# Focus on Nature XII

## Natural History Illustration Exhibition

New York State Museum
Albany, New York, USA

NEW YORK State Museum

April 28–December 31, 2012

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*Cranes Slipsliding*
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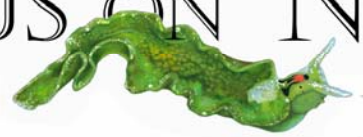

## Natural History Illustration Exhibition

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# Acknowledgements

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# Dedication
# Dr. Norton Miller, 1942-2011

This exhibit is dedicated to Dr. Norton Miller, New York State Museum staff member for 28 years, most of that time as Curator of Bryology and Quaternary Paleobotany. In 1990, a few months before the first Northeast Natural History Conference (NENHC), Dr. Miller suggested that there be a tandem exhibit that would highlight the contribution natural history illustrators make to research. During the ensuing 21 years, he served as a thoughtful and informed juror for both the exhibit selections and the *FON* Awards. In addition, Dr. Miller was an excellent editor of the *FON* catalogs. As the *FON* exhibits grew to be independent of the NENHC and to include an international pool of artists, his advice was invaluable. His guidance on all aspects of the exhibitions played a major role in the high standards that this exhibit has achieved. Dr. Miller's participation in future *FON* exhibits will be missed.

# Introduction

“Discovery consists of looking at the same thing as everyone else and thinking something different.” Albert Szent-Gyorgyi

*Focus on Nature* is a juried, biennial exhibition that showcases the high standards and skills of the current international natural history illustrator community. Some of the artists are scientists, and others work closely with scientists to create images needed to illustrate research projects or to be used by institutions, books, journals, online publications, and other educational venues.

The urge to carefully observe and visually represent organisms and the environment washes through many of us as incessantly as ocean waves lapping the shore. Perhaps this urge is a function of survival, material or spiritual, but it seems to be nearly as old as curiosity itself. Thus the art represented in *Focus on Nature XII* (*FON XII*) is part of a continuum that has been going on for thousands of years. There are many ways to appreciate natural history illustration: for its aesthetic qualities, technical skill, the scientific information it disseminates, as a tribute to the subject depicted, its artistic processes, or its other contributions to society. The artworks in *FON XII* show many of these aspects of the genre, but the overriding commonality of the artwork in this exhibit is the communication of scientific information. Each piece expresses, to the best of our knowledge and the artist’s ability, organisms as they are understood at the current time. Each tells the story about a visual exploration of nature.

Once again it is a pleasure to bring this specialized art to the attention of visitors to the New York State Museum.

## Selection Jury Members

Francesca Anderson
Guest Artist Juror
Brooklyn, New York

Dr. Norton Miller
Curator Emeritus of Bryology and Quaternary Paleobotany
New York State Museum

Dr. Carl George
Professor Emeritus of Biology
Union College

Dr. Charles Ver Straeten
Curator of Stratigraphy and Sedimentology
New York State Museum

Patricia Kernan
Biological Illustrator
New York State Museum

## Award Jury Members

Chris Sanford
Exhibit Designer
New York State Museum

Ronald Burch
Senior Historian Emeritus of Art and Architecture
New York State Museum

Dr. Carl George
Professor Emeritus of Biology
Union College

Dr. Charles Ver Straeten
Curator of Stratigraphy and Sedimentology
New York State Museum

Patricia Kernan
Biological Illustrator
New York State Museum

# Artist Commentaries

# MILLY ACHARYA

Ithaca, New York, USA
Garlic (*Allium sativum*)
Watercolor on paper, 2010
9 × 22 in (23.8 × 55.8 cm)

Garlic is a hardy perennial that thrives in full sunlight and is cultivated worldwide. It is a good neighbor to most plants, except legumes and alfalfa, and is thought to repel rabbits, deer, moles, and insects. Garlic flowers are hermaphroditic, meaning they have both female and male organs. The garlic plant has a long recorded history, starting with Sanskrit texts from Vedic India to ancient cultures from China to Egypt to present times. It was believed to ward off diseases and infections. Because it also was believed to confer strength, the ancient Egyptians and Romans provided it to the laborers who built their massive architectures and infrastructures, such as pyramids, aqueducts, and roads.

## Sue deLearie Adair

Schenectady, New York, USA
*Looking Out*
Eastern Chipmunk (*Tamias striatus*)
Colored pencil on paper, 2008
7 × 5.5 in (17.7 × 13.9 cm)

I remember reading a passage about chipmunks in one of nature writer Edwin Way Teale's wonderful books. Teale liked to count things, and one of the things he counted was the number of successive "chip" calls of the Eastern Chipmunk. This common, sometimes incessant sound of eastern woodlands emphasizes how often chipmunks are alarmed by a potential threat. In *Looking Out*, I've drawn an Eastern Chipmunk in a typical watchful pose.

## Sue deLearie Adair

Schenectady, New York, USA
African Bush Elephant (*Loxodonta africana*)
Graphite on paper, 2009
11 × 10 in (27.9 × 25.4 cm)

Tanzania is one of the most inspiring places that I have ever visited, and elephants are one of the most inspiring species that I have ever seen. The individuals in this drawing were in a herd of a dozen elephants that we encountered in the tall grass plains of Serengeti National Park. We saw elephants many times during our two-week trip to Tanzania, but this was the group I chose to draw because it was in an open, treeless area, a favorite landscape of mine. I had never drawn grass before working on this piece, but I took on the challenge in order to depict these elephants.

# Gionata Alfieri

Magenta, Lombardia, Italy
*Ecosystem of an Italian Paddy Field*
White Stork, Northern Lapwing, Little Egret, Grey Heron, Wood Sandpiper, Mallard, Carp, Grass Snake, Edible Frog, Dragonfly, European Tree Frog, Common Backswimmer, Tadpole species, Predaceous Diving Beetle, Waterstrider
(*Ciconia ciconia*, *Vanellus vanellus*, *Egretta garzetta*, *Ardea cinerea*, *Tringa glareola*, *Anas platyrhynchos*, *Cyprinus carpio*, *Natrix natrix*, *Pelophylax esculentus*, *Libellula* species, *Hyla arborea*, *Notonecta glauca*, *Dysticus* species, *Gerris gibbifer*)
Watercolor on paper, 1992
13.5 × 13 in (34 × 30 cm)

In the 1990s, I was working for the nature journal *Airone*, when they decided to produce a weekly newspaper for a teenage audience to be called *Airone Junior*. The director asked me to illustrate a series of eighteen articles that were about food and the plants and animals associated with its production. The aim of these works was to create realistic images that would engage the journal's youthful audience. To complete these assignments, I painted in the field whenever possible, but I also used photographs for reference. The artwork pleased the editor so much that he compiled them into a book titled *Ragazzi, a tavola!* ("*Children, To the Table!*") by Manuela Stefani (Giorgio Mondadori Editore Milano, 2004). In 1995, a number of these pieces were part of the Bologna Children's Book Fair (Fiera del Libro per Ragazzi) in Bologna, Italy. I am grateful that two of these paintings will be brought to yet another audience by being exhibited in *Focus on Nature XII*.

# Gionata Alfieri

Magenta, Lombardia, Italy
*Birds of an Italian Salina*
Blackheaded Gull, Grey Heron, Mallard, Great Cormorant, American Flamingo, Eurasian Spoonbill, Little Tern, Eurasian Wigeon, Common Tern, Common Shelduck, Black-winged Stilt, Pied Avocet (*Larus ridibundus*, *Ardea cinerea*, *Anas platyrhynchos*, *Phalacrocorax carbo*, *Phoenicopterus ruber*, *Platalea leucorodia*, *Sternula albifrons*, *Anas penelope*, *Sterna hirundo*, *Tadorna tadorna*, *Himantopus himantopus*, *Recurvirostra avosetta*)
Mixed media (watercolor, tempera) on paper, 1992
13.5 × 11.7 in (34.29 × 29.8 cm)

This painting is one of eighteen works I completed to illustrate articles on food for the magazine *Airone*. Titles to some of the other articles included *From Rice to Salt* and *From Maize to Sugar.* I am pleased to have two of this series included in the *FON XII* exhibition.

# Jury Award

## Neil Jonathan Allen

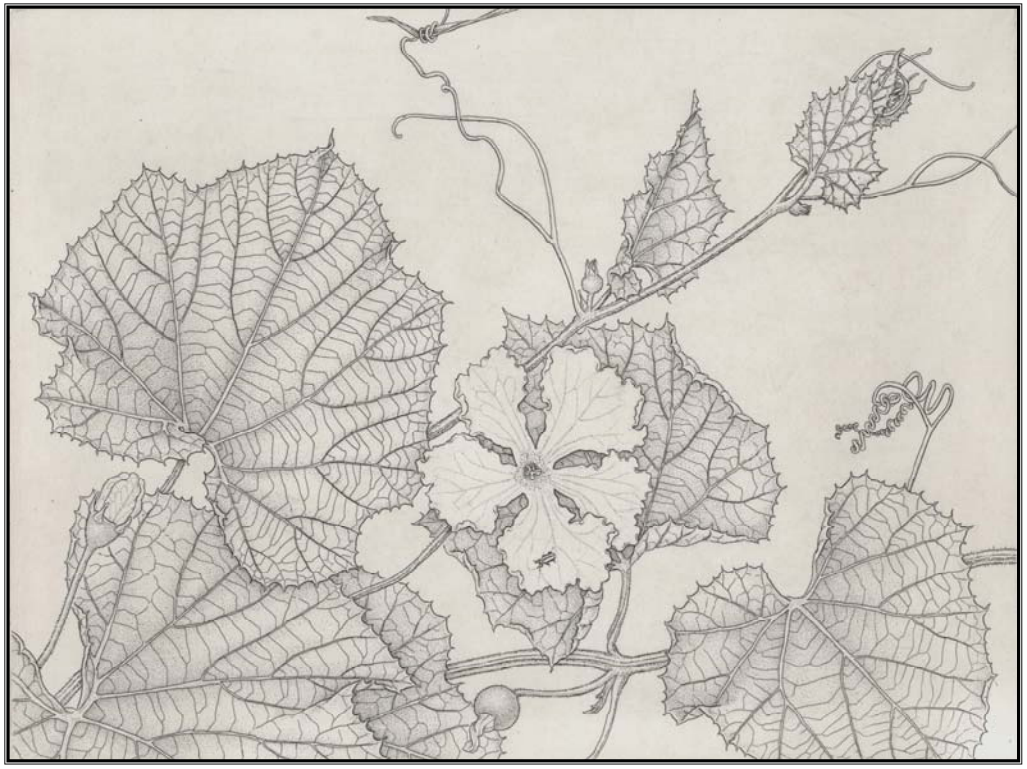
Villarino de Los Aires, Salamanca, Spain
Five-spot Burnet, Burnt-tip Orchid
(*Zygaena trifolii*, *Orchis ustulata*)
Mixed media (graphite, watercolor) on paper, 2011
12 × 16 in (30.4 × 40.6 cm)

On a springtime orchid-searching trip to Spain's picturesque northern mountainous region known as Los Picos de Europa (Peaks of Europe), I found these distinctive and graphic five-spot burnet moths (*Zygaena trifolii*) among the profusion of wildflowers that had erupted in the alpine meadows. During the same day I saw beautiful Burnt-tip Orchids (*Orchis ustulata*) growing at the base of the scree slopes, and was attracted to their spotty, jazzy blooms. I juxtaposed the two in my composition to create a personal, visual summary of a blissful and unforgettable day.

# Bobbi Angell

Marlboro, Vermont, USA
Bottle Gourd (*Lagenaria siceraria*)
Etching (copper plate) on paper, 2011
9 × 6 in (22.8 × 15.2 cm)

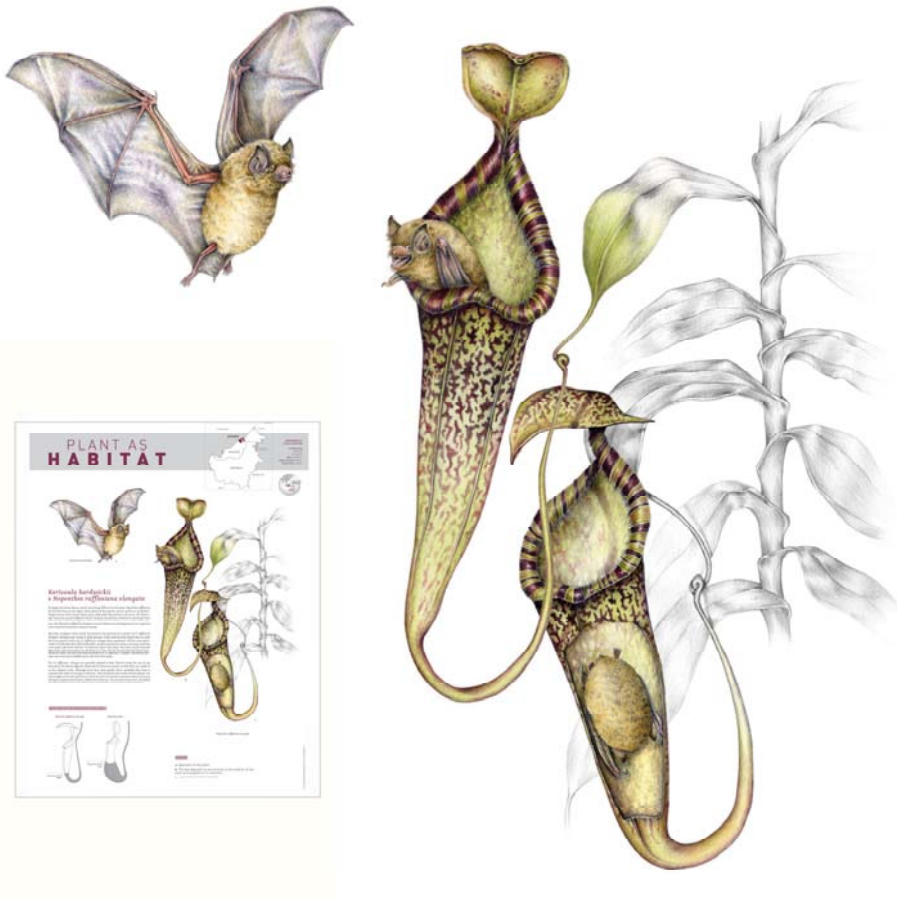
Bottle Gourd, Dipper Gourd, Birdhouse Gourd, Calabash Gourd, Kettle Gourd are all common names applied to *Lagenaria siceraria*, according to the shape and use of the fruits. I grow the annual vine in my rambling garden and have envisioned drying and decorating them as intriguing novelties. *Lagenaria* is easily cultivated in tropical regions throughout the world, but it seems my Vermont climate does not offer an adequate growing season for the fruits to fully mature. Instead I have come to adore the plant for its downy soft, green leaves, elegant tendrils, and tissue-textured flowers that open at dusk and last well into late morning. It sprawls and clambers gracefully and effortlessly, blurring the border between vegetable garden and the brambly weedy environs beyond. I am always delighted when the leaves fade after a first frost, revealing a few robust but still tender green gourds, teasing me into thinking I can successfully dry them. Although I daydream about accomplishing that some day, I was easily distracted and contented with drawing and etching the handsome plant.



# Lúcia Antunes

Lisboa, Portugal
Hardwicke's Woolly Bat, Raffle's Pitcher-Plant
(*Kerivoula hardwickii*, *Nepenthes rafflesiana* var. *elongata*)
Mixed media (watercolor, graphite) on paper, 2011
12 × 17 in (30.4 × 44 cm)

I started taking interest in bats during the first year of my master's degree in scientific illustration. I was doing research for various projects, and this particular subject came to me while focusing on plants that function as habitats for animals. This species of *Nepenthes* is not as efficient at catching insects as most carnivorous plants. It captures, on average, seven times less than the more common species. The secret to its survival turns out to be its symbiotic relation with, the Hardwicke's Woolly Bat, *Kerivoula hardwickii*, a small mammal less than 1.5 in (4 cm) long. There is room for one or two animals to hang above the digestive fluid in the tube-like leaves that form the cup structure. The bats sleep upside down, but like other bats, they turn to defecate, and this fertilizes the *Nepenthes*. Research has found that the healthiest plants absorb about a third of their total nutrients from bat feces.



# Cecelia Azhderian

Santa Cruz, California, USA
Swellshark (*Cephaloscyllium ventriosum*)
Acrylic on paper, 2009
18 × 22 in (45.7 × 55.8 cm)

Swellsharks are common in the kelp forest ecosystems of California's coastal waters. They are one of the few sharks whose embryonic development has been well studied. Swellsharks lay rubbery egg cases with wiry tendrils at the corners that catch on rocks and seaweeds, anchoring them in place. Each case has an embryo with a large egg yolk that provides nutrients during the 9–12 months it takes to hatch. The gestation period depends on surrounding water temperature. The shark pups use two sets of bony protrusions, called denticles, along their backs to aid in hatching and pushing themselves into the sea. The newborn Swellsharks usually measure about 6 in (15 cm), and are able to feed on small mollusks and crustaceans immediately. The adults, which grow to approximately 3.5 ft (1 m), can expand their bodies to prevent predators, such as seals and larger sharks, from pulling them out of reef crevices or ledges.

# Debra Bartlett

Mount Dandenong, Australia
Laughing Kookaburras, Eucalyptus (*Dacelo novaeguineae*, *Eucalyptus regnans*)
Watercolor on paper, 2010
22 × 16 in (55.8 × 40.6 cm)

Scientists estimate that 30% of the bird population of Southeastern Australia has been lost during the recent decade-long drought. We share our property with a family of kookaburras whose numbers remained constant at nine over many years until the "long-dry" reduced their group to six. It was exciting to find that a break in the drought had prompted the hatching of two new members of what we lovingly call "the mob" (a term the Australian aboriginal people use for any grouping of people, particularly family, or native animals). Unfortunately, only one survived. The juvenile is pictured centrally in my painting with its parents to the right. Since I began the work, territorial feuding and disruptions from competing families have resulted in the loss of two members. In my painting, I wanted to emphasize the often overlooked individuality of each bird. The family is pictured in pale winter light, perched on the bough of a *Eucalyptus regnans*, the dominant species in our wet-sclerophyll forest (typified by hard-leaved vegetation). I have used heavily textured paper to subliminally represent the harsh environment and watercolor to imply a delicate balance of survival for creatures within that environment.

# Jury Award

## Debra Bartlett

Mount Dandenong, Australia
Black Hellebore (*Helleborus* x *hybridus*)
Watercolor on paper, 2010
14 × 21 in (35.5 × 53.3 cm)

I have always loved hellebores, in part because they have few horticultural demands. The specimen portrayed in this painting is from my garden. Hellebore toxicity is generally well known, yet the ancient Greeks dried the roots, and recommended their use for "dropsy, gout, epilepsy, hysteria, and general disarrangement of the mind." The name is derived from the Greek *elein* (to injure) and *bora* (food.) Both Dioscorides and Pliny mentioned the plant medicinally, but advised that its use not be extended to the young, the old, or the effeminate, thankfully leaving few people suitable for experimentation. In my work it is important to provide details of the full life cycle of the plant. Therefore, flower buds, mature flowers, ripe capsules, and seed shed are depicted to give as full a story of the hellebore as possible while subtly hinting at the danger.

# Tara Dalton Bensen

Scotts Valley, California, USA
California Giant Salamander (*Dicamptodon ensatus*)
Watercolor on paper, 2002
10 × 7 in (25.4 × 17.7 cm)

Although I grew up exploring, and now live in, the Santa Cruz Mountains of California, prime habitat for the California Giant Salamander, I have encountered only a few individuals of *Dicamptodon ensatus*. This species and its close relatives are the largest salamanders that have a terrestrial stage. They can reach up to 12 in (30.5 cm) in length, and often bark loudly when startled, making them quite spectacular to see in the wild. Though the species is not threatened, it is very elusive, feeding mostly at night and staying hidden during the day.

One foggy January morning, a close friend found this slimy beauty in her woodpile. Knowing that I had a unique appreciation for such things, she called me, and I was there within the hour. I kept the salamander in a mossy little terrarium for the day while I sketched it and took photos. The salamander stayed quite still in the terrarium, but as soon as I brought it back to my friend's property to release it, it became very active. By the time I got out of the car and near a small stream where I was going to let it go, it was trying to jump right out of the container.

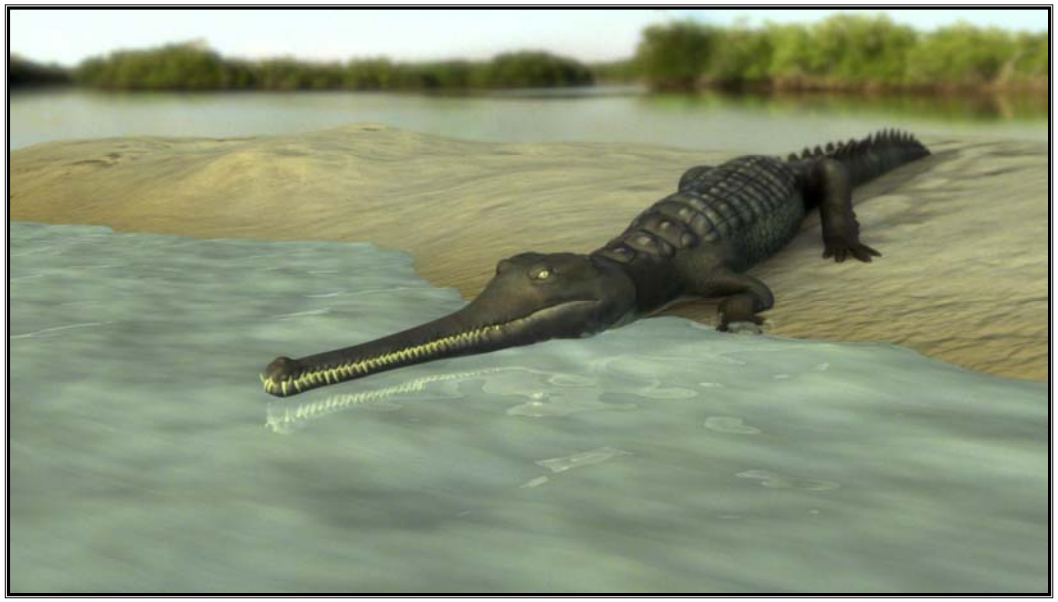
## Melisa Beveridge

Brooklyn, New York, USA
Julia Caterpillar (*Dryas iulia*)
Gouache on paper, 2010
13 × 9 in (33 × 22.8 cm)

Ever since I can remember, I have loved finding and learning about different kinds of insects. When I was growing up among the cornfields of Ohio, I would go out at night with my father to see what species had gathered on the garage doors under the lights. I used to collect wooly bears to play with before letting them go. The species of insect depicted here, *Dryas iulia*, was one of many that I illustrated for the book *Inside Butterflies* by Hazel Davies (Sterling Press in partnership with the American Museum of Natural History, 2011). The larvae of the Julia butterfly are toxic and covered in protective spines. Among the many defense strategies in the butterfly world, spines and warning coloration are a couple of the most visibly obvious.

# Evan M. Boucher

Redwood City, California, USA
*Thoracosaurus neocesariensis*
Digital animation, 2010
24 × 14 in (60.9 × 35.5 cm)



This four-minute, animated restoration of the extinct crocodilian, *Thoracosaurus neocesariensis* (Crocodilia: Gavialidae), was created as my master's thesis at Drexel University in Philadelphia, Pennsylvania. For me it was an exploration of a novel scientific illustration medium for paleontological subjects.

The *Thoracosaurus* depicted came from the late Cretaceous Period green sands of the Hornerstown Formation of New Jersey. The project started by scanning the relatively complete fossils of the 16.5-ft (5-m) long *Thoracosaurus* with a Konica Minolta 910 digitizer. The rest of the animal's skeleton, its muscles, and outer skin were then restored, using techniques of computer animation. I was guided in the restoration by the scientific literature, principles of comparative anatomy, and directives from a number of paleontologists. Animation was then used to depict the behavior and habits of the animal, influenced by the biology of the animal's closest living relatives. The goal of the piece was to restore an animal with an unprecedented amount of scientific accuracy by blending the techniques of rigorous scientific research with state-of-the-art, computer-generated imagery.

For more information about the project, check out the production blog at thoracosaurus.blogspot.com

## Juan Luis Castillo

Valdemorillo, Madrid, Spain
*Boletus permagnificus*
Digital (entirely) on paper, 2011
13 × 19 in (33 × 48.2 cm)

This beautiful *Boletus* is a Mediterranean species, considered rare in Europe. It prefers to grow in acidic soils of deciduous forests, usually of oak, with which it has a mycorrhizal symbiosis. The *Boletus* genus is characterized by thick roundness, and most of them turn blue when cut or bruised. The *Boletus permagnificus* has a pileus, or cap, of 1–3.5 in (3–9 cm) across, hemispherical when it first emerges, then convex and, at maturity, nearly flat. It is red or purple to reddish-brown. The pores on the underside of the cap are yellow, red, orange, or vermillion-red. The stems are a beautiful golden-yellow and fibrous, and the flesh is yellowish-white.

## Juan Luis Castillo

Valdemorillo, Madrid, Spain
Sack-shaped Catasetum (*Catasetum saccatum*)
Digital (entirely) on paper, 2011
13 × 19 in (33 × 48.2 cm)

The Sack-shaped Catasetum, *Catasetum saccatum*, is an orchid found in tropical montane forests of South America. The male flowers of this epiphytic orchid (which grows on tree branches) have a unique technique for the ejection of the pollinia (pollen sacs). As discussed briefly by Darwin, it launches its pollinia up to 8 ft (2.4 m) away from the mother plant when an insect touches its hair-like bristles called setae.

This orchid has fusiform pseudobulbs 1.9–9.8 × 0.9–2.3 in (5–25 × 2.5–6 cm) from which, when newly matured, the flowers emerge in January through March. The 4–7 leaves are elliptic-lanceolate, petiolate, acute, and the inflorescence (flower cluster) can be erect or pendant and 8–16 in (25–68 cm) long. The petals and sepals of both male and female flowers are green with reddish-brown short streaks and spots, and the sepals are densely covered with brown blotches inside.

# Kathryn Chorney

Toronto, Ontario, Canada
*Great Horned Owl on Silver Maple in Winter*
Great Horned Owl, Silver Maple (*Bubo virginianus, Acer saccharinum*)
Mixed media (watercolor, graphite) on paper, 2011
16 × 24 in (40.6 × 60.9 cm)

This portrait of Alex, a female Great Horned Owl, is from an ongoing series I am creating of the raptors and owls at the Canadian Peregrine Foundation (CPF) near Toronto. As a member of the CPF Education Team, Alex helps raise awareness of the challenges facing wild birds of prey, and the importance of habitat conservation. I have come to know Alex and her teammates through educational drawing sessions I arrange at the Sheridan Institute of Technology, where I teach scientific illustration.

Following a snowfall last winter, I noticed that the pattern of fresh snow, drifted into the fine crevices of the silver maple bark, closely resembled Alex's plumage pattern — a vivid demonstration of the concept of camouflage. Both species share a wide geographic range in North America, so this seemed the ideal setting for Alex's portrait.

Preparatory work included observational sketching, taking numerous reference photos of the subjects, and detailed composition studies. The final painting involved a variety of watercolor and graphite techniques.

# Karen S. Coleman

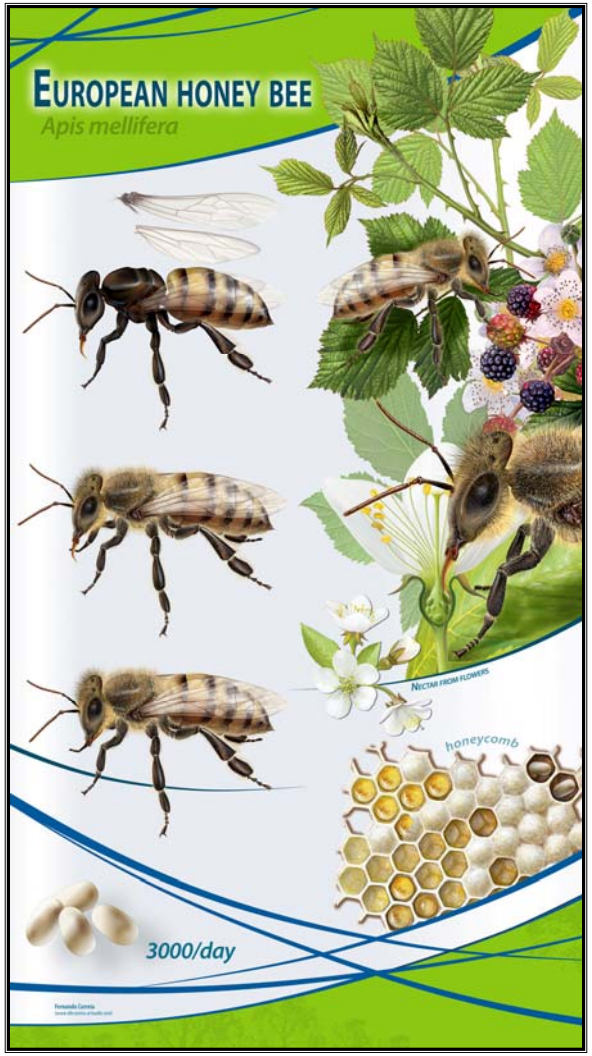
Round Hill, Virginia, USA
Cecropia Moth (*Hyalophora cecropia*)
Colored pencil on drafting film, 2010
10 × 12 in (25.4 × 30.4 cm)

A member of the Giant Silk-moth family (Saturniidae), the *Hyalophora cecropia* adult is a stunning sight. Having no mouth parts, the mature moth is unable to eat, and lives only 7–10 days. It was once plentiful in my area of northern Virginia, but is now a rare sight. The reasons for its decline are not known, but it is suspected that light pollution, parasites, environmental degradation, and pesticides may be the causes. I was fortunate to have a friend loan me her specimen as a model for my work. She found the *Cecropia* on the side of the road in Ohio. Obviously, it had been hit by a car, but was still whole and beautiful. It would be a terrible loss if this magnificent creature disappeared from our landscape.

To capture the brilliant colors of the Cecropia, I applied many layers of wax-based colored pencil on Dur-lar, a brand of drafting film, applying pigment to both the front and back of the translucent film.

## Fernando Jorge Simões Correia

Pampilhosa, Aveiro, Portugal
European Honey Bee (*Apis mellifera*)
Digital (entirely) on paper, 2011
19.7 × 10.8 in (50 × 27.4 cm)

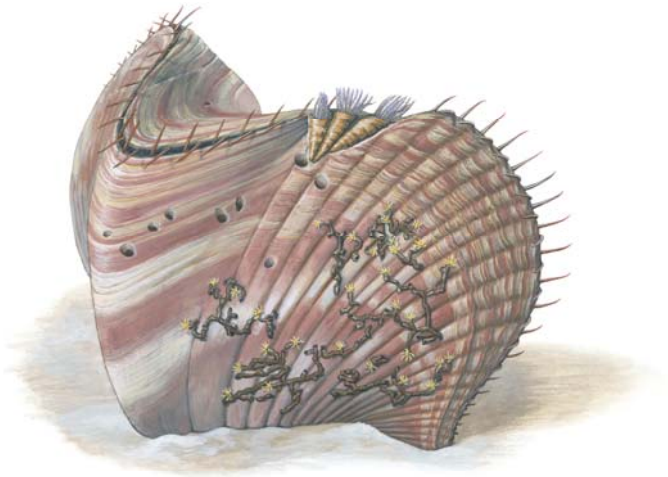



High rope climbing as a means of experiencing nature has come recently to Portugal. The SkyGarden at the Botanic Gardens in Coimbra is the most complete and innovative venture of this kind in the country. There are six adventures available, but the "Bird Parcours" is the most popular. This course is a short journey through the animal world, where people may climb from one nest tucked in the treetops to the next, learning about animals such as birds, squirrels, and insects that live in the forest. Inside each big tree nest there is a poster that provides general information about various species they might encounter. These posters rely heavily on illustrations, and I was commissioned to create seven of them in 2011. The illustration of the European honey bee was one of the most challenging because of this insect's small size and complex details. The tiny bristles all over its body are visually confounding and do not allow a clear view of the segments. In order to understand the anatomy, I first drew it without any hair. This seemed weird because I think of a bee as a furry creature — it was a mental hair-removal exercise! Through the process of doing many magnified observations and drawings of preserved specimens, I came to understand the form and function of head, thorax, and wings. Now I see this delicate insect beyond being simply a manufacturer of honey that I use to sweeten my toast. From now on, bees sweeten my life in other, unsuspected ways!

# Emily S. Damstra

Kitchener, Ontario, Canada
Devonian Brachiopod (*Paraspirifer bownockeri*)
Gouache on paper, 2008
8.5 × 9.2 in (21.5 × 23.4 cm)

This species of brachiopod is from the Middle Devonian Silica Formation of the Michigan Basin. Two different views at the bottom are idealized depictions since the fossils are rarely found in such perfect condition. Most are weathered, broken, encrusted with hard debris, pyritized, or deformed in some other way. Measuring up to 2.3 in (6 cm) wide, this species is large for a brachiopod. The top view is my conception of what the animal might have looked like alive, based on a specimen that bears the predatory boreholes as well as epifauna. Near the opening at the top are three cornulitids, tube-forming invertebrates of uncertain affinity. Spread across the side of the shell is a colony of bryozoans. Although brachiopods still exist today, the order Spiriferida, to which *Paraspirifer* belongs, is extinct. So, there were no close relatives to serve as a model for color or position. I consulted a paleontologist who studies brachiopods in order to determine the correct position, and I used colors typical of modern marine bivalves.



# Jury Award

## Monika E. de Vries Gohlke

Brooklyn, New York, USA
Rose (*Rose micrugosa*)
Etching on paper, 2010
9 × 12 in (22.8 × 30.4 cm)

This hybrid rose was born in 1910 and shown as a new rose in the Botanic Garden in Strassburg. It was named after its parents: the "mother" Red Russian *Rosa rugosa*, and the "father" *Rosa microphylla*. Like its mother, *Rosa micrugosa* is hardy, "prickly," and resistant to diseases such as rose rust and black spot. *Rosa rugosa* is native to eastern Asia and is called "Flowers Near Seashore" in Korean, due to its tolerance to salt and ability to grow along the ocean coast in sand dunes. It does just as well on North American seashores and gardens, where it is planted as an ornamental, forming dense thickets where it has naturalized.

As with other roses, the petals of *Rosa rugosa* and its hybrids, are used for cosmetic, culinary, and medicinal purposes; jams, jellies, potpourris, and rose oils. An old recipe recommends wrapping a stick of butter in rose petals, and sealing in a jar overnight. The next day, the delicate rose flavor will sweeten your morning's toast.

## Sansanee Deekrajang

A. Bangphi, Samut Prakran, Thailand
Pink Queen Conch (*Lobatus gigas*)
Watercolor on paper, 2011
11 ×15 in (27.9 × 38 cm)

The Pink Queen Conch, *Lobatus gigas*, is native to North and South America. It is one of the largest and most commercially important gastropod mollusks in the Atlantic Ocean, both for its edible meat and attractive pale to bright pink shells tinged with yellow, peach, and cream. Female queen conchs lay a mass of hundreds of thousands of eggs that hatch in about five days as veligers (larvae.) They spend 18–40 days floating and feeding on plankton until they settle to the ocean bottom where they complete metamorphosis into an adult with a shell. Adults graze on algae and detritus, reaching sexual maturity at approximately 3–4 years, with a shell length of about 12 in (30 cm) and weight up to 5 lb (2.3 kg). Their life span is generally 20–30 years, but may be as long as 40 years in deeper waters.

## Sansanee Deekrajang

A. Bangphi, Samut Prakran, Thailand
Fish Studies (undetermined species)
Watercolor on paper, 2011
11 × 15 in (27.9 ×39 cm)

I found the fish skeleton on the grounds of a fish farm near my home, naturally decomposed and cleaned by nibbling ants. The complex bone structure, perfectly revealed, inspired me to study other fish, and I obtained the top specimen from the same fish farm. I was attracted to the shimmering color of the scales that changes in the light. This is possibly a Barramundi because of its distinctive concave dorsal head profile, but it is not possible to say definitely because the fish farm sometimes produces hybrids that are all locally called "Pla-kra-pong."

# Emily M. Eng

Bellevue, Washington, USA
Sea Slugs: Sap-Sucking (upper left), Lettuce (upper right), Emerald Elysia (lower left), Elysia (lower right)
(*Elysia viridis*, *Elysia crispata*, *Elysia chlorotica*, *Elysia hirasei*)
Mixed media, (acrylic, colored pencil) on drafting film, 2011
14 × 11 in (35.6 × 27.9 cm)

Sea slugs are gastropod mollusks best known for their physical beauty. As a diver, I was first attracted to their vivid coloration. But as I began to understand their fascinating biology, they became my hero organisms. Animals in the genus *Elysia* are known as "solar-powered sea slugs," due to their ability to incorporate chloroplasts from algae into their own cellular structure. By doing this, they become green. This color provides camouflage, and the sea slugs utilize the sugars produced from photosynthesis for food.

## Emily M. Eng

Bellevue, Washington, USA
*American Lobster Fishery*
American Lobster (*Homarus americanus*)
Watercolor on paper, 2011
15.5 × 13.5 in (39.3 × 34.2 cm)

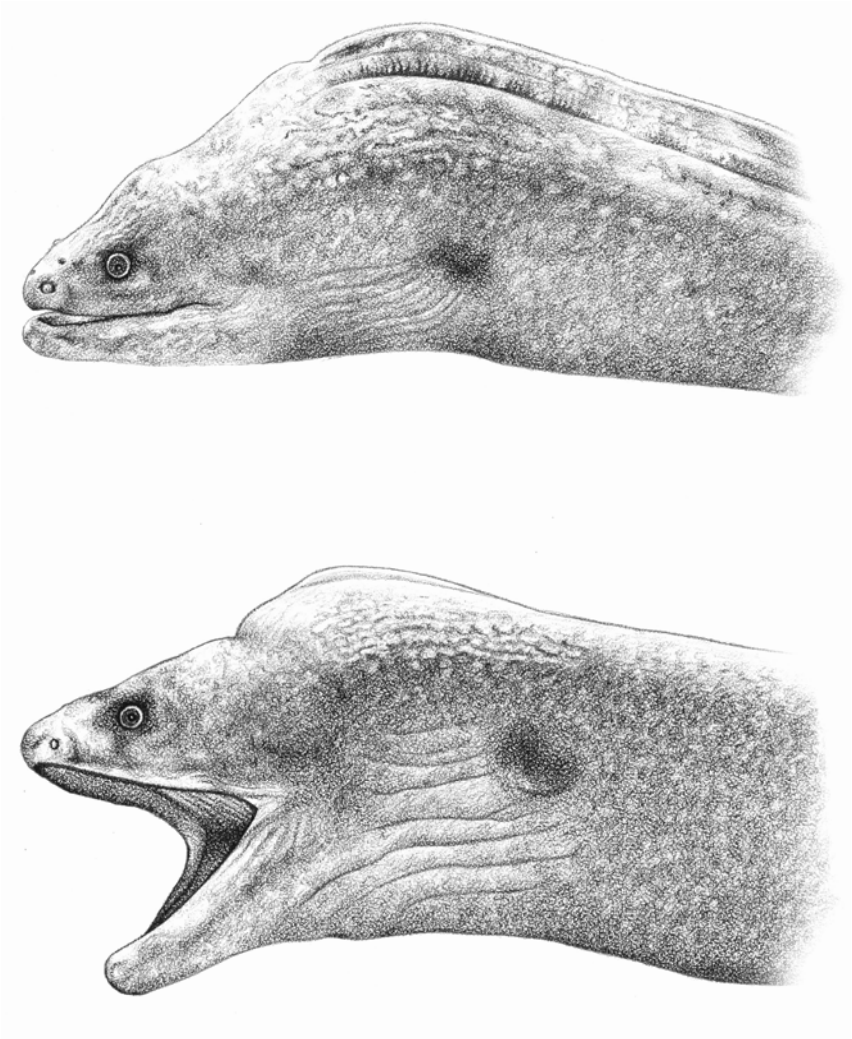
As a marine education intern in Maine, I spent a summer out on the water, pulling up lobster traps and explaining the science behind Maine's American Lobster regulations. The size regulations state that a legal lobster's carapace (headshell) must be 3.25–5 in (8.25–12.7 cm). These laws protect juveniles from being harvested, and also protect the adult breeding stock, since a female lobster's egg production is directly linked to her size. The larger she is, the more eggs she produces. I painted this in a trompe l'oeil (trick of the eye) style, and I wanted to showcase the tools used by lobstermen. Included is a claw-banding tool with rubber bands and a measurement gauge. I also wanted to show off the lobster's natural, uncooked coloration. For reference, I had this particular specimen carefully gutted raw, salted, and mailed from Maine. Unfortunately, it came with a decaying, "fishy" smell that, even after several applications of odor eliminator and baking soda, persists to this day.

# Emily M. Eng

Bellevue, Washington, USA
California Moray Eel (*Gymnothorax mordax*)
Colored pencil on coquille, 2010
8.5 × 10.5 in (21.5 × 26.6 cm)

When I worked at a marine research institute off the coast of Los Angeles, one of my responsibilities was to feed their California Moray Eel. The individual I took care of appeared to be insatiable, and as I dropped pieces of frozen squid into its tank, it would try to grab them all at once. I wanted to portray this strong personality, and so drew it with mouth open and ready for a feeding.

My initial goal for this illustration was to draw a “glow-through” image simultaneously showing the outer body and its skeleton with the double jawbones. Since I drew the outer body and skeleton separately, when I combined the two in Photoshop it soon became apparent that certain angles didn’t match. The outer body presented a three-quarter view, whereas the skeleton presented a side or half view. Since combining the two would have produced an anatomically incorrect drawing, I chose to show only the outer body, resulting in seemingly toothless eels!



## Lisa A. Falkenstern

Califon, New Jersey, USA
Black-crowned Night Heron (*Nycticorax nycticorax*)
Oil on illustration board, 2010
9 × 22 in (22.8 × 55.8 cm)

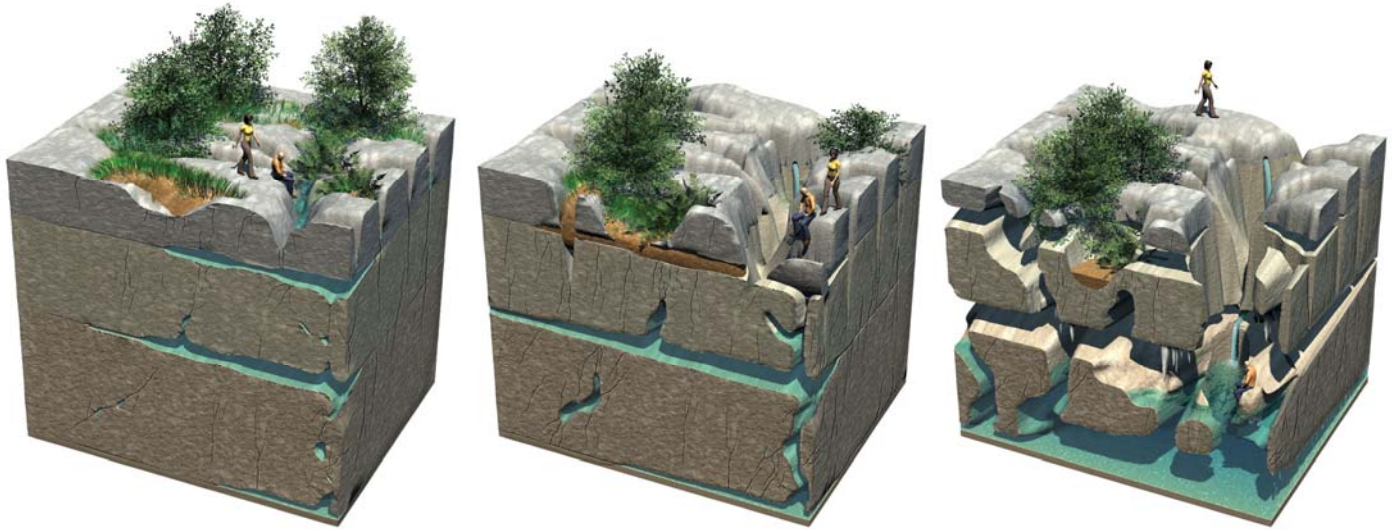
I chose to paint the night heron during the time its name implies. Using oil paints, I kept the scene dark, while still depicting some of the creatures that are out at night. To gather references for this painting, I walked to a nearby stream after dark to record how the moonlight plays on the vegetation and water. I was surprised to find that leaves hanging over the stream had water droplets hanging from their tips. The only way to show the fish that the Night Heron hunts was to create a cut-away of the stream. These are minnows, one of the fish that inhabit my local waterways.

# Nuno Jorge Rodrigues Farinha

Lisboa, Portugal
Karst Topographies
Digital (entirely) on paper, 2011
21 × 8 in (53.3 × 20.3 cm)

Speleology, the scientific study of caves and other karst features, has been a complete passion of mine for about twenty years. Making voyages deep underground to discover the rich world that exists in such dark places is fascinating. At about the time I became a troglophile (a creature who is able to live part of its life in a cave), I started working with a team of geological and biological researchers studying caves. This gave even more meaning to the activity, and I began to put my observations on paper.

The sequence seen in *FON XII* explores the main steps of karst formation. It is the latest of many speleological illustrations I have done, including sequences depicting similar evolutions of the limestone massifs. I have also created 3D versions that depict deep perspective, and allow the viewer to explore, virtually, even the smallest crevices and hollows. When combined with the fourth dimension, time for instance, to animate the models, the acceleration, dissolution, and erosion patterns on the limestone are depicted. These models vividly visualize rare or complex geologic processes on these landforms. The possibilities for the scientific illustrator are endless!



# Michael J. Felber

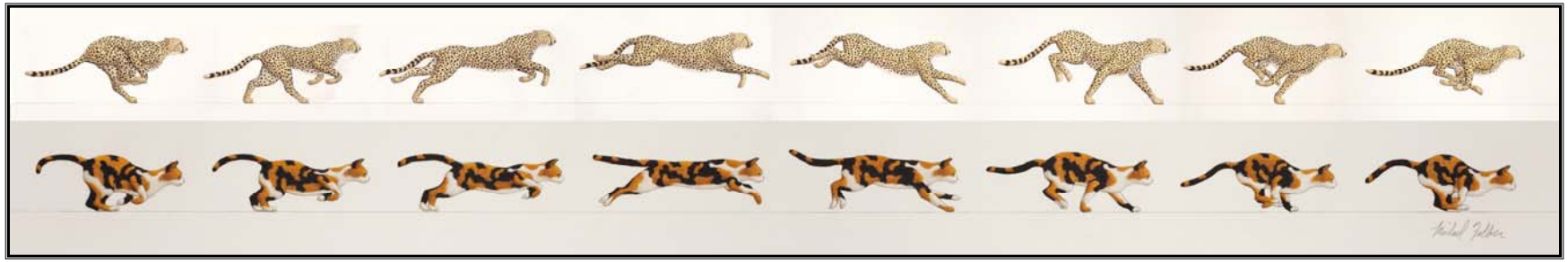
Port Townsend, Washington, USA

*Running Cheetah*
Cheetah (*Acinonyx jubatus*)
Mixed media (colored pencil, watercolor) on coquille paper, 1994
Digitally projected, 1997
60 × 4 in (152.4 × 10 cm)

*Running Domestic Cat*
Domestic Cat (*Felis catus*)
Mixed media (colored pencil, watercolor) on coquille paper, 1997
Digitally projected, 1997
27 × 2 in (68.5 × 5 cm)

Before computer animation was used commercially, in the early 1980s, I worked as an animator on the feature film, *The Plague Dogs*. We used animated running animal cycles to guide our drawings of the running characters in the film. That experience inspired me to create a poster called *Animals in Motion* that illustrates the movement of seven different mammals. Then in 1997, the Los Angeles Natural History Museum contacted me to use my Cheetah drawing for a zoetrope (a rapid succession of pictures that create the illusion of movement) in an exhibit on wild and domesticated cats. At that time, I drew the Domestic Cat for a second zoetrope.

My drawings *Running Cheetah* and *Running Domestic Cat* show similar positions in the running movement of the two different cat species, and are drawn to the same relative size. When viewing the drawings together, you can see some of the reasons why cheetahs can run so much faster than Domestic Cats.



## James Gurney

Rhinebeck, New York, USA
*Elasmosaurus platyurus*
Oil on illustration board, 2010
14 × 18 in (35.5 × 45.7 cm)

These long-necked marine reptiles ate a variety of invertebrates and fish. Some scientists have suggested that they snuck up on fish and attacked them from below, given that their eyes are positioned on top of their head. In this scene, I have portrayed two of them hunting alongside each other near the surface of the water, giving their prey few escape routes. Their long necks, which contain upward of 70 vertebrae, undulate gracefully in the water of North America's Jurassic Period inland sea. Their fins were used for "flying" in water. Recent studies of their paddle fins have shown that, instead of being pulled back and forth like oars on a rowboat, they were flapped up and down much like the wings of a bird or the paddles of a marine turtle.

## James Gurney

Rhinebeck, New York, USA
*Sinornithomimus dongi*
Oil on illustration board, 2011
18 × 18 in (45.7 × 45.7 cm)

A mass fossil graveyard in the Gobi desert reveals a terrible story: a flock of juvenile dinosaurs crossing a patch of soft mud became hopelessly mired, and died in a single event. Paul Sereno authored the article for *Scientific American*, for which I did this painting. I pictured them in the late afternoon light of the Late Cretaceous Period, immersing the viewer in the midst of the action, as some struggle actively, and others are resigned to their fate. On the shore, the rest of the individuals remain on safe ground. To achieve the appearance of natural light, I sculpted a maquette of the scene, complete with cracking mud, and lit it to see what would happen with the light and shadows.

## Amelia Hansen

Kalamazoo, Michigan, USA
Ruby-throated Hummingbird, Trumpet Creeper (*Archilochus colubris, Campsis radicans*)
Watercolor on paper, 2008
10 × 7 in (25.4 × 17.78 cm)

I'm probably not alone in my fascination with hummingbirds and their many captivating attributes! But I did not thoroughly understand how they feed from long-necked flowers until I was asked to depict it for a book, and had to do some research. It was a challenge to find good reference material for the hummingbird. Although I watched them come to our feeder, and observed their rapidly flicking tongues, I still could not see exactly what was happening. So, from a DVD with good feeding sequences, I made gesture sketches. I supplemented these sketches with an array of photographs. The trumpet creeper flower was easy to find for reference; I simply collected several blossoms from a large specimen near my house, and cut them open with a razor blade. Their interiors were fascinating but ephemeral, quickly wilting in the heat, and I had to return twice to collect fresh flowers.

## Anne Hayes

Coorparoo, Queensland, Australia
*Grevillea* species
Watercolor on paper, 2011
12 × 11 in (30.4 × 27.9 cm)

*Grevillea* is a genus native to South East Asia and Australia whose numerous species and unique beauty seem emblematic of the region's vast biological diversity. It is one of the most popular genera grown horticulturally in Australia, partly because it attracts honey-eating birds. The plant depicted grows in our garden, and usually has flowers on it all year round. Thus I was able to represent the flowers at each stage of their development, from closed to fully open. The inflorescence was a challenge to paint because of its extreme delicacy. I chose to use watercolor as the medium that would best express the rich color, complexity, and soft aspect of this plant.

# Jury Award

## Asuka Hishiki

Briarwood, New York, USA
Asian Swallowtail Butterfly (*Papilio xuthus*)
Mixed media (graphite, watercolor) on paper, 2011
10.7 × 14.2 in (27.3 × 37 cm)

It is possible to see Asian Swallowtail butterflies, *Papilio xuthus*, everywhere in Japan from early spring until summer. It might seem strange to see such a large butterfly fluttering across a big boulevard, but they are everywhere, flying between buildings in the spring sky! The Japanese love this butterfly and its appealing caterpillar so much that we protect them, even though they damage our citrus trees. The host plants for this species are in the family Rutaceae, and it is common to see homes with potted plants of this family to attract the butterflies, especially the Japanese pepper trees, *Zanthoxylum piperitum*. My mother had one in her garden. As a child, I would watch the butterflies in amazement. Each stage of the metamorphosis is breathtakingly beautiful, a wonder of nature.

## Asuka Hishiki

Briarwood, New York, USA
Soybeans (*Glycine max*)
Watercolor on paper, 2011
6.7 × 10.5 in (18 × 26.6 cm)

I love to watch something change over time. We think plants move so little and grow slowly, but when I grow soybeans, *Glycine max*, on wet cotton, the beans surprise me by growing very fast. The first, small sprouts poke out, but it isn't a "sprout" at all. It develops into a thick root that twists into curves, even though there are no obstacles. The color is amazing as well; a variety of pastel yellows to dark brown-reds, purples, and bright greens. Everyday, every time I check, each little bean has changed its face dramatically. We tend to think of vegetables and fruits as edibles, but not plants. However, they are a part of nature and very much alive, keeping us healthy and robust. After observing the soy beans grow, I appreciate more than ever the taste of a cup of miso soup with tofu.

## Beverley Irwin

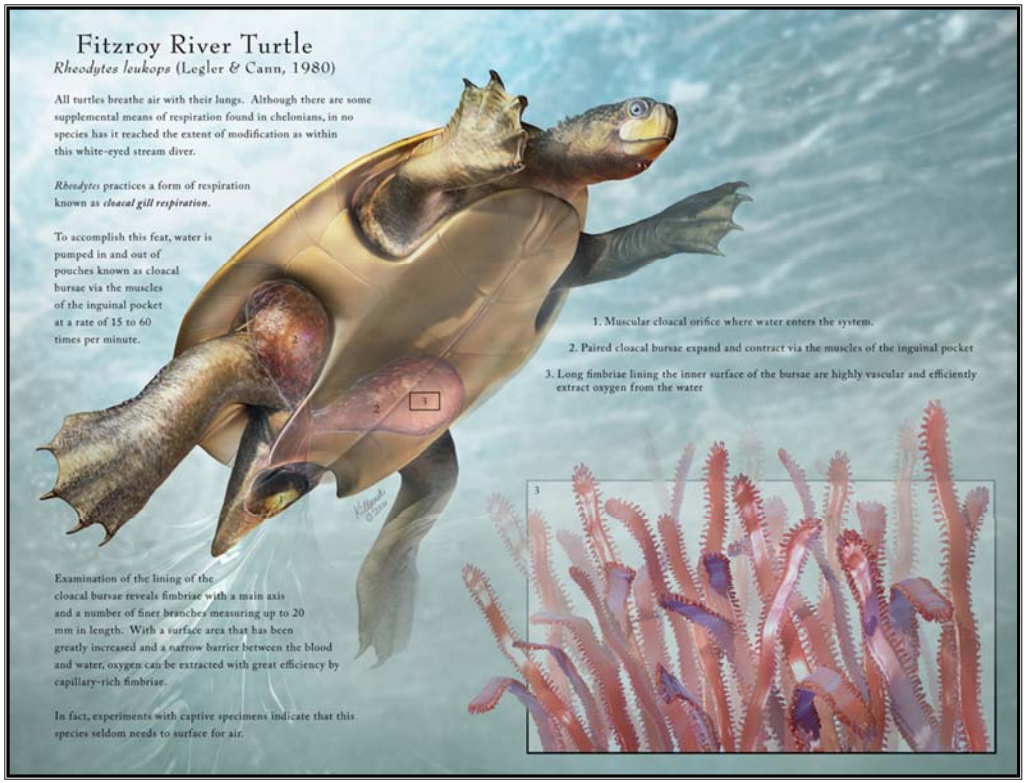
Toowoomba, Australia
Brush-tailed Rock-wallaby (*Petrogale penicillata*)
Mixed media (acrylic, gouache, watercolor) on paper, 2010
18 × 14 in (45.7 × 35.5 cm)

**Jury Award**

The beautiful, endangered Brush-tailed Rock-wallabies are very difficult to find as they blend perfectly with their environment. I had been sitting patiently with camera poised for some time in a deep gully suggested by the local wildlife ranger, when a slight movement alerted me to the presence of my elusive quarry, silently observing me and basking in the sun. Obviously, she had been there when I arrived, but was so well camouflaged that I failed to see either her or her joey, even though they were almost within touching distance. I watched them for an hour or more. Then she grew tired of my company, collected her sleepy youngster, and gracefully hopped up the steep rocky wall to a sunnier spot away from my prying eyes. It was a magical experience to be so close to this magnificent animal in its natural habitat.

# David C. Killpack

Cedar Hill, Texas, USA
Fitzroy River Turtle (*Rheodytes leukops*)
Digital (entirely) on paper, 2007
13.6 × 18 in (34.5 × 45.7 cm)




*Rheodytes* is the record-holder for its ability to stay submerged underwater. Known in southeastern Queensland as the "bum breathing turtle" because of its adaptation known as cloacal respiration. Its cloaca is expanded into paired bursae (sacs) that are muscular and contractile. These are lined with filamentous fimbriae that are subdivided into finer structures to create a large surface area to facilitate oxygen extraction, similar to fish gills. The turtle is able to fulfill most of its oxygen requirement through this method of respiration, although it also possesses completely functional lungs that it uses when out of the water.

This species is rare in USA collections, but fortunately I had access to a preserved specimen. A PET (positron emission tomography, a technique used to produce a three-dimensional image) scan was used to visualize the volumes of the cloacal bursae, and measurements were taken for the external anatomy. A digital 3D model was constructed in 3ds max and Zbrush. After lighting, texturing, and rendering, Adobe Photoshop was used to detail the background and subtle painted details. The final layout, with inset and typography, was created in Adobe Illustrator. It was published in *Turtles: An Extraordinary Natural History 245 Million Years in the Making* by Carl J. Franklin (Voyageur Press, 2007).

# David C. Killpack

Cedar Hill, Texas, USA
Illuminated Netdevil (*Linophryne arborifera*)
Digital (entirely) on paper, 2011
8.7 × 11 in (23 × 27.9 cm)

## Jury Award

The Illuminated Netdevil is a deep-sea anglerfish found throughout the world's tropical and subtropical oceans at depths greater than 3,300 ft (1000 m.) This illustration depicts a pair, showing the dramatic dimorphism between the sexes. The much larger female appears fearsome, but only reaches a maximum of 3 in (7.7 cm), whereas the male is about 0.6 in (1.5 cm). Unable to feed himself after metamorphosis, he must locate a female to survive. Once the tiny male finds a female, his sole purpose is to fertilize her eggs, and he becomes parasitic, attaching to her ventral surface. In a short time, some of his blood vessels permanently merge with her circulatory system that then supplies him with all his nutrition. As if this wasn't unusual enough, this species is bioluminescent. The light organs of *Linophryne arborifera* are derived from two sources. The round part of the lure on top of the head, known as the esca, contains mutualistic, bioluminescent bacteria, whereas the seaweed-like hyoid barbels contain complex paracrystalline photogenic granules derived of the fishes' own tissues.

The illustration was created as part of a bioluminescent series to promote my business *Illumination Studios*. The medium is entirely digital, starting as 3D models that were sculpted in 3ds max and Zbrush. After lighting, texturing, and rendering, Adobe Photoshop was used to detail the background and add subtle painted details.

# Barrett Anthony Klein

Konstanz, Germany

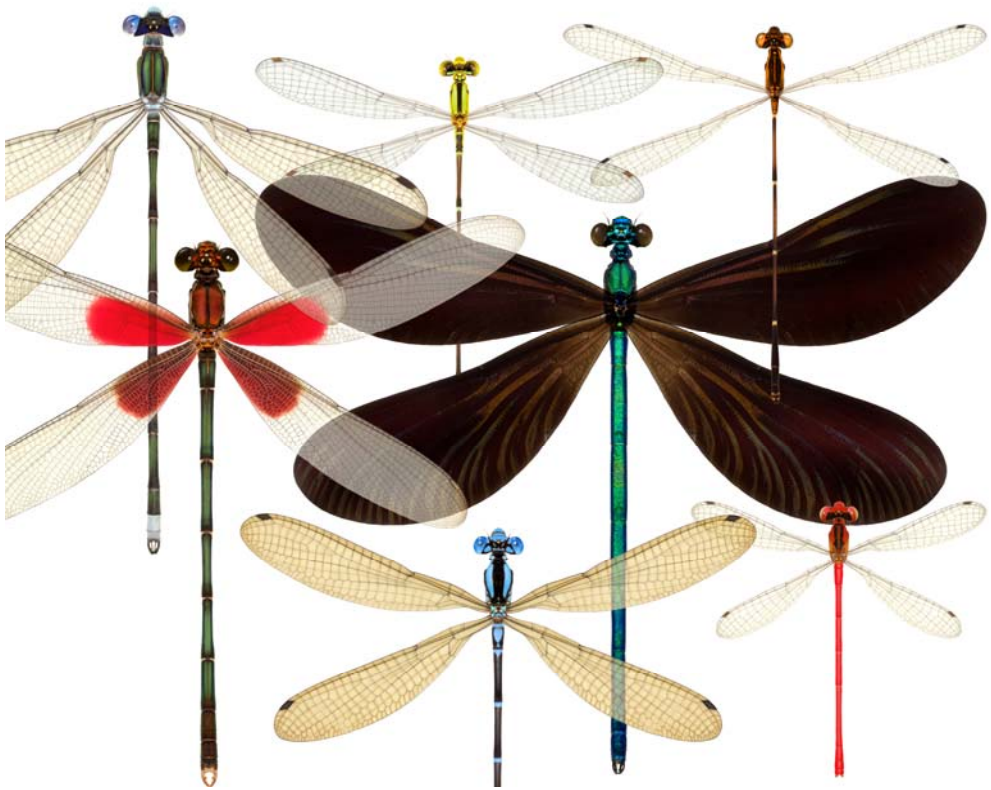
Swamp Spreadwing, Vesper Bluet, Orangestriped Threadtail, American Rubyspot, Ebony Jewelwing, Goldenwinged Dancer, Desert Firetail

(*Lestes vigilax*, *Enallagma vesperum*, *Protoneura cara*, *Hetaerina americana*, *Calopteryx maculata*, *Argia rhoadsi*, *Telebasis salva*)

Digital (entirely) on paper, 2010

10 × 8 in (25.4 × 20.3 cm)

Damselflies (order Odonata, suborder Zygoptera) are distinguished from dragonflies by having long slender bodies, eyes that are separated, and wings that are closed when at rest. To human eyes, they delicately and colorfully grace areas around bodies of water, but to small insects such as mosquitoes, they are voracious predators on the wing. I created this artwork for the cover of a field guide titled *Damselflies of Texas* by John C. Abbott (University of Texas Press, 2011). To prepare the drawings, I dissected preserved damselfly specimens, scanned each body part and then assembled and painted them digitally. The last step was to create the composite image. A detailed description of the methods I used can be found in the field guide.



The collection of damselflies in this image portray males that belong to all four families of damselflies found in the United States, but it only hints at the beauty and diversity of this suborder of insects.

## Jee-Yeon Ae Sook Koo

Gangseo-gu, Seoul, South Korea
Angel-trumpet (*Datura wrightii*)
Watercolor on paper, 2011
15 × 21.5 in (39 × 54.6 cm)

Four years ago, while hiking with my son in the Zion National Park, Utah, I was inspired to paint a portrait of the angel-trumpet, a protected plant that grows abundantly on the valley floors. This lovely plant's flower resembles a white morning glory, and it has interesting, prickly fruit. I started the piece while still in Utah, but completed it several years later in Korea. For reference I used a similar plant with appropriate color tones that grows in Korea. Every step of the long process and completion of this painting has been joyful. The entire time I worked, I kept in mind that it might eventually be featured in the *Focus on Nature* exhibition.

# Juna Kurihara

Tokyo, Japan
Robust Cicada or Minmin-zemi (*Hyalessa maculaticollis*)
Acrylic, 2011
10.6 × 10.6 in (26.9 × 26.9 cm)

The Robust Cicada, *Hyalessa maculaticollis*, is one of Japan's most familiar insects of the summer. It is distributed throughout the country in both rural and urban areas. Nymphs of this species live 6–7 years underground, and then emerge to spend their last 2–3 weeks of life as adults. The male makes a loud, distinctive noise meant to attract the females. Although they are easily identifiable by this sound, they are usually high in the tree tops where close observation is impossible.

One day in September, I came across a male that had must have died recently because its colors were very different from pinned specimens: the body a bright green, the simple eyes a deep crimson, the compound eyes a hazy turquoise, and the tiny hairs shiny gold. Quickly, I painted a portrait in acrylic in order to capture its fresh beauty.

The color patterns of these cicadas vary according to the summer climate of the area they inhabit. Those from cooler climates have more black than those from areas with very hot summers. The male depicted here was found in Tokyo, where summers are moderately hot. It is known as the "standard type," having both green and black coloration.

# Kelly A. Lance

Las Vegas, Nevada, USA
Moon Jellyfish (*Aurelia aurita*)
Acrylic on paper, 2002
11 × 17 in (27.9 × 44 cm)

Often the beauty of an animal is found in its locomotion. During the time I studied scientific illustration at the University of Washington, I made several trips to the Seattle Aquarium, and found myself captivated by motion, especially of the invertebrates. I soon realized that a species such as *Aurelia aurita*, no matter how common, was mesmerizing and full of delicate grace. The depiction of such an animal would be incomplete without the observation and recognition of this aspect of its existence. When I did this piece, I had in mind a thought from Aristotle: “The whole is greater than the sum of its parts.”

# Fernando Emmanuel Laverde

Bogotá, Cundinamarca, Colombia
Caribbean or American Flamingo (*Phoenicopterus ruber*)
Mixed media (gouache, graphite, watercolor) on paper, 2010
11 × 8.5 in (27.9 × 21.5 cm)

I have the privilege of living in Colombia, a biologically mega-diverse country. Birds alone comprise more than 1,850 species. This factor, coupled with their beauty and sophisticated evolutionary adaptations, has inspired me to paint and protect them for over ten years. This painting shows the American Flamingo, *Phoenicopterus ruber*, a famously elegant and fascinating bird. They are ideal subjects to paint, as they may hold one position for several minutes at a time. Flamingos usually are found congregated along the coastal regions of Colombia and other parts of the Caribbean, as well as in the Galapagos Islands. This image belongs to a series of paintings I made during visits to zoos and natural reserves in Colombia. I find it deeply satisfying to work outdoors, especially during expeditions to wild places. Also, I am continuously inspired by the same nature that sages and explorers, such Alexander von Humboldt and José Celestino Mutis, experienced 200 years ago.

## Elayne Leighton

Jackson, New Jersey, USA
Thick-headed Fly (*Physocephala tibialis*)
Mixed media (colored pencil, gouache) on drafting film, 2011
8.5 × 11 in (21.5 × 27.9 cm)

*Physocephala tibialis* is the most common of a relatively rare genus of flies from the eastern United States. This unusual fly, which inhabits open meadows and gardens, is a native pollinator. Its larvae are parasites of bees and wasps, but because of their small numbers, they do not pose a serious threat to other pollinating insects. The two-toned wing pattern and "wasp waist" make it appear to be a wasp at first glance. This characteristic, along with the unicorn-like antennae and strange mouth parts, compelled me to draw this little insect.

# Mindy Lighthipe

Gainesville, Florida, USA
Garden Tiger Moth (*Arctia caja*)
Mixed media (gouache, graphite) on paper, 2010
6 × 6 in (15.2 × 15.2 cm)

I am fascinated with the color and textures of insects, especially moth and butterfly wings. Using a microscope to see these patterns and textures is a whole new world for me. In this piece I depicted what I saw under the microscope of the Garden Tiger Moth in graphite, and painted the entire moth, life-size, in full color.

# Peggy Macnamara

Wilmette, Illinois, USA
*Cranes Slipsliding*
Sandhill Crane (*Grus Canadensis*)
Mixed media (graphite, watercolor) on paper, 2011
36 × 47 in (91.4 × 119.3 cm)

*Cranes Slipsliding* is from my series of watercolors called *Bird Compositions: Ruskin's Nine* that illustrate John Ruskin's (1819–1900) nine laws of composition. I had been preparing flight images for my upcoming book on migration, and they were displayed in my studio at the time I was planning a class on composition. I noticed that my bird arrangements, which accurately illustrate the bird distances from one another, reflected Ruskin's laws of curvature. To make sure, I placed a large round platter from the kitchen over one of my paintings. It became clear that birds create repetitious curves in relation to one another. In his book *Elements of Drawing*, Ruskin used leaves (stationary examples) to illustrate these theories, but birds that choreograph for survival also adhere to these laws. This crane piece shows the phenomenon of slipsliding, in which each bird, in turn, assumes the lead. Furthermore, the formation adheres to Ruskin's law of consistency, in his words: "While contrast displays things, it is unity and sympathy, which employ them, concentrating the power of several into a mass…"

# Xavier Macpherson

Barcelona, Spain
Harlequin Shrimp (*Hymenocera picta*)
Mixed media (watercolor, digital) on paper, 2011
12 × 8 in (30.4 ×20.3 cm)

I've been illustrating crustaceans in traditional media for a long time, adhering to strict scientific accuracy. This illustration of *Hymenocera picta*, however, belongs to a series of shrimp illustrations that combine scientific accuracy with artistic aspects, such as color and paint strokes. It was a challenge for me to mix watercolor technique with the digital software, Infographics. I have used each technique separately for a long time, and had to rethink their possibilities when I combined them.

# Alan Male

Truro, Cornwall, England
*Vertebrates and Invertebrates of the Carboniferous*
*Strepsodus* species, *Pederpes* species, *Crassigyrinus* species, *Dolichosoma* species, *Stendodyctia* species, *Meganeura* species
Mixed media (gouache, watercolor) on paper, 2011
20 × 8 in (50.8×20.3 cm)

This image conveys the dense, moist textures of the Carboniferous swamps 359–299 million years ago. It represents a composite procession of diverse animal life, and is to be published in a book about evolution. The Carboniferous Period saw the emergence of creatures with which we are familiar today, such as scorpions, cockroaches, and silverfish. Tetrapods, the first vertebrates to evolve two pairs of legs, were the earliest amphibian-like forms, and developed from lobe-finned fish such as the *Strepsodus* shown. The amphibians on view are *Pederpes*, the large predator on the left, *Crassigyrinus*, and the legless *Dolichosoma*. Also seen here are insects that took to the air such as *Stendodyctia*, an early form of stonefly, and *Meganeura*, the biggest flying insect to live, with a wingspan of over 3 ft (1 m)!

# Alan Male

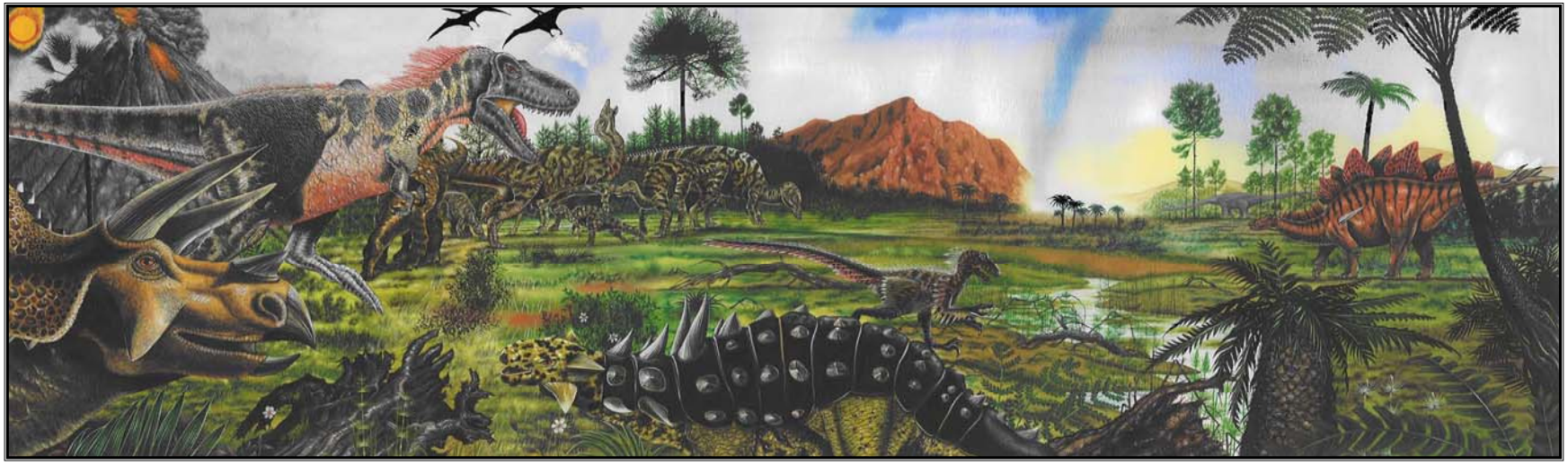
Truro, Cornwall, England
Black Widow Spider (*Latrodectus mactans*)
Mixed media (gouache, watercolor) on paper, 2000
13 × 7 in (34 × 17.7 cm)

This illustration was produced for a book illustrated solely by myself, titled *Spiders and their Websites* by Marjorie Facklam (Little, Brown and Co., 2001). The essence of the concept is to depict the drama and atmosphere associated with this iconic species; fear and terror with a "gothic horror" connection. Not surprisingly, the image was also used by the same publisher for the cover of a book of supernatural tales!

# Alan Male

Truro, Cornwall, England
*The End of the Cretaceous*
*Tyranosaurus rex*, *Triceratops* species, *Edmontosaurus* species, *Sauropelta* species, *Apatosaurus* species, *Deinonychus* species, *Stegosaurus* species
Mixed media (gouache, watercolor) on paper, 2008
16 × 5 in (40.6 × 12.7 cm)

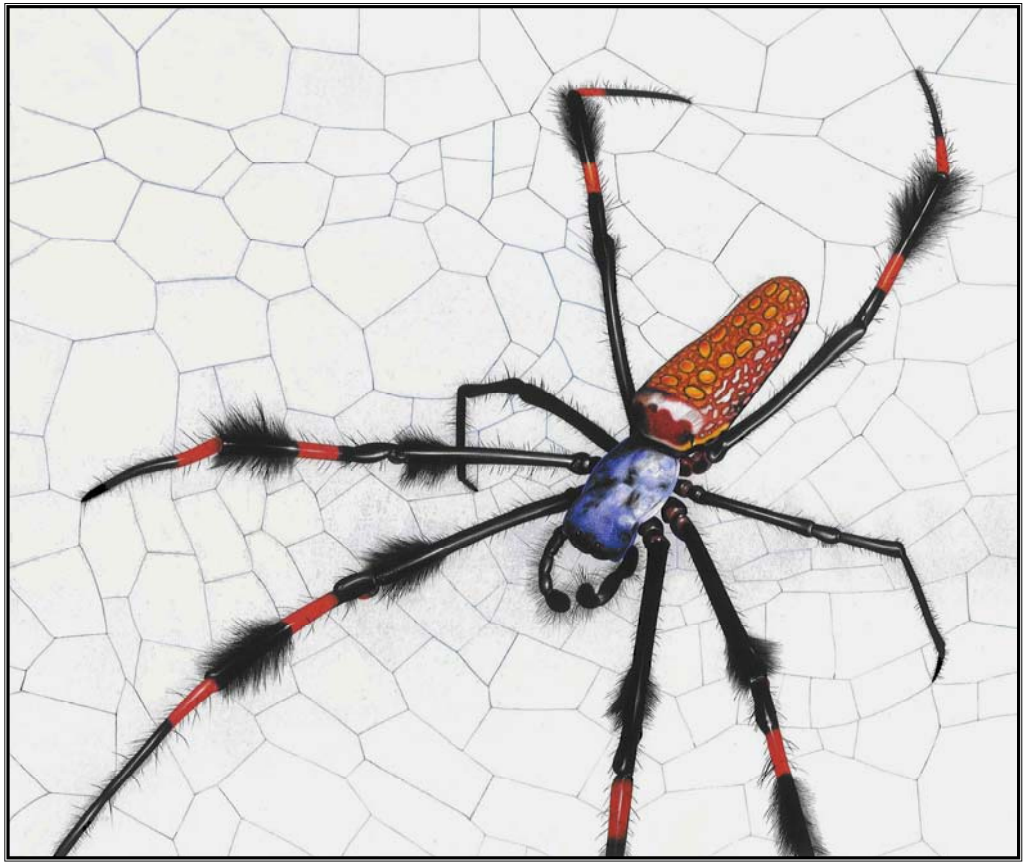
The published title of this image was *Extreme Makeover*, and was commissioned by *Yale University Alumni Magazine*. It is a re-evaluation of the Peabody Museum's *Age of Reptiles* mural, painted between 1942 and 1947 by Rudolph Zallinger. The original is a time line from the Triassic to the end of the Cretaceous periods, and it is here that I was asked to present my visual re-appraisal of the ecology and fauna of that time. No longer are there lumbering, cold-blooded reptilians; instead, I show them as current scientific opinion suggests: warm-blooded, sprightly, and alert. Note the feathery-hairy aspect to *Tyranosaurus rex*, plus skin that is hide-like rather than scaly. There were far fewer flowering plants around than previously thought. In addition, the picture shows *Triceratops*, *Edmontosaurus*, *Sauropelta*, *Apatosaurus*, *Deinonychus*, *Stegosaurus*, and the obligatory asteroid (top left) about to bring an end to the age of the dinosaurs!



# Alan Male

Truro, Cornwall, England
Calico Spider (*Nephila claripes*)
Mixed media (gouache, watercolor) on paper, 2000
12 × 11 in (30.4 × 27.9 cm)

This was produced for the front cover of a book illustrated solely by myself, titled *Spiders and their Websites* by Marjorie Facklam (Little, Brown and Co., 2001). The book won a Texas Bluebonnet Award. I chose this species because of its strong colors, markings, textures, shape, and overall visual presence.



## Janet M. Matthews

Narre Warren, Victoria, Australia
Dusky Moorhen (*Gallinula tenebrosa*)
Mixed media (colored pencil, graphite) on paper, 2011
8 × 11 in (20.3 × 27.9 cm)

Dusky Moorhens are Australia's version of the Eurasian Moorhens and North America's Common Gallinule. They have long, knobby, multi-colored legs, and strikingly long toes that add to their gangly look when walking or swimming, all features that attracted me to draw them. These Moorhens live in swamps, lakes, and waterways, where they feed during the day among the reeds. The aims for this piece were to depict an intimate caring moment of feeding a chick while surrounded by protective foliage, and to capture the visual rhythm of their comical, bright red bill and green legs. The best way I thought of accomplishing this was to show both the over and underwater world of their environment.

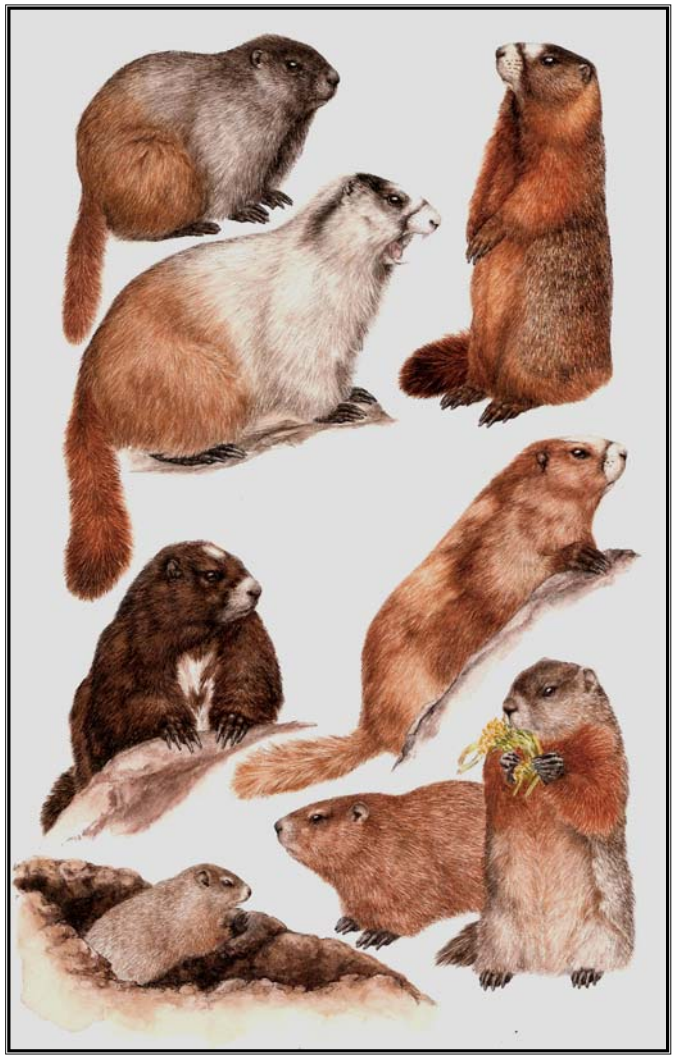
## Elizabeth McClelland

Berkeley, California, USA
Collared Pika (adult and juvenile, top)
American Pika, (winter and summer pelage, bottom)
(*Ochotona collaris*, *Ochotona princeps*)
Watercolor on illustration board, 2009
6 × 9 in (15.2 × 22.8 cm)

At about 6 in (15.2 cm) in length and 6 oz (170 grm) in weight, pikas are a small member of the order Lagomorpha, which includes the family of rabbits and hares. North American pikas live in high mountain areas of the West, near or above the tree line, requiring cool moist microhabitats. Herbivores that live in talus slopes and boulder fields with good foraging areas close by, pikas gather plant material throughout the growing season into hay piles. When the piles have dried in the open, pikas then store the hay for winter use as food and bedding. The pikas have been observed to make up to thirteen trips per hour foraging for hay. They do not hibernate or dig burrows, but den in natural spaces under rocks. Commonly called “whistling hares” because of their high-pitched alarm call, pikas also sing seasonally. Some North American pika populations are declining in numbers, some have disappeared (such as in the Great Basin in Nevada), and some are migrating to higher, cooler elevations. The *Pikas in Peril Project* of the U. S. National Park Service, funded in eight western parks, is examining the vulnerability of pika species to future climate-change scenarios, with results expected in 2012.

# Elizabeth McClelland

Berkeley, California, USA
Marmots (clockwise starting upper left): Alaska, Yellow-bellied, Olympic, Woodchuck, Woodchuck juvenile, Vancouver Island, Hoary (*Marmota broweri*, *M. flaviventris*, *M. olympus*, *M. monax*, *M. monax ochracea*, *M. monax* (juvenile), *M. vancouverensis*, *M. caligata*)
Watercolor on illustration board, 2009
6 × 9 in (15.2 × 22.8 cm)



The largest members of the squirrel family, marmots are house-cat-sized rodents. All marmot species are herbivores, dwell in burrows, and hibernate through the winter, typically for 6–7 months. The name Woodchuck (or Groundhog) commonly refers to *Marmota monax*, found at low elevations throughout eastern and central North America (north of Louisiana), and across Canada into eastern Alaska. This marmot is asocial, in contrast to the extended family groupings of the western marmots. The other five marmot species are residents of the mountain ranges and high plateaus of western North American, from the southern Rockies and Sierra Nevada, north through British Columbia, western Alberta, Yukon, and Alaska. The altitude of occurrence is dependent on latitude, as they generally live at high altitude except in some more northerly regions. Nick-named “whistle pigs” for their long, loud, piercing alarm calls and chirps, marmots can identify types of predator threats, locations, and distances by the character of the calls. Two species, the Olympic and Vancouver Island marmots, exist only as very small populations in isolated areas. The latter remains one of the world’s most endangered mammals. Before the first captive-bred animals were released in 2003, only 21 wild individuals were known. By 2010, 308 individuals were released into the wild, and it is believed that there are now 200–300 surviving on Vancouver Island in three locations.

# Dianne McElwain

Cincinnati, Ohio, USA
Okra (*Ambelmoschus esculentus*)
Watercolor on paper, 2010
21 × 27 in (53.3 × 68.5 cm)

I found *Abelmoschus esculentus* at the Krohn Conservatory Garden in Cincinnati, Ohio. For this painting, I used Winsor & Newton watercolors on Fabriano Artistico 300-lb hot press watercolor paper, my favorite. The flower of okra is like a hibiscus, and I painted it in very fine brush strokes to achieve its dainty, transparent look. The leaves are rather stiff and rigid, so I needed to build up the paint to make it look as realistic as possible. I was struck by the fact that the okra plant looked like a starburst of leaves surrounding the pods and flowers. After many detailed drawings from life, I decided to paint the whole plant. I believe I have captured the star burst effect that so intrigued me when I first saw this plant. Notice that the pods grow upright, not hanging down as one would expect. I hope you enjoy viewing this okra portrait. I enjoyed painting it.

# D. W. Miller

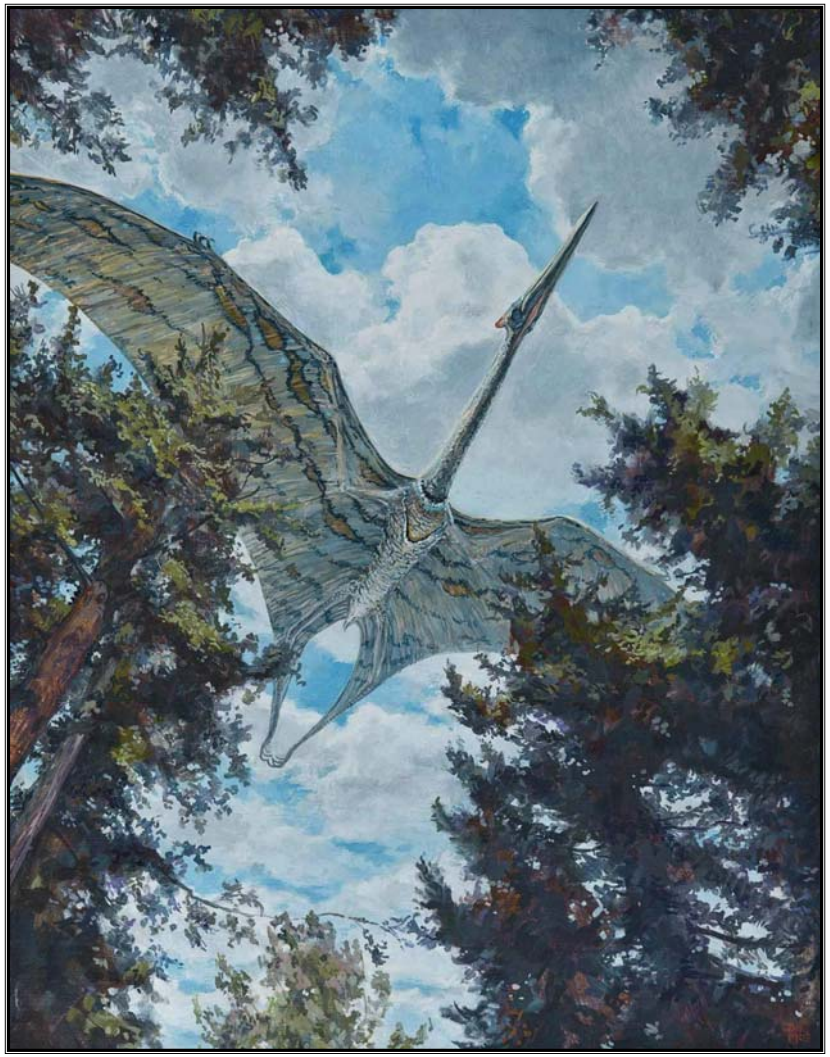
Bellingham, Washington, USA
*Hypsocormus* species
Oil on illustration board, 2002
12 × 9 in (30.4 × 22.8 cm)

*Hypsocormus* is an extinct genus of fish that lived in Europe during the Jurassic Period (200–145 million years ago). It was a fast-swimming, predatory fish about 3.3 ft (1 m) long. John Maisey of the American Museum of Natural History advised me to leave off the pelvic fins. An under-painting of acrylic preceded the oil finish.

## D. W. Miller

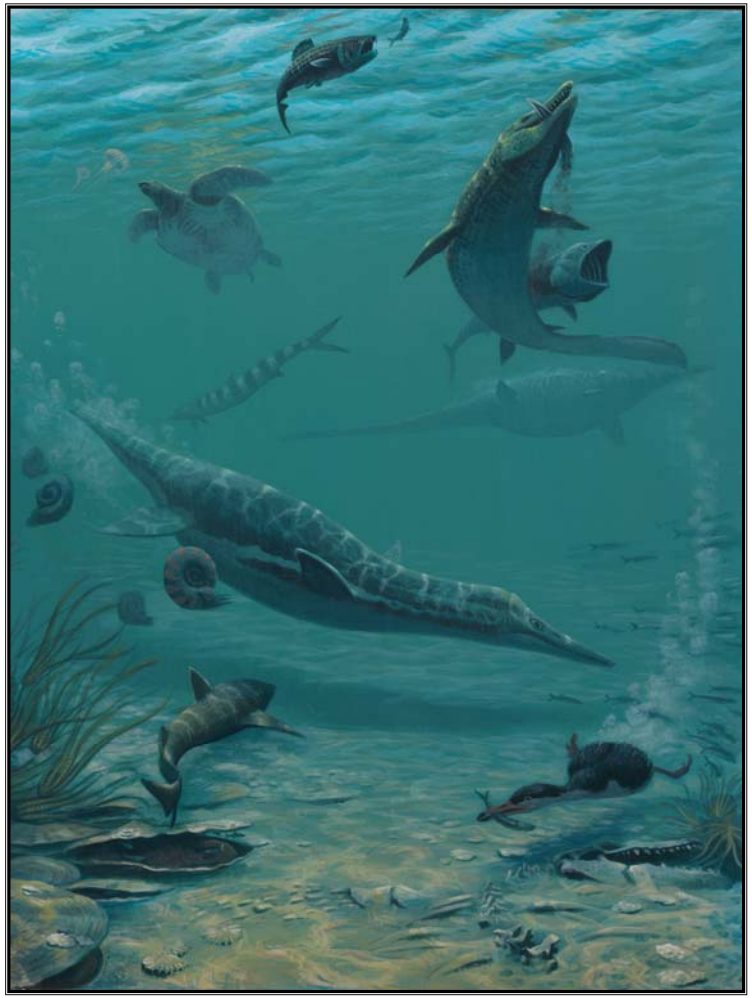
Bellingham, Washington, USA
*Quetzalcoatlus* species
Oil on illustration board, 2003
12 × 16 in (30.4 × 40.6 cm)

This painting originally had a short deadline for a book that was subsequently illustrated by another artist. The image dramatically depicts the 45-ft (13.7-m) wingspan of a *Quetzalcoatlus* species, a pterodactyl that lived in North America during the late Cretaceous Period (c. 145.5–65.5 million years ago.) One of the largest known flying animals of all time, the first fossils were discovered in Texas in 1971. The name *Quetzalcoatlus* means “feathered serpent” from the Mesoamerican god Quetzalcoatl.



# Sean R. Murtha

Norwalk, Connecticut, USA
*Marine Life of the Cretaceous from the Niobrara Chalk in North America*
*Enchodus petrosus*, *Protostega gigas*, *Saurodon leanus*, *Tylosaurus prorigor*, *Bonnerichthys gladius*, *Elasmosaurus sternbergi*, *Dolychorhynchus osborni*, *Clioscaphites* species, *Uintacrinus socialis*, *Squalicorax kaupi*, *Caproberyx* species, *Volviceramus grandis*, *Ostrea congesta*, *Hesperornis regalis*
Acrylic on Masonite panel, 2010
16.5 × 21.5 in (41.9 ×54.6 cm)



During the Cretaceous Period, c. 145.5–65.5 million years ago, a sea covered the North American Midwest. This sea teemed with organisms, some of which were beginning to take on modern aspects. Many would have seemed unfamiliar, particularly the dominant, large, marine reptiles, such as the Plesiosaurs and Mosasaurs, which would not survive the extinction event at the end of the Cretaceous Period. Marine turtles and toothed diving birds were members of families that would survive and would be recognizable. Bony fish were diversifying, while sharks continued their conservative but successful design. Holdovers from an earlier age, ammonites and crinoids had a final flourish before becoming rare and inconspicuous.

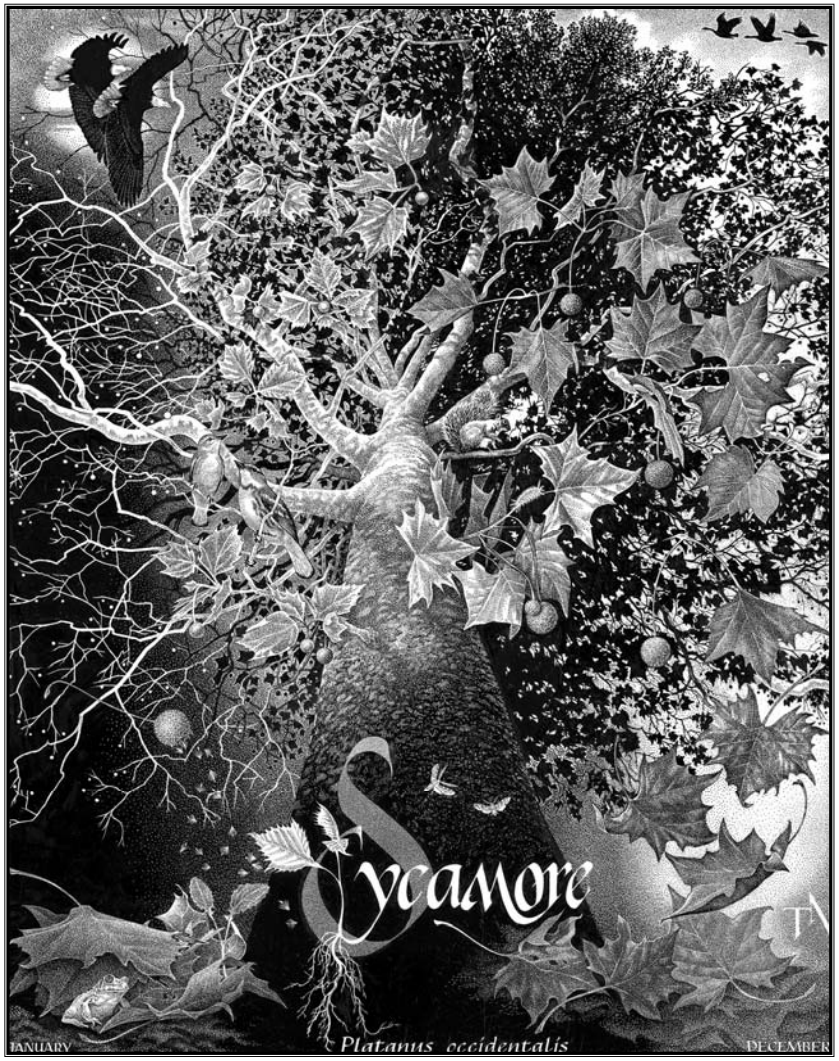
This painting was one of a series for the Bruce Museum in Greenwich, Connecticut that illustrates the evolution of life in the sea. Each panel was digitally enlarged and displayed end-to-end as a mural behind representative fossil specimens. The organisms depicted in the mural are a scattered sampling through time and place. This sampling often resulted in unnatural conglomerations of species that never would have coexisted. However, this particular painting depicts species from a relatively brief time, several of which would have been contemporaries.

# Jury Award

## Trudy Nicholson

Cabin John, Maryland, USA
Sycamore, Gray Squirrel, Cerulean Warbler, Sycamore Tussock Caterpillar and Moth, Bald Eagle, Gray Tree Frog (*Plantanus occidentalis*, *Sciurus carolinensis*, *Dendroica cerulea*, *Halysidota harrisii*, *Haliaeetus leucocephalus*, *Hyla versicolor*)
Pen & ink on scratchboard, 2007
14.5 × 18.5 in (36.8 × 21.6 cm)

In the floodplain of the Potomac River, groves of sycamore trees stand out by their size and stark whiteness. It's a tree to be noticed. Along the riverbank near our home, a huge eagle's nest can be seen in a sycamore growing on an island. That scene was the first inspiration for this illustration. The tree provides far more than support for one oversized nest. It gives shelter, protection, shade, nourishment, and leaf litter to the riverbank inhabitants, which include Eastern Gray Squirrel, Cerulean Warbler, Sycamore Tussock Caterpillar and Moth, Bald Eagles, and Gray Tree Frog. All are shown in the season of their presence during the tree's annual cycle, from winter seed release through spring pollination, lush summer growth, and leaf loss in the fall. Scratchboard, with its high contrast, is a perfect medium to show the contrast that makes this bright tree stand out in its habitat.

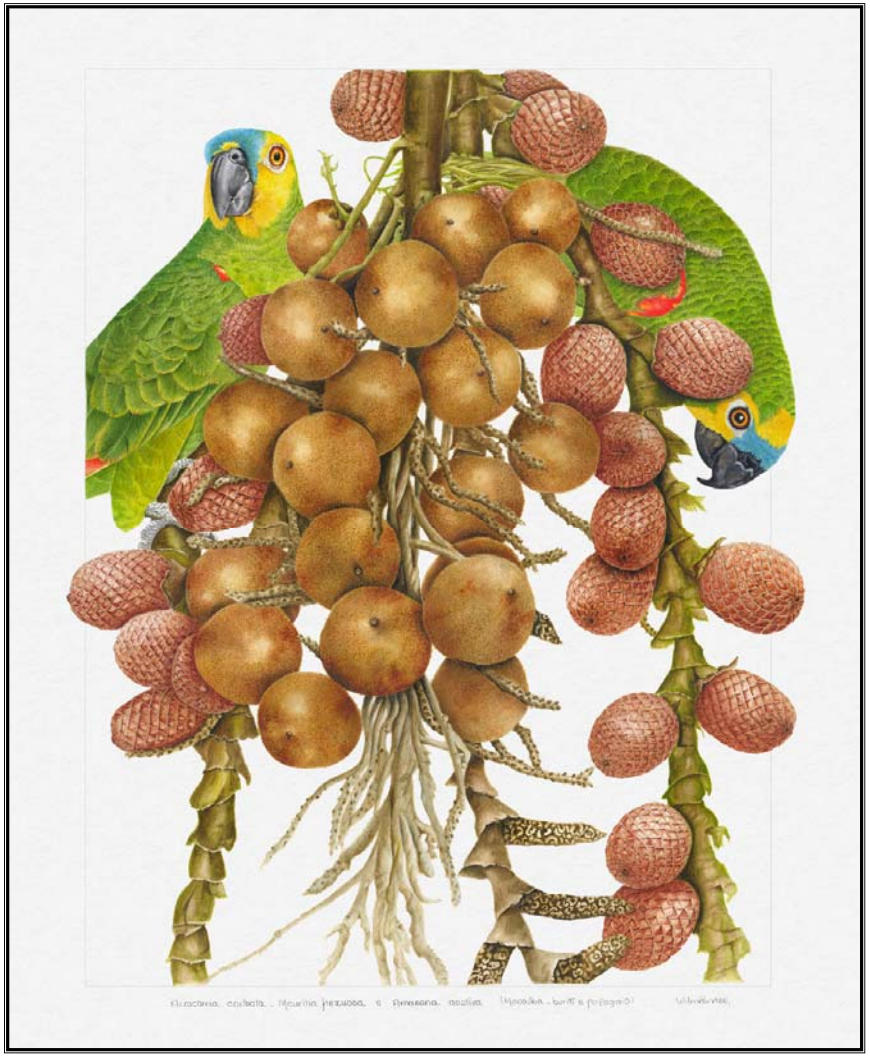


# Wilma Ander Oliveira

Anapolis, Goiás, Brazil
Papagaios, Palm Nuts
(*Amazona aestiva*, *Acrocomia aculeata*, *Mauritia flexuosa*)
Watercolor on paper, 2010
19.7 × 25.6 in (5 × 65 cm)

Papagaios are found in both major ecotypes of Brazil; the savannah known as *cerrado* (Portuguese for "closed") and the Amazon Basin. These beautiful birds are members of the same family as macaws and, like them, have strong beaks that enable them to break open and eat the hard palm tree nuts that grow all over Brazil. Depicted here are Papagaios eating two kinds of palm nuts. The dark yellow ochre is *Acrocomia aculeata*, in Brazil commonly called "Macauba", and the reddish nuts are *Mauritia flexuosa*, known as "Buriti."

These very cute, easily domesticated parrots are popular as pets, particularly because they are very adept at imitating human speech. The Brazilian government tries to protect them through laws and other actions, but it is still relatively common to see them as pets.



# Wilma Ander Oliveira

Anapolis, Goiás, Brazil
Yellow-wings or Periquitos, Monguba (*Brotogeris chiriri*, *Pachira aquatica*)
Watercolor on paper, 2011
21 × 15 in (54 × 38 cm)

This species of parakeet, *Brotogeris chiriri* is usually found in central Brazil, in the region known as *cerrado*, the second largest biome of the country. They are very noisy, fruit-loving birds that often congregate in the backyards of houses. This painting was made to be part of a 2011 exhibition to celebrate the Fiftieth Anniversary of Brasilia, the capital city of Brazil. The exhibit was sponsored by the Brazilian Congress, and it was a great honor to participate in this event.

## Sharron L. O'Neil

Eagle, Idaho, USA
Western Tanagers (*Piranga ludoviciana*)
Watercolor on paper, 2011
9 × 10 in (22.8 × 25.4 cm)

The Western Tanager winters in warm climates as far south as western Mexico, and migrates north to summer breeding grounds. They are a familiar sight around my family cabin in Idaho's Boise National Forest at 5500 ft (1,676 m). Small flocks pass through the lower Boise valley during the migratory period, but nesting pairs remain in the mountains all summer. The sight of the male's striking bright yellow and red feathers in the pine trees thrills me every time—a tropical jewel in the forest. The female's colors are more subtle, but she is easy to spot when her brilliant mate is nearby. As a child, I was naturally attracted to bright colors. So, the Western Tanager was one of the first birds I learned to identify. They are still a favorite. I have spent many hours observing and photographing these handsome birds.

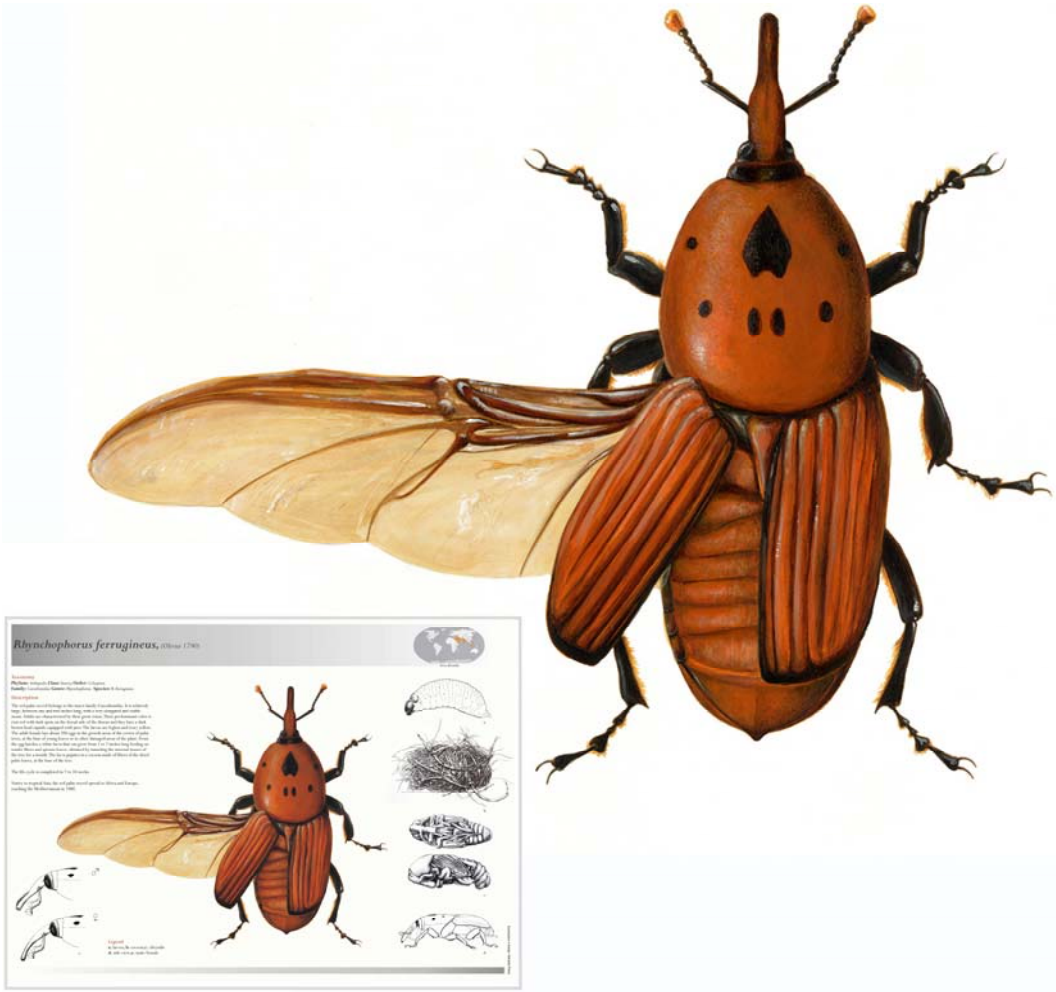
In this painting, two males are perched on old Lodgepole Pine branches. I began it in the mountains, and finished a few months later in my home studio. For reference, I brought a pine branch home, used my own photographs, and examined a bird that had crashed into a window. I do more botanical illustrations than bird paintings, but find that the techniques used apply equally well to both subjects.

# Mafalda Varela Paiva

Palmela, Setúbal, Portugal
Red Palm Weevil (*Rynchophorus ferrugineus*)
Mixed media (acrylic, pen & ink, digital) on paper, 2011
16.5 × 11.7 in (41.9 × 29.7 cm)

One day I arrived home and found a Red Palm Weevil, *Rhynchophorus ferrugineus*, in my living room—probably one who had just destroyed the palm tree in my neighbor's garden. I thought this would be a good subject to illustrate because this insect has been killing all the palm trees in southern Portugal since 2007. The Red Palm Weevil, a native of tropical Asia, is having a huge impact on palms throughout the warmer areas of Africa and Europe. The female lays about 200 eggs in the growth areas, such as the crown, and base of young leaves. From the egg hatches a larva that grows 5–7 in (12.7–17.7 cm) long. This larval stage lasts about a month, during which time it destroys the internal tissues by feeding and tunneling through the tree fibers.

After creating the illustration in acrylic, I added the life cycle of the insect in pen and ink, then put it together as a poster digitally.

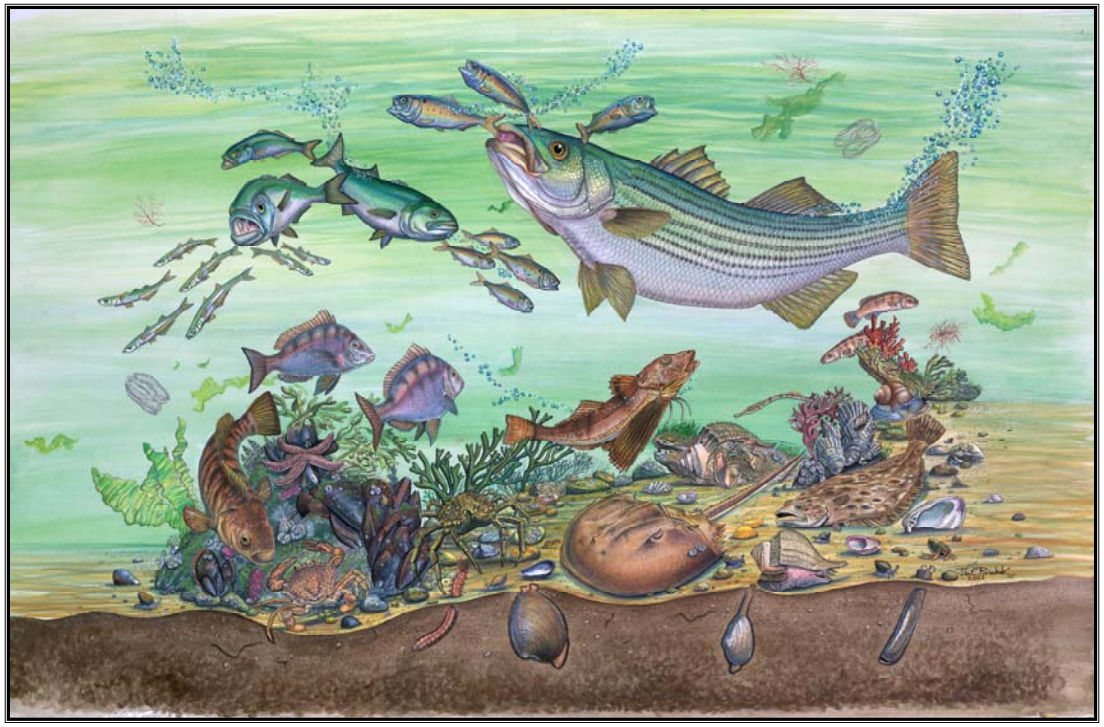


## Jan Christopher Porinchak

Kings Park, New York, USA
*Life Under the Surface*
Striped Bass (*Morone saxatilis*)
Mixed media (pen & ink, watercolor) on illustration board, 2011
38 × 24 in (96.5 × 60.9 cm)

**Jury Award**

*Life Under the Surface* was commissioned by the town of Brookhaven on Long Island, New York, and will be reproduced as interpretive signage at West Meadow Beach. The signage will highlight for visitors the diversity of life found in Long Island Sound. The artwork depicts over forty species of marine fauna and flora, close to twice the number of animals and plants originally planned. When I donned wetsuit and snorkel to explore this underwater ecosystem, I saw first-hand the amazing density, variety, and interconnectedness of life in Long Island Sound, and was compelled to add a number of species to the composition! Seeing the subjects in their habitat, swimming, crawling, and swaying in the currents, was both overwhelming and inspiring. I hope I've conveyed to the viewer a small taste of the spellbinding, glimmering, tumultuous world under the waves with this illustration.



## Jan Prentice

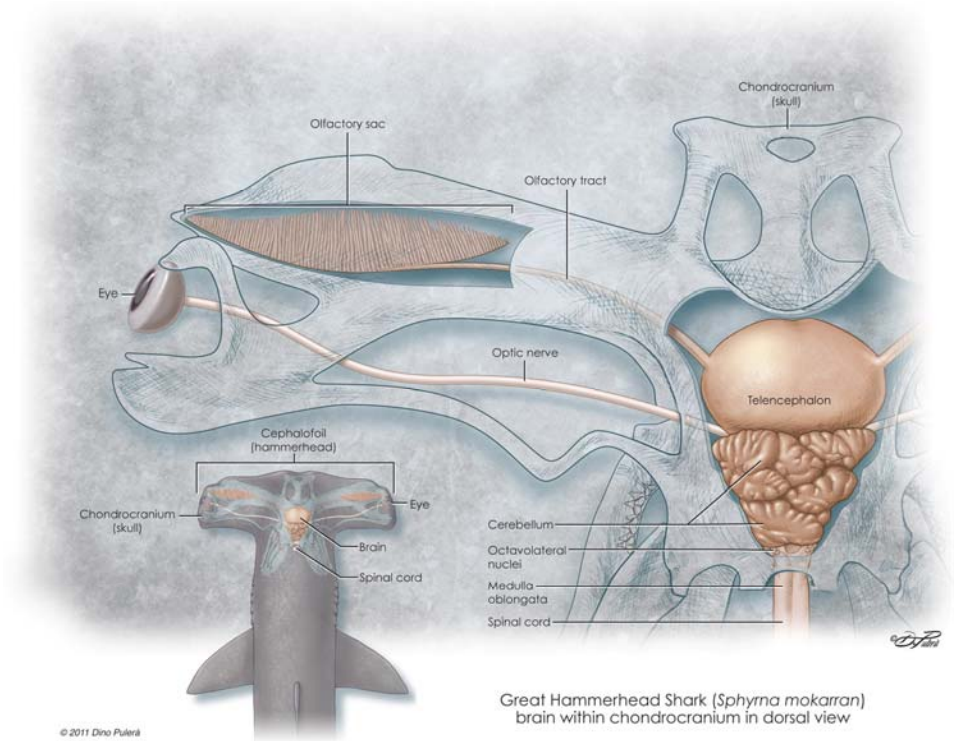
Branford, Connecticut, USA
Red-spotted Purples, Black Cherry
(*Limenitis arthemis*, *Prunus serotina*)
Egg tempera on paper, 2007
14 × 18 in (35.5 × 45.7 cm)

Although distinctly different in appearance, both the Red-spotted Purple (shown here) and the White Admiral are members of the same genus and species. For many years, zoologists thought they were two distinct species, but these butterflies freely interbreed where their ranges overlap. Adults mimic poisonous Pipevine Swallowtail butterfly, *Battus philenor*. Humped and cream-colored, the caterpillars resemble bird droppings, thereby avoiding predacious birds. Host plants for the Red-spotted Purple are extremely varied. Shown here is a Wild Black Cherry, *Prunus serotina*, but Chokecherry, Pin Cherry, plum, apple, poplar, aspen, willow, and birch also serve as host plants. This painting was executed in egg tempera, a permanent, fast-drying medium consisting of powdered pigments mixed with the yolk of an egg. This medium is not as common as watercolor today, but examples exist from the 1st century AD. It was the primary panel-painting technique of the European Medieval and Early Renaissance periods.

# Dino Pulerà

Maple, Ontario, Canada
*Great Hammerhead Shark Brain within the Chondrocranium, dorsal view*
Great Hammerhead Shark (*Sphyrna mokarran*)
Mixed media (graphite, digital) on paper, 2011
8 × 10 in (20.3 × 25.3 cm)

This artwork is the result of an independent research project that I have been working on for about three years. I am interested in understanding and illustrating the relationship of the optic nerve and olfactory tract in the apomorphic, or highly derived, chondrocranium of a hammerhead shark. In order to create this illustration, I consulted several hammerhead shark experts, and worked from CT and MRI scans, scientific papers, photographs, and dried specimens. Through my investigations, I was surprised to discover that the optic nerve travels from the brain to the eye virtually unprotected by the cartilaginous chondrocranium, unlike the olfactory tract which is completely enclosed within the skull. Hammerheads have true stereo-olfaction as a result of the wide separation between nostrils, due to their bizarre cephalofoil (hammerhead) design. Conversely, there is evidence that supports that the role of enhanced vision may have influenced the evolution of the hammerhead cephalofoil. The illustration was created as a hand-drawn pencil sketch that I scanned into the computer and rendered in color using Adobe Photoshop. This figure will be published in the third edition of *The Dissection of Vertebrates* that is currently in production with an estimated publication date of 2015.



# Randall C. Raak

Golden, Colorado, USA
Secretary Bird (*Sagittarius serpentarius*)
Graphite on paper, 2011
18 × 11 in (45.7 ×27.9 cm)

The secretary bird is a striking species. I was aware of this bird, but had never observed a live individual until a visit to The Denver Zoo provided an opportunity. With its unusual crest feathers and its large size, it struck me as a good subject for a graphite portrait. I was able to take some good reference photos that day at the zoo. This piece was the result of combining two of those shots into an image that fit my impression of this magnificent bird's character.

# Jury Award

## Richard Gary Raham

Wellington, Colorado, USA
*Prototaxites* species
Acrylic on canvas, 2010
16 × 20 in (40.6 × 50.8 cm)

*Prototaxites* lived during the Late Silurian and Devonian Periods, 420–370 million years ago. Its monolithic form stretched up to 26 ft (7.9 m) tall in an emerging terrestrial landscape that included early vascular plants, tiny arthropods, and lichens. Canadian paleontologist William Dawson first found specimens in 1859 along the shores of Gaspé Bay in Québec, Canada. At first classified as a conifer, various scientists suggested that it could be an alga, lichen, or fungus. Francis Hueber of the National Museum of Natural History in Washington, D.C. has championed the notion that it was a fungus. He has collected specimens in Canada, Australia, and Saudi Arabia, and his isotopic chemical analyses, reported in *Geology* in 2007, support the idea that *Prototaxites* was a "humongous fungus."

I couldn't resist portraying this early terrestrinaut towering over a landscape during a Devonian sunset. It formed an intimate connection among organisms in kingdoms that endure today.

# Dick Rauh

Westport, Connecticut, USA
*Male Pollen Cones*
Japanese Black Pine (*Pinus thunbergii)*
Watercolor on paper, 2011
22 × 20 in (55.8 × 50.8 cm)

*Pinus thunbergii*, like the majority of conifers, is monoecious. Coming from a group more primitive than flowering plants, this means that the pollen-bearing and egg-bearing structures are separate, but occur on the same tree. These come in the form of strobili or cones. The woody, ovule-bearing cones with which we are all familiar are long-lived, and sometimes take years to mature. The pollen-producing cones are smaller, usually clustered at the end of a growing branch, and highly evanescent, lasting only a few weeks. In many species these are very colorful; yellow, yellow-green, even bright red and lavender, or combinations of these are not unusual. Unlike the compound seed cones that consist of scale, bract, and ovules, the male cones are simple with scales bearing the pollen sacs. In preparing for a lecture on conifers, I became fascinated with these neglected cones. This painting is the result, enlarged so that their inherent but minor beauties can be more thoroughly appreciated.

# Dick Rauh

Westport, Connecticut, USA
Coral Pea (*Abrus precatorius*)
Watercolor on paper, 2011
28 × 20 in (72 × 50.8 cm)

The brilliant, scarlet and black seeds of *Abrus precatorius* have been used by many cultures for jewelry, even though they are highly toxic. In some cases, the pricking of the beads to allow for stringing has proven fatal. As is so often the case with poisonous plants, the toxin, abrin in this case, when prepared with care and under close medical supervision, can be highly beneficial. *Abrus* has been a staple of traditional Indian medicine for centuries for headache, dysentery, and nervous disorders, among other ailments. The consistent weight of the beans has meant some cultures have used them as a measurement standard. This legume is a tropical vine, and the subject of my painting was acquired in Florida, where it has become invasive. From an artistic point of view, I was struck by the contrast between the highly polished surface of the beans and the multiple textures of the opened pods.

# Scott Rawlins

Roslyn, Pennsylvania, USA
Red Slug (*Arion ater* subspecies *rufus*)
Mixed media (colored pencil, gouache, watercolor, digital) on paper, 2011
9 × 7 in (22.8 × 17.7 cm)

This large, terrestrial mollusk is native to central and western Europe, where its color ranges from golden yellow to black. The orange to vermillion individuals have been known as *Arion rufus*, but taxonomists have recently concluded that all color variations belong to the same species, *Arion ater*. *Arion rufus* has been relegated to subspecies status. This slug is a serious agricultural pest in the American Northwest and British Columbia.

Without knowledge of its environmental status, I was impressed by the colors exhibited by this slug. Because it is slow-moving, I was able to complete some detailed sketches as well as take some photographs of the creature to aid me in my drawing. The background is a digitally-generated print suggestive of the slug's habitat. The slug itself was rendered in colored pencils and gouache.

## Bernadette Rawyler

Niederscherli, Bern, Switzerland
*Bronze Age Valaisan Garb in the Swiss Alps*
Digital (entirely) on paper, 2011
16 × 12 in (40.6 × 30.4 cm)

This is a conceptual illustration for the planned exhibition in the Bern Museum of History in Switzerland titled *Die Pfahlbauer Am Wasser und über die Berge* (*The Lake-dwellers at the Water and Over the Mountain*). It is an update of the romantic and deeply influential painting titled *Die Pfahlbauerin* (*The Lake-dweller*) by 19th century artist Albert Anker. His work showed a mother in her lake dwelling, but today it is known that the central European population in the Bronze Age settled in mountainous areas as well as around the lakes. My illustration combines Anker's theme with new research and archeological findings. The featured cloak pin was found 8694 ft (2650 m) above sea level on the mountain pass of Schnidejoch. The other bronze items shown originate from graves in the Valais valleys below the Schnidejoch. Therefore, my illustration shows a woman that may have lived around 2000 BC, not in a lakeside settlement, but in the Swiss mountains.

# Karen M. Reczuch

Acton, Ontario, Canada
Common Loon (*Gavia immer*)
Acrylic on canvas, 2011
17 × 11 in (44 ×27.9 cm)

Since my mid-teens, the call of the Common Loon has evoked a northern Canadian lake. For me, no canoe trip or summer cottage visit is quite authenticated unless the eerie laughter of these distinctive birds echoes across the water. Illustrating the children's picture book, *Loon* by Susan Vande Griek (Groundwood Books, 2012), allowed me months to learn about these birds and their environment. The book follows the transformation of chick into a mature adult. With acrylic on canvas, I was able to use bold colors and textures to depict the seasonal changes, the dramatic variation in the loon's iconic plumage, and the story of the migratory journey from northern lake to coastal waters and back.

# Betsy Rogers-Knox

Bethlehem, Connecticut, USA
*Bursting Out*
Queen Anne's Lace, Annual Honesty, Blue False Indigo, Virgin's Bower, Sugar Maple, Wild Cucumber, Intermediate Dogbane, Saucer Magnolia, Common Milkweed, Foxglove Tree, Timothy, Yellow Goatsbeard (*Daucus carota*, *Lunaria annua*, *Baptisia australis*, *Clematis virginiana*, *Acer saccharum*, *Echinocystis lobata*, *Apocynum medium*, *Magnolia soulangiana*, *Asclepias syriaca*, *Paulownia tomentosa*, *Phleum pratense*, *Tragopogon pratensis*)
Watercolor on paper, 2011
14 × 14 in (35.5 × 35.5 cm)

In the annual lifecycle of a plant, the moment that it sheds its seeds is magical. Over the course of several years, I was fascinated to watch seeds of the twelve plants in *Bursting Out* develop, and I anticipated the most opportune time to capture in watercolor the dispersal phenomenon. Plants each have a unique system for seed dispersal, from the tiniest seeds of Queen Anne's Lace, goatsbeard, milkweed, and dogbane for which the wind does the work, and the wild cucumber seeds that are propelled outward at 20 mph (32 kmh), to the magnolia trees whose seeds are dispersed with the help of animals. Nature provides for us this moment to share in her wonder.

# Michael Rothman

Ridgefield, Connecticut, USA
Ivory-billed Woodpeckers (*Campephilus principalis*)
Acrylic on paper, 2011
11.5 × 8.8 in (29.2 × 22.3 cm)

This work represents my interpretation of a female Ivory-billed Woodpecker, *Campephilus principalis*, about to land at a nest hole in a Water Tupelo tree, *Nyssa aquatica*, while a male, characterized by red feathers at the rear of its head, flies in the mid-distance.

The scene depicts a canopy view of southern North American bottomlands, such as might have been present in the Singer Tract of Louisiana prior to its complete harvesting during the Second World War. The last acknowledged sighting of the Ivory-billed Woodpecker was in 1944. The alleged encounters with a relictual population in Arkansas in 2004 have proven to be unsubstantiated, and it is widely considered to have become extinct. The Ivory-billed Woodpecker was a large bird that superficially resembled the still extant Pileated Woodpecker, *Dryocopus pileatus*. Probably *D. pileatus* is the source of occasional claims of sightings of *Campephilus principalis*.

# Michael Rothman

Ridgefield, Connecticut, USA
Puerto Rican Amazon Parrot, Tabonunco (*Amazona vittata*, *Dacroydes excelsa*)
Acrylic on paper, 2011
11.5 × 8.9 in (29.2 × 22.6 cm)

*Amazona vittata* is endemic to the US Commonwealth of Puerto Rico, hence the common name Puerto Rican Amazon Parrot. Once a widespread species, it now is considered to be one of the most endangered birds in the world. The population plummeted to a mere two dozen individuals occupying a tiny area of montane forest on the eastern side of the island, after being devastated by Hurricane Hugo in 1989. I witnessed an early effort at Captive breeding when I visited the Luquillo National Forest, and my reference photographs taken then influenced the design and composition of this painting. Since 2000, the numbers of individuals have risen modestly both within the captive breeding program and among the flock that has been augmented in the wild. Plans have been developed for establishing a second flock at another protected site on the western side of the island so that the relatively small number of individuals will not be quite as vulnerable to the effects of meteorologic events.

# Susan Elmblad Rubin

Denver, Colorado, USA
Titan Arum or Corpse Flower, Flesh Fly
(*Amorphophallus titanum*, Sarcophagid species)
Mixed media (colored pencil, digital, pastel, collage) on paper, 2011
18 × 24 × 2 in (46 × 62 × 5 cm)

*Amorphophallus titanum*, literally “huge, shapeless phallus”, is a botanical spectacle of Barnum and Bailey proportion. Also known as the Titan Arum or Corpse Flower, it is indigenous to the rainforests of western Sumatra. It is the largest non-branching inflorescence in the world, with a height and circumference that can top 9.5 ft (3 m), roughly the size of an up-ended Liberty Bell! The plant flowers only a few times in its forty-year life span in the wild, and even less frequently in botanical gardens. It is not, however, the size or scarcity that gives the corpse flower it reputation. The scent of the flower must attract the pollinators: flesh flies and carrion beetles. The female flowers release an overpowering scent of rotting flesh that has been called “botanical tear gas.” In 2011, I presented a gallery exhibit of work based on botany and the five senses. The Titan Arum was a perfect counterpoint to more delicate, fragrant plants. I depicted the meaty bloom (at 1/6 scale) with a combination of pastel dust and colored pencil. The flesh fly (at 6/1 scale), in colored pencil, alights on the background map in the native territory of the plant.

# Bart Rulon

Greenbank, Washington, USA
Rock Ptarmigan (*Lagopus mutus*)
Acrylic on hardboard, 2002
30 × 20 in (76.2× 50.8 cm)

Experiencing wildlife in its natural habitat is the most important part of the creative process for me. I was inspired to paint the Rock Ptarmigan after witnessing this bird at close range on a trip to Denali National Park in Alaska. We were in the park during the first snowfall of autumn. While walking through the snow and picking blueberries, we almost missed the ptarmigan standing as still as a statue only a few yards away. The bird was very approachable and an excellent photography subject for at least an hour. Knowing I would someday want to paint this experience, I also gave attention to the surrounding habitat through which the bird was walking. The long shadows cast on the snow from bushes made for a very interesting and enjoyable background to paint with the ptarmigan.

# Anita Walsmit Sachs

Den Haag, The Netherlands
*Lactarius aquizonatus*
Watercolor on paper, 2010
8.6 × 7.8 in (21.8 × 19.8 cm)

*Lactarius aquizonatus* is found in the Ardens region of Belgium. I was invited by our mycologist, Chiel Noordeloos of the Leiden Herbarium, to participate in a five-day fungi convention near the French border. About eighty scientists and amateurs of fungi came together to discuss their discoveries during daily forays into the woods. I have never seen so many unique and colorful species in my life as were gathered by these experts from many countries. Italian, French, and Belgian artists and I painted specimens collected. We exhibited the paintings in Meisse, at the Nationale Plantentuin van België (National Botanic Garden of Belgium), near Brussels.

# Maria da Penha Passos Sant'Anna

Água Verde, Curitiba, Paranà, Brazil
Castanha Portugesa or Sweet Chestnut (*Castanea sativa*)
Watercolor on illustration board, 2005
35 × 50 in (88.9 × 127 cm)

*Castanea sativa* is commonly called Sweet, Spanish, or Portuguese Chestnut, although it is native to southwestern Asia. It was introduced to southern Europe by the ancient Greeks. Around 1530, the Portuguese colonists brought Sweet Chestnuts to Brazil. Because of the cool climate requirements, it at first survived only in the cold southern highlands of the country, but starting in the 1970s, less cold-demanding cultivars became available through plant breeding. These chestnuts are robust trees reaching up to 100 ft (30m) in height. They are deciduous and monoecious (have both male and female flowers on the same plant), but often are self-incompatible. The female flowers grow at the base of the catkins, below the male flowers, and produce seeds, but cultivars are maintained by budding or grafting. The large edible nuts, in groups of two or three, are surrounded by a hard and spiny cupule (cup). Sweet chestnuts are eaten cooked, baked, ground into flour, and served as candied *marron glacés*. The hard, heavy, and durable chestnut wood is used for construction and fine furniture.

## Rodger Scott

Princess Hill, Victoria, Australia
Eastern Pygmy Possum, Eucalyptus
(*Cercartetus nanus*, *Eucalyptus* species)
Mixed media (gouache, watercolor) on paper, 2011
10.5 × 13.5 in (26.6 ×34.2 cm)

The Eastern Pygmy Possum is a small, mouse-sized marsupial. They are very difficult to find and see because of their small size, arboreal lifestyle, and the fact that they are nocturnal. One of the purposes of wildlife art is to show the beauty of nature, and that is the reason for this painting. Few people would have seen this animal in the wild, and despite the fact that they are not a threatened species, may not even be aware of its existence. My hope is that this work, which shows an Eastern Pygmy Possum climbing over eucalyptus leaves, makes people aware of this beautiful little animal.

## Stephen Sepe

Katonah, New York, USA
Rockweed or Spiral Wrack (*Fucus spiralis*)
Gouache on paper, 2009
16 × 11 in (40.6 × 27.9 cm)

Rockweed or Spiral Wrack grows extensively in the intertidal zone along the coast of Maine. The bladders float the seaweed when the tide is up, exposing it to sunlight. Otherwise, it lies flat against boulders, whose rounded shapes are testimony to the fierce action of ocean waves. That Rockweed is able to survive on these rocks is indicative of its resilience in a very harsh environment. When the tide is up, a dense, swaying mass of seaweed provides a hiding place for small fish and, at low tide, provides a protective habitat for periwinkle snails and small crustaceans. The small, strange-looking bumps on the bladders are reproductive organs.

## Beth Surdut

Santa Fe, New Mexico, USA
*Walks Like a Man*
Common Raven (*Corvus corax*)
Mixed media (colored pencil, pen & ink) on paper, 2010
10 × 15 in (25.4 × 38 cm)

In my dream, a raven walks like a man.
My friend Cuervo, who grew up in Colombia and looks like an aging grandee, warned me, "If you see a really big raven, I mean, one that is just too big like a dog, it's a spirit or a brujo, and not a good one." Raven lopes towards me, mouth wide open, but I can't tell what he wants so I wake up. I draw every feather and shadow until he walks off the page to tell me why he is here.

I'd spent three years paddling with Florida alligators when Raven called me to the high desert to create the art and story of *Listening to Raven: Drawings, Myths, & Realities*, an ongoing exploration of science and spirit. As I came to know this bird intimately — the nuances of color, form, stance, personality, and stories flying through time and world cultures — I had no idea that people from around the globe would eagerly present me with examples of clever corvid behavior mixed with tales of spirit, death, healing, and guidance, or that humans who had never paid attention to birds would catch my enthusiasm. These responses encouraged me to continue gathering stories for *Listening to Raven* (publication in process), a book combining my drawings with remarkable raven stories. What's your story?

# Linda T. Thomas

Westport, Connecticut, USA
*Brazoria Freshwater Marsh*
Northern River Otter, Little Blue Heron, Common Gallinule, Red-winged Blackbird, Bullfrog, Crayfish, Water Strider, Bayou Killifish, Broad-leaved Cattails (*Lutra canadensis*, *Egretta caerulea*, *Gallinula chloropus*, *Agelaius phoeniceus*, *Rana catesbeiana*, *Procambarus* species, *Gerris remigis*, *Fundulus pulvereus*, *Typha latifolia*)
Acrylic on illustration board, 2011
36 × 24 in (91.4 × 60.9 cm)

This illustration of the freshwater marsh ecosystem was used on a large, printed interpretive exhibit panel for the visitor center at the Brazoria National Wildlife Refuge on the Texas Gulf. The theme of this illustration is small things run the world. Special emphasis is placed on interpreting the backbone of life in the marsh, as represented by phytoplankton, zooplankton, and insects in various stages of their life cycles. The marshes of Brazoria are part of an important migratory flyway that provides food, shelter, and nesting opportunities for many species of birds.

# Linda T. Thomas

Westport, Connecticut, USA
Spotted Salamanders (*Ambystoma maculatum*)
Acrylic on illustration board, 2008
28 × 19 in (72 × 48.2 cm)

Early spring rains and warming temperatures, during March and April in our region, prompt the mass migrations of beautiful Spotted Salamanders to their annual breeding pools. The salamanders emerge from their upland burrows on warm, rainy nights, making their way to vernal pools that dot the interior of northeastern woodlands. Males arrive before females, and form groups called congresses. Females arrive after the males, sometimes by a few days. After courtship, females will attach their egg masses to submerged branches before leaving the ponds to return to their leaf-litter lifestyle in the upland woods.

## Jeannetta vanRaalte

Brooklyn, New York, USA
Swiss Chard (*Beta vulgaris* var. *cicla)*
Mixed media (pen & ink, watercolor) on paper, 2010
21 × 25 in (53.3 ×63.5 cm)

Chard is a wonderful, leafy green vegetable used in a variety of cuisines, especially Mediterranean. Although the leaves are always green, the veins and stems come in several colors. I've seen orange, yellow, pink, and white, as well as the red that I chose to paint. The word "Swiss" was used by 19th century seed catalog publishers to distinguish chard from French spinach. The first varieties, grown centuries ago, have been traced back to Sicily. Chard is also called "silver beet" and "spinach beet," among other names. When you see the roots of the plant that I painted, you can see that chard and beets are closely related.

## Mim Wells

East Victoria Park, Western Australia, Australia
Spinifex Hopping-mouse (*Notomys alexis*)
Mixed media (colored pencil, pen & ink) on paper, 2011
11.5 × 10 in (29.2 × 25.4 cm)

Anyone who has seen this tiny mammal in full flight will understand why it is commonly called the Spinifex Hopping-mouse. Its rapid, erratic, hopping gait helps it avoid predators during its night-time foraging. Since it is easily alarmed in the wild, I find the best place to observe this species closely is the Nocturnal House at the Perth Zoo. The large eyes and ears of this mouse make it a very appealing subject for a natural history artist. Measuring only 9.5 in (24 cm), more than half of which is tail, its delicate beauty belies the harsh environment of its habitat. The Spinifex Hopping-mouse is widespread throughout the arid areas of western and central Australia. It is named for the prickly grasses in the genus *Spinifex* that dominate its habitat.

# David Russell Wheeler

Mechanicville, New York, USA

*Various Algae*

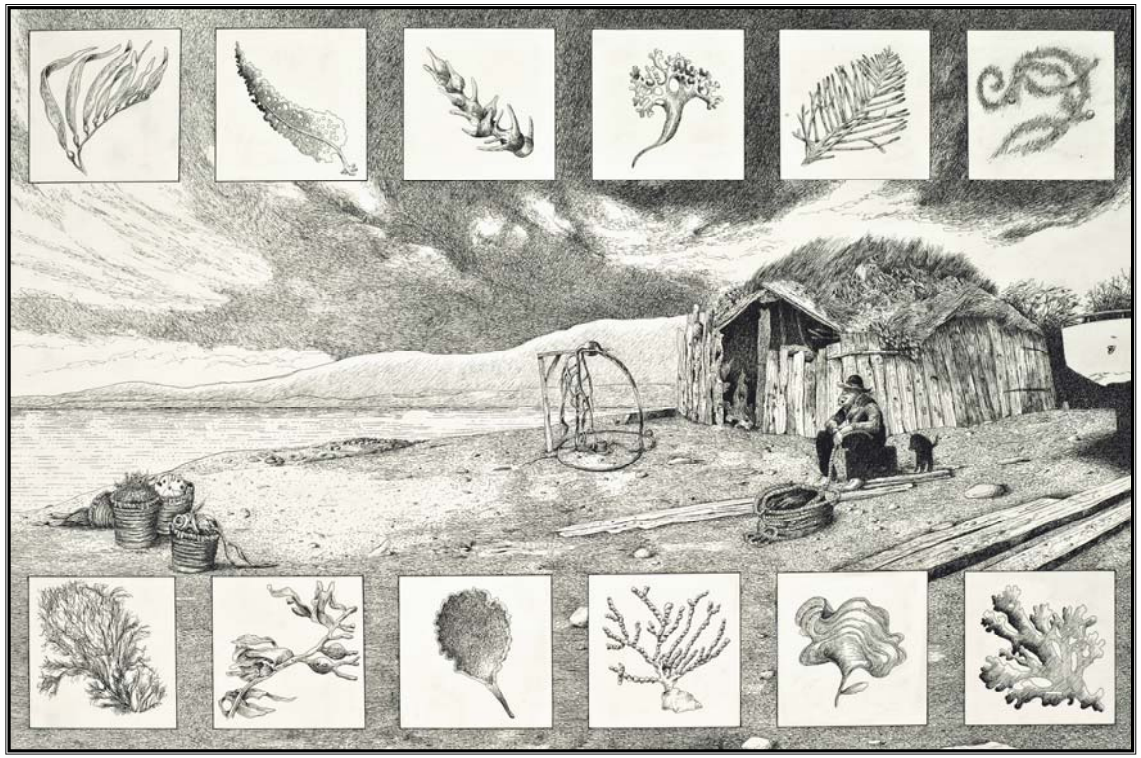
Top Row: Macrocystis, Agarum, undetermined species, Irish Moss, Sea Moss or Bryopsis, Ceramium (*Macrocystis pyrifera*, *Agarum cribrosum*, *Chondrus crispus*, *Bryopsis plumosa*, *Ceramium fastigiatum*) Bottom Row: undetermined species, Fucus or Rockweed, Gigartina, Halimedia, Peacock's Tail or Padina, Dulse or Palmaria (*Fucus evanescens*, *Gigartina corymbifera*, *Halimedia tuna*, *Padina pavonia*, *Palmaria palmata*)

Pen & ink on paper, 2011

30 × 20 in (76.2 ×50.8 cm)

*Various Algae* is one of a series of drawings inspired by the research of my student S. Patrick Murphy at the State University of New York/Empire State College. Pursuing the visual capacity of John James Audubon, Mr. Murphy gradually expanded his research, questioning in turn the perceptual experience of science illustrators, geologists, forensic investigators, mathematicians, and engineers.

As Mr. Murphy gathered his observations on the nature and range of human and animal perception, on the widening vision of those focused in, I illustrated what he uncovered and what he described as the "larger worlds." Working in concert we came to see what the seaweed seller sees.

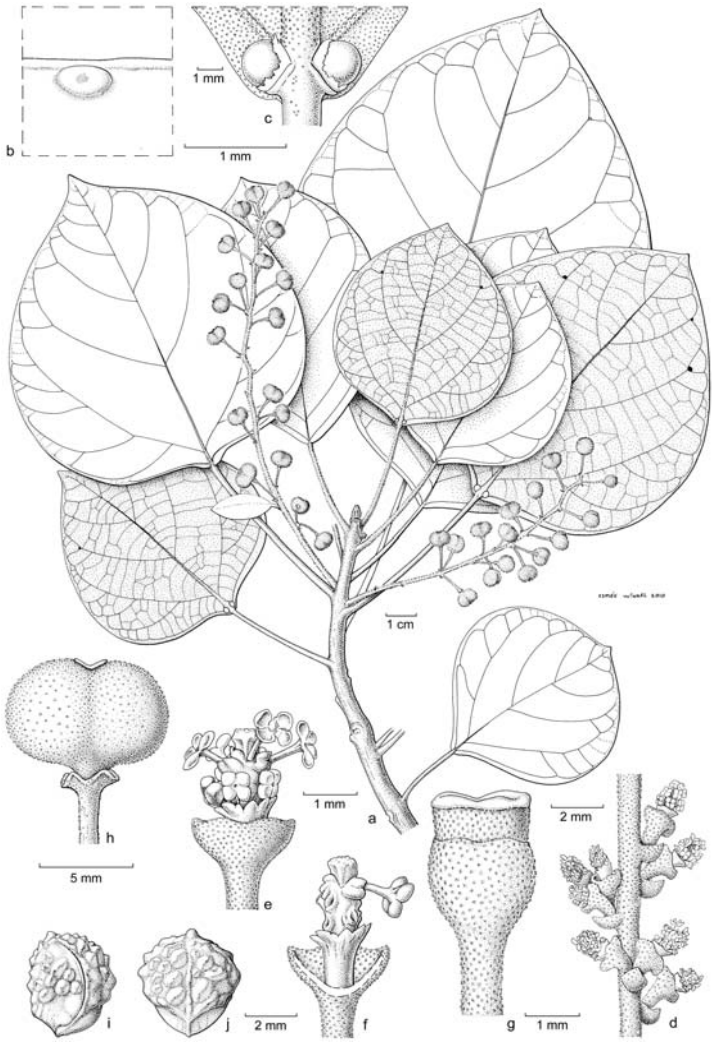


# Esmée Winkel

Leiden, Zuid-Holland, The Netherlands
*Endospermum diadenum*
Pen & ink on paper, 2011
11.8 × 15.7 in (29.9 × 39.8 cm)

This drawing of *Endospermum diadenum* was done for the *Flora Malesian*, a project that includes the National Herbarium of The Netherlands, where I work. *Endospermum* has some peculiar structures that make it interesting to study and draw. For instance, the staminate (male) flowers have fused into four-locular stamens, and the pistillate (female) flowers are very simple. Also unusual are the stellate hairs and the presence of various types of glands (e.g. along the leaf margin, as seen in the upper left). The genus has fruits that are drupes (meaning it has a hard covering around the seed like a peach, as seen in the lower left), which is unusual in the family Euphorbiaceae. I was delighted when the specimen of *Endospermum diadenum* arrived in good condition (not always the case), and I was able to depict every detail with precision.

Courtesy of the National Herbarium of The Netherlands

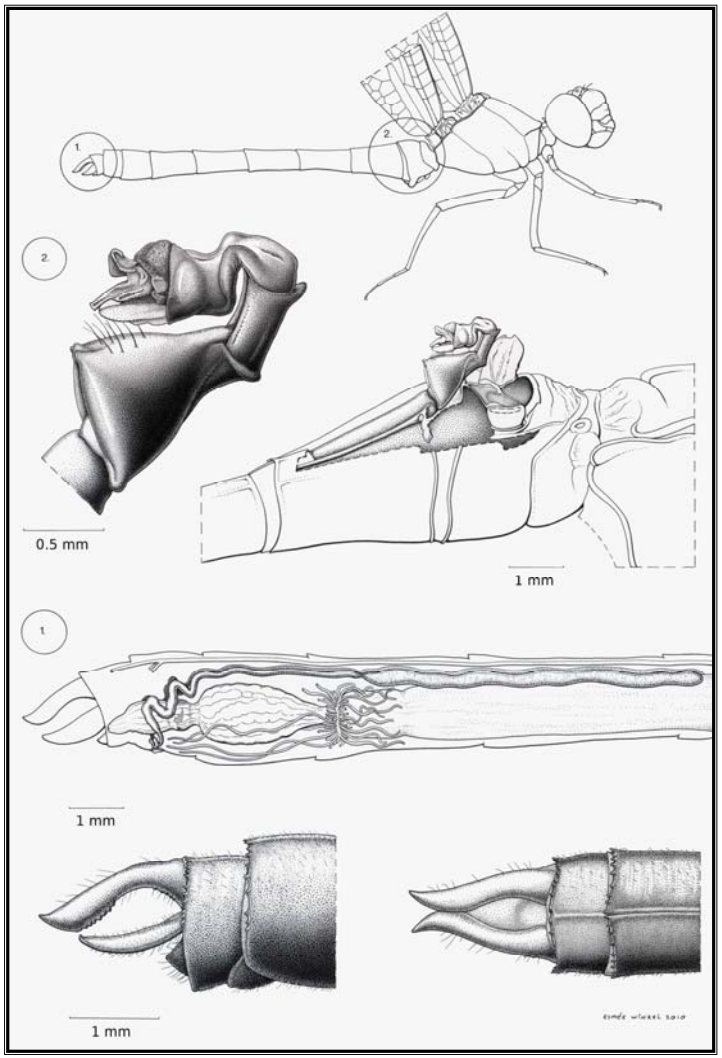


# Jury Award

## Esmée Winkel

Leiden, Zuid-Holland, The Netherlands
Dragonfly, male genitals (Odonata species)
Pen & ink on paper, 2010
11.8 × 15.7 in (29.9 × 39.8 cm)

At the Academy of Fine Arts and Design in Maastricht, Holland, I studied for a master's degree in scientific illustration. One assignment was to choose something specific about an animal, to study and draw. I choose the mating process of a dragonfly, under the guidance Dr. Jan van Tol of Netherlands Center of Biodiversity Naturalis. Dragonflies have two sets of genitals and a unique way of mating, as is seen by their linked circular position. The male first grasps the female by the top of her head with two appendages at the base of his abdomen. He then transfers sperm from his primary to secondary set of genitals, his ligula or penis. When the female reaches the end of her abdomen around to the male's secondary set of genitals, the sperm is transferred to the female's ovipositor, and the eggs are fertilized. Many species remain linked together until the female has finished laying her eggs. Other species have males that hover nearby to guard the female. I decided that pen & ink was the best technique for showing these complex details. The drawing is studied by biology students during entomology courses.



# Carol J. Woodin

Accord, New York, USA
Paw-paw (*Asimina triloba*)
Watercolor on stretched calf vellum, 2011
16 × 25 in (40.6 × 63.5 cm)

Pawpaws are not commonly grown, although their delicate fruit is delicious, enjoyed during their short season in September and October. Native to North America, they are the most northerly member of a family of trees that produces cherimoya and soursop fruits. Their time of appreciation is coming, however, as more people cultivate them, captivated by the fruit's memorable flavor and the tree's hardiness.

It took attention and a little luck to capture the Pawpaw in all its stages in one year. Early in the year, I made watercolor studies of a Hudson Valley neighbor's tree in flower and early fruit. Later in the year, I found the ripe fruit in Washington, DC. The Pawpaw's fragrance is irresistible. So, after serving as a model, it was quickly consumed. These watercolor paintings are on natural vellum (calf skin) that has been stretched over prepared panels.

# Amanda Elizabeth Zimmerman

Glenshaw, Pennsylvania, USA
Leafy Seadragon or Glauert's Seadragon (*Phycodurus eques*)
Mixed media (acrylic, colored pencil, watercolor) on paper, 2010
18 × 13.5 in (45.7 × 34.2 cm)

I saw my first Leafy Seadragon as a child, and was struck by the surreal presence of the delicate creature. Working on a project documenting members of the family Syngnathidae, I had the chance to illustrate my seadragon with the same dreamlike quality as the real thing.

There are two kinds of seadragons, the Leafy, seen here, and the Weedy, which lacks the leaf-like adornments. Similar to male seahorses (also members of the family Syngnathidae), male seadragons are responsible for incubating the eggs. However, instead of a seahorse's brood pouch, they carry the fertilized egg mass under their tails until birth.

I could not travel to Australia to study these beasties in native waters, but luckily the local aquarium has a very healthy population to study and observe. These are graceful and elegant creatures, and I look forward to illustrating more from this unusual fish family.

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FON

# Natural History Illustration Resources

FoN

### Focus on Nature: Natural and Cultural Illustration Exhibitions

Curator: Patricia Kernan
NYS Museum/Research and Collections
Cultural Education Center, Room 3140
Albany, New York, USA, 12230
518-486-2024 / pkernan@mail.nysed.gov
www.nysm.nysed.gov/illustrations/fon/

Focus on Nature (FON) is a biennial, international exhibit of natural and cultural history illustration. Started in 1990 in conjunction with the Northeast Natural History Conference, it continues to highlight the status of contemporary illustration. Each FON is juried by three scientists and two artists. Entry deadline for FON XIII will be October 1, 2013 for an exhibition in 2014.

### GNSI: Guild of Natural Science Illustrators

652 Ben Franklin Station
Washington, District of Columbia, USA 10044-0652
301-309-1514
www.gnsi.org

The Guild of Natural Science Illustrators (GNSI), a nonprofit organization of natural science illustrators and associated professionals, was founded in 1969 by artists who believed that ideas and techniques should be shared. With this concept in mind, the Guild has grown to be an international group, the goal of which continues to be encouraging and maintaining high standards of competence and professional ethics through education.

### ASBA: American Society of Botanical Artists

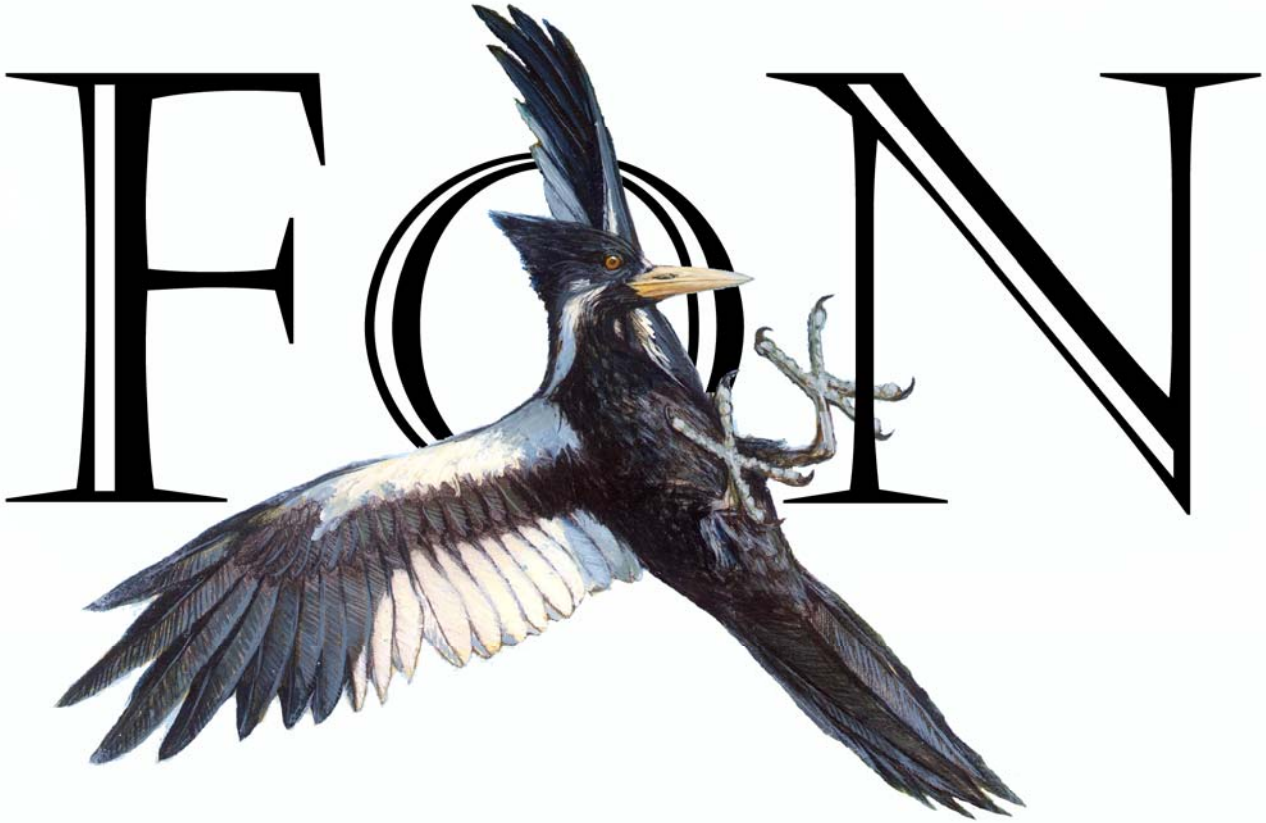
200th Street & Kazimiroff Boulevard
Bronx, New York, USA, 10458-5126
866-691-9080
www.asba-art.org

The ASBA is a nonprofit organization dedicated to promoting public awareness of the botanical art tradition and furthering its development. It does this by sponsoring juried exhibits, responding to inquiries, and presenting lectures and workshops for artists and the general public at botanic gardens, natural history museums, art galleries, and educational institutions. The ASBA newsletter provides information about these events and features book reviews, articles about botanical artists, and news of botanical art worldwide.

### COM.EN.ART: COMmunity/ENvironment/ART

Edmund Niles Huyck Preserve
Box #1
Rensselaerville, New York, USA, 12147
518-797-3440 / info@huyckpreserve.org
www.huyckperserve.org

COM.EN.ART (COMmunity.ENvironment.ART) is a natural history artist residency program that takes place at a biological research station. It is designed to provide rich, concentrated field experience and study for illustrators as well as encourage interaction and discussion about the environment among artists, scientists, and the community. The artists, during their two-week residency, contribute a piece of artwork to the research station in exchange for studio and living quarters


FON