Our story begins on September 12, 2003 with a meeting between Dr. Tim Rhodus, Professor Horticulture and Crop Science; Dr. Pablo Jourdan, Associate Professor and Acting Director of the OSU Chadwick Arboretum; Mary Maloney, Education and Volunteer Coordinator for the arboretum, and Elaine Eberlin, Systems Specialist and Certified Picture Framer®. The four of us met to discuss the Emanuel Rudolph Collection of Botanical Illustrations that had been donated to the arboretum in 1992 by Dr. Emanuel Rudolph, OSU Botany Professor. The collection was being housed in the OSU Main Library but very few of the 700+ pieces in the collection had ever been on display.

However, our story actually began 500 years ago when botanical illustration was confined to medicinal publications called herbals. It was here that botanical illustration found its first informational application. Pictures in herbals were often crudely drawn and it was not until the sixteenth century that herbalists hired artists to render more accurate drawings of plants to document all their characteristics.

The sixteenth century, which resulted in plant discoveries in the New World and the Far East, brought a new emphasis to botanical illustration. Plant collectors and institutions such as Jardin de Plantes in Paris and the Royal Botanical Gardens...
at Kew (London) cultivated these new exotics in their gardens and glasshouses. They commissioned artists to render accurate and detailed documentation of their botanical marvels as a way to display them to the rest of the world. Artists worked closely with scientists to improve the manner in which plants and their structure were delineated, a process intensified by the introduction of the Linnaean system of classification. Books of ornamental plants, known as florilegiums, a collection of selected works of art, became more elaborate and attracted better illustrators. The early books were sometimes hand-colored, using the limited pigments available. In time, more colors became available and the hand-coloring became more realistic and artistic.

Printing Techniques

Just as the types of books changed through the years, so did the printing techniques. The earliest printing technique, the woodcut, was developed around 1400. The original was copied on to a wood block in reverse. Then, the space between lines was cut away leaving the now raised lines. The block was inked and pressed on to a sheet of paper leaving a correct impression. Copper engraving was the technique used from about 1700 through 1830. Again, the original was copied on to a copper plate in reverse, but in this method, the lines of the drawing were cut away. The plate was inked and pressed on to a sheet of paper leaving a correct impression. Both of these techniques left basically printed lines, allowing for very little representation of light or shade.

Later in the seventeenth century, more refined printing techniques were developed. First was the mezzotint technique, an engraving method that involved scraping or burnishing a roughened sur-
face to produce areas of light and shade. **Stipple engraving**, contrary to the name, was an etching technique and the first to use an acid to “cut” away areas where the ink would fill. **Aquatint** was another etching technique. The plate was etched so that the printed tones were similar to watercolor washes. Mezzotint and aquatint techniques were much better suited to color printing than previous engraving techniques. Both of these techniques also presented problems with wear. Each time a print was taken, the plate wore, leaving no two prints exactly the same. Plates were frequently re-worked and occasionally a new plate needed to be engraved or etched.

When color printing was used instead of hand-coloring, it could be done in one of two ways. One, all colors were applied to a single plate or, two, several identical plates were made and each had only one color applied to it, then, they were applied to the paper one after the other. **Lithographs**, printing from a stone rather than a copper plate, first appeared about 1830. The original was applied to a smooth stone surface with an ink-receptive greasy lithographic crayon. Blank areas were ink-repellent. Lithographs were frequently hand-colored. Towards the end of the nineteenth century, **chromolithographs**, lithographs colored directly from the stone, were used. Each color used required a different lithographic stone. Blocks of color overlapped, creating a range of colors, but this overprinting, overlapping required skill to be done well.

While this latest technique allowed for large-scale printing of botanical illustrations and made natural history books less expensive, the illustrations lacked the individual artistry that made the earlier ones fascinating and unique. However, hand-colored plant illustrations published in many garden magazines, such as *Curtis’ Botanical Magazine*, continued to exist and served to popularize the study of horticulture. (Source: *Great Flower Books 1700-1900: A Bibliographical Record of Two Centuries of Finely-Illustrated Flower Books* by Sir Sacheverell Sitwell and Wilfrid Blunt. The Atlantic Monthly Press. New York, 1990)

**Emanuel Rudolph Collection**

Dr. Emanuel Rudolph (1927 – 1992) and his wife, Ann Rudolph (1935 – 1991), were passionate collectors of botanical prints and books. Their extensive library consisting of 53,000 volumes was bequeathed to The Ohio State University and distributed to several libraries. It was Dr. Rudolph’s desire to have his collection of 750 botanical prints donated to the OSU Chadwick Arboretum. Dr. Rudolph was a respected and much beloved professor in the biological sciences at The Ohio State University from 1961 until his death in 1992. In addition to his distinguished work as a Polar Lichenologist, Dr. Rudolph became nationally known for his broad interests in the history of nineteenth and early twentieth century biology and botany. His inclination to collect botanical illustrations was
not limited to an appreciation of their artistic merit, but also included an awareness of their value in tracing the history of the natural sciences.

In viewing Dr. Emanuel Rudolph’s remarkable collection of botanical illustrations, one can embark upon a 500 year journey through the development of botanical knowledge and a parallel trip through the evolution of botanical depiction. It is unfortunate that we do not know the exact intentions behind each of the selections Dr. Rudolph acquired, but we can be sure that in its totality he meant to reconstruct a pictorial history of botany upon which much present knowledge is based.

Dr. Rudolph believed that the use of botanical illustration was a way of “enhancing natural history writings and making them more universally valuable to experienced and beginning naturalists alike.” His contention that trained illustrators played an important role in the development of botany became more focused in his investigation of the work of little known nineteenth century American illustrator Isaac Sprague. (Source: Botanical Illustrations - Art in Science, Exhibit Guide prepared by Janet Oberliesen for the Columbus Museum of Art exhibition of the Emanuel Rudolph Collection of Botanical Illustrations, 1998.)

Preservation of the Collection

After weeks of preparation, the collection of botanical illustrations was physically moved from the OSU Main Library to Howlett Hall on January 8, 2004. Great care was taken to move the 40+ framed pieces and approximately 700 unframed prints. The move was well organized and went very smoothly.

The next step was to begin cataloging the collection. One of the challenges of this project is that there is very little documentation associated with the illustrations. We were fortunate to have background information on 40 pieces that were framed and exhibited in 1998 at the Columbus Museum of Art.

In February, Elaine began to disassemble the framed pieces. She used her knowledge as a CPF® and additional research to determine what products would be best for long-term storage of the art. We started with museum quality flat file cabinets. These cabinets are specifically designed for the protection of artifacts with specially formulated non-outgassing paint finishes, Delrin™ plastic drawer rollers with fully-encased ball-bearings, and a fully enclosed case bottom to prevent entry of dust and moisture.

After removal from the frame, the delicate art is only handled while wearing 100% cotton gloves to protect the print from skin oils, dirt and fingerprints. Each illustration is photographed, measured and inspected. The condition, original markings, additional markings, etc. are all noted.

Photographing the collection has now become our main activity. We’re using a Beseler Copy Stand and two light stands with tungsten bulbs. The camera is a Canon EOS 10D digital SLR camera with an EF 50mm f/2.5 Compact Macro. We use Adobe® Photoshop® software to make any necessary adjustments to the digital photographs.

After photographing an illustration, it is mounted to 4-ply Bainbridge® Alphamount Artcare boards with Archival Clearhold Mounting Corners. The mounting board is pure alpha cellulose with MicroChamber® zeolite technology which actually traps and neutralizes environmental pollutant gases. The mounting corners are made of high-quality polyester with 3M™ #415 FilmTape Adhesive that is set back from the edges, so it never touches the art. We cover the illustrations with Archival Grade DuPont™ Polyester Film sheets. This safe, untreated film is ideal as a barrier against acid and moisture migration. It has a neutral pH, contains no harmful plasticizers, and is transparent for easy viewing. These sheets are attached on one side only with pressure-sensitive Filmoplast® Linen Tape. This strong, acid-free tape is pH neutral and has non-yellowing adhesives. The mounted illustrations are then placed in the flat file cabinets.
Developing the Knowledge Bank for Botanical Illustrations

An additional outcome of our research will be the development of the OSU Hort & Crop Science Knowledge Bank for Botanical Illustrations. This Internet-based search engine will be similar to the OSU PlantFacts system <plantfacts.osu.edu> and serve as an authoritative source on botanical illustrations. We have begun the process of cataloging sources to be used in the knowledge bank. Sources will include libraries, museums, gardens and arboreta, plant societies, rare books and antique dealers, and educational institutions that offer information on this topic. The knowledge bank will obviously be linked to our image database and provide background information on any item in the Emanuel Rudolph Collection.

For example, Curtis' Botanical Magazine is one of the outstanding publications we’re using to identify pieces in our collection. An excellent online source for searching the first 26 volumes of Curtis’ publications is the United States National Agricultural Library <www.nal.usda.gov/curtis>. Their website contains 1,048 digital photos of the 1,050 items listed in the first 26 volumes of Curtis' Botanical Magazine. The site also contains photos of the original text pages that accompanied each botanical illustration in addition to data on the taxonomy of the illustrated plant and information about the illustration itself, like the artist and publisher. Other holdings in NAL’s rare books collection <www.nal.usda.gov/speccoll/collect/rarebook.html> include A Curious Herbal, Les Roses, Pomona: Being a Selection of Choice Fruit, Pomona Italiana, and Pomona Londinensis.

Another online resource we’ve investigated is Postaprint <www.antiquemapsandprints.com/curtis1.htm>. Formerly an antique print business, the owner decided to maintain his online reference pages and digital photos. This site has information on 700 plates, covering the first 14 volumes of Curtis’ Botanical Magazine and several other publications. Additional research information regarding plants of the family Asclepiadaceae is available from the International Asclepiad Society <www.cactus-mall.com/ias>. Having these sites fully indexed, along with dozens of others will provide scholars and horticulturists a unique online resource that specializes in botanical illustrations.

How Can You Get Involved?

For any of you with an interest and, hopefully, knowledge of botanical illustrations, we invite you to collaborate with us on this project. Or, perhaps you know a person whom we should contact. As stated above, the Emanuel Rudolph Collection of Botanical Illustrations consists of over 700 pieces and we are just getting started with the preservation of the collection. We have a long way to go with the digitizing and cataloging. Any assistance will be appreciated.

Please check <hcs.osu.edu/botanical> frequently for links to the image database and the Knowledge Bank. You can also use this website to inform us of your willingness to assist in the project or suggest someone to contact.

Sneak Preview

The following pages provide a sneak preview of three of the pieces in the collection. Beginning with Plate #1, Persian Iris. Yes, this is the very first plate published in the 1787 issue of Curtis’ Botanical Magazine. We are indeed very fortunate to have this unique item. The remaining items include, Plate #16, Variegated Iris and Plate #61, Tall Iris. A copy of the original text page describing each plant is included. Source: US National Agricultural Library. We hope you enjoy this collection and will want to inspect each item more closely in our online botanical gallery <hcs.osu.edu/botanical>.
Plate No. 1

COMMON NAMES- Persian Iris, Persian Flower-de-luce, Flag, Sword Lily, Iris
GENUS- Iris
SPECIES- Iris persica
CLASS- Triandria
ORDER- Monogynia
AUTHORITY- Linnaeus
MODERN GENUS- Iris
MODERN SPECIES- Iris persica
MODERN FAMILY- Iridaceae
PLANT TYPE- perennial
COLOR- variable green-blue, silver, yellow, brown
SEASON- winter - spring
NATIVE REGION- S & SE Turkey, N Syria, NE Iraq
ZONE- north temperate zones

SOURCE- The Botanical Magazine
VOLUME- 1
PUB DATE- 1787
REISSUED- 1793
EDITOR- William Curtis

IRIS PERSICA. PERSIAN IRIS.

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Clafs and Order.
Triandria Monogynia.

Generic Character.


Specific Character and Synonymy.

IRIS Persea corolla imberbi, petalia interioribus breviflimis
IRIS bulbosa precox minus odora Persea variagata. Moris.
 Hort. v. p. 357.

A native of Persia. Flowers in February and March. Its
beauty, early appearance, and fragrant blossoms, make it highly
esteemed by all lovers of flowers; like the Hyacinth or Narcis-
hus it will blow within doors in a water-glass, but stronger in
a small pot of sand, or Sandy loam; a few flowers will fecet a
whole apartment: it will also blow in the open air, but re-
quires warmth and shelter; it is propagated by offsets and
seeds; the best flowering roots are imported from Holland,
they bear forcing well, and hence this plant may be had to
flower a full month or six weeks in succession.

Parkinson remarks, that in his time (1629) it was very rare,
and seldom bore flowers.

Copy of original text describing Plate #1
Source: United States National Agricultural Library
http://www.nal.usda.gov/curtis/images/1a.jpg
Plate No. 16

COMMON NAMES- Variegated Iris, Variable Flower-du-luce
GENUS- Iris
SPECIES- Iris variegata
CLASS- Triandria
ORDER- Monogynia
AUTHORITY- Linnaeus

MODERN GENUS- Iris
MODERN SPECIES- Iris variegata
MODERN FAMILY- Iridaceae

PLANT TYPE- perennial
COLOR- light yellow, veined red-brown to purple; beard yellow
SEASON- May and June
NATIVE REGION- Hungary

SOURCE- The Botanical Magazine
VOLUME- 1
PUB DATE- 1787
REISSUED- 1793
EDITOR- William Curtis
ARTIST- J. Sowerby

Copy of original text describing Plate #16
Source: United States National Agricultural Library
Plate No. 61

COMMON NAMES- Tall Iris
GENUS- Iris
SPECIES- Iris ochroleuca
CLASS- Triandria
ORDER- Monogynia
AUTHORITY- Linnaeus

MODERN GENUS-
MODERN SPECIES-
MODERN FAMILY- Iridaceae

PLANT TYPE- perennial
COLOR- white and yellow
SEASON- later than most irises
NATIVE REGION- uncertain

SOURCE- The Botanical Magazine
VOLUME- 2
PUB DATE- 1788
REISSUED- 1796
EDITOR- William Curtis
ARTIST- Sowerby

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IRIS ochroleuca. TALL IRIS.

Cliffs and Order.

Triandria Monogynia.

Generic Character.


Specific Character and Synonyms.


Of the several species of Iris cultivated in our gardens, this excels in point of height; we have taken our English name therefore from this character, and not from the term ochroleuca, which, if translated, would be too expressive of the colour of the blossoms of the Iris Pteridarium, with which the ochroleuca has some affinity in point of size as well as colour.

Notwithstanding Mr. Miller’s description of his orientalis accord very badly with that of Linneus’s ochroleuca, they have been generally considered in this country as one and the same plant, distinguished by the name of Pocock’s Iris, Dr. Pocock being the person who, according to Miller, in his time first introduced it from Carniola (by inadvertence speelt Carolina, in the 6th 4to edition of the Dictionary). There are grounds, however, for supposing some error in the habitat of this plant, for had it grown spontaneously in Carniola, it is not probable that Scopoli would have omitted it in his Flora Carniolica.

Leaving its place of growth to be more accurately ascertained hereafter, we shall observe, that it appears perfectly naturalized to this country, growing luxuriantly in a moist rich soil, and increasing, like most of the genus, very fast by its roots. It flowers later than most of the others.

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Copy of original text describing Plate #61
Source: United States National Agricultural Library