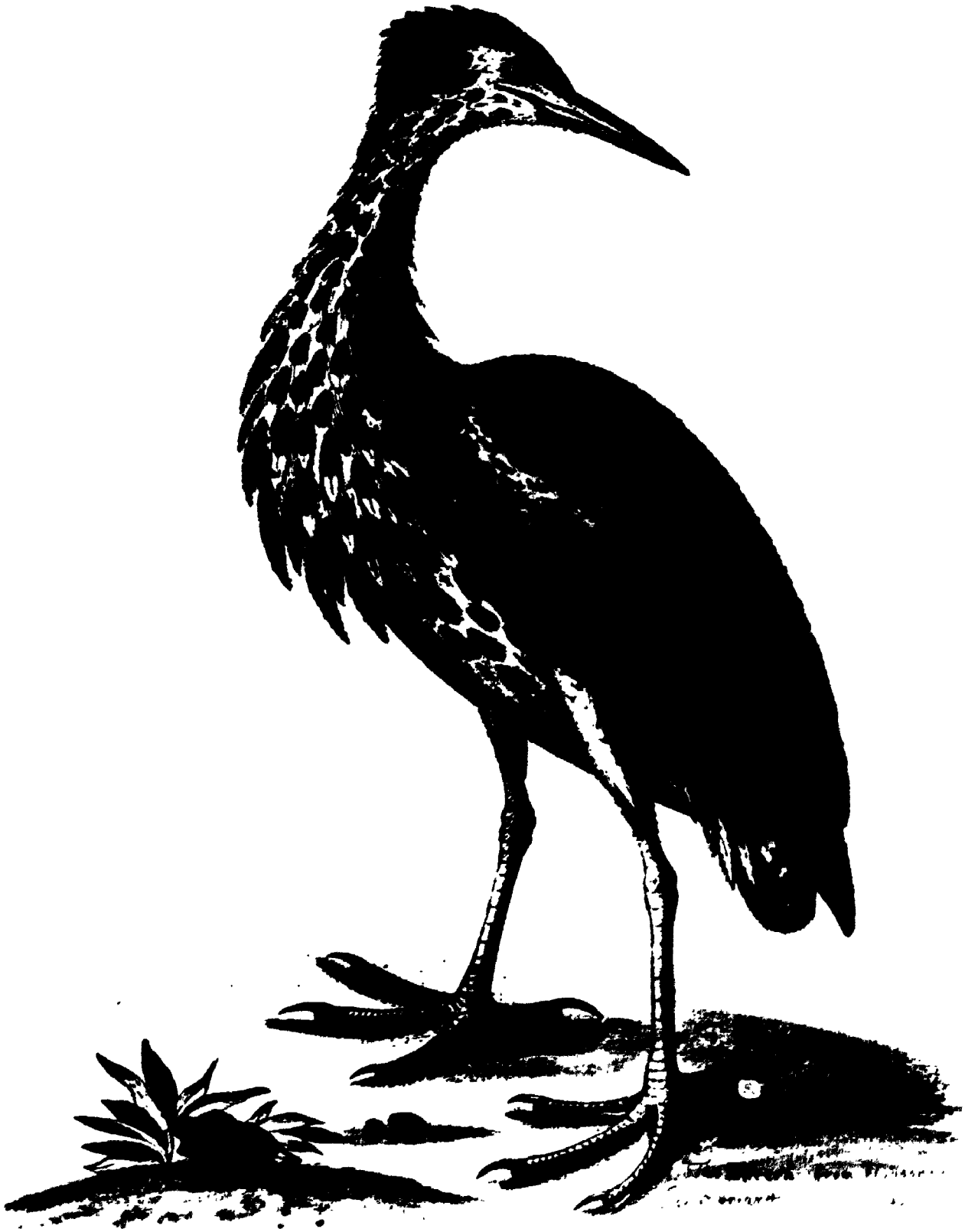


PLATE TWO

Insula hyspana

Woodcut

1493

From Christopher Columbus, *De Insulis Inventis* ("The Columbus Letter").-

The typical generic landscape of this woodcut was to be repeated many times in illustrations of the New World. Susan Danforth suggests that the illustration may have been recut from a block showing European ports.

(Plate reproduced from Susan Danforth and William H. McNeill, *Encountering the New World, 1493 to 1800*. Providence, Rhode Island: John Carter Brown Library, 1991, fig. 2.)



PLATE THREE

Pierre Desceliers
(1487-1553)

Map of North America, from a Map of the World

1546

Colour lithograph
68.0 x 85.0 cm

A nineteenth-century redrawing of the original map, taken from *Les Monuments de la géographie* by Edme François Jomard, Paris, 1854. The original is in the John Rylands University Library of Manchester, England.

Desceliers' beautifully coloured manuscript map was likely executed as a decorative wall chart, though it contained contemporary information from the voyages of Cartier and Roberval. The convention that north should appear at the top of the map had not been established firmly, and thus the map appears to modern eyes as "upside-down."

National Archives of Canada (NMC-40461)

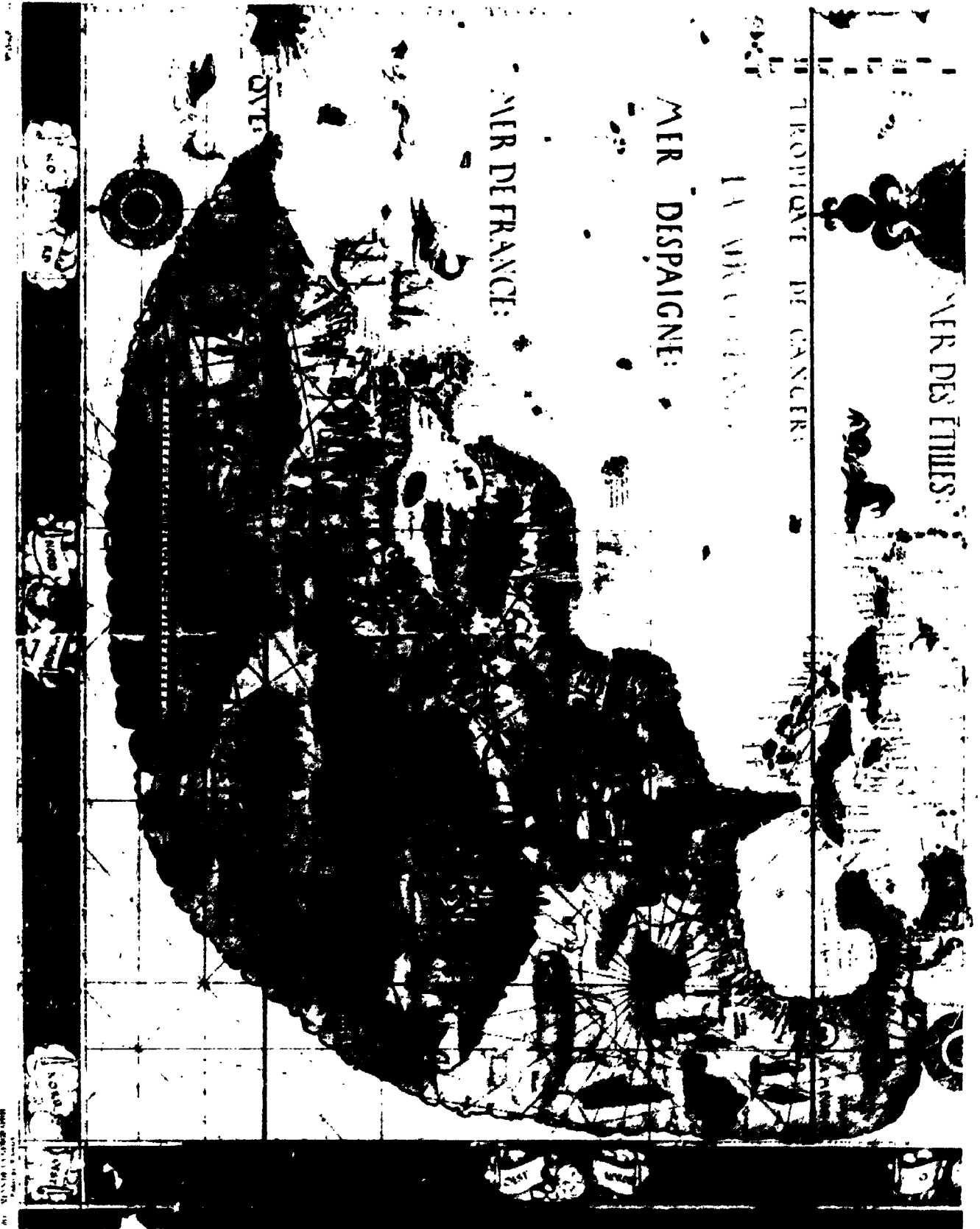


PLATE FOUR

**Giacomo Gastaldi
(c1500-c1565)**

Map of New France

1556

**Woodcut
27.0 x 37.0 cm**

From Giovanni Battista Ramusio, *Navigazioni et viaggi* (Venice, 1556).

Although appearing after Cartier's voyages, this woodcut map is based chiefly on Verrazano's voyage of 1524. This is the first of the map's two known states. The Grand Banks are depicted as a ribbon running along the eastern edge of the New World.

National Archives of Canada (NMC-52408)

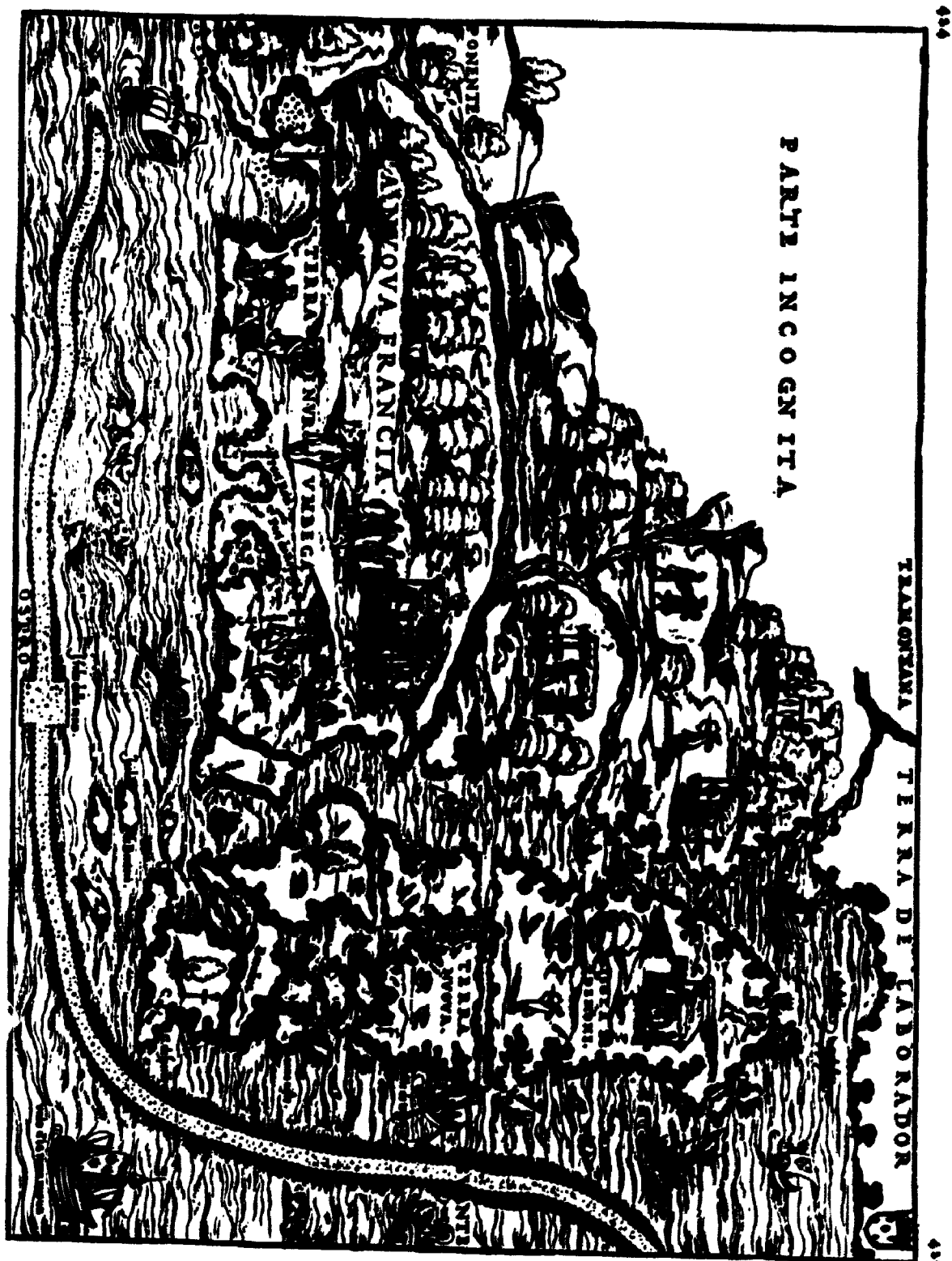


PLATE FIVE

Walrus and Calf

1633

Etching
35.0 cm

From Johannes de Laët (1593-1649), *Novus orbis, seu Descriptiones Indiae Occidentales, libri XVIII* (Leyden, 1633), p. 38.

De Laët notes that the walrus has been drawn after life, and it is likely that he saw a preserved specimen in a cabinet. The same illustration is used in the catalogue for Ole Worm's *Museum Wormianum*, published in 1655.

National Library of Canada, Rare Book Collection.

DESCRIPT. INDIAE

corum, portus *Ningam* à Lusitanis memoratur, ad quem olim sedes fixerant, quas postea deseruerunt. Septentrionale hujus Insulae promontorium vulgo *Cap S. Laurentii* appellatur, huic insula *S. Pauli* objacet, ab hoc promontorio ad Terram Novā & promontorium *S. Mariae* octuaginta trium milliariū iter à Gallis designatur. Denique ab hoc litus versus Africū se subducit & multos sinus & stationes aperit, ignobiles fere & solis nominibus notas, hęc hic recensere supervacuū puto, ne lectori tardium adferant.

CAP. VI.

Minores aliquot insulae per Fretum S. Laurentii sparsae.

DUAE insulae, de quibus jam diximus, objectu suo veluti concludunt mediterraneum æquor sive sinum quem *S. Laurentii* nomine celebrant: in quem Oceanus per tres diversas fauces irrumpit, quarum medix satis latæ, inter duo promontoria *S. Laurentii* & *de Røye*, extremæ angustiores sunt; quibus dictæ insulae utrimque à Continenti separantur. Æquor hoc triquetrum est formæ, illiusque basis, ut ita dicam, ab uno Novæ Franciæ cornu ad altitudinem sex & quadraginta graduum, ad alterum cornu vel angustiores fauces ad altitudinem quinquaginta duorum graduum, utriusque insulae prætenditur, hac enim parte longissimus est sinus: reliqua duo latera usque ad magni fluminis Canadensis ostia in conum fastigiantur; dextrum quidem recta pene linea, sinistrum vero sinuoso anfractu & cubiti in modum, premio suo aliquot insulas complectitur. Quatum una ab illis qui fretum hoc primi intrarunt *Menro* dicitur, & ob Asellorum majorum uberem capturam multum celebratur, in recentioribus tamen tabulis geographicis non designatur, nomine illo obsoleto. Viginti trium ab hac leucarum intervallo, tres minores insulae memorantur, quas ab avium copia nunc *Isles des Oiseaux*, nunc *I. des Marquaux*, Champplainis autem in tabula sua *Isles aux Tangeaux* appellat. Harum dux rupibus abruptæ & ascensu perdifficiles tanta multitudine avium obidentur ut fidem pene superet: ad altitudinem quadraginta novem graduum & x l. scrupul. ab Anglis fuerunt observatæ: ad tertiam Phocarum quoddam genus, maximo numero adnatæ solet, ignotum, ut opinor, veteribus animal, quod nostrates *Walrus*, Angli à Russis mutato nomine, *Morsh* vulgo nominant: Monstruosum est animal & amphibium; bobus nostratibus, ubi adolevit, interdum majus, cute cani marino, bucca vaccæ similes (unde & vaccæ *marinae* nomen apud quosdam meruit) nisi quod duos dentes, prominentes & ante recurvos habeat, cubiti nonnumquam longitudine, quorum usus & precium ebori comparatur: fortum supra unum aut alterum vix enititur: robustum & ferox imprimis animal, ideoque difficulter capitur & sæpius in terra, rarissime in mari. Iconem hic subjicimus ad vivum accurate expressam.



Nam hic ejusmodi bellua visa fuit anno clō lō c x i i, quam Cl. Vir *Ælus Everhardus Vorstius Medic. D. & Professor p. m.* ita descripsit. Belluam (inquit) hanc marinam vidi, magnitudine vituli, aut canis Britannici majoris, Phocæ non dissimilem;

PLATE SIX

Possibly Jean Cousin the Younger
(c1525-c1594)

Su

1558

Woodcut

From André Thevet, *Les Singularitez de la France Antartique, Autrement nommée Amerique: & de plusieurs Terres & Isles decouvertes de nostre temps* (Paris: Maurice de la Porte, 1558).

Cousin's image of Thevet's *su* was much copied, appearing as late as 1697 in Gaspar Schott's *Physica Curiosa sive Mirabilia Naturae et Artis* (3rd edition). It was one of the New World animals illustrated by Gesner, who credits Thevet for "the true image thereof."

National Library of Canada, Rare Book Collection.



PLATE SEVEN

Possibly Jean Cousin the Younger
(c1525-c1594)

Bison

1558

Woodcut

From André Thevet, *Les Singularitez de la France Antartique, Autrement nommée Amerique: & de plusieurs Terres & Isles decouvertes de nostre temps* (Paris: Maurice de la Porte, 1558).

Thevet relates that he had acquired two bison horns and had at least examined a skin. He correctly connects the North American bison with the European Wisent, something that Gesner fails to note.

National Library of Canada, Rare Book Collection.



PLATE EIGHT

Buffalo

1553

Woodcut

From Francisco López de Gómara, *Primera y segunda parte dela Historia general de las Indias* (Zaragoza, 1553).

Gómara's woodcut shows a beast with what appear to be an udder and was likely drawn from a skin. Gomara's buffalo appears on de Bry's 1595 map of Mexico with a parrot perched on its back.

(Plate reproduced from Susan Danforth and William H. McNeill, *Encountering the New World, 1493 to 1800*. Providence, Rhode Island: John Carter Brown Library, 1991, fig. 36.)



PLATE NINE***Buffalo*****1633****Etching
35.0 cm**

From Johannes de Laët (1593-1649), *Novus orbis, seu Descriptiones Indiae Occidentales, libri XVIII*, p. 56 (Leyden, 1633).

De Laët's buffalo is based on the Gómara buffalo.

National Library of Canada, Rare Book Collection.



PLATE TEN

After Martin Waldseemüller

Simivulpa, or Apish-Fox

1658

Woodcut

From Edward Topsell, *History of Four-Footed Beasts and Serpents*, Volume I. *The History of Four-footed Beasts* (London: E. Cotes, 1658).

Waldseemüller depicted the simivulpa on his woodcut *Carta Marina* of 1516. Konrad Gesner incorporated the image into his 1551 edition of *Historia animalium*, which was copied by Topsell and published in an English edition in 1658. Topsell's title page notes that his *History of Four-footed Beasts* includes "Their True and Lively Figure."

(Plate reproduced from facsimile edition of Edward Topsell, *History of Four-Footed Beasts and Serpents*, Volume I. *The History of Four-footed Beasts*. New York: repr. Da Capo Press, 1967.)

Of the *SIMIVULPA*, or *Apish-Fox*.



PLATE ELEVEN

Marcus Gheeraerts
(c1519-before 1604)

AMERICA

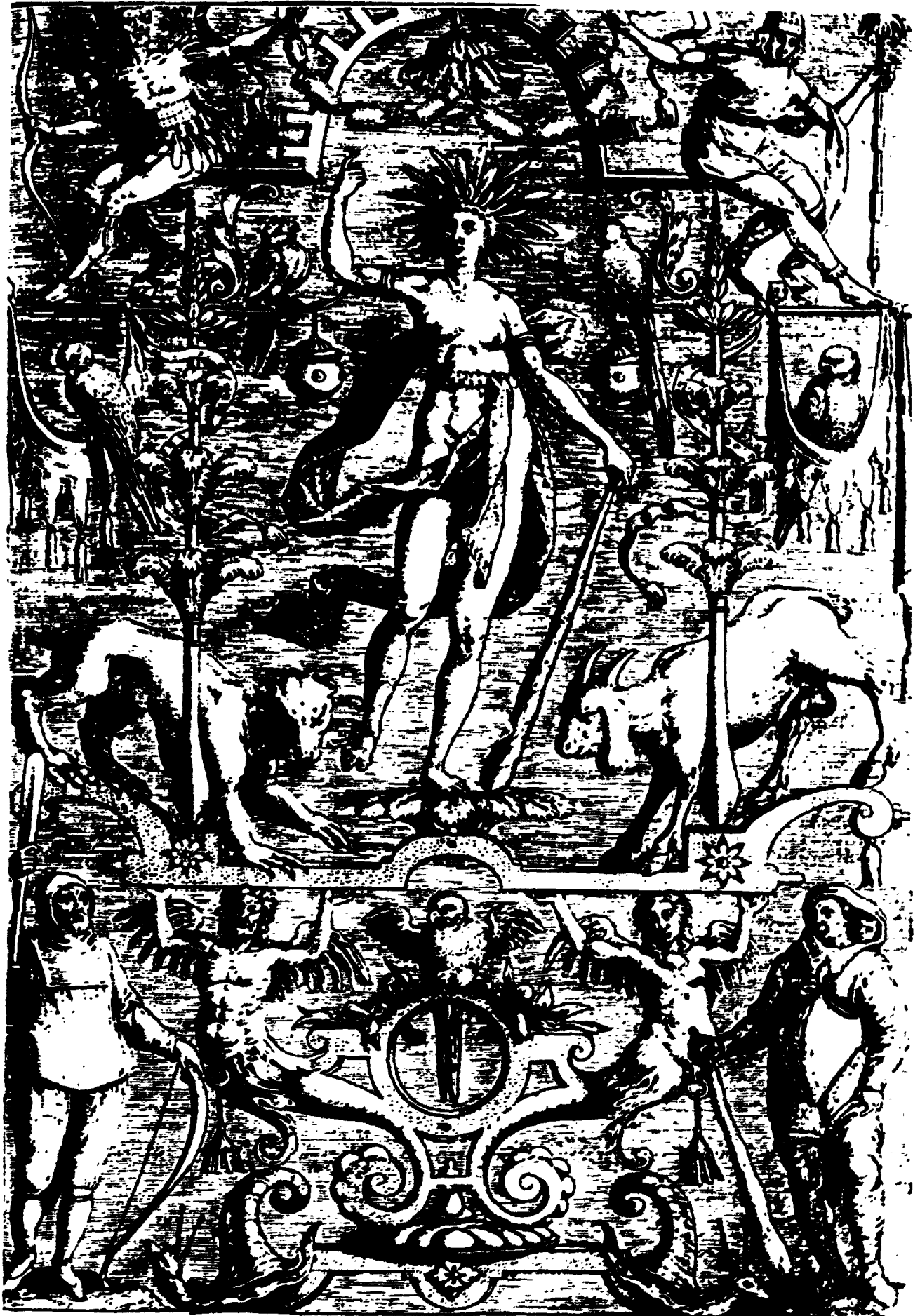
c1590-1600

Copper engraving
20.6 x 14.3 cm.

Inscription: *Marc. Gerar inuen. AMERICA Phls Galle excud.*

An allegory of America, Gheeraert's engraving (by Philipp Galle of Antwerp) shows a naked Indian woman with feathered headdress and club, flanked by four parrots and feathered staffs, and two almost heraldic beasts, on the left the simivulpa, and on the right a goat. Goats and fat-tailed sheep, native to Asia, had long been associated with the New World, in a manner similar to the way in which "Turkey" came to be used to describe New World animals and plants, things that were foreign. In Bernard von Breydenbach's *Peregrinatio in terram sanctam* (Mainz, 1486), they are also identified as *Capre de Indii*, and the confusion between the Indies makes them translatable into the New World context. In the top corner sit two native men, while in the bottom corners below America stand two Inuit, the man on the left and the woman with baby on the right. based on John White's drawings, though Hugh Honour suggests that Gheeraerts himself might have seen the Inuit in England. Another parrot and two fanciful snails complete the fauna.

(Plate reproduced from Fredi Chiapelli, *First Images of America. The Impact of the New World in the Old*. Berkeley: University of California Press, 1976.)



Marc Gerar. inven.

AMERICA

Pbt. Galle. sculp.

PLATE TWELVE

Matthæus Merian
(1593-1650)

New World Landscape

Engraving
34 cm

From Johann Theodor de Bry, *Les grands voyages*, Part XIV, p. 55 (Hanau, 1630).

Merian's malevolent landscape with exploding volcanoes, strange beasts and venomous serpents has suggested to some that the New World was part of a lesser creation, unfit for civilized habitation. In the background naked natives wander in what would be a pleasant valley were it not for the erupting volcanoes, spewing fire and brimstone. A strange single-horned beast resembling the camelopardus, but perhaps here a unicorn, stands in the background by a running cat-like animal. In the foreground is a veritable bestiary of strange creatures, including a crocodile or alligator, an armadillo, two lizard-like monsters, two snakes, a scorpion, perhaps two jaguar, what might be an opossum, and a simivulpa and a su, both likely drawn after Gesner.

(Plate reproduced from Susan Danforth and William H. McNeill, *Encountering the New World, 1493 to 1800*. Providence, Rhode Island: John Carter Brown Library, 1991, fig. 23.)



PLATE THIRTEEN

John White
(fl 1577-93)

Common Box Tortoise

c1585

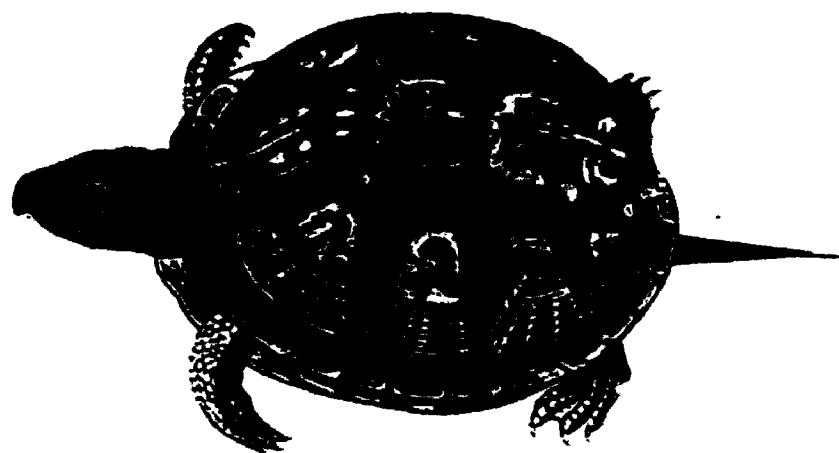
Watercolour over black lead, touched with white
14.4 x 19.7 cm

Inscription: *A land Tort wh^{ch} the Sauages esteeme above all other Torts*

Few of White's original watercolours survived the expedition's return from Virginia, but the originals and at least one set of copies appear to have had wide circulation in England. Theodor de Bry engraved over twenty of White's originals as illustrations to Thomas Harriot's account of the Virginia colony, *A briefe and true report of the new found land of Virginia*, published as the first volume of the *America* series in 1590. Mark Catesby used a number of White's original watercolour drawings, then in the collections of Sir Hans Sloane, as the basis for engravings in *The Natural History of Carolina, Florida and the Bahama Islands* (1729-47).

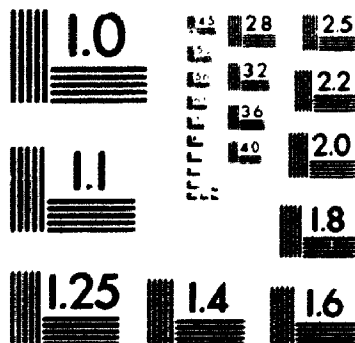
(Plate reproduced from Paul B. Hulton, *America 1585. The Complete Drawings of John White*. [Raleigh, NC]: University of North Carolina Press, 1984.)

A Land Tort wth the Scutes obtuse above & a Water Tort



4

PM-1 3 1/2"x4" PHOTOGRAPHIC MICROCOPY TARGET
NBS 1010a ANSI/ISO #2 EQUIVALENT



PRECISIONSM RESOLUTION TARGETS

PLATE FOURTEEN

Spipola altera and *Spipola alba*

1599

Copper engraving, hand-coloured
32.0 x 20.3 cm.

Inscriptions: Top - *Spipola altera cum lunco levi, item cum musca*; Bottom -
Spipola alba, siue Bouarina cum cerro Rouilij, & papilione.

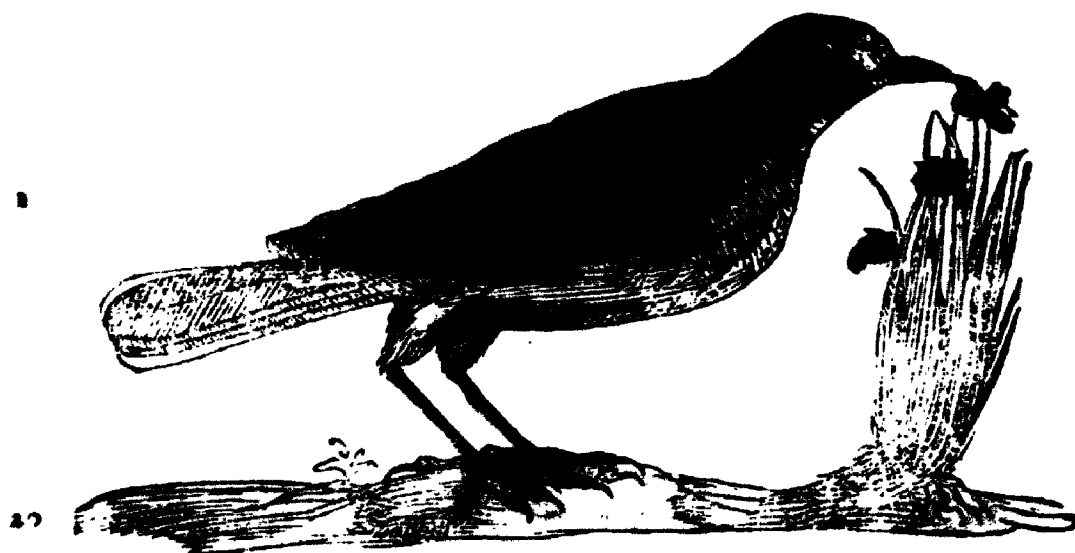
From Ulisse Aldrovandi, *Ornithologiae*, p. 731 (1599). The birds are coloured decoratively rather than naturally, and the colouring is relatively crude.

Collection of the author.

Ornithologiæ. Lib. XVII.

731

Spipola altera cum Iunco leul, item cum musca.



Spipola alba, siue Bouarina cum cerro Rouilij,
& papilione.



PLATE FIFTEEN

Albrecht Dürer
(1471-1528)

RHINOCERUS

1515

Woodcut
21.2 x 29.7 cm

The long inscription is an excerpt in Dutch from a letter Dürer received from Valentin Fernand which included a sketch of a strange animal brought from India to Lisbon. Dürer himself never saw a rhinoceros, but his became the reference image to be repeated until well into the eighteenth century.

(Plate reproduced from Jessica Rawson, *Animals in Art*, fig. 173, London: British Museum Publications, 1977.)

Int Jaer ons Heeren 1515 den eerften dach Mey, is den Coninck van Portugael tot Lifbona gebracht uyt Indien een aldusdanigen dier geheet *Rinoceru*, ende is van coleure gelijk een schilpadde met stercke schelpen bedect, ende is vande groote van eenen Oliphant, maer leger van beenen, seer sterck ende weerachtich, ende heeft eenen scherpen hoorn voor op sinen neuse, dien waer by als hy by eenige steenen comt, daer is den Oliphant doods-vyande, ende den Oliphant ontseget seer, want als dit dier den Oliphant aen comt, soo loopt hem menen hoorn tusschen de voorste beenen, ende scheurt hem alsoo den buich op, ende doots alsoo den Oliphant. Dit dier is alsoo gewapent dat hem den Oliphant niet misdoen en can, oock is seer soet, lichtvoerdich, ende daer by listich, &c. Desen voorgestelden *Rinoceru* wert van den voornoemden Coninck gesonden naer Hocheduytslant by den Keyser *Maximilian*, ende vanden hoogh-geroemden *Albertus Duerer* naer t'leven gescontereyt alinnen hier sien mach.

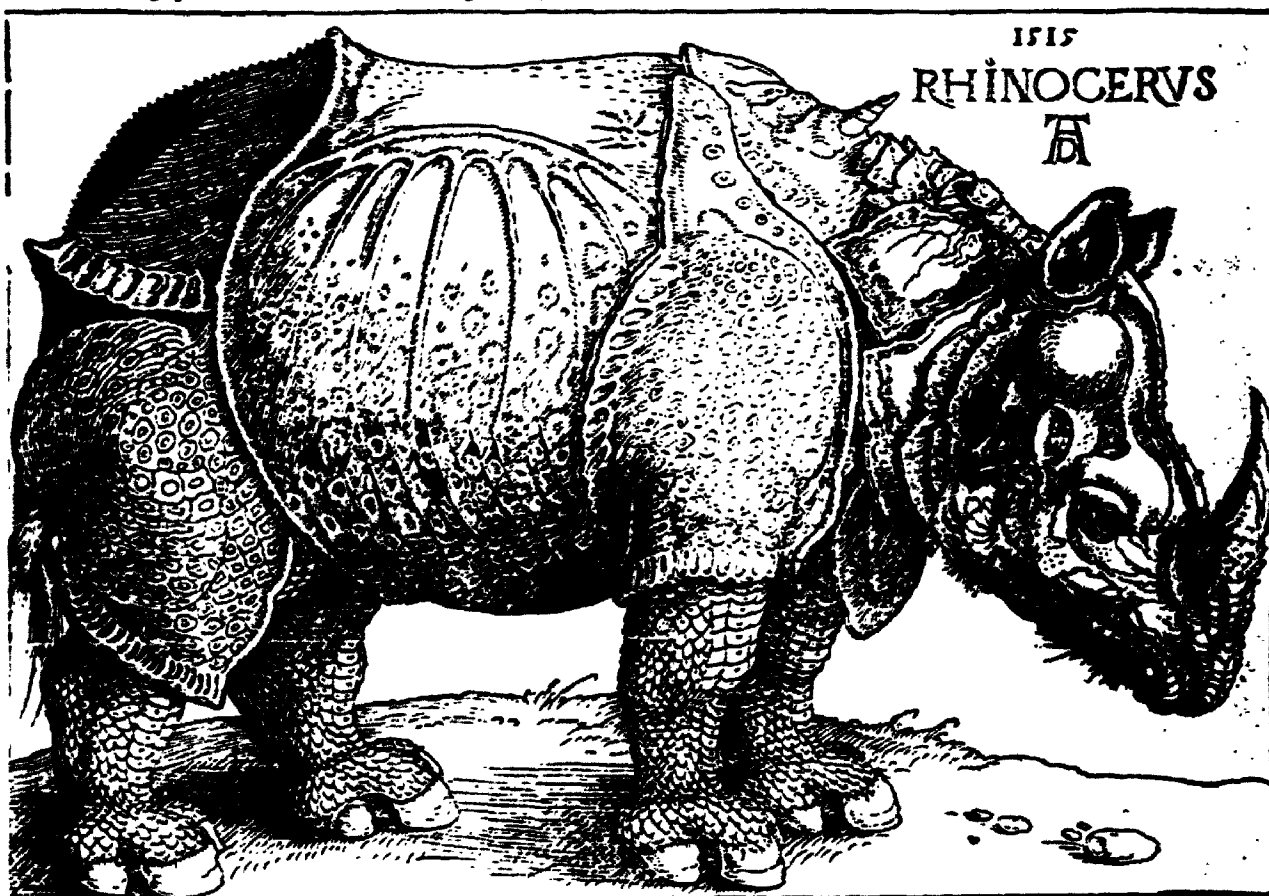


PLATE SIXTEEN

Theodor de Bry (1528-98)
after John White (fl 1577-93)

Their manner of fishynge in Virginia

1590

Copper engraving
35 cm

Plate XIII from Thomas Harriot, *A true and briefe discourse of the new found land of Virginia*, Volume One in the *America* series or *Les grands voyages*, published by Theodor de Bry (Franckfurt am Mayn, 1590).

De Bry had engraved a number of John White's drawings to accompany Harriot's work. The engravings appear in a group following the narrative in the German edition. This engraving is a double-page print with textual description on the left-hand side. De Bry revised the original drawing, incorporating non-indigenous animals into the marine view, and adding a number of weirs and additional canoes.

National Library of Canada, Rare Book Collection.



PLATE SEVENTEEN

David Pelletier
after Samuel de Champlain (1567-1635)

Map of New France

1613

Etching

From *Les voyages du Sieur de Champlain Xaintongeois*, subtitled *lournal tres-fidele des observations...* (Paris: Chez Jean Berjon, 1613).

The large-scale map is folded into the back cover of the 1613 edition. Champlain was a superb cartographer, and his manuscript map with depictions of flora and fauna was engraved by David Pelletier.

National Library of Canada, Rare Book Collection.

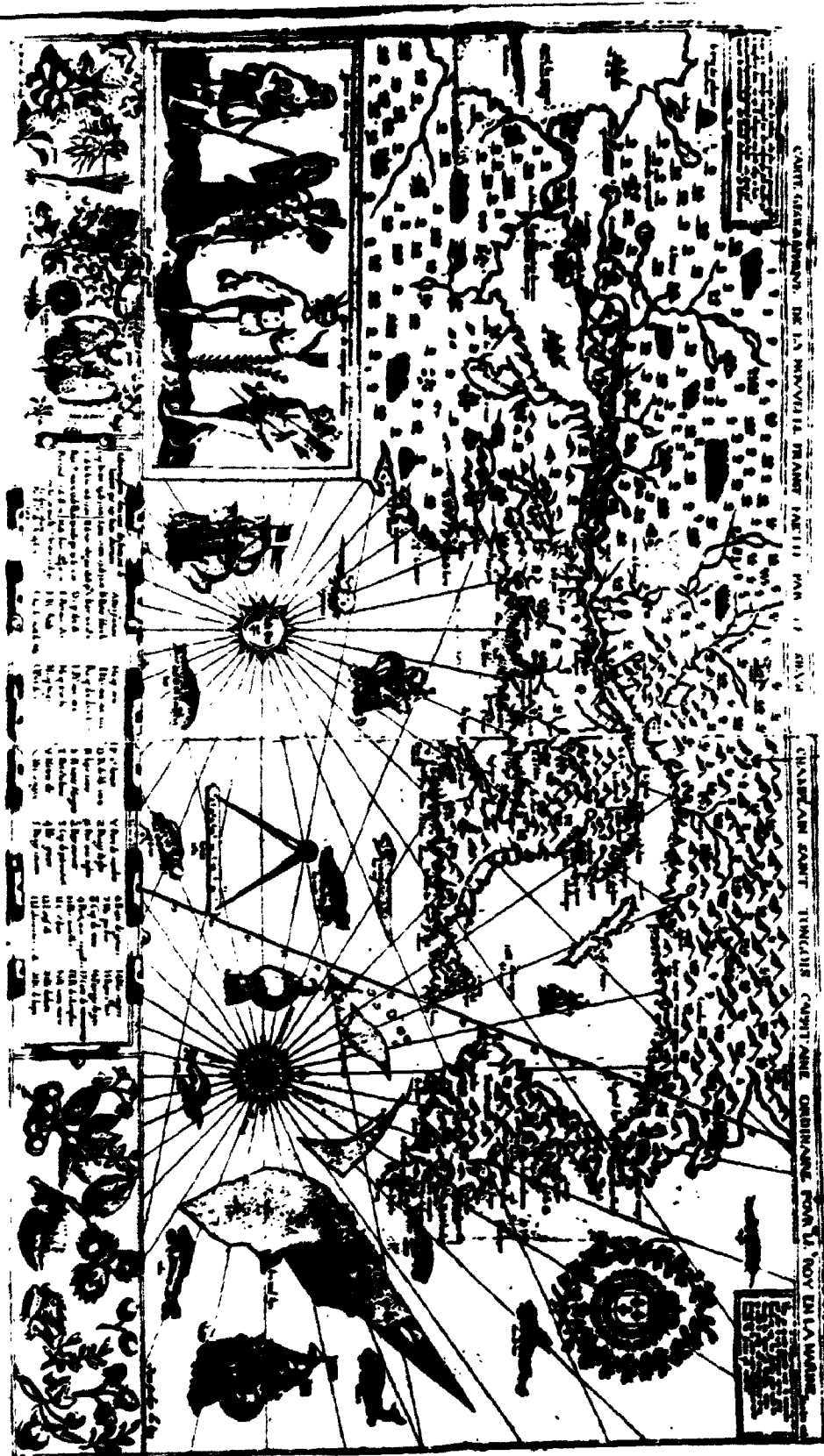


PLATE EIGHTEEN

After Samuel de Champlain
(1567-1635)

Map of New France

1632

Etching
23 cm

From *Les Voyages de la Nouvelle France occidentale, dicte Canada: Faits par le Sr. de Champlain...* (Paris, 1632).

National Library of Canada, Rare Book Collection.

PLATE NINETEEN

Theodor de Bry (1528-98)
after Jacques le Moyne de Morgues (d. 1588)

Map of Portus Regalis

1591

Copper engraving
34 cm

**Plate V from Volume Two in the *America* series or *Les grands voyages*,
published by Theodor de Bry (Franckfurt am Mayn, 1591).**

**Jacques le Moyne de Morgues was another talented artist who had actually
visited the New World. The schematic view of Portus Regalis includes stylized
pumpkins, grape vines, deer and turkies.**

National Library of Canada, Rare Book Collection.



PLATE TWENTY

Theodor de Bry (1528-98)
after Jacques le Moyne de Morgues (d. 1588)

Apalatchy

1591

Copper engraving
34 cm

Plate XLI from Volume Two in the *America* series or *Les grands voyages*, published by Theodor de Bry (Frankfurt am Main, 1591).

The cattails and milkweed (or flowering rush?) are well-realized depictions of native vegetation in the correct habitat. Le Moyne later published *Le cléf des champs*, which showed his ability as a botanical draftsman.

National Library of Canada, Rare Book Collection.

Wie sie Goldt in den Bächen/so auß XLI. dem Gebirge Apalatcy fließen/ suchen.



Die von dem Platz/ auff welchen vnser Schloß gebaut wet ge we-
sen/ sind grosse Berge/ auff Indianisch Apalatcy genannt/ auß welchen/ (gleich wie
auß der Mappen/ auff welcher die Städte vnd Plätze der Landtschafft entworfen
sind/ zu sehen ist/) drey grosse Wasser entspringen/ welche einen Sandt (vnter wel-
chem viel Goldt/ Silber vnd Kupffer ist/) mit ihnen herfür treiben. Von des wegen
machen die Indianer in solchen Bächen Gruben/ auff daß der Sandt/ mit dem Wasser auß den Ber-
gen herfür gefloßt/ von wegen seiner Schwere in die Gruben hinein falle. Denselbigen tragen sie
darnach mit fleiß herauf/ auff einen gewissen Ort. Wann sie das etlichmal gethan/ so laden sie den
Sandt in einen kleinen Weyding/ vnd führen in auff einem grossen Wasser/ welches von den Vnsern
der May genannt wirdt/ vnd fleußt in das Meer. Den Reichthumb/ welcher hier auß
entstehet/ wissen ihnen die Spanier zu dßer zeit wol nütze
zu machen.

PLATE TWENTY-ONE

Jan Swelinc (b. 1601?)
after Marc Lescarbot (1570-1642)

FIGURE DE LA TERRE NEUVE, GRANDE RIVIERE DE CANADA, ET COTES DE L'OCEAN
EN LA NOUVELLE FRANCE

1611

Copper engraving

Inscription: *Ian Swelinc fecit I Millot excudit MARCUS LESCARBOT nunc primum
delinauit, publicauit, donauit Avec privilege du Roy*

Marc Lescarbot published his *Histoire de la Nouvelle-France* in 1609. The small inset shows corn plants in rows, ears of corn and grape vines. The profusion of wild grapes in northeastern North America has been commented upon since the Viking voyages. Even today, grape vines clamber over trees and shrubs throughout the area.

National Archives of Canada.

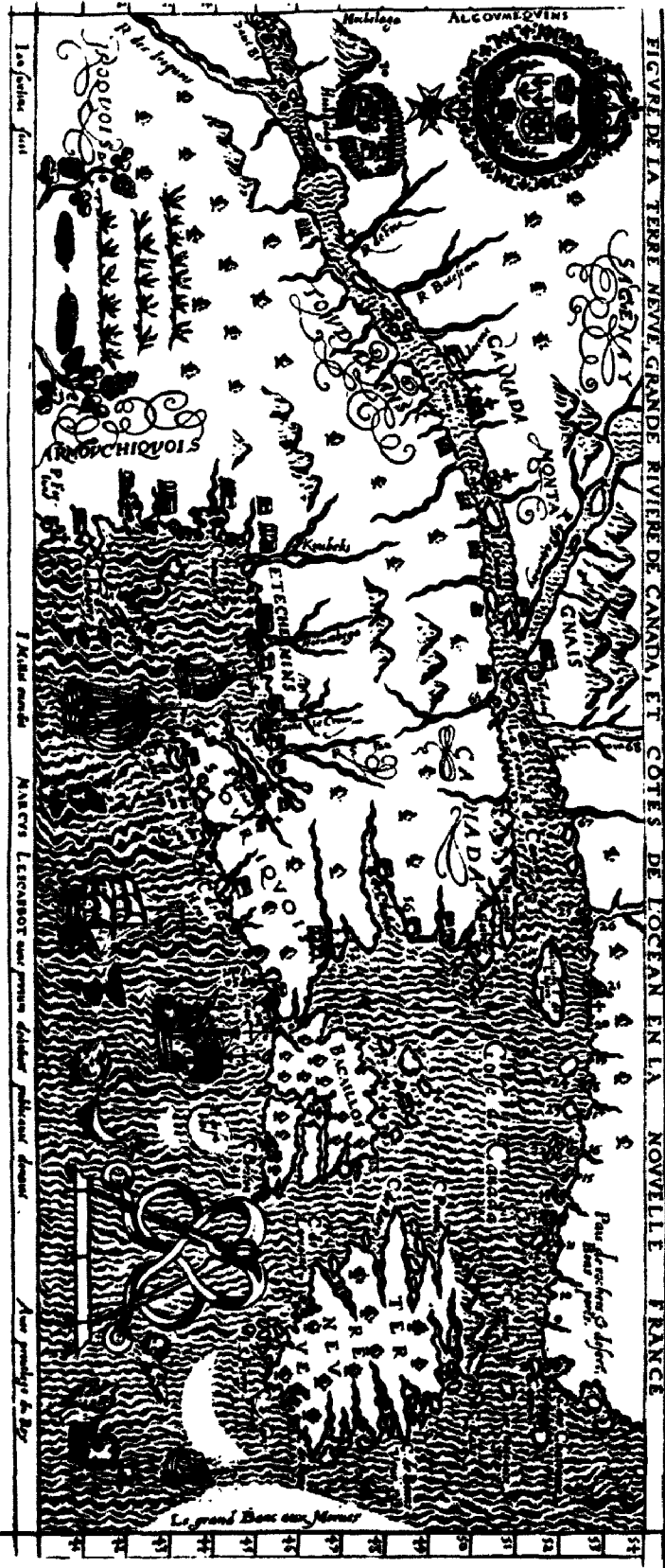


PLATE TWENTY-TWO

Edera trifolia canadensis

1635

Etching

24.0 cm

From Jacques Philippe Cornut (c1606-1651), *Canadensium Plantarum aliarumque nondum editarum Historia*...., plate XL, p. 97 (Paris, 1635).

Poison ivy (*Toxicodendron radicans*) continues to be a scourge for travellers in the woods of eastern Canada. The crushed root was, however, applied by the native peoples as a poultice for skin disease and it is also reported that an eighteenth-century French physician used the plant in the treatment of skin infection.

Plant Research Library CLBRR, Agriculture Canada, Ottawa.

Canadensium Plant. Historia. 97
EDERA TRIFOLIATA CANADENSIS.



PLATE TWENTY-THREE

Solanum triphyllum canadense

1635

Etching
24.0 cm

From Jacques Philippe Cornut (c1606-1651), *Canadensium Plantarum aliarumque nondum editarum Historia....*, p. 167 (Paris, 1635).

The etching of the trillium (*Trillium grandiflorum*) shows clearly the bulbous root. The leaves of trillium are recorded as edible.

Plant Research Library CLBRR, Agriculture Canada, Ottawa.

Canadensium Plant. Historia. 167
SOLANVM TRIPHYLLVM CANADENSE.



PLATE TWENTY-FOUR**Ear of Corn****1606****Woodcut**

From Giovanni Battista Ramusio, *Terzo Volume delle Navigazioni et viaggi* (Venice, 1606).

Corn or maize was known as "Turkey wheat," and was in widespread use in southern Europe by the sixteenth century.

(Plate reproduced from Susan Danforth and William H. McNeill, *Encountering the New World, 1493 to 1800*. Providence, Rhode Island: John Carter Brown Library, 1991, fig. 35.)

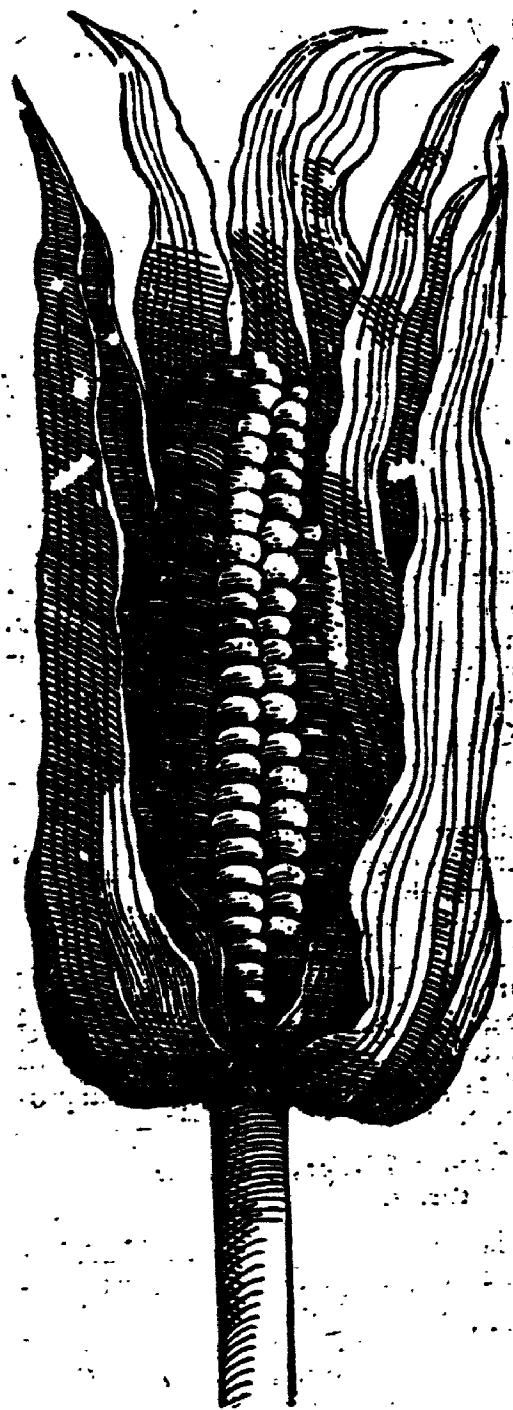


PLATE TWENTY-FIVE

Wisnck, siue Vincetoxicum Indianum, or Indian Swallow-woort

1633

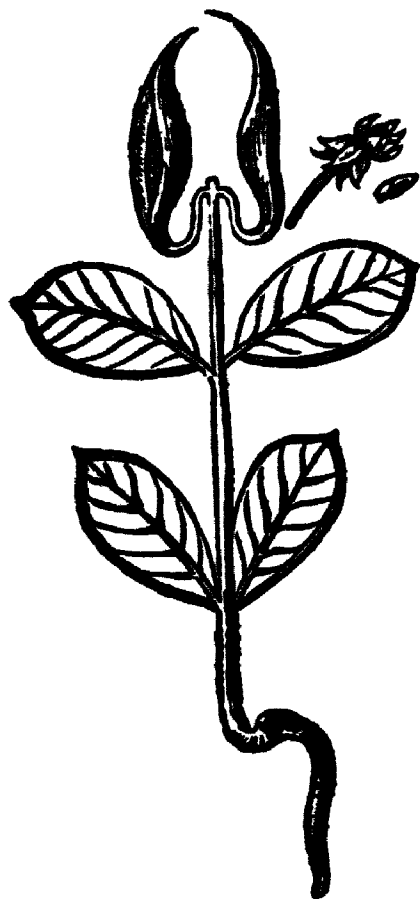
Woodcut

From John Gerard, *The Herbal or General History of Plants*, Chapter 334, pp 898-9, (London, 1633).

"There groweth in that part of Virginia, or Norumbega, where our Englishmen dwelled (intending there to erect a certain Colonie), a kind of *Asclepias*, or Swallow-woort..."

(Plate reproduced from John Gerard, *The Herbal or General History of Plants*, New York: Dover, 1975.)

Wisanck, sine Pinctoxicum Indianum.
Indian Swallow-wort.



‡ *Apocynum Syriacum Clusij.*



PLATE TWENTY-SIX

Cereus Peruvianus spinosus Lobely, or The Torch-Thistle or thorny Euphorbium

1633

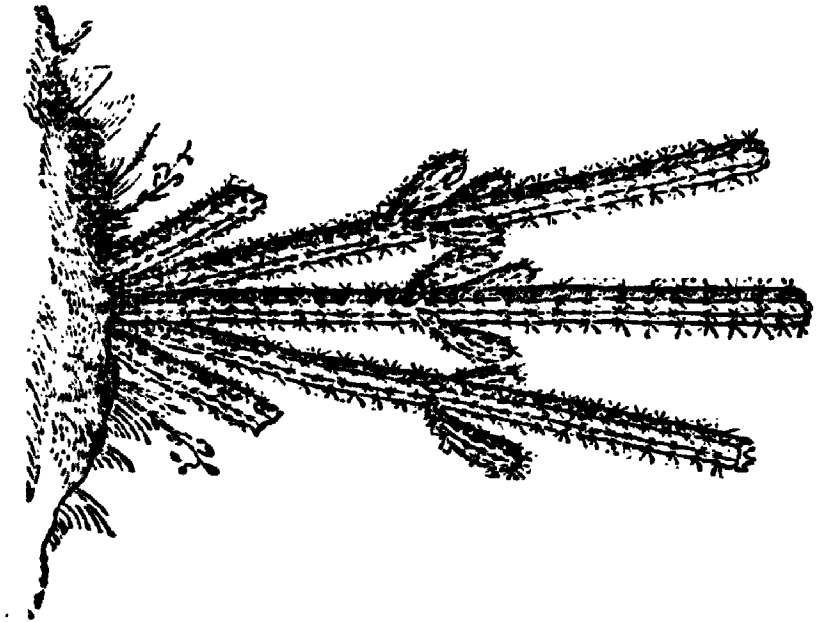
Woodcut

From John Gerard, *The Herbal or General History of Plants*, Chapter 492, p. 1179, (London, 1633).

"There is not among the strange and admirable plants of the world any one that gives more cause of marvel, or more moueth the minde to honour and laud the Creator, than this plant, which is called of the Indians in their mother tongue *Vragua*, which is as much to say, a torch, taper, or *Cereus*, or a Torch."

(Plate reproduced from John Gerard, *The Herbal or General History of Plants*, New York: Dover, 1975.)

3 *Cereus Peruvianus* *pinifolius* Lobely.
The Torch-Thistle or thorny Euphorbium.



4 *Calamus Peruvianus* *pinifolius* Lobely.
The thorny Reed of Peru.



PLATE TWENTY-SEVEN

**Crispijn de Passe
(b 1589)**

Frontispiece to the First Book

Copper engraving

From Crispin de Pass, *Hortus Floridus* (Utrecht, 1615/London, 1929). The First Book is described as "Contayninge a very lively and true Description of the Flowers of the Springe." The English version was printed by Salomon de Roy for de Passe. French and Latin editions also exist.

Plant Research Library CLBRR, Agriculture Canada, Ottawa.

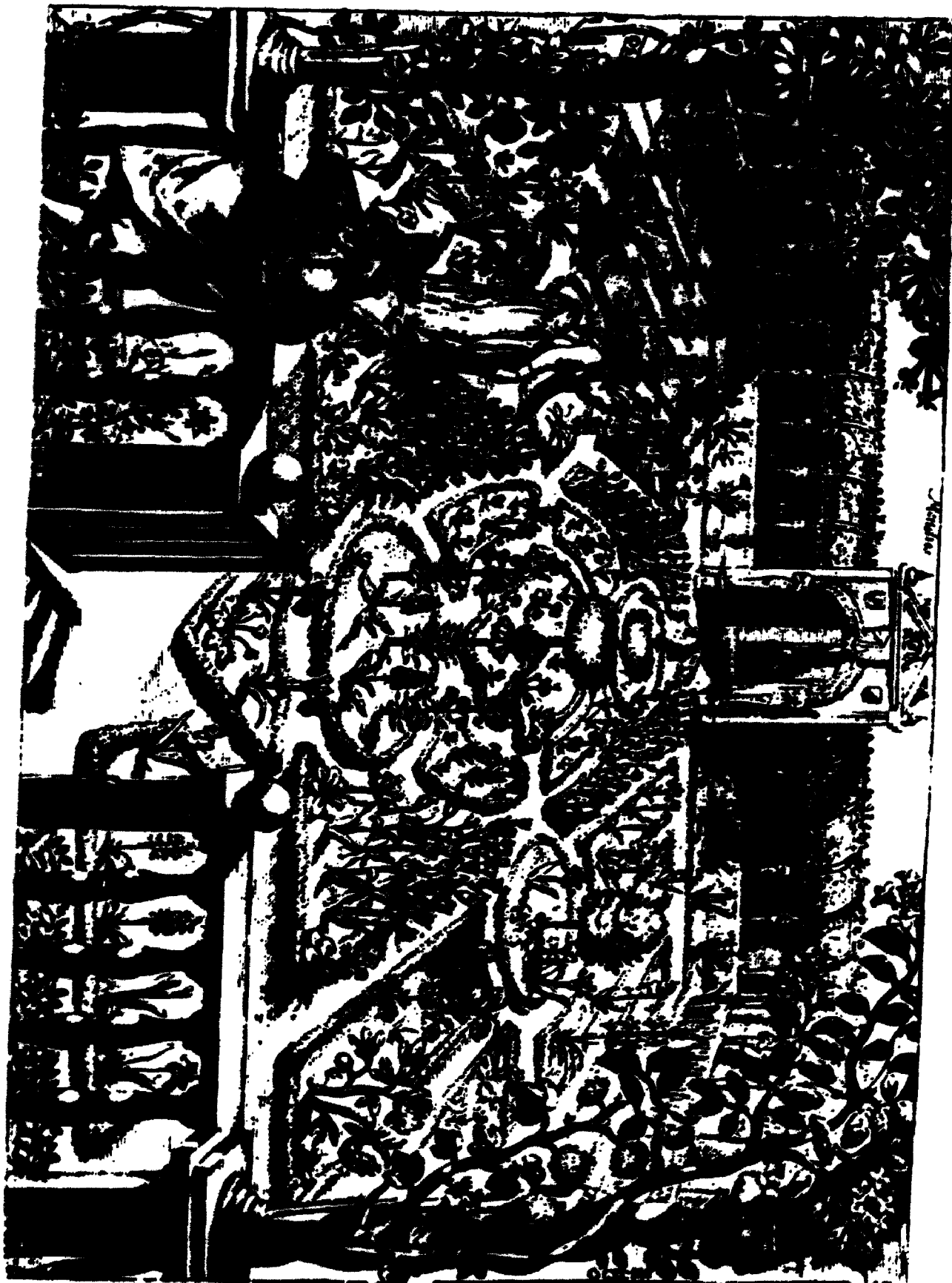


PLATE TWENTY-EIGHT

Crispijn de Passe
(b 1589)

Crocuses

1615

Copper engraving

Inscription: *L. Colchicum Byzantinum multiflorum. Ge. Colchicum van Constant met brede bladeren. L. Colchicum lusitanicum: reticulatum. Ge. Portugaelsche Colchicum fritillare gelyck.*

From Crispin de Pass, *Hortus Floridus* (Utrecht, 1615/London, 1929). The First Book is dedicated to spring, while the second contains plates of the flowers of summer, autumn and winter. The flowers are often shown from ground level and at various stages of growth, so that gardeners might recognize them easily. De Passe also included charming portraits of insects.

Plant Research Library CLBRR, Agriculture Canada, Ottawa.

L. Colchicum Byzantinū multiflorum.
Ge. Colchicum van Constant met
brede bladen.

L. Colchicum lybianū: reticulatum.
Ge. Irmgaessche Colchicum frillaregeyd.

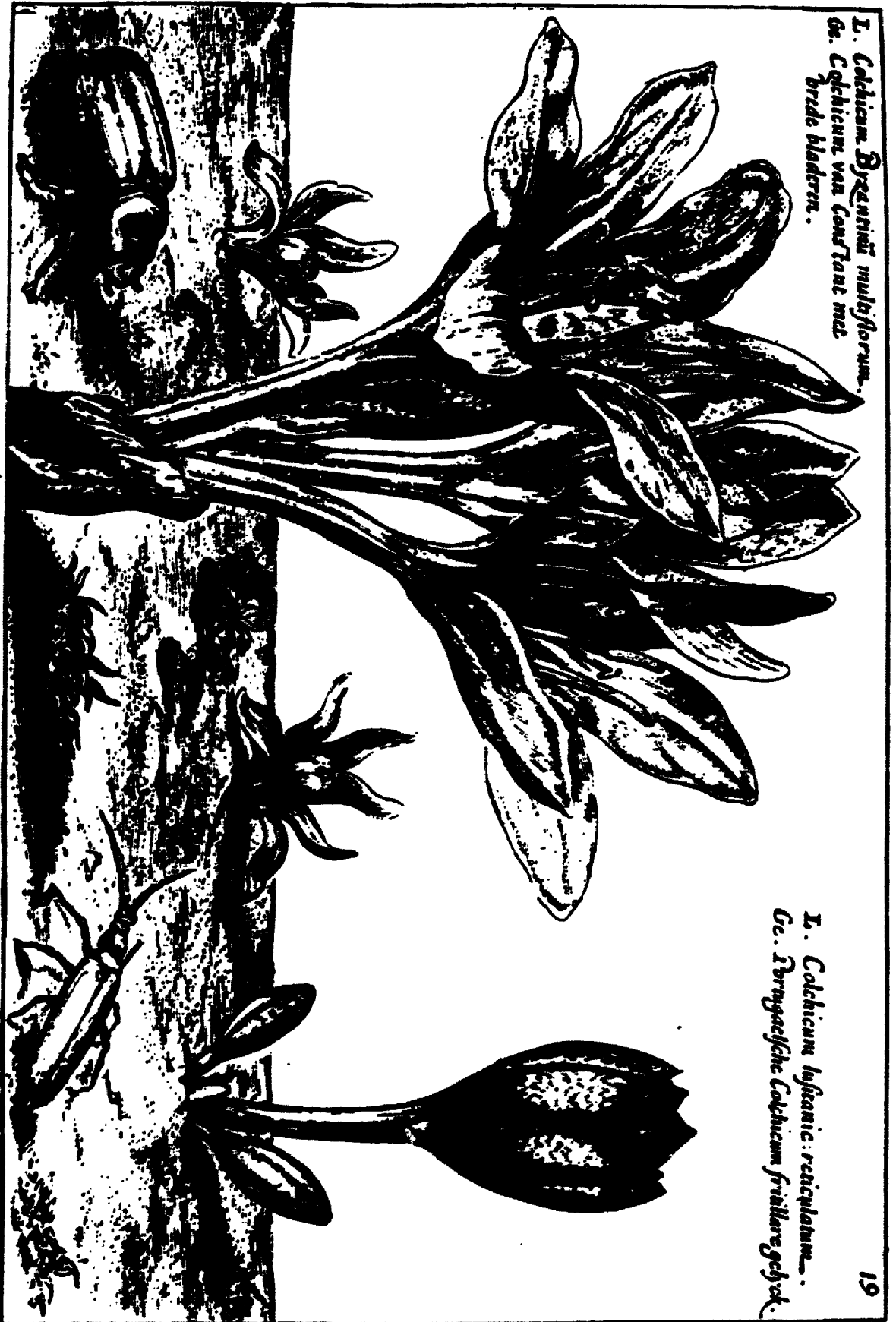


PLATE TWENTY-NINE**New World Plants****1744****Etchings****12.5 x 19.5 cm.**

Four plates from Pierre-François Xavier de Charlevoix (1682-1761), *Histoire et description générale de la Nouvelle France* (Paris, 1744).

Volume II contains the "Description des plantes principales de l'Amérique Septentrionale." Forty of the 98 plates in Charlevoix are engraved (in reverse) after Cornut. Charlevoix completed this work over two decades after his return from New France and his text reveals evidence of his subsequent researches, with references to Catesby, Tournefort, Sarrasin, François Hernandez, as well as Cornut.

Canadian Museum of Nature.

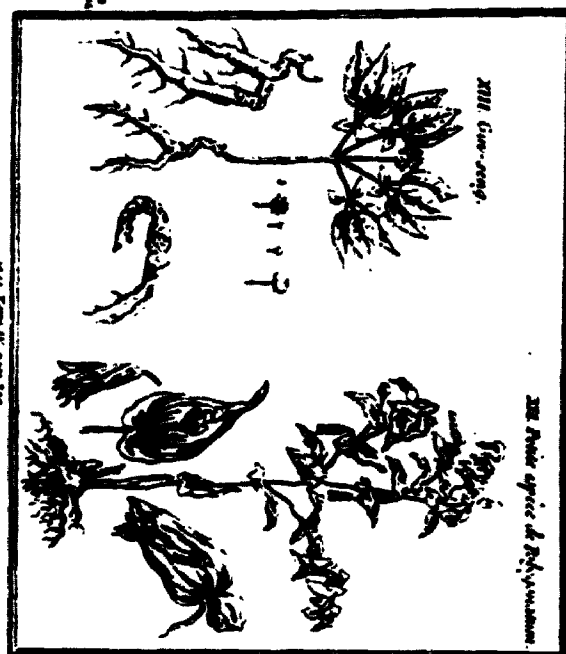


PLATE THIRTY

**Attributed to Jan van Vianen
(1660-1726)**

Niagara Falls

1697

**Etching
16.0 cm.**

**Page 44 in Louis Hennepin's *Nouvelle découverte d'un très grand pays...*
(Utrecht, 1697).**

**The Dutch artist who may have executed this etching for Hennepin's book
probably had a sketch or even drew under Hennepin's direction, though the
text does not specify how the artist achieved the likeness of the falls.**

Rare Book Collection, National Library of Canada.



PLATE THIRTY-ONE

**Nicolas Guérard
(d. 1719)**

Beavers working

1698

Engraving

From a vignette on Nicolas de Fer's map of North America (1698). Guérard borrowed the image of Niagara from Hennepin's account, published the year before, but the beavers at work appear to have been his own invention, following earlier published descriptions. One might speculate that these artificial images of the industry and organization of the beaver endured because they reflected something of the sense of order Europeans longed for in the New World. Beavers did in fact create meadows through their labours, natural clearings in the vast forests.

National Archives of Canada.

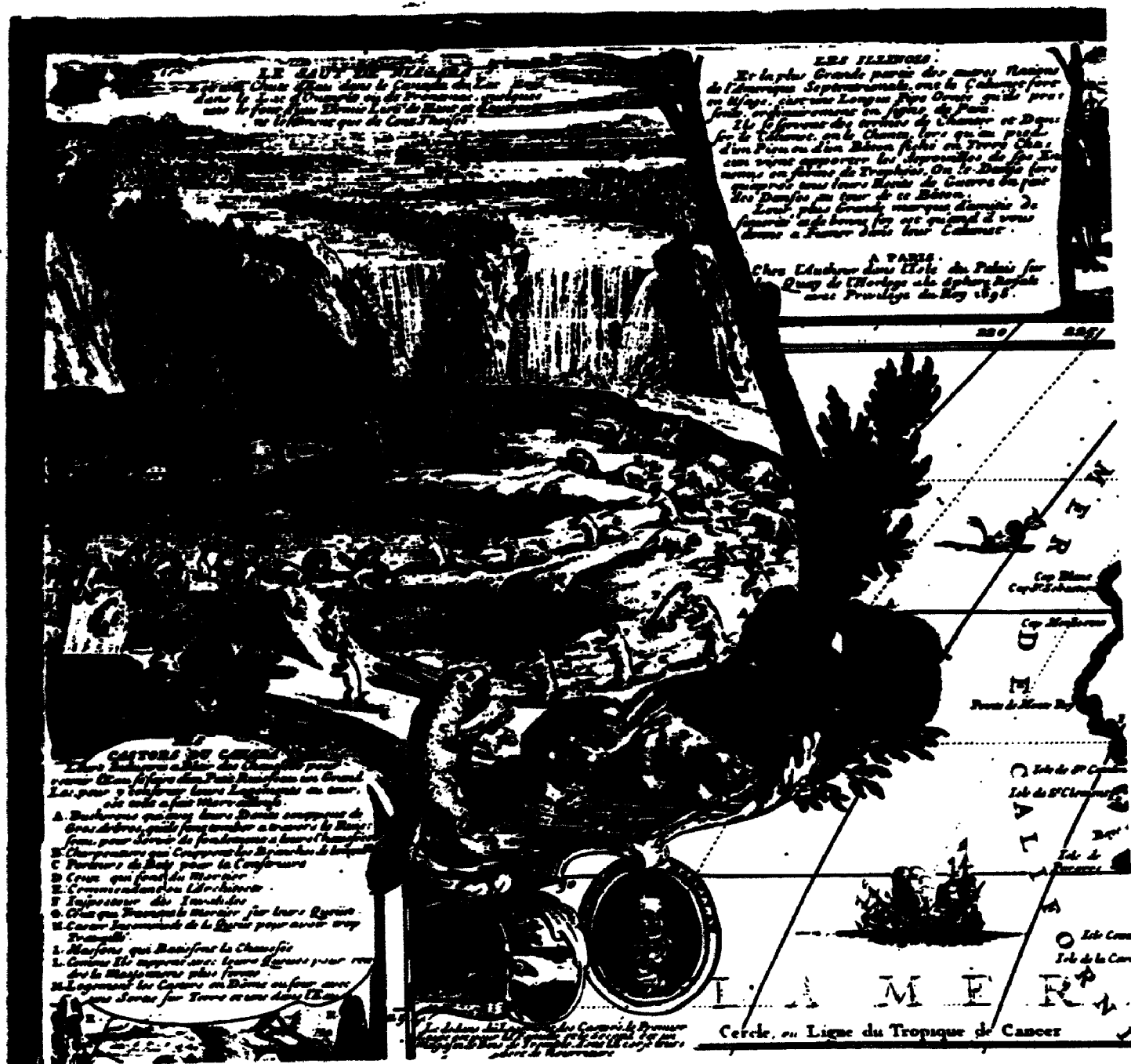


PLATE THIRTY-TWO

Robert Hancock
(1730-1817)

The Waterfall of Niagara

c1794

Engraving, hand-coloured
23.7 x 39.0 cm

Inscription: R. Hancock fecit *The Waterfall of Niagara* – This most surprizing Cataract of Nature is 137 feet high & its breadth about 360 yards. The Island on the middle is about 420 Yards long, & 40 Yards broad, at its lower end. The Water, on it's approaching the said island, becomes so rapid, as almost to exceed an arrow in swiftness till it comes to the Fall; where it reascends into the Air foaming white as Milk, & all in Motion like a boiling Cauldron; Its Noise may be heard 15 Leagues off, & in Calm Weather, it's Vapours rise a great height into the Air, & may be seen like thick Smoak at 30 Miles distance. in North America / La Cascade de Niagara – Cette Surprenante Chute d'Eau est haute de 137 Pieds, et large d'environ 368 Vierges L'Isle qui est dans le milieu a 420 Vierges de Longueur, Sur 40 de Largueur sur sa fin. L'Eau, en approchant la ditte Isle, devient Si rapide, qu'elle L'emporte presque sur la Vivacite d'une fleche, jusqu'a cequ'elle arive a sa Chute; ou elle se remonte bien haut dans l'Air avec une ecume blanche, comme du Lait, et tout en Mouvement comme une Chaudiere bouillante; on peut en entendre le Bruit a 15 lieues de distance; et dans un Tems calme Ses Vapeur s'elevant fort dans l'Air, ei paroipent comme une Fumée Epaisse a 30 milles distance.

Hancock's description, in French and English, is based on Kalm's 1750 account. Kalm notes in this account that the Falls had been measured "with mathematical instruments" by Monsieur Morandrier, "the king's engineer in Canada," and that their height is precisely 137 feet.

Documentary Art and Photography Division, National Archives of Canada
(1992-466-6X; neg. C-014586).



PLATE THIRTY-THREE

Sébastien Leclerc
(1637-1714)

Chute de la rivière de Niagara: Elie enlevé dans un char de feu, Ontario

1705

Etching
16.2 x 27.2 cm

Inscription: *Chute de la Rivière de Niagara S. le Clerc fecit ELIE ENLEVE
DANS UN CHAR DE FEU.*

Leclerc was a well-known engraver who chose to reinterpret Henenpin's 1697 image as a backdrop for a biblical scene. Both Elijah being lifted up in a chariot of fire and Niagara could be deemed "miraculous."

Documentary Art and Photography Division, National Archives of Canada
(1992-416-1X; neg. C-117226).



PLATE THIRTY-FOUR

**Johann Theodor de Bry
(1561-1623)**

**Hunting Scene
1618**

**Copper engraving
35 cm**

Plate XI from Volume Ten in the *America* series or *Les grands voyages*, published by Theodor de Bry (Oppenheim, 1618).

Joahnn Theodor de Bry continued the series begun over two decades earlier by his father. Volume X includes the accounts of Amerigo Vespucci and John Smith, and Plate XI depicts a hunting scene in the colony of Virginia.

National Library of Canada, Rare Book Collection.



PLATE THIRTY-FIVE

Matthæus Merian
(1593-1650)

Hunting Scene
1628

Copper engraving
34 cm

Plate XV from Volume Thirteen in the *America* series or *Les grands voyages*, published by Theodor de Bry (Franckfurt, 1628).

Matthæus Merian was the engraver for this hunting scene which is supposedly set in Newfoundland. The same scene is repeated in Volume XIV, published two years later, to depict hunting in Mexico.

National Library of Canada, Rare Book Collection.



PLATE THIRTY-SIX

To flye at the Hearon according to Martine

1575

Woodcut

From George Turberuile, *The Booke of Faulconrie or Hauking, for the onely delight and pleasure of all Noblemen and Gentlemen*, London 1575., p. 81.

(Plate reproduced from the 1969 reprint by Da Capo Press/ Theatrum orbis terrarum Ltd.)

112 The booke of Falconrie.
How to flee the Hearon.



PLATE THIRTY-SEVEN**Huron Deer Hunt****1632****Etching
23 cm**

From Samuel de Champlain (1567-1635). *Les Voyages de la Nouvelle France occidentale, dicte Canada: Faits par le Sr. de Champlain...* (Paris, 1632), p. 265.

Emblematic deer and fox flee the natives who drive them by beating bones together. The two snared animals hang from bent saplings like joints in a butcher's.

National Library of Canada, Rare Book Collection.



DE CHAMPLAIN. 265

PLATE THIRTY-EIGHT

Hunting

1705

Etching
16 cm

Inscription: *Sauuage tuant des martres ou des chats sauvages/ Sauuages tuant des gelinotes de bois avec ses fleches par la voye dun chien/ PARC/ cerfs renfermés dans un parc apres avoir esté pour suiuis par les sauvages/ sauuage tuant un ours sur un arbre/ renard qui se tue luy meme par un fusil tendu et pointé sur un appas*

From Baron Louis-Armand de Lom D'Arce de Lahontan, *Voyages du Baron de La Hontan dans L'Amerique septentrionale...* (Amsterdam, 1705).

De Lahontan complained that Dutch engravers had misunderstood and ruined his plates, but the schematic rendering of the hunt is more in the nature of a diagram than an artistic image. De Lahontan's book contains a strange mixture of such crude schematic engravings and more polished, classicized images of native life.

National Library of Canada, Rare Book Collection.

sem. prem. Pag. 85.

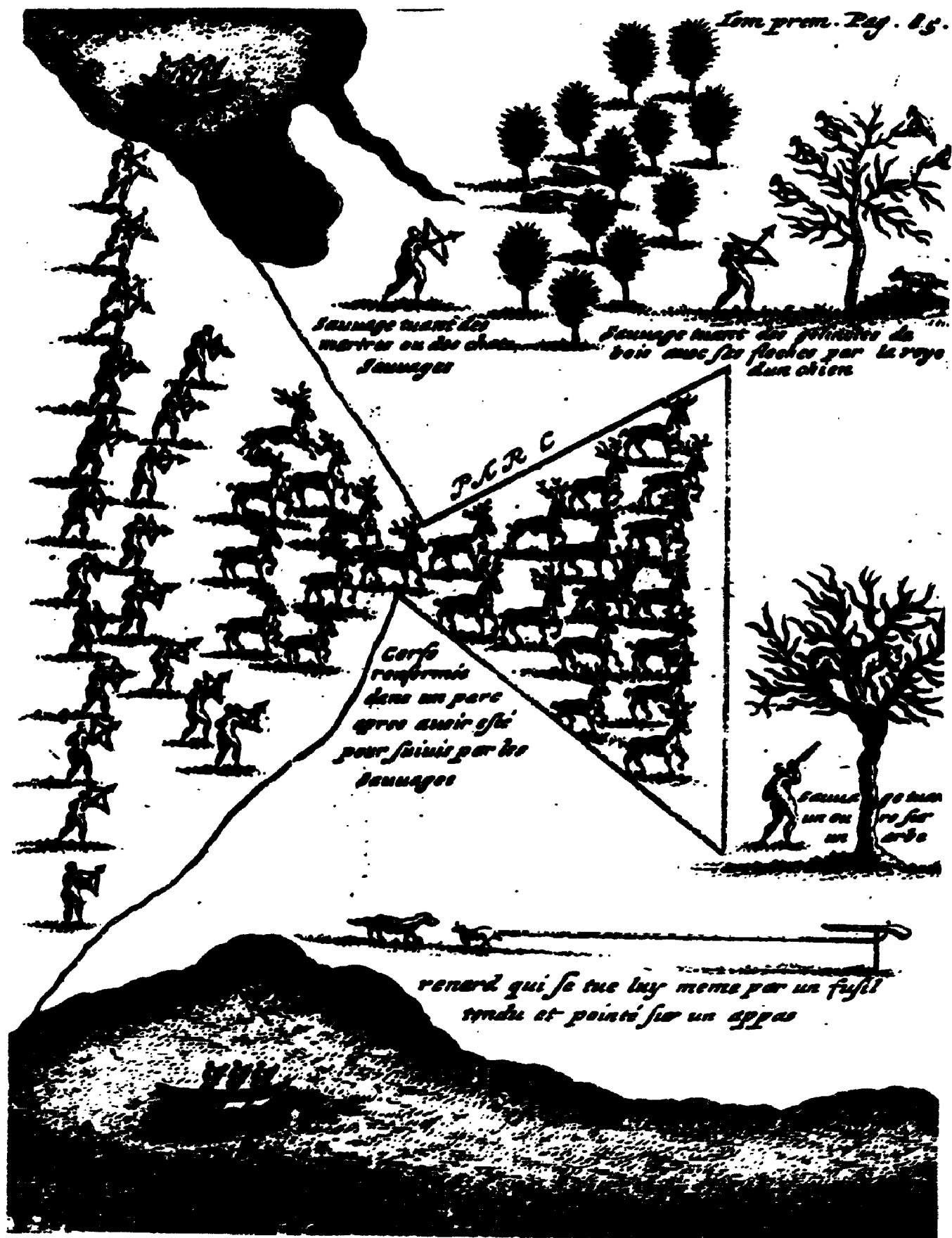


PLATE THIRTY-NINE

Buffalo Hunt

1705

Etching
16 cm

Inscription: *Boeufs Sauvages/ Crocodile ...nt deuorer ...petit veau/ Boeuf pris par les Cornes avec des Cordes/ Boeuf attaque a coup de lance/ Sauvage sautant sur un boeuf/ Sauvages boucanant des viandes*

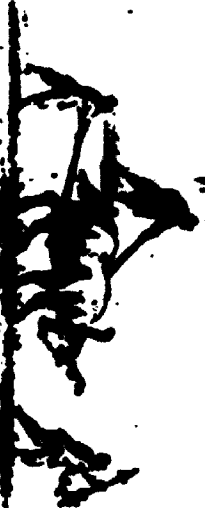
From Baron Louis-Armand de Lom D'Arce de Lahontan, *Voyages du Baron de La Hontan dans L'Amerique septentrionale...* (Amsterdam, 1705).

Here are depicted a herd of buffalo and various native methods of hunting and preparing the flesh. Also shown in this schematic view is a narrative incident of a "crocodile" eating a calf.

National Library of Canada, Rare Book Collection.



*Beuf pris par les
Carrés aux des Carrés*



*Beuf pris par les
Carrés aux des Carrés*



*Beuf pris par les
Carrés aux des Carrés*



*Beuf pris par les
Carrés aux des Carrés*

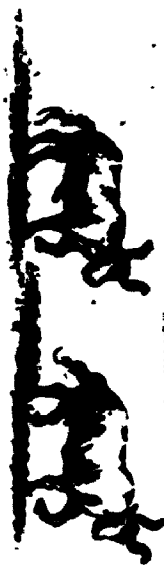


PLATE FORTY

Theodor de Bry (1528-1598)
after John White (fl 1577-93)

The Towne of Secota.

1390

Copper engraving
35 cm

Plate XX from Thomas Harriot, *A true and briefe discourse of the new found land of Virginia*, Volume One in the *America* series or *Les grands voyages*, published by Theodor de Bry (Franckfurt am Mayn, 1590).

White's original watercolour fails to show the orderly rows of corn and other plantings. Here de Bry follows closely on Harriot's text, adding to the engraving both detail and a letter code to increase its informative value. The text at the side of this double-page engraving also makes reference to other plates within the book which provide additional detail or vignettes of native life. Thus, the town is less a landscape than a mapping of both structures and activities.

National Library of Canada, Rare Book Collection.

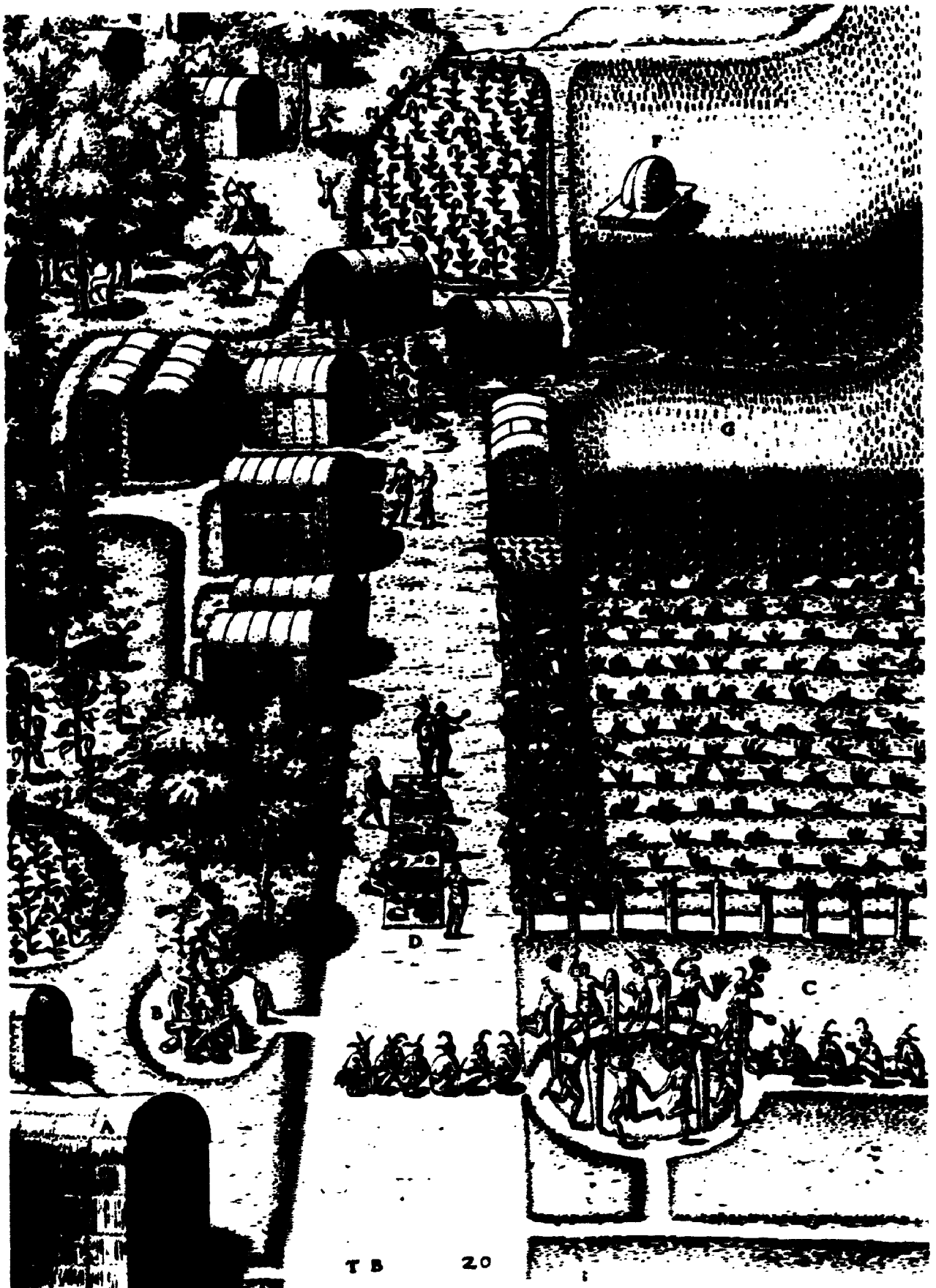


PLATE FORTY-ONE

Alce

1664

Copper engraving
25 cm

From François du Creux (1596?-1666), *Historiae canadensis, seu Nova-Franciae...* (Paris, 1664), pl. IV.

Du Creux describes the Moose: "There are as many beasts in the woods as there are fish in the streams. Most of the animals that are to be found in the forests of France are found also in Canada, but there are several that we have not got, more especially the moose, which is by far the most famous and sometimes goes under the name of 'the great beast' on account of its height." Gesner's artists had rendered several tolerable illustrations of the European elk, to which the moose is related, but Du Creux chose to include this emblematic animal to stand in for "the great beast." His engravers did, however, follow his text when he said that "its head resembles a mule."

National Library of Canada, Rare Book Collection.



PLATE FORTY-TWO

Fiber

1664

Copper engraving
25 cm

From François du Creux (1596?-1666), *Historiae canadensis, seu Nova-Franciae...* (Paris, 1664), pl. III.

Du Creux's engravers have depicted a standard type of European landscape to which they have added a schematic rendering of a lodge and dam, and some sheep-like beavers with bird-like feet.

National Library of Canada, Rare Book Collection.

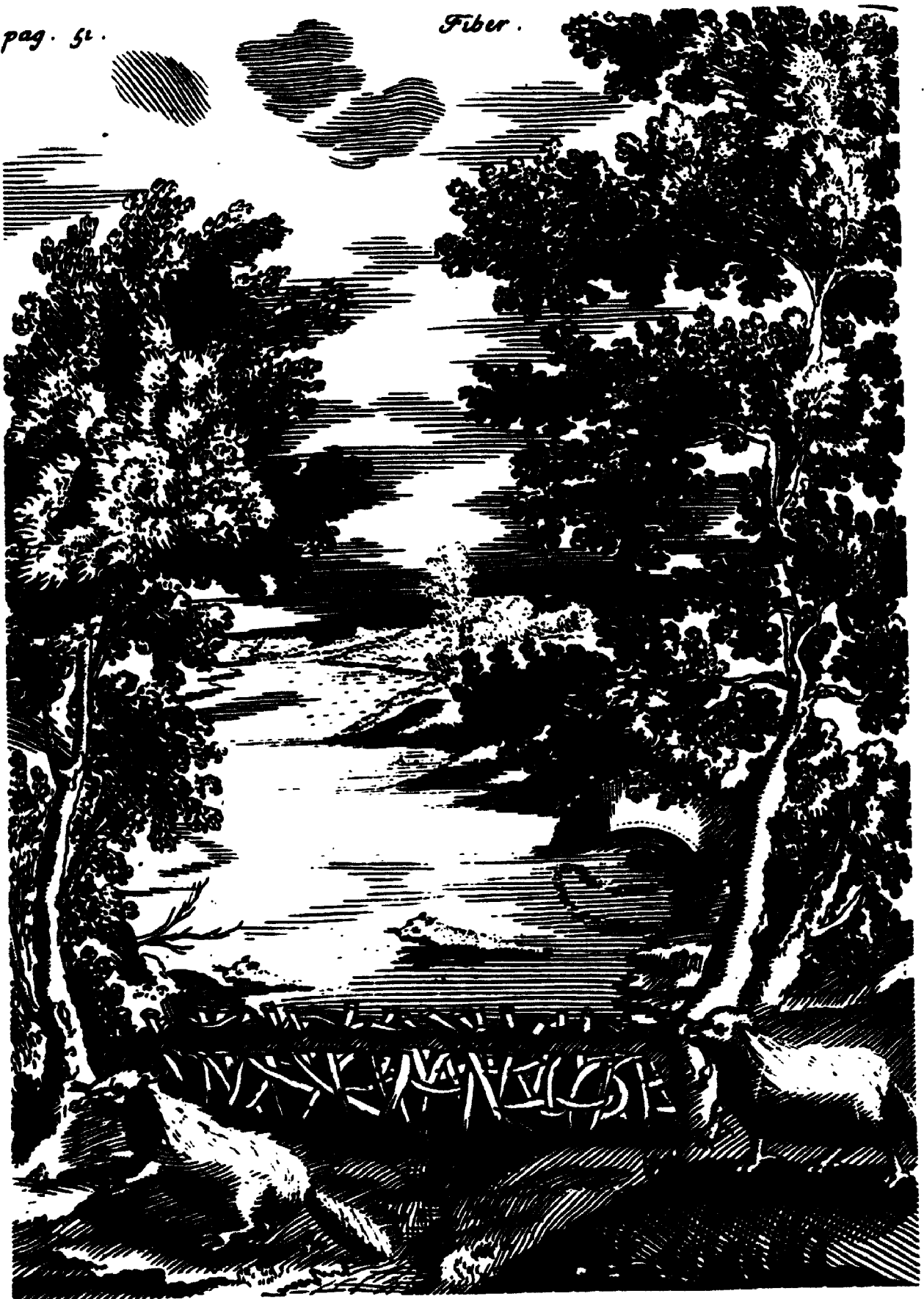
*pag. 52.**Fiber.*

PLATE FORTY-THREE

Avis prædatrix

1664

Copper engraving
25 cm

From François du Creux (1596?-1666), *Historiae canadensis, seu Nova-Franciae...* (Paris, 1664), pl. VI.

The osprey, resembling strange-footed geese, appear in a stylized European landscape. The myth concerning the osprey's feet - one clawed, one webbed - was current in classical times and oft-repeated, though rejected by European naturalists in the sixteenth century.

National Library of Canada, Rare Book Collection.



PLATE FORTY-FOUR

Attributed to Jan van Vianen
(1660-1726)

Buffalo

Etching
16 cm

Page 187 in Louis Hennepin's *Nouvelle découverte d'un très grand pays...*
(Utrecht, 1697).

This etching features a cattle-like buffalo, as well as an opossum showing the nature of its prehensile tail, and a pelican drying its wings. The landscape is admirably rendered and more typical of the habitat than many artists had hitherto achieved.

Rare Book Collection, National Library of Canada.



PLATE FORTY-FIVE

Inhabitants of North America near Hudsons Bay with their manner of Killing Wild Fowl

1768

Engraving, 21.5 x 28.5 cm

Inscription: Engraved for Drakes Voyages Inhabitants of North America near Hudsons Bay with their manner of Killing Wild Fowl

This eighteenth-century engraving reveals both the corruption which original images undergo as well as the disregard for the documentation of landscape. While the central figure is derived from the sixteenth-century White/Settle original of an Inuit hunter in a kayak, the figures on the right wear only an approximation of Inuit skin clothing. The birds are generic waterfowl, while the arctic has been transformed into a craggy, wooded country.

Hudson's Bay Company Archives, Provincial Archives of Manitoba (HBCA P-318)



PLATE FORTY-SIX**Reindeer Sound and Inuit Greeting****1620****Woodcut****From Jens Munk, *Navigatio Septentrionalis* (1620)**

The crude woodcuts in Munk's early seventeenth-century journal are reminiscent of those of a century earlier. Naked natives welcome the explorers, while another group shoot a prancing and emblematic deer. The land is rocky and barren.

(Plate reproduced from Cumming, W.P., Skelton, R.A., Quinn, D.B. *The Discovery of North America, 1630–1776*. New York: American Heritage Press, 1971/2.)



PLATE FORTY-SEVEN

Four views of an iceberg

1578

Woodcut

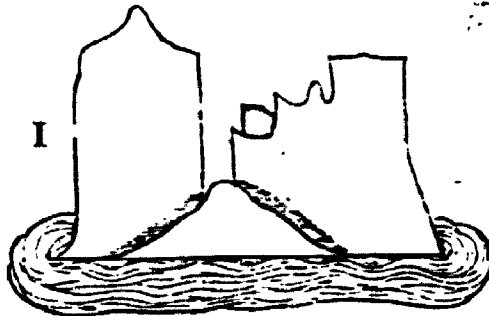
Inscription: 1. *At the first sight of this great and monstrous peece of yce, it appeared in this shape* 2. *In comming neere unto it, it shewed after this shape* 3. *In approaching right against it, it opened in shape like unto this, shewing hollow within* 4. *In departing from it, it appeared in this shape*

From Thomas Ellis, *A True Report of the Third and Last Voyage into Meta Incognita* (1578).

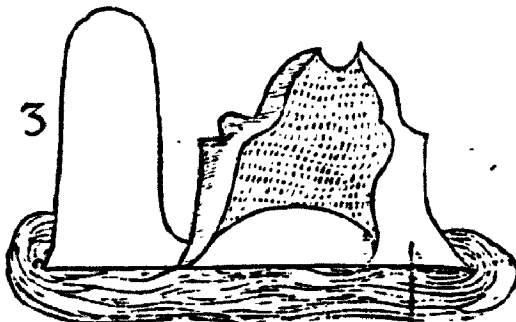
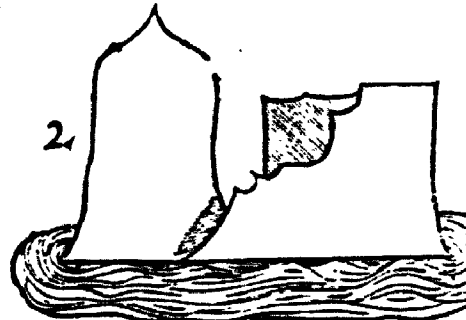
The four views are numbered sequentially and Ellis' comments placed above them. It is likely that the cut was made after Ellis' own sketches from a logbook.

(Plate reproduced from Franklin, Wayne. *Discoverers, Explorers, Settlers. The Diligent Writers of Early America*. Chicago: University of Chicago Press, 1979, plate 25.)

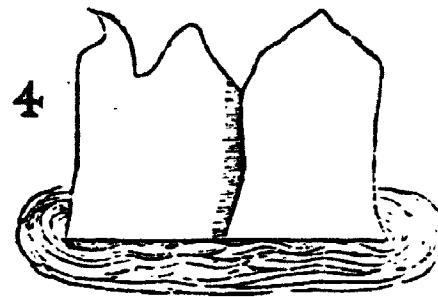
As the light of this group and numerous parts of you it appears in the shape.



The evening horizon is, it seems like this shape.



As appearing right against it, it appears as shape like this one, forming hollow inside.



As appearing from left appears in the shape.

PLATE FORTY-EIGHT

George Edwards
(1694-1773)

Frontispiece

1743

Etching, hand-coloured
26.5 x 31.0 cm (sight)

Inscription: GEORGII EDVARDI ORNITHOLOGIA NOVA

From George Edwards, *A Natural History of Uncommon Birds*, Part I.

Edwards' frontispiece reveals his understanding of the work of the natural history artist. Heir to the great classical naturalists, he uses the tools of his trade to preserve the likenesses of birds, for in the very appearance of the thing itself is the key to knowledge.

Collection of the author.



PLATE FORTY-NINE

**After Maria Sibylla Merian
(1647-1717)**

Engraving, hand-coloured

From Maria Sibylla Merian, *Metamorphosis Insectorum Surinamensium*, 1705.

The lizard (*Tupinambis nigropunctatus*) depicted by Merian on the Cassava plant ate dead animals, and according to Merian grew as big as a crocodile, but had no taste for human beings. The butterfly is shown as caterpillar, chrysalis and adult.

(Plate reproduced from Valiant, Sharon D. "Questioning the Caterpillar," *Natural History*, 101, 12, December, 1992, p. 52.)



PLATE FIFTY

Mark Catesby
(1682/3-1749)

Buffalo and Pseudo-acacia

1729-43

Hand-coloured etching

From *The Natural History of Carolina, Florida, and the Bahama Islands* (1771).

Catesby had some opportunity to observe the buffalo but this diminutive specimen, while anatomically more or less correct, lacks a lifelike appearance, perhaps as the result of Catesby's lack of training as an artist. Catesby was, however, a skilled botanical draftsman, as the pseudo-acacia shows. He notes in The Preface that "Of Beasts there are not many species different from those in the Old World: most of these I have figured, except those which do not materially differ from the same species in *Europe*, and those which have been described by other authors."

(Plate reproduced from Kastner, Joseph. *A Species of Eternity*. New York: Alfred A. Knopf, 1977, facing p. 28.)



PLATE FIFTY-ONE

Mark Catesby
(1682/3-1749)

Flamingo and coral

1729-43

Hand-coloured etching

Inscription: *Phanicopterus Keratophiton &c.*

From *The Natural History of Carolina, Florida, and the Bahama Islands* (1771).

Catesby posed the flamingo on a sandy beach before a gorgonian coral, and added rocky islets to the background. He noted that "at these islands more particularly I collected many Submarine productions, as Shells, Corallines, *Frutices Marini*, Sponges, *Astroites*, &c." Despite having original specimens to which he could refer, Catesby exaggerated greatly the size of the coral.

(Plate reproduced from Dance, S. Peter. *The Art Of Natural History. Animal Illustrators and Their Work*. Woodstock, N.Y.: The Overlook Press, 1976, p. 53.)

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PLATE FIFTY-TWO

Peter Paillou
(fl. 1744-84)

Male Caribou

ca 1769

Watercolour on paper
53.5 x 37.5 cm

Peter Paillou worked for Taylor White (1701-72) and for Thomas Pennant (1726-98), recording specimens in watercolour, much as did the artists employed by Gesner and Aldrovandi two centuries earlier. A pair of caribou arrived in England in 1769, and Taylor White arranged to have them recorded. Lysaght suggests that Collins was the artist, but Eleanor McLean of the Blacker-Wood Library at McGill University feels the male and female caribou watercolours are the work of Paillou (personal communication).

Blacker-Wood Library of Biology, McGill University, Montreal.



PLATE FIFTY-THREE**Charles Collins****Raccoon****c 1759****Watercolour on paper
37.0 x 54.0 cm****Charles Collins also worked for Taylor White.****Blacker-Wood Library of Biology, McGill University, Montreal.**



PLATE FIFTY-FOUR

**Peter Mazell (fl. 1761-97)
after George Stubbs (1724-1806)**

Moose Deer

1792

Hand-coloured engraving

From Thomas Pennant, *Arctic Zoology* (London, 1792), p. VIII.

George Stubbs was hired in 1770 by William Hunter to paint an oil portrait of the Duke of Richmond's yearling bull moose. The portrait was exhibited at the Society of Artists in 1783, and Pennant requested that Mazell be allowed to prepare an engraving for inclusion in his book. This engraving is hand-coloured in Pennant's personal copy of the 1792 edition. Stubbs' painting is more felicitous than Mazell's strangely proportioned engraving.

Blacker-Wood Library of Biology, McGill University, Montreal.

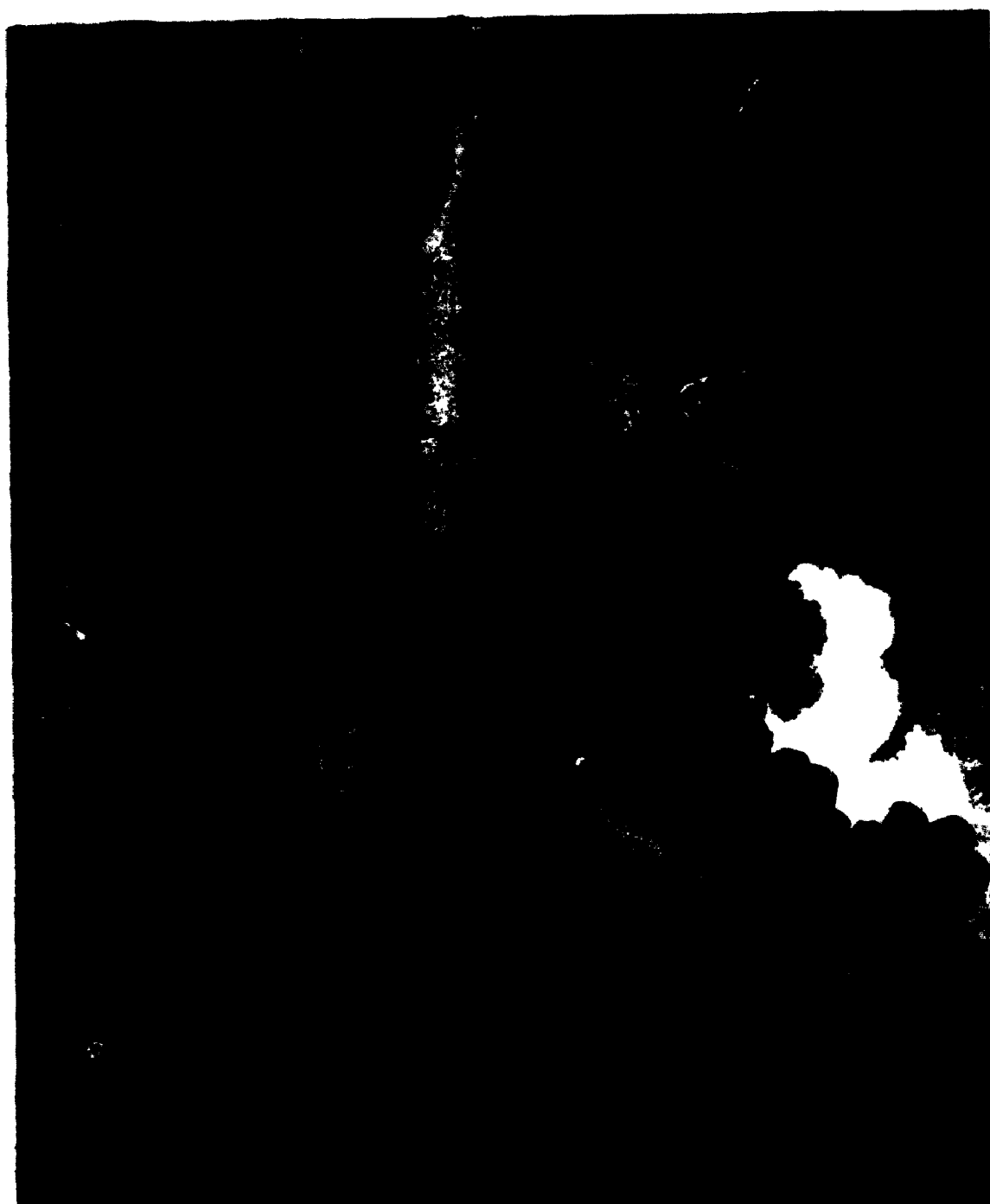


PLATE FIFTY-FIVE

Jan Wandelaar
(1690-1759)

Frontispiece

Engraving

From Carolus Linnæus, *Hortus Cliffortianus* (Amsterdam, 1737/8).

Jan Wandelaar worked as both artist and engraver for a number of plates in the *Hortus*. Wandelaar was also the engraver for Claude Aubriet's drawings in the *Botanicon parisiense* (1727). The allegorical frontispiece shows Linnaeus as a cheerful Apollo at the gate of Clifford's great garden at Hartecamp.

Plant Research Library CLBRR, Agriculture Canada, Ottawa.

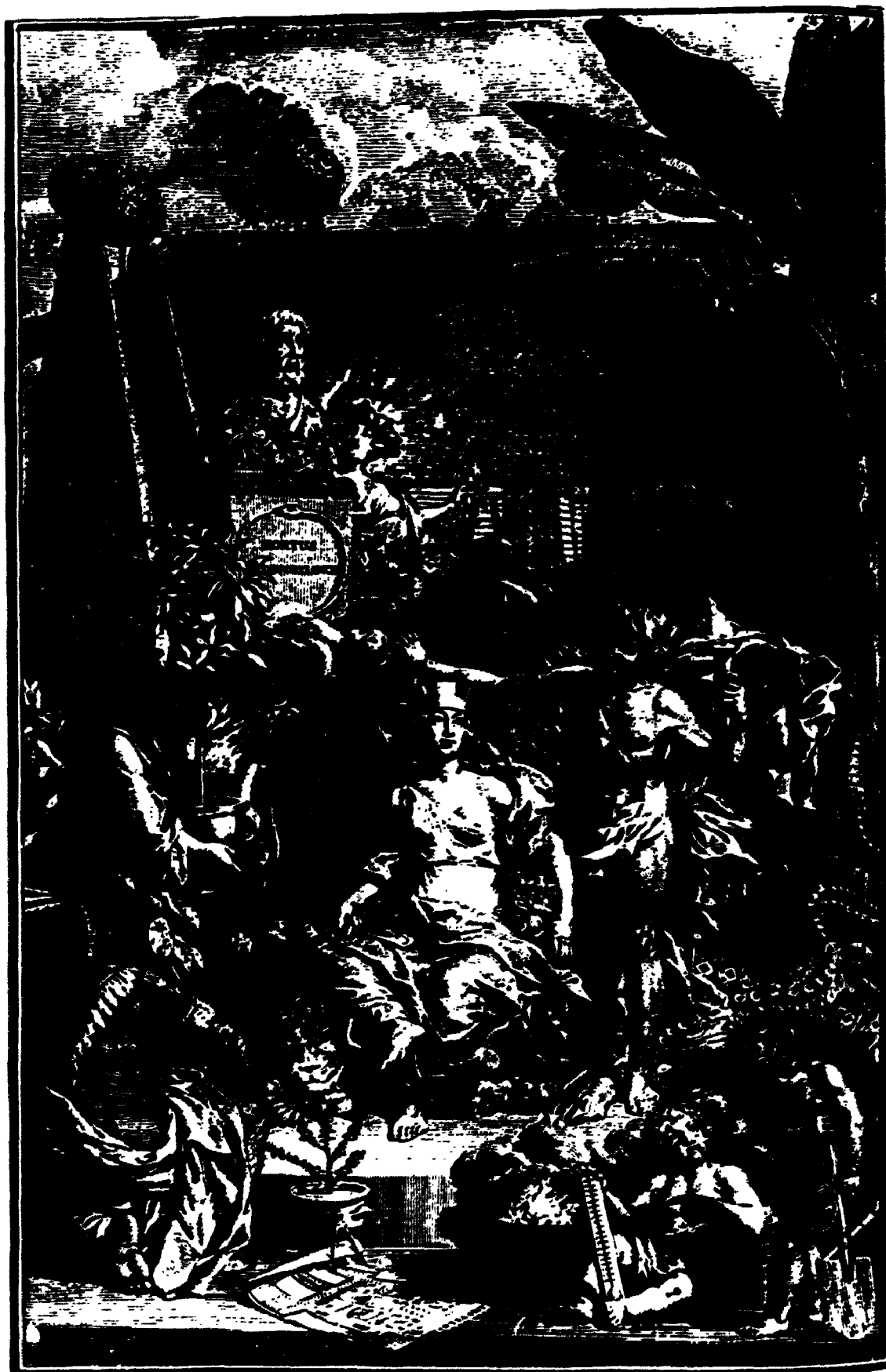


PLATE FIFTY-SIX

**Jan Wandelaar (1690-1759)
after Georg Dionysus Ehret (1708-70)**

Collinsonia

Engraving

From Carolus Linnæus, *Hortus Cliffortianus* (Amsterdam, 1737), pl. VI.

Ehret maintained that he had been used to drawing the dissections of flowers before Linnæus requested it of him in the *Hortus*. Nevertheless, shortly after the publication of the *Hortus*, Ehret produced a "Tabella" of the Linnæan system which sold well throughout Europe.

Plant Research Library CLBRR, Agriculture Canada, Ottawa.

TAB. V.



COLLINSONIA. *Hort. Cliff.* 14. *Sp.* 1.
 a. Flos magnitudine naturali. b. Idem a tergo visus.
 c. Calyx sub flore scutis constitutus. d. Idem fructu pugnati.
 e. Germen.

G. D. ERRET del.

J. WANDelaar fecit.

PLATE FIFTY-SEVEN

Georg Dionysus Ehret
(1708-70)

Rhodora (*Rhododendron canadense*)
1767

Watercolour on vellum
47.7 x 33.4 cm

Inscription: *G.D. Ehret pinxit 1767*

Ehret moved to England in 1736 and remained there for the rest of his life. In 1767 he painted twenty-three of the Newfoundland plants brought back as dried specimens from the 1766 expedition by Joseph Banks. The colours remain amazingly fresh and the details are precisely rendered. Ehret's skill breathes life into the dried specimens which Banks recounts he had no little trouble in preparing and drying. The rhodora was collected at Inglic.

The Natural History Museum, London.



PLATE FIFTY-EIGHT

George Edwards
(1694-1773)

The Porcupine from Hudsons Bay

1743

Etching, hand-coloured
19.6 x 28.1 cm

Inscription: *The Porcupine from Hudsons Bay* Published according to act of
Parliament May 1742 Geo Edwards; in reverse: September 29 1741

From George Edwards, *A Natural History of Uncommon Birds*, Part I, pl. 52.

Edwards notes that he has shown a quill as well as a portion of the quill tip magnified. He dismisses as showmen's fiction the idea that the porcupine shoots its quills, describing it as an inoffensive animal. He drew the porcupine from a specimen in the collection of Sir Hans Sloane, who had received it from Dr. R.M. Massey at Stepney, who in turn had been sent the specimen by Alexander Light in Hudson's Bay.

Documentary Art and Photography Division, National Archives of Canada
(1983-91-1; neg. C-105601).



Published after withdrawal of permission from the artist

PLATE FIFTY-NINE

After George Edwards (1694-1773)

The Porcupine and The QuickHatch, or Wolverine

1748

Engraving

19.5 cm

Inscription: *The Porcupine The QuickHatch, or Wolverine*

From Henry Ellis (1721-1806), *A Voyage to Hudson's Bay by the Dobbs Galley and California....* (London, 1748), facing p. 42.

Ellis' engraver copied a number of Edwards' engravings for the account of Ellis' 1746-6 expedition. Ellis acknowledged in the text his debt to "the ingenious and accurate Mr. *Edwards*."

National Library of Canada, Rare Book Collection.



PLATE SIXTY

After Moses Harris
(1730-88?)

A Plan of the Harbour of Chebucto and Town of Halifax

1749

Engraving
22.0 x 26.8 cm

Inscription: *A Plan of the Harbour of Chebucto and Town of Halifax*
The Musk Beetle The Ensign of NOVA SCOTIA The Orange Underwing Tyger
The White Admiral The Porcupine

From *The Gentleman's Magazine* (London , February 1750).

Moses Harris was presumably the author of *The Aurelian* (1766), which featured exquisite hand-coloured engravings of European insects. Harris copied the porcupine from Edwards, but it is likely that the butterflies and beetle are his own work.

Nova Scotia Legislative Library, Halifax.

PLATE SIXTY-ONE

After Henry Popple

A View of the Fall of Niagara

1751

Engraving

Inscription: *a. The Place where a Piece of Rock was broken from which while standing turned the Water obliquely across ye Fall as in Popple's Map. b. Two Men passing over ye east Stream with Staves c. The Indians reascending their Ladder*

From *The Gentleman's Magazine* (London, February 1751).

Henry Popple issued a twenty-sheet "Map of the British Empire in America" in 1733, and included an inset of Niagara, which he based on the Hennepin original. The third side fall originally in the Hennepin engraving is missing from the print illustrating the Kalm article, its absence explained by the inscription in the lower margin. Popple has, however, added a second stream on the left.

(Plate reproduced from Lane, Christopher W. *Impressions of Niagara. The Charles Rand Penney Collection of prints of Niagara Falls and the Niagara River from the Sixteenth to the early Twentieth Century*. [Philadelphia]: The Philadelphia Print Shop, Ltd., 1993, p. 24.)



* The Place where a mass of black rock
breaks, from which water cascades
toward the Water at a great height / And
as in People's eyes

A View of the Fall of Virginia.

* The Place where a mass of black rock
breaks, from which water cascades
toward the Water at a great height / And
as in People's eyes

PLATE SIXTY-TWO

Ignace Fougerson (fl. c1760-8)
after Thomas Davies (c1737-1812)

An East View of the Great Cataract of Niagara

c1768

Engraving

33.7 x 50.9 cm

Inscription: *To his Excellency Lieutt: Genl: Sir Jeffrey Amherst, Knight of the Most Honourable Order of Bath, &c. &c. &c. These six views are most humbly Inscribed, by his Excellency's most devoted Servt: Thos: Davies. An East View of the Great Cataract of Niagara. Extent: Height of the Fall 162 Feet, Breadth about a Mile & a Quarter. Drawn on the Spot by Thos: Davies Capt: Lieutt: in the Royal Regt: of Artillery; J. Fougerson sculp.*

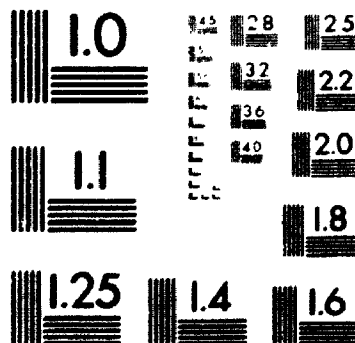
From the portfolio *Six Views of Waterfalls* (London, c 1768).

Davies view of the falls from the top of the gorge represents a novel perspective and one that could only have been achieved "on the Spot."

Documentary Art and Photography Division, National Archives of Canada
(1992-498-1X; neg. C-038858).

5 OF / DE 5

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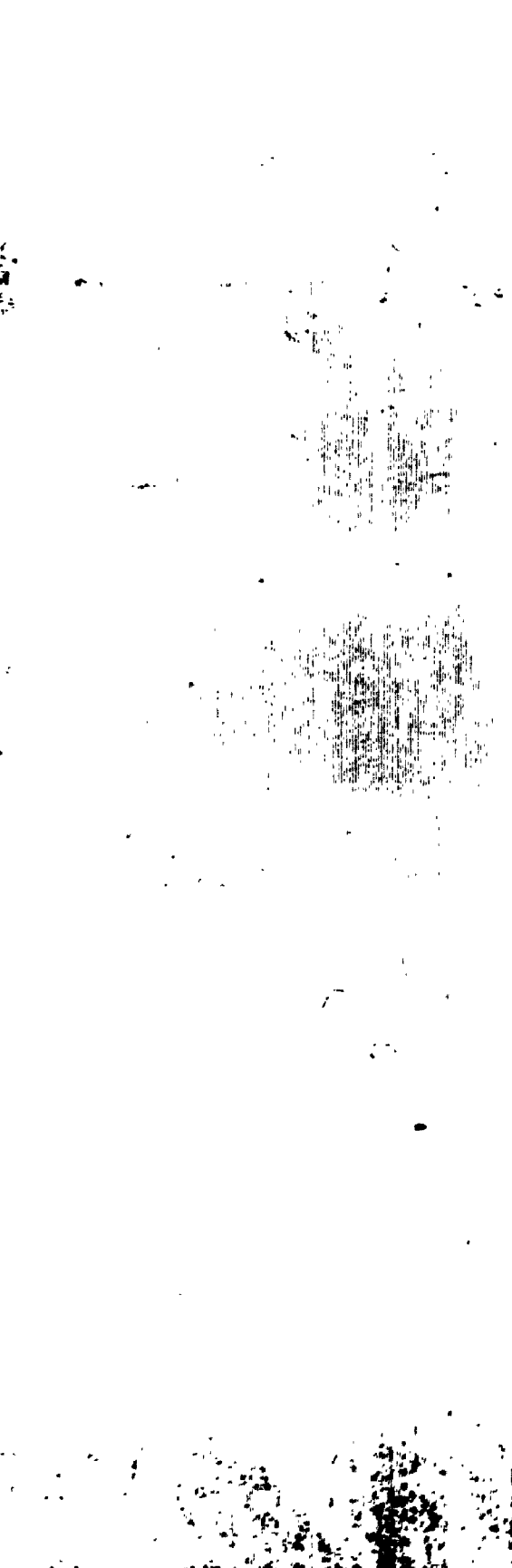
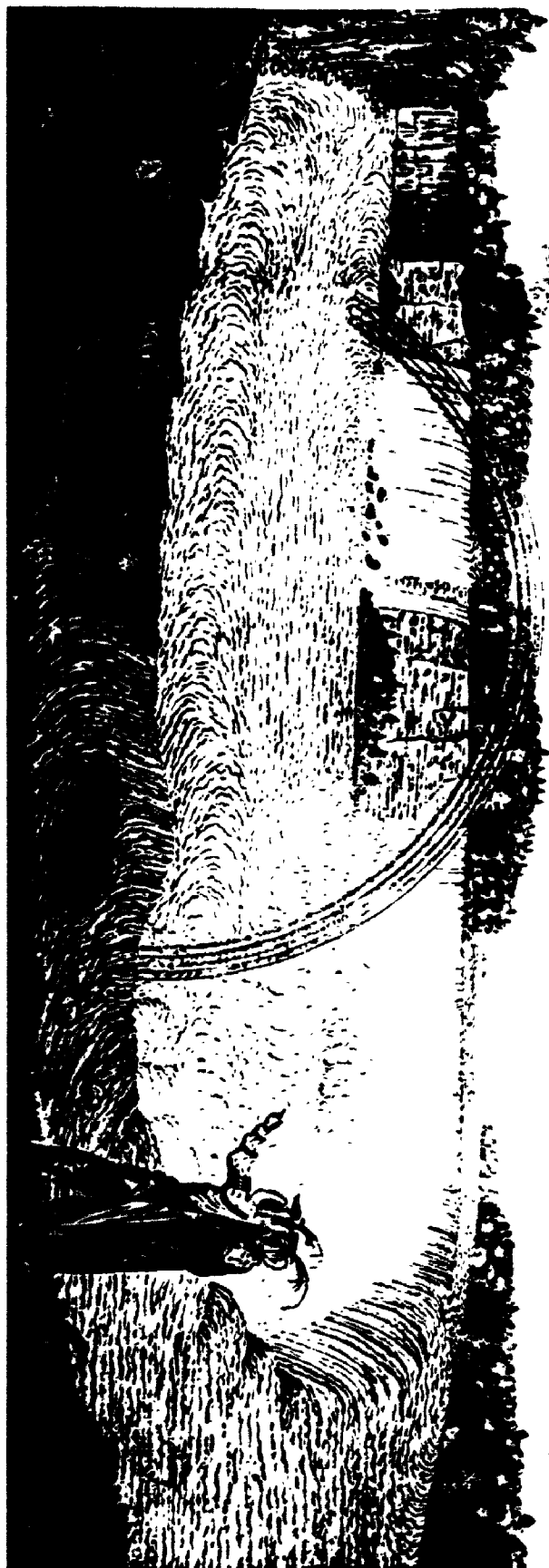


PLATE SIXTY-THREE

Thomas Davies
(c1737-1812)

Niagara Falls from Above

c1766

Watercolour on paper
34.3 x 52.7 cm

Again Davies adopts the novel perspective from the top of the Falls looking down the river. The native people in the far right are less the centre of attention than the three bald eagles soaring and sitting above the river, evidence of Davies' lifelong interest in natural history. This watercolour was not engraved.

The New-York Historical Society, New York; Travellers Fund, J.S. Cushman, and Foster-Jarvis Fund 1954 (1954-2).



PLATE SIXTY-FOUR

After Thomas Davies
(c1737-1812)

Dipus canadensis (The Jumping Mouse)

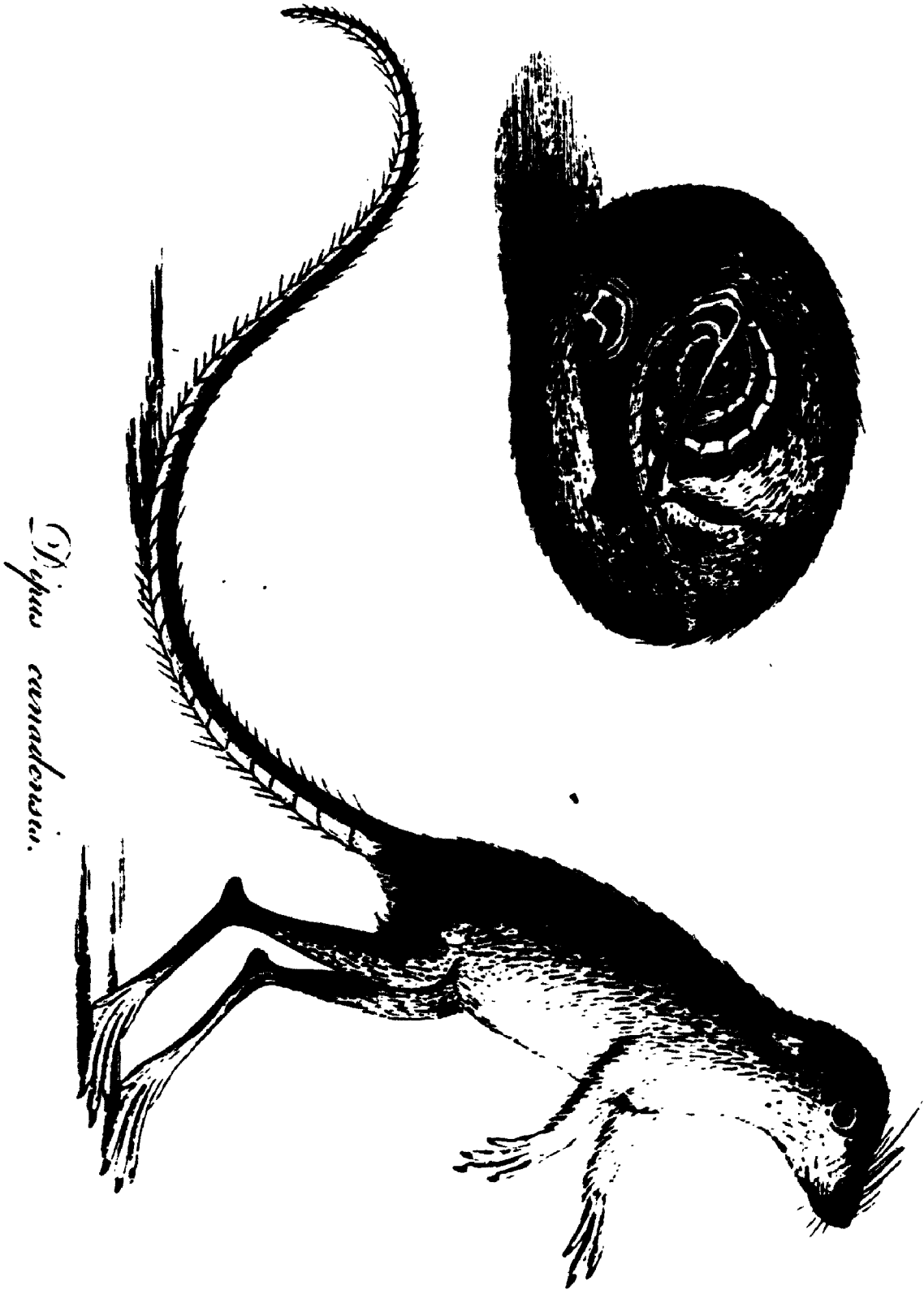
1798

Hand-coloured engraving
9.5 x 15.7 cm (image)
Inscription: *Dipus canadensis*

From "An Account of the Jumping Mouse of Canada. *Dipus Canadensis*,"
Transactions of the Linnaean Society, IV (London, 1798).

Davies's paper on the Jumping Mouse (*Zapus hudsonius*) was read in 1797 when Davies was a Major General and Fellow of both the Royal Society and the Linnaean Society. Davies recounts that he observed and possibly painted the animal during his last tour of duty in Quebec (1786-90). He may well have drawn the animal in its torpid state from a preserved specimen, since he notes that he received the torpid mouse enclosed in a ball of clay from a workman in May 1787. He kept it "until I found it began to smell: I then stuffed it, and preserved it in its torpid position."

Canadian Museum of Nature.



Tupia canadensis.

PLATE SIXTY-FIVE

Thomas Davies
(c1737-1812)

The Falls of Chaudière near Quebec

1787

Watercolour on paper

37.8 x 54.6 cm

Inscription: *T. Davies Pinxit 1787 The Artist*

Davies pictures himself sketching at the foot of the Chaudière Falls. Davies painted another view of these falls in 1792 after he returned to England.

(Plate reproduced from Hubbard, R.H., ed. *Thomas Davies, c. 1737-1812*, [Ottawa]: National Gallery of Canada, 1972, pl. 48.)



PLATE SIXTY-SIX

Peter Mazell (fl. 1761-97)
after Peter Paillou (fl.1744-84)

Frontispiece
1783

Engraving

From Thomas Pennant, *Introduction to the Arctic Zoology* (London, 1792).

Pennant's work was one of the first efforts at zoogeopgraphy and his frontispiece is described as a "winter scene in *Lapland*." The animals are, however, characteristic of the Canadian arctic, and Pennant obtained many of his specimens from his connections with the Hudson's Bay Company.

National Library of Canada, Rare Books Collection.



PLATE SIXTY-SEVEN

Georg Dionysus Ehret
(1708-70)

Dryas tenella (*Dryas integrifolia*)
1767

Watercolour on vellum

33.2 x 23.6 cm

Inscription: *G.D. Ehret pinxit 1767*

The dryas was also collected at Inglie, Newfoundland. Ehret has mistakenly painted the flowers yellow, based on the colouring of the dried specimen. The flowers are actually white.

The Natural History Museum, London.



PLATE SIXTY-EIGHT

B.T. Pouncy
after W. Alexander

VIEWS of PARTS of the COAST of NORTH WEST AMERICA

1798

Engraving
55.0 cm

Inscription: *VIEWS of PARTS of the COAST of NORTH WEST AMERICA*

T. Hoddington del^t The Westernmost of SCOTS ISLANDS... J. Sykes del^t CAPE SCOT... J. Sykes WOODY POINT... H. Humphrys del^t The entrance of NOOTKA SOUND... H. Humphrys The entrance of COLUMBIA RIVER CAPE DISAPOINTMENT... H. Humphrys PUNTO BARRO DE ARENA W. Alexander del^t from Sketches made on the Spot London. Published May 1st by R. Edwards New Bond Street J. Edwards Pall Mall and G. Robinson Paternoster Row Engraved by B. T. Pouncy

From George Vancouver (1757-98), *A Voyage of Discovery to the North Pacific Ocean and round the World...*, Atlas of Plates (London, 1798).

Bernard Smith suggest that the skills naval artists brought to coastal profiles was important in developing the notion of the "typical" landscape, a view of the countryside in which rendering accurately became important.

National Library of Canada, Rare Book Collection.

1. The Commission is of the opinion that the Commission should be authorized to conduct such investigations as may be necessary to determine the extent of the problem and to recommend appropriate measures to be taken to deal with it.

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PLATE SIXTY-NINE

After Aleksandr Filippovich Postels
(1801-71)

Frontispiece: *ALGARUM VEGETATIO*.

Lithograph
69.0 cm

From Aleksandr Filippovich Postels and F. Ruprecht, *Illustrationes Algarum in itinere circa orbem jussu imperatoris Nicolai I* (St. Petersburg, 1840).

One of the most brilliant nineteenth-century depictions of the natural historian. Postels was the expedition artist and also made a collection of algae. His view of the specimens below water and of the scientist and his assistant above with the scenery of the northwest coast for backdrop is startling. Postels' large book is written in Latin and provides full-scale lithographs of the algae collected.

The Library of the New York Botanical Garden, Bronx, New York.

ALCANTARA THERAPEUTIC CO.



PLATE SEVENTY

After Joseph F. W. DesBarres
(1722-1824)

*A View from the Camp at the East End of the Naked Hills... on the Isle of Sable,
Nova Scotia*

c1779

Aquatint
40.9 x 60.2 cm

Inscription: *A View from the Camp at the East End of the Naked Sand Hills on
the South East Shore of the Isle of Sable*

From Joseph F.W. DesBarres, *The Atlantic Neptune* (1780).

DesBarres was an army surveyor who undertook for the Admiralty a coastal survey which resulted in *The Atlantic Neptune*. Like Davies, DesBarres' views of the landscape are fresh and drawn on the spot.

Documentary Art and Photography Division, National Archives of Canada
(1970-188-62; neg. C-40985), W.F. Coverdale Collection of Canadiana.



PLATE SEVENTY-ONE

A Winter View in the Athapuscow Lake

c1796

Engraving
21.0 cm

From Samuel Hearne (1745-92), *A journey from Prince of Wales's Fort in Hudson's Bay to the Northern Ocean...* (Dublin, 1796), p. 248.

Hearne undertook an overland expedition between 1769 and 1772, and was a skilled observer and naturalist. The view of the northern landscape would appear to have been engraved after a sketch by Hearne, capturing as it does the look of the northern boreal forest, though Maclaren points out it is stiff and unnatural when compared to later views by George Back.

National Library of Canada, Rare Book Collection.



PLATE SEVENTY-TWO

Sir George Back
(1796-1878)

Upper Falls of the Wilberforce Falls, Northwest Territories

August 27, 1821

Watercolour
Inscription: *Upper Fall*

From George Back, Sketchbook II, 1821-22.

Like Davies, Back has placed the artist in the landscape, sketching by the side of the falls. Falls and rapids gave the artist time to sketch while portages were being made.

Documentary Art and Photography Division, National Archives of Canada (C-141488, 1994-254-2). Acquired with the assistance of Hoechst and Celanese Canada with a grant from the Ministry of Heritage under the Cultural Property Import and Export Act.



Myia F. H.

PLATE SEVENTY-THREE

Robert Hood
(1795/6-1821)

A Canoe on the Northern Land Expedition Chasing Reindeer in Little Marten Lake, Northwest Territories

1820

Watercolour on paper
25.4 x 38.1 cm

Inscription: *A canoe of the north land expedition in Marten lake, chasing Reindeer, Lt. 64 42'. N. Long 112 5' W. September - 1820 An Indian in the fore ground, creeping towards the deer. Robert Hood. Fort Enterprize. April 1821.*

Hood's luminous watercolour is remarkable for his vision of the north filled with light and life. Hood describes the snow geese which feature so prominently in this view: "The gale brought with it, from their northern haunts, long flights of [snow] geese, stretching like white clouds from the northern to the southern horizon, and mingling their ceaseless screams with the uproar of the wind among the hills."

Documentary Art and Photography Division, National Archives of Canada (C-40360; 1970-188-1275).



PLATE SEVENTY-FOUR

Sir George Back
(1796-1878)

"Common Tops to the North"

1822

Watercolour

Inscription: *Pine Common Tops to the North*

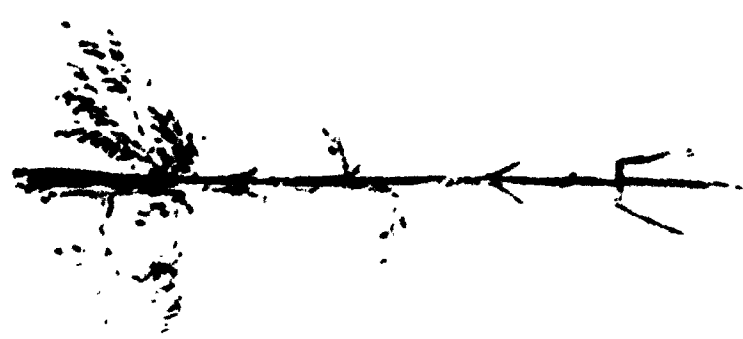
From George Back, Sketchbook II, 1821-2.

Back sketched details which later found a place in his larger watercolours and in the engravings.

Documentary Art and Photography Division, National Archives of Canada (C-141518, 1994-254-2). Acquired with the assistance of Hoechst and Celanese Canada with a grant from the Ministry of Heritage under the Cultural Property Import and Export Act.



2. n. o.



Common leaf
of the Kauri

PLATE SEVENTY-FIVE

Sir George Back
(1796-1878)

Northeast view of Great Slave Lake from Fort Providence, Northwest Territories

November 10, 1820

Watercolour

11.3 x 17.8 cm

Inscription: *NE View of Great Slave Lake Novem 10 1820 GB*

From George Back, Sketchbook I, 1819-20.

Waiting for the lake to freeze, Back has time to paint a series of sketches of Great Slave Lake from various compass points.

Documentary Art and Photography Division, National Archives of Canada (C-141432, 1994-254-1.41R). Acquired with the assistance of Hoechst and Celanese Canada with a grant from the Ministry of Heritage under the Cultural Property Import and Export Act.



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National Archives of Canada, Ottawa

The Natural History Museum, London

National Library of Canada, Ottawa

New York Botanical Garden, Bronx, New York

Nova Scotia Museum, Halifax

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