

**BETWEEN THE BOARDS: COLLECTIONS, COMPILATIONS, AND
CURIOSITIES FROM THE JOHN CRERAR COLLECTION OF RARE BOOKS
IN THE HISTORY OF SCIENCE AND MEDICINE**

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INTRODUCTION

"Between the Boards" presents the role of the book form in collecting, classifying and conveying knowledge. As with so many objects that we use on a daily basis, our familiarity with books leads us to overlook their flexibility and complexity. In routine interactions, we use the codex (the form of folded sheets of paper, parchment or other materials; attached at the spine and usually protected by a cover or binding) as a highly convenient container for texts of all lengths and subjects. Theological, scientific, literary, legal and educational writings; records of business and official transactions; diaries, journals, albums, anthologies, sketchbooks and scrapbooks; encyclopedias, dictionaries and other reference sources, often with maps, charts or other illustrations, are among the many types of works we expect to find "between the boards."

The processes of book manufacture and distribution have been transformed several times since the codex replaced the roll nearly 2,000 years ago. Although these developments caused profound changes in the availability and cultural impact of books, handwritten and printed books alike continue to function as efficient structures for delivering works to readers. This ubiquitous physical object also has the capacity to serve more subtle and varied purposes. Foremost among these is preservation: copying a manuscript greatly increased the likelihood of its survival, and printing was hailed as "the art preservative of all arts" soon after its invention.

In addition to disseminating and preserving texts, the material form of a book actively shapes the reader's experience and contributes to its intellectual content. The physical structure allows for pages containing illustrations, folding tables or devices with moving parts, handwritten or pasted-on slips of paper and other materials to be bound up together, facilitating consultation and comparison of ideas and images presented in the book. When separate texts are combined together in one book, as in an anthology or the collected works of an author, the juxtaposition creates new relationships among the individual works. A book that has been annotated or otherwise "altered" by its readers, perhaps over several generations, creates layers of memory and meaning, not unlike an archaeological site. The binding of a codex, intended to protect its contents, also creates boundaries; the book form thus provides a tangible means of delimiting seemingly infinite ideas or topics and helps to define the universe enclosed within it. In the process of organizing the text and its parts, authors use books to structure and impose order on their subject matter. The act of publishing a letter announcing the discovery of a new world, or the results of a scientific experiment, is a way to stake a claim to physical or intellectual territory by taking a private form of communication into the public realm.

The physical structure of the book thus offers authors, compilers and readers opportunities to present and preserve information tailored to their unique purposes. Since these basic functions emerged early on and endure, the organization of "Between the

Boards” creates a typology, rather than following a chronological sequence. The exhibition opens with two groups of books that show strong parallels between books and collections. The first, "Curiosity in Context," considers printed catalogs of collections, illustrating how the book form has been used to provide permanent integrity for a group of objects that has been dispersed. In the second section, "Collecting By the Book," the book itself is the collection -- of actual specimens or reproductions -- and a vehicle for encompassing the universe of its subject. "Visible Hands" looks at how books are created, altered and appropriated by individuals; while "Picturing the Text" examines illustrated books that function as tools for various arts and sciences.

All items referred to in this Introduction are identified in the Checklist.

CURIOSITY IN CONTEXT

Amassing a collection of objects can be motivated by status or study, entertainment or empire. In the early modern period, objects of "curiosity" or "wonder" were collected as part of growing interest in the new and unknown as well as the desire to possess scarce and valuable artifacts. Books often formed part of these collections, displayed right alongside other objects prized for their rarity and monetary value. The concept of "curiosity" is an ambivalent one, describing both the inclination to delve into the arcane or obscure and the objects of such investigation. Today we value "curiosity" as a sign of a lively mind and adventuresome spirit, but early moderns also saw the dangers inherent in pursuing forbidden areas of knowledge. The collectors of the 16th, 17th and 18th centuries who formed cabinets of natural and manmade objects emphasized the unusual and rare. They eagerly bought artifacts and fabulous specimens brought back by travelers to foreign lands, the more "curious" the better. If their enthusiasm sometimes caused them to believe fraudulent claims about the objects, it also paved the way for speculation to be replaced by observation.

Collections formed by early naturalists often served practical purposes. The great naturalist Ulisse Aldrovandi used his collection of natural history specimens for teaching in his native Bologna, in conjunction with the botanical garden he founded there. Ole Worm, a Danish physician and antiquarian who had visited Aldrovandi, followed him in using his collection for teaching and emphasized its use for study. Albert Seba, an apothecary, began his collection for professional reasons, to acquire ingredients for the manufacture of medicines, although the passion for collecting soon took over.

In deciding what to collect and protecting their collections, the activities of collectors influence what is saved of our culture and history. Thus it is not surprising that so many collectors – of books, art, antiquities, natural and manmade objects – seek to achieve permanence for their collections through a published catalog. The publication can also fulfill scientific purposes by presenting the collection according to an organizational schema that may have been lacking in the physical installation. Especially when the collector aimed to be comprehensive or contribute to understanding, the catalog records the state of knowledge for its era. Often illustrated works produced at great expense, requiring a patron or other subvention, sometimes even the sale of the collection, to fund the publication, the catalogs themselves have become rare books sought by collectors.

The posthumously published catalogs documenting collections formed by Aldrovandi, Worm and Seba use the printed book to preserve the integrity and accomplishment of the collection and open the doors of a private collection -- or "museum" -- to a specialized audience dispersed over place and time.

1A.

Apothecary and collector Albert Seba amassed his natural history collections by offering medicines and treatments in exchange for specimens to sailors and others returning to Amsterdam from far-flung journeys. After his death, his family sold the collection to fund completion of the catalog. He is shown in this frontispiece portrait holding a jar containing a preserved snake; preserved specimens line the shelves behind him. He points to shells on a table, on which also lie loose sheets of drawings and a bound volume. Seba calls attention to the process by which his collection is preserved for posterity, successfully enough that years later, Carl von Linné frequently used the catalog in his work devising the taxonomic system for plants and animals still in use today. Linné had visited Seba and studied his collection as a medical student in Amsterdam.

1.

Although printing was well established throughout Europe by the mid-16th century, early naturalists remained in awe of its power. "It is incredible but true," wrote the great naturalist, Aldrovandi, "that one man alone can print more in one day than even the quickest writer could scribble in two years." Aldrovandi amassed a vast collection of specimens that he called "my microcosm." He saw print as a means of preserving his work for posterity and went to great efforts to find patrons to finance his natural history publications, which contained illustrations of specimens in his museum and botanical garden. Two years before his death, he obtained an agreement to give his collection to the city of Bologna in exchange for city-sponsored publication of the rest of his natural histories. It was a vast undertaking; by 1667, eight more of his books had been published. Thus Aldrovandi succeeded in securing the permanent existence of his collection in book form. Though it was famous enough to attract admiring scholars and visitors from all over Europe during his lifetime, it was as a book that Aldrovandi's collection reached its widest public.

2.

Along with other eager collectors of curiosities, Danish physician and antiquarian Ole Worm was susceptible to believing claims about things too good to be true. But he used the fakes and fabulous objects in his collection to advance understanding, for example to prove that straight horns were not from unicorns but from a species of arctic whale.

The catalog of Worm's collection was similarly intended to promote study, rather than to satisfy "curious ladies and cavaliers." In his preface Worm referred to "the establishment of a natural collection formed with the clear intention to lead towards knowledge by direct observation and away from hollow verbiage." The natural history collection formed by Ole Worm was absorbed after his death into the Royal Kunstkammer by King

Frederick III in Copenhagen, where it later formed the basis for the National Museum of Denmark.

3.

Seba prided himself upon the extent and rarity of his collection, which he had painstakingly brought together by frequenting the Amsterdam docks, offering medicines and treatments to sailors in exchange for specimens brought back from their journeys. An apothecary, Seba supplemented traditional recipes with his search for new ones, studying and testing raw ingredients from faraway places. Seba's medicines were famous enough that Peter the Great of Russia had them sent to him. In 1717 the Czar visited Seba in Amsterdam and bought the entire collection. Seba immediately began to collect again, and his second collection formed the basis for this publication. He commissioned artists to make drawings and had them published as copper engravings along with his own commentary. After Seba's death, his family sold the collection to fund completion of the publication.

COLLECTING BY THE BOOK

Some volumes transform the metaphorical "book of nature" into reality by actually collecting the world of nature "between the boards." Naturalists frequently used the book form for taxonomic purposes: describing and illustrating exemplars from many places, whether or not they were ever collected together, makes it possible for others to study and compare them. The book itself becomes a collection, filled with exquisite and detailed reproductions, such as the ones depicting birds' eggs collected by Jacob Klein and the shells and mussels drawn by Franz Regenfuss. More surprisingly, actual specimens have been collected in book form, producing a portable museum or herbarium. Such uses challenge our definition of a book: Does the presence of a printed title page and captions in the volume containing lichens collected by Edward Tuckerman mean that it is a "publication"? How can readers be sure that all of the specimens in each copy of the book compiled by Tuckerman are the same, or have remained so over time? Does the absence of any printed information within the boards surrounding Nicholas Senn's plants and Alexander Braun's algae make them "scrapbooks"?

Graphic reproductions of specimens, such as the hand-colored engravings of moths and butterflies in Jacob Hübner's compilations, can be of breathtaking beauty and astonishing detail. Jan Sepp explicitly intended his book depicting wood samples from all over the world to serve as a "collection" for those who could not afford to form a physical one like the cabinets of kings and princes. The 19th century abounded in efforts to reproduce nature ever more faithfully, and the technique of "nature printing" represents a bridge between the world of graphic reproduction and the collected specimen. Examples in works by Alois Auer and Sherman Foote Denton display the potential and deficiencies of nature printing, which never achieved a commercial success. Although in the 19th century photography made "objective" reproductions possible, Romeyn Hough's *American Woods* testifies to the continuing interest in collections of specimens and exemplars to serve specialized purposes.

Encompassing an entire world in book form serves scientific goals, but it also has been used for nationalistic and imperial aims. Constantin von Ettingshausen paid tribute to the Austrian empire by bringing together botany of the realm. The massive *Description de l'Égypte* represents an effort to conquer and classify Egypt through meticulous documentation of its past history and present civilization. While Napoleon's imperial ambitions failed, the resulting study had profound scientific and cultural importance. It also created an encyclopedic compilation of design motifs, as did many of the natural history books. In art nouveau portfolios such as those by Ferdinand Luthmer and Richard Kühnel and Hugo Sachs, natural specimens are the source of stylized patterns based on organic forms. The "book of nature" is transformed into a source of inspiration for designs and decorations.

4.

Hand-colored engravings showing subtle variations of birds' eggs. Jacob Klein served as Secretary of the Senate in Danzig and founded a botanical garden there. He collected natural history objects to further his interest in taxonomy and was the first to use binomial nomenclature for molluscan classification. Klein believed that classification must be based on external characteristics; he vigorously opposed the Linnean classification system because it did not adhere to this method (see **Case/Item No. XX**).

Klein's emphasis on visible elements made the illustrations in his books of particular importance. This work on birds' eggs, an effort to encompass the known world of birds' eggs in one place, allows comparisons between different specimens.

5.

Regenfuss was a German painter and engraver who drew and engraved 12 exquisite illustrations of shells, which were hand-colored by his wife. The shells are arranged symmetrically, in accord with the 18th-century style, although not in the bizarre decorative schemes fashionable with some collectors. Regenfass planned a scientific text to accompany the plates and halted publication when he was unsatisfied with the initial results; he ultimately relied on several contributors. The work does not represent a major advance in conchology: most of the shells had been described in earlier works, and it is not systematically arranged. Regenfass solicited subscriptions for the publication and received subventions to complete his work. He had difficulty arranging for publication until he was appointed engraver to Frederick V, King of Denmark, who financed it. The folio may be the largest work on shells ever produced, and it succeeded largely because of its size and the quality of the illustrations. The John Crerar Library report on the acquisition describes the book as a "a classic on the subject of shells and mussels [and] a great rarity in the literature of conchology."

6.

Tuckerman was a botanist who participated in early U.S. exploring expeditions: he wrote the section on lichens for the report published after the expedition sent out under Commander Charles Wilkes (1838-42). At that time, the United States was expanding

explorations, combined with collecting specimens from all over the world, such as the old world had been conducting for centuries.

He produced his monograph on American lichens by mounting specimens onto paper with printed labels and title page, blurring the line between a collection and a printed book: the collection exists only in the book; and though multiple sets were published, each one contains individual specimens. Tuckerman's herbarium still exists and is located at the Farlow Herbarium of Cryptogamic Botany at Harvard University.

7.

Nicholas Senn was a renowned Chicago surgeon and an important book collector. Like some of the early naturalists, he collected specimens both out of interest and for possible practical applications. Senn's collection of plants is mounted on paper with handwritten labels and arranged according to the months of the year, rather than by a taxonomic classification scheme. This organization brings together plants that grow simultaneously, and records the times at which different plants flower, rather than indicating any physical resemblances between them.

There is no printed material in this book; it is absolutely unique. The portfolio once had leather straps to hold the pages together. Clearly it was much used and added to, and pages could be carried into the field by the collector or naturalist: the book becomes a functional format.

8.

Alexander Braun, a German botanist, was professor of Botany in Karlsruhe, Freiburg, Giessen and Berlin. This book, put together by Braun and his colleagues Ludwig Rabenhorst and Ernst Sitzenburger, contains individual algae specimens loose in folded paper envelopes that are pasted to unbound sheets of paper. Printed labels give the details for the specimen in Latin and record where and by whom each was found.

9.

Hand-colored engravings of larvae by Hübner, who collected moths and butterflies and made drawings, which he then engraved, of them and their habitats. Hübner, who showed an early talent for drawing, was apprenticed to an etcher in Augsburg but pursued a career as a designer in a cotton factory.

By Hübner's time, the increase in named species had created a need to distinguish closely allied ones. He combined the skill of a draughtsman with the knowledge of an entomologist in his accurately colored and detailed drawings. Hübner published his work in sections, or fascicles, beginning in 1793; Carl Geyer added 41 plates to this study of European larvae after the author's death. In other works, Hübner portrayed the insects themselves.

Hübner's vast compilations of illustrations made it possible to identify and distinguish closely allied species, facilitating the development of a more precise and systematic nomenclature for lepidoptery. But since the date of publication for each fascicle is hard to

establish and the plates are not numbered, it was difficult to determine when a particular species was assigned to a given genus. A major bibliography published in 1937 attempted to address the problem. The epitaph on Hübner's tombstone identifies him as "Naturforscher" or nature researcher, and observes that "Immortality is a great thought; it is worth the sweat of the brow of nobles."

According to the Crerar annual report, a set of Hübner's "inimitable works on butterflies" was long desired by the Library before a bookseller, Johannes R. Loewe, procured one for them in 1935.

10.

With photography in the 19th century came an entirely new focus on objectivity in illustration, along with a desire for images that were more true to nature than dried specimens in a natural history cabinet. New printing techniques and new ways of disseminating collections of original specimens were pursued, often at great expense and effort, with the goal of achieving accuracy and fidelity to nature not possible with traditional graphic reproductive processes.

Denton wrote, "It is the aim of the present work to represent our native butterflies and moths not as dried and mutilated specimens in a cabinet, nor as dissected fragments for scientific classification, but as one sees them in our woods, fresh and lovely." He calls the process that makes this possible "nature prints." He explains in his preface: "The colored plates, or Nature Prints, used in the work, are direct transfers from the insects themselves; that is to say, the scales of the wings of the insects are transferred to the paper while the bodies are printed from engravings and afterward colored by hand."

Denton adapted the process of nature printing by combining actual specimens and engravings to overcome some of the limitations inherent in the standard process. The limited edition contains 59 "transfers from life" in each three-volume copy, in addition to copious photographs. Denton made at least 29,000 transfers to complete the edition of 500 copies, and in his preface he claims that 50,000 were necessary in the end.

In 1939, the John Crerar Library acquired a special version of Denton's work, produced for Alice Steele Cheney of Boston. The set includes nine "extra" volumes, entirely composed of "Nature Prints" with handwritten labels, covering the butterflies and moths of tropical and sub-tropical America, Europe and "the Orient." This luxury edition illustrates that the "boards" can enhance the experience of what is between them: the bindings of the additional volumes are decorated with exquisite gold tooling of butterflies on green morocco, and the paste-down endpapers are of green silk brocade.

11.

Sepp presents a collection of hand-colored, engraved samples of wood from all over the world. Included are woods used for all purposes, such as building houses, ships and furniture; producing dies and medicines. Sepp compiled examples of woods that had been previously reproduced and others new to his publication; and issued them with a description and indexes by M. Houttuyn in Dutch, German, English, French and Latin.

Sepp is acting as a collector in his role as publisher: the samples never existed in one place or in his possession.

Sepp argues for the beauty not only of flowers and herbs, but for the wood of trees and shrubs, when “work’d and polish’d;” and he suggests that the book is an economical substitute for a physical collection. He explains that he intends his ersatz collection of wood in book format for those other than royalty and nobles: “We have at present a *Collection of Wood* very neatly and exactly represented in Copper-plates (being the first to this day and the only one of this Kind) carefully colour’d to nature and now under the view of the Lovers of Natural History.”

In this manner, Sepp extends the experience of a collection fit for kings and princes to the lover of natural history, no matter his station in life. Of course Sepp’s book itself has itself become a precious and rare object, undermining his popularizing intent.

12.

Romeyn Beck Hough emphasizes the ecological and national importance of trees over mere beauty: “The necessity of more generally diffused information concerning the variety and importance of our forest trees is justification enough for the appearance of this work, especially at this day, when the demands of Forestry in this country are constantly more and more keenly felt.”

He developed a system of slicing wood so thinly that light passes through them, illuminating the grain. For each sample of wood, Hough presents three sections: a transverse, a radial and a tangential cut, in order to give a full sense of each specimen.

13.

Auer, director of the Austrian government printing office, wanted to create a printing process that offered both speed of production and utmost fidelity to the individual specimen. He and his partner Andreas Worring invented a printing technique, *Naturselbstdruck* — “self print of nature” or “natural self-acting printing-process” — that had its origins in techniques used by Leonardo da Vinci and others. The process involves making a plate for printing by compressing specimens between lead and copper plates.

The title page of Auer’s treatise, printed in four languages, describes the benefits and applications they expected:

An Invention for creating by means of the Original itself – in a swift and simple manner – plates for printing copies of Plants, Minerals, Lace, Embroideries, Originals or Copies, containing the most delicate profundities or elevations as not to be detected by the human eye . . . without the aid of drawing or engraving.

Auer’s claims for his invention are grandiose, amounting to a bid for international recognition of a new and exciting technological development on the part of an old and moribund empire. He applauds the imperial decision to turn the patent over for the

benefit of the public and declares that: “Three important moments are prominent in the history of the civilisation of the nations with regard to the press – the invention of writing – Gutenberg’s artificial mode of printing – and the discovery, how Nature itself furnishes a process for printing.”

14.

Melica nutans and *Melica uniflora* are species of European woodland grasses. Constantin von Ettingshausen was professor of botany and mineralogy at the imperial medical and surgical academy in Vienna. The scope of this work is the botany of the Austrian empire, presented to illustrate the nature printing process. Ettingshausen claims glory for the empire and the emperor because of the ‘fatherland’ invention, and he puts it to imperial purpose: to represent the lands of the Austrian empire by encompassing its botany in one place. *Physiotopia* was printed at the Austrian government printing office, where the nature printing process was invented, and was intended to present a useful application of the new process.

The authors claim that they have been able to devise a new classification system as a result of the new printing process – that it will now be possible to identify plants not just by blooms and fruits, but by their leaves, or even by fragments of the leaves — because *Naturselbstdruck* allows the detailed study of the surface organs and nerve systems of leaves.

Despite the authors’ claim that improvements in the process will make a new classification system possible, nature printing never achieved widespread use. These “true-to-life” representations are certainly more stable and lasting than actual specimens.

However, many of the claims made for the process are over-blown or counter-intuitive. Naturalists, who disdained nature printing for its distortion and inability to display texture and several parts of plants, preferred the artistic rendering of fine detail possible with copperplate engraving. Also, the color in nature prints is quite arbitrary, simply applied as ink to different parts of the plate. Ettingshausen decided against color, so that his “multiple originals” fade in the monotone sepia ink of his ferns and grasses. Despite the ultimate impracticality of the process, the prints are starkly astonishing.

15.

Throne with an ornamented cushion, from a plate depicting several examples of furniture found in the tomb of Rameses III. Napoleon’s unsuccessful mission to cut off France’s rival and enemy, England, from her overland route through Egypt to India resulted in one of the most ambitious projects in the history of printing. Even with subventions from the new Emperor Napoleon, publication took 30 years. By the time it was completed, Napoleon had gone from general to emperor to exile, and most of the artifacts eventually went to the British Museum after the British sank the French fleet and destroyed the French mission to Egypt.

The *Description de l'Égypte* is the product of attempted collection, classification and colonization of an entire country, ironic in its magisterial representation of conquest because, ultimately, it was the only record for posterity of France's imperial ambitions. But the *Description* had lasting impact, fulfilling the aims and discoveries of the Institut d'Égypte, including preservation of the pre-excavation appearance of many archaeological sites. And the *Description* sparked a Europe-wide "Egyptomania," which inspired countless new directions in industrial design.

The illustrations of chairs found in the tomb of Rameses III demonstrate multiple purposes for the work. Each chair is represented rigorously to scale, and the text explains the possible iconographical or metaphorical meaning of design elements. The artists assert that the chairs were "all copied faithfully" and that "if one wishes to construct them at full-scale, one will be served exactly by the designs." The *Description* began as a systematic record of a country, including natural history, the modern state and antiquities in its scholarly scope. But it was co-opted as a design manual, transforming its function from preservation to inspiration, a transformation which 19th-century industrial arts effected with natural history specimen books as well.

16.

The art nouveau pattern book uses organic specimens as the basis for creating an entirely stylized world beyond the confines of the book. In *Blüthenformen*, flowers are source materials for surface ornamentation, and the single specimen becomes a stylized design. Art nouveau – a new art for a new century – drew on the natural world, unfettered by the historicist fads of the 19th century and unrestrained by classical forms. The defining features are evident here: long sinuous curves of flower stems, filaments or insect feelers, undulating lines that intertwine and cover surfaces asymmetrically.

17.

Neue einfache Ornamente incorporates floral and organic elements into decorative schemes that could cover any surface: textile, ceramic, glass. As one of the pioneers of art nouveau, Siegfried Bing, explained — "nature is a big book from which we can draw inspiration." The book of design transformed and contained the book of nature.

VISIBLE HANDS

Medieval scribes left their marks on manuscripts in every word they transcribed, and sometimes they wrote their names and other details of their labors in colophons at the end of the book. Although scribes introduced intentional and accidental changes to the texts from which they copied, creating puzzles that generations of textual scholars strive to solve, their work was intended to be invisible. Individual owners, readers and compilers of books are not so constrained; and their "visible hands" often create or alter meaning. Printed books with additions by individuals become unique objects and sometimes stretch the boundaries between manuscript and published work.

Commonplace books, with origins in the classical era, consist of quotes or other materials copied down from other writers, often combined with personal thoughts and reflections. During the Renaissance, commonplace books helped students and others to organize their

reading and study. With the expansion of newspapers in the 19th century, printed information and illustrations became available to a mass audience; and individuals could select, compile and organize items of interest to them in books. Creating a scrapbook brings together many different formats – newspaper and almanac clippings, letters, photographs, programs, advertisements, menus, tickets and samples – into a book. Whether created to commemorate a personal or historic event, to record the life of a family or document a subject, a scrapbook is the result of an individual act of collecting. A detailed manuscript of instructions and diagrams for manufacturing silk fabrics with samples, and a scrapbook compiled by aviation pioneer Octave Chanute, suggest the range of personal, collective, industrial and institutional uses of scrapbooks.

Book owners affix bookplates, write their names on title pages and elsewhere, and use inside covers, flyleaves and other open areas as spare notepaper. Readers underline and annotate texts with reactions and references, creating a one-sided dialogue with absent authors. When the reader has made important contributions to the same field, as is the case with Gaspard Bauhin, who annotated his copy of Jacobus Theodorus's *Eicones plantarum*, such "graffiti" provide clues to influences. Authors send copies of their works to colleagues, sometimes inscribed with notes that reveal a professional relationship, and they mark up copies of their texts for subsequent editions, allowing us to scrutinize the places where revisions and additions were made. Revisions to Carl von Linné's *Species plantarum* and Nicholas Senn's *Surgical Bacteriology* reveal extensive development over the course of several editions. Binding previously published writings into one or more volumes, as the Crerar Library did for Emil Du Bois-Reymond, creates a set of "collected works" that includes articles and offprints. And when a manuscript or book is passed down through generations, with each owner or user making further contributions, as was the case with John Martin's "Book of Receipts," the book becomes a space for collected memory or an archaeological site. In each of these examples of "visible hands," the appropriation of the book for unique purposes confers upon it an afterlife unforeseen by the author and illustrates that the book is indeed a capacious and organic artifact.

18.

Instructions for producing a cashmere shawl, from a textile design manual for manufacturing silk fabrics. The manuscript defines silk weaving terms and explains techniques for the production of particular fabrics and patterns. The samples collected in this book, one of several similar volumes in the Crerar manuscript collection, together with the text and technical drawings, create a specimen book for industrial, loom production.

19.

Octave Chanute was a veteran railroad engineer who had a lifelong fascination with the possibility of flight. He chaired an international conference on aerial navigation at the 1893 World's Columbian Exposition in Chicago that helped to legitimize flight research and experimentation. The Wright brothers and Chanute worked together in the 1890s; he visited Kitty Hawk and they came to Chicago to present their work in 1901. Chanute's experiments took place in the Indiana Dunes, south of Chicago; in

1896, seven years before the Wright brothers' historic flight in 1903, Chanute designed and successfully flew a biplane glider, the most advanced aircraft in the world at that time.

Chanute actively collected materials on engineering and flight, and he donated much of his library to the Crerar as well as arranging for the Western Society of Engineers to donate their books to the Library in the 1890s. Chanute's scrapbook brings together offprints, photographs and diagrams of flight research and experimentation, between 1873 and 1923, from the United States, England, France, Germany and Italy. It also includes related correspondence, handwritten notes and articles on the subject. The ordering mind of a collector here traces a history of an industry – flight – by compiling contemporary materials into a book.

20.

Marginal annotations provide material evidence of a book's use and possible influence. Often tantalizingly anonymous, when by a known and noted hand, marginalia provide insights into the reader/annotator's own work. Gaspard Bauhin (1560-1624) was from a family of Swiss anatomists and botanists. His greatest contribution was to reform the nomenclature for both fields, assigning practical names to parts of plants and anatomy that were useful enough to be adopted throughout Europe, allowing for a standardized scientific vocabulary.

Theodorus was a German physician whose herbal, *Neuw kreuterbuch*, took 36 years to produce. This edition includes only the illustrations, which were based on those in earlier botanical books, with the Latin and German names of the plants. The oblong format and generous margins suggest that it may have been intended for use as a field guide for plant identification. Bauhin made excellent use of the white space as he worked out his own system of nomenclature.

21.

Annotations reveal the life of a book after its publication; they are traces of the book's use or its metamorphosis into something new. The notes, possibly in the author's hand, in this second edition of Linné's *Species plantarum* transform a printed book into a unique manuscript.

By the 18th-century, existing systems of scientific classification were insufficient to cope with all the new materials resulting from increased exploration and collection of plants. *Species plantarum*, first published in 1753, was the first work to succeed in classifying all known plants with a single, universal system, using binomial nomenclature. It includes Latin descriptions for nearly 8,000 plant species from around the world. Linné's system was simple, practical and easily applicable to new specimens.

Linné viewed the universe as an enormous collection to be described and fit into a framework, and his life's work was devoted to cataloging and classifying that all-encompassing collection. His great contribution to botany was to devise a taxonomic system arranging plants according to their sexual system. He established three systems

— for the plant, animal and mineral kingdoms — to enable description and comparison of the entire natural world.

Henry Probasco, whose book collection came to the Crerar from the Newberry Library, acquired a number of books that belonged to important individuals. Provenance, or former ownership, and association between two distinguished figures in such books gives historic and emotional significance to the markings left in them by their owners.

22.

Nicholas Senn, whose herbarium in book form is also in this exhibition (**item/case XX**), was probably the best known American surgeon of his time. He was born in Switzerland and emigrated with his family to the United States in 1852. Senn entered Chicago Medical College in 1865 and lived in Chicago from 1893. He was a medical teacher as well as a surgeon, ultimately serving as professor of military surgery at the University of Chicago. Senn published more than 300 medical texts, including *Surgical Bacteriology*; this unique copy is extensively annotated for a later edition.

Senn formed one of the largest medical book collections in his day, acquiring a number of libraries owned by earlier scholars and physicians such as Wilhelm Braum and German physiologist Emil Du Bois-Reymond. Before the Newberry Library's medical department was established, there was no substantial medical library in Chicago, and Senn made his collection available to students and colleagues. He began to add his collection to the Newberry beginning in 1893 while continuing to acquire materials for it. At the time it was transferred from the Newberry to the Crerar, Senn's collection was numbered at 10,689 volumes and 14,501 pamphlets.

23.

Along with Ernst Brücke, Hermann Helmholtz and Carl Ludwig, Du Bois-Reymond was one of a group of pioneering 19th-century German physiologists. They sought to prove that all processes in an organism could be explained and demonstrated by physical, molecular and atomic mechanisms. Du Bois-Reymond's particular specialty was electrical phenomena. His groundbreaking research was matched by his writing and publishing activities – he founded and for years edited the German physiological journal, *Physiologie und wissenschaftliche Medizin*.

Du Bois Reymond had a strong humanistic education and interests. From the 1870s on, many of his publications addressed the natural sciences and their relationship to the humanities, especially philosophy, theology and history. Du Bois-Reymond wrote important articles on Voltaire, Diderot, Goethe, Darwin and Copernicus. His views were often unorthodox and sparked heated debate among both scientists and the general public.

Emil Du Bois-Reymond's library was acquired by Nicholas Senn and transferred from the Newberry to the Crerar in 1906. Libraries sometimes create a completely new book, or collection, of published works by binding individual pamphlets together for ease of classification or shelving. This volume from Du Bois-Reymond's library contains his speeches, papers on physiology, commemorative talks and lectures on the humanities. A

number of the pamphlets have extensive annotations, some perhaps incorporated into the collected volume of his speeches published in 1886.

24.

Recipes for preserved fruits, pastes and butter. Levis, an American businessman, lived for many years in London, where he collected more than 900 books on the subject of food. Approximately 500 books were purchased by the Crerar in 1940, dating from the 15th to the 19th centuries and ranging from books on gourmet foods and culinary history intended for aristocratic readers to everyday cookbooks.

This recipe book was handed down for several generations in one family before it was acquired by Levis and then by the Crerar Library. Several family names are inscribed on the covers, with dates ranging from 1715 to 1897, and the recipes are written in many different hands. The manuscript documents the history of a family through its use of a book.

The book is in a handy format and contains recipes for household preparations, cakes, ales, puddings and meats, for example: "Artificiall Clarett," "Aqua mirabilis," "Inke for my own use," "White Mead" and "Mrs. Warwicks seed cake." It includes recipes as well as remedies, demonstrating that the natural world, especially botany, bridged the two realms of cooking and healing in early science and medicine.

PICTURING THE TEXT

Images, such as the ones in most of the books in this exhibition, can inform, instruct and delight. In describing our aggressively visual culture, critics have pointed out that pictures, too, are texts, that "visual literacy" is a special skill and that we must learn to read pictures as well as words. The ability to produce printed pictures was well developed by the late 15th century, and scientific and technical books depend heavily on information conveyed through illustrations. When illustrations are added to a literary work, they can clarify and help readers understand the author's meaning. Through the hands of different illustrators, the same text has a range of interpretations and appeal to diverse audiences. Some books are made up solely of images, or have no text other than what is needed to identify the pictures. A familiar example is the "atlas," a collection of terrestrial or celestial maps. "Anatomical atlases" contain detailed images that map the human body.

Pictures can demonstrate what is to be performed in books that are "tools" for specialized or popular audiences. In such books, visual representation is an integral part of the pedagogical or practical purpose of the text. The diagrams in the earliest known carving manual, *De sectione mensaria*, were intended for practical use, although they appeal to us as stunning abstractions. Anatomical atlases that go to great lengths to achieve accuracy of detail, such as Govard Bidloo's *Ontleding des menschelyken lichaams* and the engravings of human and animal skeletons by Filippo Napoletano, were often used by artists.

Comparisons between physical and electronic books often cite the ability of the digital form to involve the reader in constructing meaning and to provide for an interactive experience. While this is true, it obscures that fact that books have always engaged readers directly and often physically. Books with moveable parts or pop-up constructions, and flap books, go back to the manuscript era, and soon appeared in print. By the late 19th century, advances in color reproduction and paper and printing technology had made it possible for them to be produced inexpensively, and moveable books ranged from children's literature to demonstrating the intricate workings of the human body and industrial machinery. *Dr. Minder's Anatomical Manikin* and Apian's *Cosmographia* are excellent examples of the book form as an effective and enjoyable medium for popular instruction.

Strategies for selecting, preserving, organizing and presenting information “between the boards” of books, the subject of this exhibition, are also fundamental to the work of research libraries. In some ways not unlike private collectors who formed cabinets of curiosities, the John Crerar Library collected materials in all formats, and from all times and places, considered useful and pertinent to a comprehensive collection within the Library’s scope. Items of great wonder abound, a selection of them on view in this exhibition. "Between the Boards" illustrates that within context, such “curiosities” are an essential part of understanding and learning about our world. Rare book collections such as the one formed by the John Crerar Library remind us that as libraries are reshaped by the co-existence of print and electronic resources in the 21st century, we need to preserve the mix of the standard and unusual that make research library collections as varied and complex as the book itself.

28.

Illustrations showing how to hold a carving knife and carve a chicken. This rare, early carving manual contains 48 striking woodcut drawings for the carving of fowl, meats and fruits. The diagrams are striking designs, but they have a practical purpose. Each image depicts an explanation in the text and serves as a guide or teaching aid.

Like anatomies and other books designed to function as tools for learning or experimentation, the manual visually represents what the reader is preparing to do. The carving manual thus forms part of a group that includes anatomies, which train students for dissections, or remind them of details in the absence of specimens; and books with moving parts. All of these books encourage readers to interact with the illustrations.

29.

This striking and disturbing baroque anatomical atlas was produced by Dutch physician Govard Bidloo, who was appointed physician to William III of Orange in 1701. The 105 plates were drawn by the painter Gérard de Lairesse, who combined details of everyday life with all the paraphernalia of dissection.

Since they were expensive to produce, anatomical illustrations were frequently reused or copied, often with significant deterioration in quality over time and place. The plates in Bidloo's work were sold and used in an anatomy written and published by William Cowper (1666-1709). Bidloo believed Cowper was translating his book into English; when he saw a copy of the published version, giving him no credit at all, he wrote to the Royal Society in London, angrily demanding that they deprive Cowper of his membership. But Cowper's book had been published by the Royal Society's official printers, and they took no action on the plagiarism.

This is an artist's anatomy, a tool not for cutting the body, but for representing it. The array of illustrated equipment includes pins, nails, ropes, ties and blocks, unsettling for viewers accustomed to schematic images of the human body. Despite his insistence upon the trappings of the dissection theater, the artist arranges the dissected bodies in metaphorical poses, in a strange juxtaposition of art and science. Bidloo's anatomy represents what later, popular books allow the reader to simulate by opening the illustration itself, lifting flaps to reveal hidden layers.

30.

A human skeleton bearing a large banner, the first in a series of 17 engravings of human and animal skeletons that are considered among the earliest and most interesting graphic contributions to comparative anatomy. Each plate includes a Latin distich characterizing the animal, among them horse, hedgehog, rabbit, bat, camel, crow, goose, heron, tortoise and carp, and its vernacular Italian name.

The collection of prints belonged to the anthropologist Johann Friedrich Blumenbach, who was instrumental in showing the value of comparative anatomy. According to Blumenbach, the original skeletons were made by a German taxidermist, Theophilus Molitor. Napoletano's forthcoming publication was mentioned in a letter from Johann Faber, physician to Pope Urban VIII and friend of many scientists, to Galileo, on January 18, 1621. On November 27, 1621, Faber received a letter thanking him for sending the plates, putting the date of publication as sometime in 1621.

Blumenbach had the prints bound into book form, mounted on pages with printed captions, much like Renaissance collectors who formed portfolio collections of prints and engravings for ease of storage, study and display.

32.

Anatomical model illustrating various layers of the body. Moving parts were a feature of early books, and 19th-century advances in printing made it possible to produce them for a mass audience. Anatomical flap-books generalize for teaching purposes and are intended to popularize understanding. By manipulating the illustrations, the reader opens the body and effortlessly gets beneath the skin.

These books represent a single specimen, a single body, with several layers, rather than providing many specimens or different views. We can look inside the body, move from

surface to interior, through different levels. The format offers literal depth, rather than breadth, of knowledge.

34.

The motor and the submarine also can be dissected. These layered flap-books illustrating the gas motor and submarine are identical to the format used for viewing the body. Intended to increase popular understanding of technical phenomena, they allow readers to investigate the different parts of complicated industrial machinery, to observe both interior workings and their relationship to the exterior.

35.

In early books the individual components of moveable parts, or volvelles, were printed on sheets of paper tipped into the volume to be put together by readers with string and pins. The format was often used in works of navigation and cosmographies, which described and illustrated the features of the universe. The volvelles were handy for solving practical mathematical problems relating to time, the calendar, astronomy and astrology.

Apian studied mathematics and astronomy in Leipzig and Vienna, and he built instruments for astronomy and geography. He was a contemporary of Copernicus (1473-1543), but Apian's world view was traditional, and his works were based on classical and medieval sources, including Ptolemy, who centered his cosmography around the earth. *Cosmographia*, first published in 1524, reached a broad audience over the course of many editions in several languages. It functioned as a textbook for mapping the earth by readers who constructed their own paper instruments.