

Focus XV on Nature


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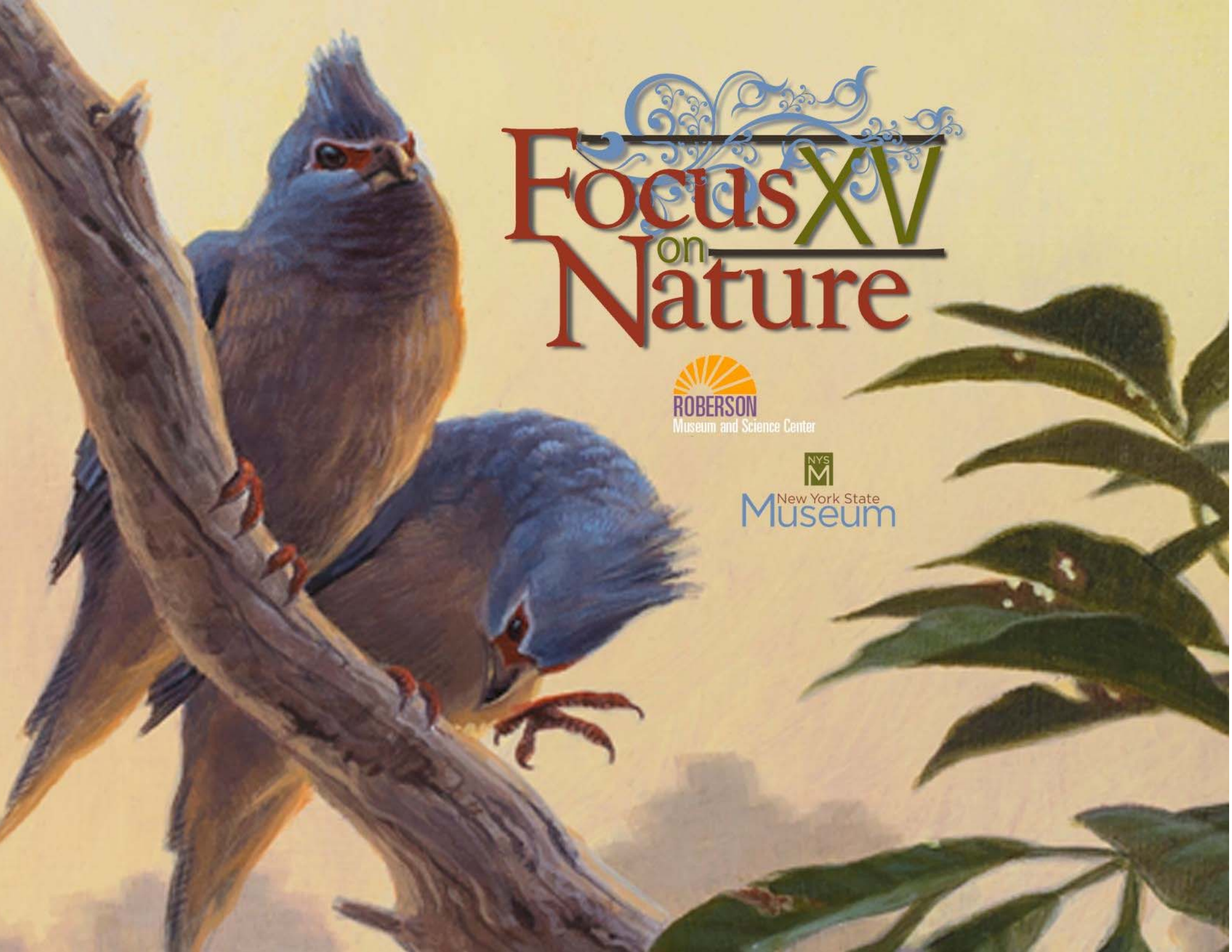
C OVER IMAGE BY SEAN MURTHA

Mouse-birds *Tsidiyazhi abini*

Pages 123–124

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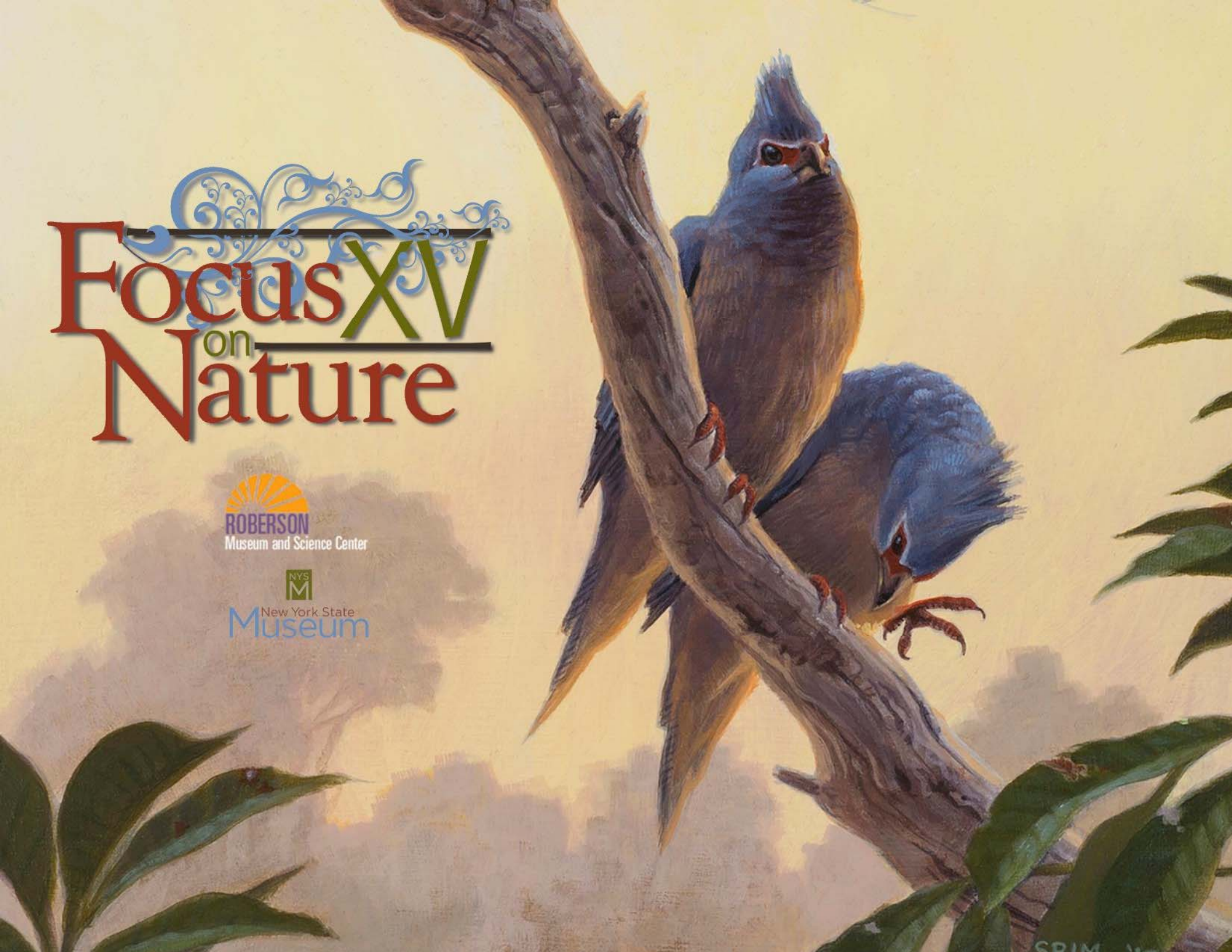
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An artistic illustration of two blue birds perched on a tree branch. The bird in the foreground is looking towards the viewer, while the one behind it is looking down. The background is a soft, hazy landscape with green foliage in the foreground.

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ACKNOWLEDGEMENTS

The *Focus on Nature XV* selection jury members and the New York State Museum would like to thank the people who have helped make *FON XV* a success. Fernando Correia and Michael Grasso served as the Guest Jurors for *FON XV*, and their insights and opinions were a critical part of the selection process. The webpage and on-line entry form are thanks to the excellent work of Kelley Ferenac and Dave Gerhard who, along with the long-time database designer, Nancy Yule, made processing the hundreds of entries possible. The Jury Day could not have taken place without William Day, Scott Heydrick, Erik Rutnik, Daniel Stienstra, and Albert Gnidica. Thanks to Jessica Fisher Neidl for copyediting and New York State Museum staff scientists Dr. Tim McCabe, Dr. Jeremy Kirchman, Dr. Charles Ver Straeten, Joseph Bopp, Dr. Denise Mayer, Dr. Lisa Amati, Lorinda Leonardi, and Diana Hurlbut for reviewing the text. In particular, the staff of Roberson Museum and Science Center, Shannon Lindridge, Natalie Shoemaker, and the exhibit-installation crew have all been wonderful to work with in this endeavor.



TABLE OF CONTENTS

Acknowledgments	i
Dedication	ii
Introduction	iii
Selection and Award Jury Members	iv
Artist Commentaries	
Sue deLearie Adair	89–90
Wilma Ander	151–154
Bobbi Angell	101–102
Belinda Biggs	47–48
Sharon Birzer	157–158
Kathryn Chorney	119–120
Dorothy DePaulo	71–74
Maria Alice de Rezende	163–166
Dorothee de Sampayo Garrido Nijgh ..	29–32
Monika E. de Vries Gohlke	9–10
Pauline Dewar	7–8
Emily M. Eng	167–168
Michael J. Felber	111–112
Linda M. Feltner	147–148
Kelly Finan	133–138
Susan Fox	109–110
Nancy Gehrig	95–96
Christian Gerisch	117–118
Margot Glass	45–46
Markjohn Glass	143–144
Marcela Gomes	149–152
Jann Griffiths	59–60
James Gurney	3–6
Linda Hampson	43–44
M. Genevieve Hitchings	145–146
Jack Hornady	17–18
Gary Hoyle	1–2
Jasmin Chantal Huber	173–174
Barbara Ierulli	139–142
Beverley J. Irwin	171–172
Rebecca Jabs	131–132
Emily Kearney-Williams	77–78
Yun-Kae Kiang	75–76
Barrett Anthony Klein	19–20
Karen Anne Klein	19–20
Elayne Leighton	91–92
Pam Little	83–84
Janet Matthews	27–28
Lee McCaffree	163–166
Beverly McKay	113–114
Sean Murtha	121–122
Sharron O’Neil	153–156
Mafalda Paiva	127–130
Samantha N. Peters	115–116
Xavier Pita	81–82
Dino Pulerà	15–16
R. Gary Raham	85–86
Dick Rauh	67–68
Kim Renders	39–42
Michael Rothman	25–26
Stephanie Rozzo	161–162
Susan Elmblad Rubin	57–58
Bart Rulon	33–36
Hugo Salais	79–80
Tomás Sánchez	87–88
Lizzie Sanders	37–38
Carol Schwartz	123–126
Nora Sherwood	55–56
Wendy K. Smith	11–14
Heidi Snyder	103–108
Linda Thomas	21–24
Ning Tsai	69–70
Rob Tuckerman	169–170
Esther van Hulsen	93–94
Ava Varszegi	49–50
Sophie Webb	99–100
Cat Wilson	159–160
Tami Elise Winch	61–62
Chen Zha	97–98
Artist Contacts	178–179
Illustration Resources	180
Recognition of <i>Focus on Nature</i> Artists	182–185

DEDICATION

DR. CARL GEORGE



It is with great respect and gratitude that this exhibition is dedicated to a scientist and artist who is exceptionally appreciative of natural history illustration. Dr. Carl George, professor emeritus of biology at Union College in Schenectady, New York, served on all but three of the *FON* selection and award juries, always providing thoughtful insights that helped jurors make the often difficult choices. From the beginning of the *FON* series Dr. George has been an enthusiastic supporter, thoroughly understanding the value of natural history illustration and the important role it has played in the furtherance of scientific endeavors. He has generously donated significant historical natural history illustrations to the New York State Museum in memory of his late wife, Gail George, and funded the purchase of a painting for the *FON* collection. Outside of *FON*, he created and co-taught *The Illustrated Organism* at Union, an innovative course that opened the eyes of countless students to the profound wonders of nature.



INTRODUCTION

The deepest, most consistent inspiration for all art is nature. The outcome may be a mammal painted in a cave, a flower drawn in a book of herbs, a reptile carved on an African staff, a bird exquisitely embroidered on a Chinese robe, or any one of the pieces in *Focus on Nature XV*. The unique contribution of natural and cultural history illustration is that it focuses on conveying specific, closely observed, often research-based information that supports knowledge and appreciation of nature. Illustrators present comprehensible, appealing images that provide knowledge and stimulate curiosity, leading to better understanding of organisms and ecosystems that then encourages good stewardship of the planet. Highlighting the skills of such artists and the possibilities of this genre in terms of subject, medium, style, and presentation has been the primary goal of fifteen biennial *FON* exhibitions. Every piece in *FON* tells a story about a visual and intellectual exploration of nature. Every piece is put forth with energy, fascination, skill, knowledge, warning, joy, trepidation, and courage. You are invited to browse these rich, beautiful, and informative artworks and commentaries.

Patricia Kernan
Focus on Nature Curator
June 2019



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University of Aveiro, Portugal

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Guest Juror
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Roberson Museum and Science Center
Binghamton, New York

Patricia Kernan
Biological Illustrator
New York State Museum

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



ARTIST 
COMMENTARIES

GARY HOYLE

Swan's Island, Maine, USA

Wood Turtle (Glyptemys insculpta)

Alert Male Wood Turtle in Breeding Color

Epoxy-clay, plastic foam core, polychromed acrylics, cast epoxy eyes, 2016

14 × 5 in (35.56 × 12.7 cm)

Male Wood Turtles are known for their intelligence and beauty. In this sculpture I tried to express both by creating a male in breeding color posed in an alert position. This turtle is a species of concern in most of its range due to habitat loss and harvesting for the pet trade. Thanks to the Maine Department of Fish and Wildlife, I was able to borrow a specimen shell for the many months it took to complete the sculpture. I scaled-up the measurements to give the impression of a large male. This is part of a series I'm creating on turtles of northern New England that show behavior characteristics specific to each species.





JAMES GURNEY

Rhinebeck, New York, USA

Triceratops (Triceratops horridus)

Hatching Triceratops

Oil on illustration board, 2014

30 × 24 in (76.2 × 60.9 cm)

In this reconstruction, several Triceratops emerge from their shells in the darkness. I imagined the scene as an urgent moment of crisis, where life hangs in the balance, based on the behavior of turtle and crocodile hatchlings, which are unattended by their parents. So, I set the scene at night, as if dazzled by the intrusion of a photographer's flash. The composition includes a wider shot of the nest, with shell fragments strewn about and mud caked on the eggs. I painted everything in shallow focus to evoke the impression of wildlife photography. The painting was used in an article in *Ranger Rick Magazine* about baby dinosaurs.





JAMES GURNEY

Rhinebeck, New York, USA

Repenomamus robustus, Psittacosaurus

The Mammal That Ate Dinosaurs

Oil on illustration board, 2016

24 × 18 in (60.9 × 45.72 cm)

The fossil of the badger-like *Repenomamus robustus* was found with the bones of a baby *Psittacosaurus* dinosaur inside its rib cage, providing direct evidence that at least some Mesozoic mammals fed on other vertebrates, including dinosaurs. I reconstructed the scene on a rainy night, based on my observations of raccoon attacks on fledgling songbirds. This was an opener for a *Scientific American* article.





PAULINE DEWAR

Carlton North, Victoria, Australia

Dowerin Rose (*Eucalyptus pyriformis*), Mottlecah (*E. macrocarpa*), Square-fruited Mallee (*E. tetraptera*), Desmond Mallee (*E. desmondensis*), Coral Gum (*E. torquata*), Fuchsia Gum (*E. dolichorhyncha*), Warded Yate (*E. megacornuta*)

Western Australian Eucalypts II

Graphite, pen and ink on paper, 2017

30 × 24 in (76.2 × 60.9 cm)

The southwest corner of Australia has been geographically isolated from the rest of the continent by vast deserts for so long that unique flora and fauna have evolved, genetically quite separate from that of the rest of the country. This small area of Australia is a fertile oasis, enjoying a much higher rainfall than its surrounds. Among the most remarkable and characteristically Australian plants are the eucalypts. Quite different in form from trees in the same genus in the eastern states, these eucalypts are sculptural, diverse, colorful, beautiful, and, genetically, among the most ancient.

I feel that the colors of the eucalyptus blossoms, ranging from deep red browns, through pinks, to vibrant yellows and the leaves in all shades of green and blue-green, mimic the colors of the ancient land in which they evolved. However, I have chosen to portray them in black and white to emphasize their most extraordinary and attractive forms.





M ONIKA E. DE VRIES GOHLKE

Brooklyn, New York, USA

Peony (Paeonia suffruticosa)

Etching (aquatint), acrylic on paper, 2018

22 × 30 in (55.88 × 76.2 cm)

These spectacular plants are growing in the Brooklyn Botanical Garden's collection of Japanese Tree Peonies. I sketched them throughout their blooming season but neglected to write down their names. They'll be back in the spring, however, and I'll get a chance to find and admire them again. They are called trees because they are woody plants that sprout new leaves from old stems, unlike the more common herbaceous peonies that die back to the ground every year. In winter, after shedding their leaves, they look like just a few woody sticks in the ground. But come May, they are dazzling beauties, hybridized in Japan and China for optimum visual appeal in all shades of white, pink, yellow, magenta, and red, voluminous and often fluffy like a ballerina's tutu. The deep red/magenta blossoms were particularly appealing to me, hence my humble efforts to befriend them.





WENDY K. SMITH

Los Angeles, California, USA

Jaguar (Panthera onca)

FOCUS on the Jaguar

Oil on canvas, 2018

8 × 10 in (20.32 × 25.4 cm)

I completed this study in oil at a workshop led by master wildlife artist Guy Combes. Jaguars have large eyes, purportedly the largest of all carnivores relative to head size. To get the shape of this cat's pupils right, I did some research that shed interesting light on the differences in pupil shapes between small and large felids. Smaller cats, such as bobcats and domestic cats, have slit-shaped pupils and multifocal lenses with concentric zones of different focal lengths. This allows for use of the full diameter of the lenses even in bright light. Jaguars and other large cats, like tigers, leopards, and lions, have round pupils and monofocal lenses with a fixed focus for one distance. The functional significance of the absence of multifocal optical systems in large felids remains a mystery because such systems are present in other large-eyed terrestrial vertebrates. Transitions between the two eye designs have occurred frequently and in short evolutionary time frames.





WENDY K. SMITH

Los Angeles, California, USA

Monarch Butterfly (Danaus plexippus), Common Milkweed (Asclepias syriaca)

Monarch Miracle

Gouache on paper, 2018

12 × 12 in (30.48 × 30.48 cm)

The Monarch Butterfly life cycle is an iconic example of complete metamorphosis in the development of about 85 percent of known insects, notably butterflies and moths. Complete metamorphosis is characterized by four stages: egg, larva, pupa, and adult. This gives insects a significant survival advantage because adults and larvae do not compete for the same food sources and have different predators. Monarchs lay their eggs on milkweed plants. The milkweed will be food for the newly hatched caterpillars. Monarch females usually lay a single egg on a milkweed, often on the bottom of a leaf near the top of the plant. Eggs are only about the size of a pinhead or pencil tip and are off-white or yellow and characterized by longitudinal ridges that run from the tip to the base. The eggs hatch about four days after they are laid. This artwork was created for display in an interpretive wayside panel located at Lums Pond State Park in Delaware.





DINO PULERÀ

Maple, Ontario, Canada

Tyrannosaur (*Daspletosaurus horneri*)

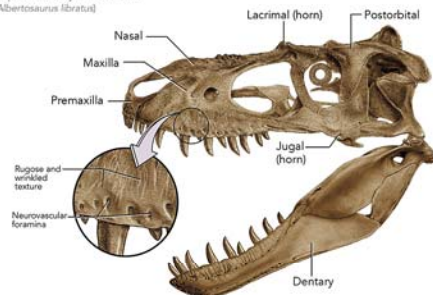
Life Reconstruction of the Integument of Daspletosaurus horneri

Digital (entirely) on paper, 2017

13 × 19 in (33.02 × 48.26 cm)

This illustration depicts a newly described meat-eating dinosaur, *Daspletosaurus horneri*. The reconstruction of this dinosaur is somewhat controversial because the researchers interpreted the life restoration as being crocodylian in appearance. The roughened texture of the facial bones and lower jaw combined with the presence of a multitude of holes that once served as portals for nerves and blood vessels for the soft tissue covering the face were very similar in appearance, and probably function, to that observed in modern crocodylians. *D. horneri* may have had a lipless face shrink-wrapped with large flat scales. In addition, some of the scales along the margins of the mouth may have had exceptionally sensitive surfaces, also like crocodylians. The research team hypothesized that *D. horneri* had a “sixth sense” that may have been beneficial in hunting, object manipulation, safely handling hatchlings, and courtship.

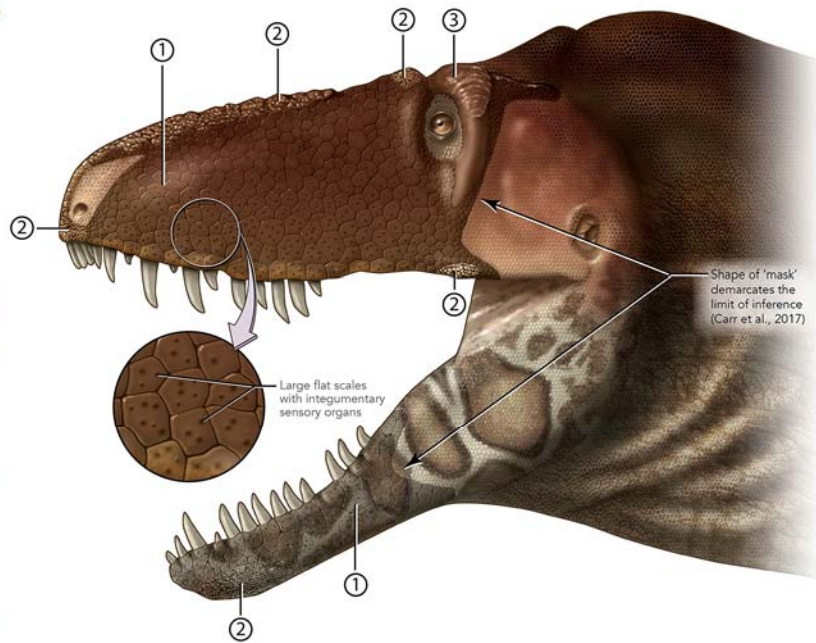
Representative tyrannosaur skull
(*Albertosaurus libratus*)



The osteological texture of tyrannosaur facial bones compares best with the rough and wrinkled texture that is consistent with overlying scales as is seen in living crocodylians. Crocodylian and tyrannosaur snouts and jaws are penetrated by numerous neurovascular foramina allowing hundreds of branches of nerve endings to innervate the skin. Some tufts of these nerve endings are capped under a tiny dome (integumentary sensory organs) which increases the sensitivity of the skin in modern crocodylians and probably tyrannosaurs too.

Distribution of facial integument	
Facial bones	Integument
Maxilla and dentary with numerous neurovascular foramina	➔ ① Large flat scales Scales closely associated with bone leave a rugose and sculptured surface texture. Therefore the presence of bumpy and coarse bone textures is a strong correlate for a lip-less 'mask' of large flat scales.
Premaxilla, nasal, lacrimal (horn), jugal (horn) and dentary ('chin')	➔ ② Armor-like skin Extremely coarse bone, e.g. nasal bone, supported armor-like skin on the snout and on the sides of the lower jaws. The armor-like skin would have protected tyrannosaurs from abrasions, perhaps sustained when hunting and feeding
Postorbital	➔ ③ Keratin sheath Coarse and rim-like edges with smooth central region, indicate a cornified sheath-like covering of keratin

Life reconstruction of the integument of *Daspletosaurus horneri*, based on the distribution of texture on the facial bones



Source: Carr, T. D. D. J. Varricchio, J. C. Sedlmayr, E. M. Roberts & J. R. Moore. 2017. A new tyrannosaur with evidence for anagenesis and crocodile-like facial sensory system. *Scientific Reports* 7, Article number: 44942. doi:10.1038/srep44942

JACK HORNADY

Chevy Chase, Maryland, USA

Bocaccio Rockfish (Sebastes paucispinis)

Digital (entirely) on paper, 2018

12 × 7.5 in (30.48 × 19.05 cm)

This illustration of the Bocaccio Rockfish was done completely in Adobe Photoshop using a Wacom tablet, a flat surface on which it is possible to draw freehand with a stylus. Although I referenced many photographs, there was no copying or pasting involved. This image was particularly fun to create because of the interesting textures and colors of the Bocaccio Rockfish.

I have been a freelance illustrator with the National Oceanic Atmospheric Administration (NOAA) for many years, where I routinely collaborate with experts to achieve accurate illustrations. NOAA's websites, www.fishwatch.gov and www.fisheries.noaa.gov/fish-sharks, showcase my illustrations.





jackhornady.com

KAREN ANNE KLEIN & BARRETT ANTHONY KLEIN

Pleasant Ridge, Michigan & La Crosse, Wisconsin, USA

Fly (Diptera), Bee (Hymenoptera), Moth (Lepidoptera), True bug (Hemiptera), Beetle (Coleoptera)

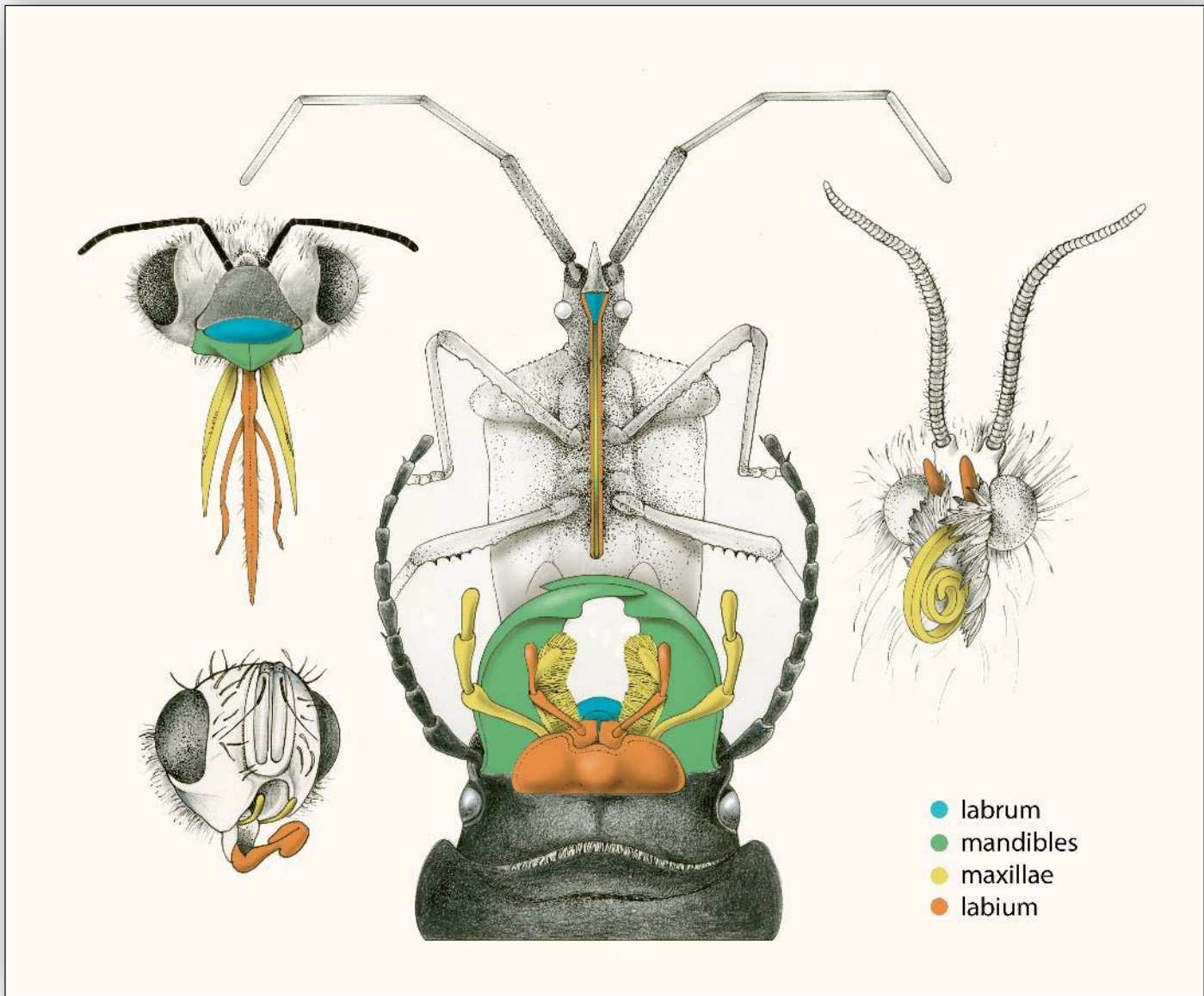
Homology of Insect Mouthparts

Color pencil, digital on paper, 2018

10 × 8 in (25.4 × 20.32 cm)

Homology (shared due to common ancestry) of mouthparts is illustrated in this piece with examples from five insect orders. Mouthparts can be sponge-like in a fly (lower left), chewing and lapping in a bee (upper left), sucking in a moth (right), piercing and sucking in a true bug (center top), or chewing in the more ancestral, mandibulate form of a beetle (center bottom). Colors signify structures that are homologous, including the labrum (upper lip), mandibles, maxillae, and labium (lower lip). For visual comparison, some structures are splayed (bee's tongue-like mouthparts), or unnaturally exposed (fly's labrum or labium, and true bug's mandibles and maxillae in the form of pairs of stylets housed within labium), while others are reduced and hidden from view, or secondarily lost. Note that the true bug and beetle (center) are in ventral view (seen from below).





L INDA THOMAS

Trumbull, Connecticut, USA

Black Huckleberry (Gaylussacia baccata)

Shawangunk Berry-pickers

Acrylic on illustration board, 2016

19 × 14 in (48.26 × 35.56 cm)

This *trompe l'oeil* (fool-the-eye) illustration was created in conjunction with a 3-D relief model as an interactive exhibit for the Sam's Point Preserve Conservation Center in Cragsmoor, New York. The goal of this exhibit is to encourage visitors to play "archaeology detective" and to gain an understanding of the Shawangunk berry-picker encampments of the late nineteenth through mid-twentieth century. Both illustration and model show a section of ground in the encampments as seen today, complete with illustrated and 3-D cultural and natural artifacts. Visitors explore the natural, cultural, and historical intersections of the seasonal berry-pickers with topics like "fire on the ridge," "family life" and "local trades." The exhibit is part of a larger Shawangunk berry-pickers exhibit at the Center.



LINDA THOMAS

Trumbull, Connecticut, USA

Alligator Snapping Turtle (*Macrochelys temminckii*), Rafinesque's Big-eared Bat (*Corynorhinus rafinesquii*), Common Baskettail Dragonfly (*Epitheca cynosure*), Belted Kingfisher (*Megaceryle alcyon*), Little Blue Heron (*Egretta caerulea*), American Coot (*Fulica Americana*), Mallard (*Anas platyrhynchos*), Black Crappie (*Pomoxis nigromaculatus*), Leopard Darter (*Percina pantherine*), Rabbitsfoot Mussel (*Quadrula cylindrica*), Winged Mapleleaf Mussel (*Quadrula fragosa*)

Beneficial Floodplains

Acrylic on illustration board, 2015

24 × 19 in (60.9 × 48.26 cm)

This artwork illustrates the story of beneficial floodplains within the context of a bottomland hardwood forest in the Pond Creek National Wildlife Refuge (NWR), located in Lockesburg, Arkansas. The original, seen here, was executed in acrylic on illustration board. This painting was scanned and digitally enlarged. Then the final printed panel was installed as an interpretive exhibit at the Pond Creek NWR Visitor Center. The goal of this exhibit is to convey the importance of floodplain habitat for the native wildlife and to highlight some of the species of concern in this region, particularly the Winged Mapleleaf and Rabbitsfoot Mussels. Migratory birds are also an important component of this exhibit because Pond Creek is part of the National Wildlife Refuge system established along the major migratory bird flyways in the U.S.





MICHAEL ROTHMAN

Ridgefield, Connecticut, USA

Iteravis huchzermeyeri

Habitat Group Reconstruction

Acrylic on paper, 2014

17 x 11 in (43.18 x 27.94 cm)

This work was based upon the description of the holotype (a single specimen upon which a new species is based) of *Iteravis huchzermeyeri*, published in the journal, *Chinese Science Bulletin* (2014) 59(36):5366-5378 DOI 10.1007/s11434-014-0669-8. The paper clearly describes the morphological similarities (and phylogenetic proximity) of this new specimen with another, slightly younger taxon called *Gansus*, which is now believed to have had at least a semi-aquatic life style. Further studies on bone morphology in *Iteravis* compared to extant birds will need to be undertaken to explore this thesis. This avian retained both wing claws and teeth in the central maxillary and central dentary regions. This painting was developed as a portfolio piece and was made available for presentation in scientific lectures by interested researchers.



JANET MATTHEWS

Narre Warren, Victoria, Australia

Monarch Butterfly (Danaus plexippus)

Wanderers Gathering

Color pencil, graphite on paper, 2017

12.25 × 17.25 in (31.11 × 43.81 cm)

Monarch Butterflies or Wanderers are big, bright, and wonderful visitors to our backyards. The idea that they travel great distances is amazing—sometimes 3,000 miles (4,800 kilometers). But one of their most distinctive behaviors is to swarm and cluster together when resting. There is a flurry of wings as they nestle up against and even on top of each other. It is a mass of color and motion. It is exciting then when we see them individually flitting through our back yards. Another moment in their life that is not seen by everyone, which I wanted to share.

Although this painting shows the Monarch on eucalyptus branches, it is a species of butterfly native to North America and only arrived in Australia in the late 1800s.





DOROTHEE DE SAMPAYO GARRIDO NIJGH

Kenmore, Queensland, Australia

Wollemi Pine (*Wollemia nobilis*)

Watercolor, graphite on paper, 2016

18 × 20 in (45.7 × 50.8 cm)

I have always been interested in the evolutionary history of plants, and while painting a series of Australian native members of one of the oldest conifer families, the Araucariaceae, I obtained a female and male specimen of the *Wollemia nobilis* from the Sydney Royal Botanic Gardens. This conifer, only known before through fossil records, was discovered in 1994 in a gully in the Blue Mountains of New South Wales, Australia, causing quite a sensation in the botanical world. It allows us a look into the ecosystem 100 million years ago, and therefore it is called a living fossil. These critically endangered trees live in an area closed to the public, and photographs of adult trees could not be used as a reference for their form and shape. Instead, I chose to paint the very typical and unique bubbly bark from a young specimen growing in the botanical garden of Coffs Harbour, New South Wales.

Although the common name for this plant includes the word "pine," this is not one because it is not in the *Pinus* genus.



DOROTHEE DE SAMPAYO GARRIDO NIJGH

Kenmore, Queensland, Australia

Tree Tumbo or Tweeblaarkanniedood (*Welwitschia mirabilis*)

Watercolor and graphite on paper, 2018

23 × 15 in (58.42 × 38.1 cm)

Once on the track of studying living fossils, I became aware of a unique plant, the *Welwitschia mirabilis*, whose natural habitat is the desert of Angola and Namibia. The specimen I painted is a young female growing in the Brisbane Botanic Gardens, Mount Coot-tha, Brisbane, Australia. This plant is a monotypic genus (having one species) in the monotypic family, Welwitschiaceae. Some plants are found to be between 1,000 and 1,500 years old. They consist of a tapering root and only two leaves that grow continuously from a basal meristem. These leaves can reach a length of 13 feet (3.96 meters) but they split and fray. The plant is dioecious, meaning the male and female structures are on separate plants. I find the vernacular name in Afrikaans (a language spoken in Southern Africa, derived from seventeenth-century Dutch) *Tweeblaarkanniedood* quite funny to say out loud. It translates, compressed into one word, as "Two leaves cannot die."



BART RULON

Greenbank, Washington, USA

White-necked Jacobin (Florisuga mellivora)

Acrylic on gessoed composition board, 2018

30× 20 in (76.2 × 50.9 cm)

I created this composition from reference materials gathered on a recent field trip to Cost Rica. The variety of hummingbirds we found was amazing, and the White-necked Jacobin was one of my favorites. I find inspiration for many of my paintings from the background habitats that I experience in the field, and this painting was no exception. Here, I liked the strong shapes created by the vegetation contrasting against the dark background. The jacobin adds that extra spark of life needed to make the painting interesting and successful.

You might ask where the white neck is that is referred to in the name. This species of jacobin has a crescent-shaped group of white feathers on the back of the neck that is exposed or covered up depending on the position of the head and whether or not the neck is outstretched. In my painting the white is not exposed because his head is tilted up slightly.





BART RULON

Greenbank, Washington, USA

Northern Shovelers (Spatula clypeata)
Acrylic on gessoed composition board, 2013
14 × 18 in (35.56 × 45.7 cm)

The typical duck painting focuses on the male since they are usually the more colorful sex. Here, I wanted to draw attention to the unfairly overlooked female by having her wings outstretched, exposing the colorful plumage on the secondaries (the speculum) and the upper-wing coverts. I kept coming back to this idea even after creating a variety of compositional ideas, something I do for all my paintings. I tend to enjoy painting female ducks more than males because of the mottled appearance of their plumage, so to paint this female's beautiful wings was like icing the cake.

This painting was commissioned for the 2013 Washington State Duck Stamp. I prepared by spending several days studying and taking reference photographs of Northern Shovelers at the Reifel Bird Sanctuary in British Columbia. The refuge is a great spot to watch a variety of waterfowl species in the wild, and luckily, I found several pairs of shovelers that were very cooperative subjects.



IZZIE SANDERS

Edinburgh, UK

Vanilla Orchid (Vanilla imperialis)

Watercolor on paper, 2018

24 × 18 in (60.9 × 45.72 cm)

I have had a long and fruitful relationship with vanilla orchids, having painted the plant ten times, depicting all stages of its growth. Initially I just loved the chunky stems that can be placed on the page in a contemporary, graphic style. Then I discovered the flowers and set about documenting the plant from early leaves through flowers to the beans, both fresh and decaying. In 2004 a series of eight of my paintings won a gold medal from the Royal Horticultural Society's (England) annual international exhibition of botanical art.

I live near the Royal Botanic Garden in Edinburgh and am fortunate to be able to take specimens home to work. Once cut, the stem lasts for weeks, allowing plenty of time to decide exactly how to paint it.

There are about 110 species in the genus *Vanilla*, but the most common commercial species is *Vanilla planifolia*, a native to Mexico. The process of turning the ripe beans into the vanilla pods we use in cooking is precise and complicated, usually carried out by women in Madagascar.





KIM RENDERS

Sleeuwijk, Netherlands

Reticulated Giraffe (*Giraffa camelopardalis reticulata*)

Graphite on paper, 2017

8.5 × 12 in (21.59 × 30.48 cm)

The Reticulated Giraffe is a subspecies of a giraffe native to the Horn of Africa, a peninsula on the eastern most part of the continent, including Somalia, southern Ethiopia, and northern Kenya. Giraffes are the tallest land animals because of their long necks, which can be 6.5 feet (2 meters) or more. These necks allow them to forage high up in the trees where other animals cannot reach, but also demand that they have a special cardiovascular system. They have very strong hearts and high blood pressure to pump blood up to their brains. Also, their thick, muscular, and elastic veins can expand or contract to regulate the volume to control the blood flow.

The Reticulated Giraffe is one of two species of giraffes most commonly seen in zoos, and I saw this one in the ARTIS Amsterdam Royal Zoo. It was standing close to a fence, which allowed me to take good reference photographs of its head. Since it was back-lit, there was a nice contrast between the light and shade, but I was still able to see enough detail in the shadow side to do a drawing.



KIM RENDERS

Sleeuwijk, Netherlands

Southern Cassowary (*Casuarius casuarius*)

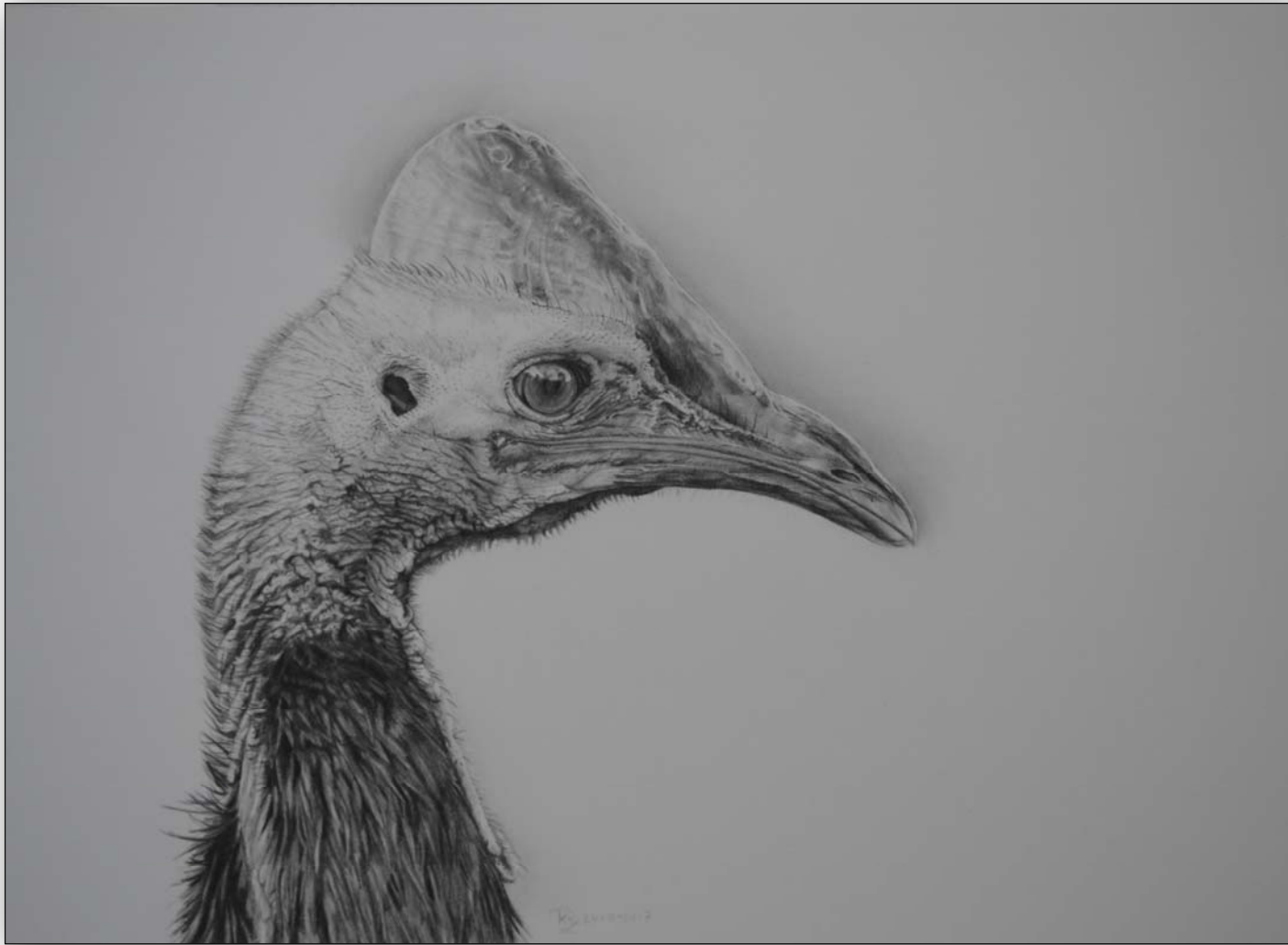
Graphite on paper, 2017

11 × 14 in (27.94 × 35.56 cm)

Southern Cassowaries are large—sometimes as tall as a man—flightless birds that are still relatively unknown. Their range is restricted to a small part of Australia, New Guinea, and a few Indonesian islands. The male cassowary builds the nest, incubates the eggs, and raises the chicks alone and, apparently, can be very aggressive to protect them. The species is seriously threatened due to habitat loss, and a lot of research is needed to understand them better.

Unfortunately, these birds have a reputation of being ugly and aggressive, which does not help their cause. However, I find them fascinating, especially their eyes that have an intriguing way of seeming to look past you. This is why I chose a portrait of just the head. Their wrinkly neck, the intense red and blue head coloration, and the deep black, stringy feathers also make them aesthetically interesting.





L INDA HAMPSON

Honiton, Devon, UK

White Bird of Paradise Flower (*Strelitzia nicolai*), Greater Double-collared Sunbird (*Cinnyris afer*)

Color pencil, ink wash on paper, 2018

18 x 18 (45.72 x 45.72 cm)

Having spent most of my life in Africa, the appeal of its flora and fauna still dominates my subject choices. Among my favorite plants are all species of *Strelitzia*. This species is a striking plant that can reach heights of 19–20 feet (6–7 meters), with a spread of up to 13 feet (4 meters). In this painting, I chose to depict it with pollinators, the Greater Double-collared Sunbird. The male of this species is a territorial, jewel-like little bird. His iridescent colors are glorious. The female, although not very showy, is endlessly diligent, collecting nectar to feed their chicks. When they land on the flower to feast on the copious nectar, their weight is just sufficient to expose the anthers. The pollen collects on their feathers and is efficiently transferred from flower to flower.





MARGOT ELIZABETH GLASS

Northampton, Massachusetts, USA

Common Dandelion (Taraxacum officinale)

Gold point on prepared ground paper, 2018

9 × 12 in (22.86 × 30.48 cm)

I draw with 14-karat-gold metal point and graphite both for the delicacy of line and for the allure of using these drawing materials. Working on a dark ground allows the gleam, luster, and delicate reflective silver and gold properties of the medium to stand out as high tones against the ground. The subject of ephemerality in nature inspires me to closely observe the fragility, delicacy, and urgency of seasonal plants, before they disintegrate. I draw grasses and weeds considered to be mundane or undesirable, to discover the hidden beauty in overlooked natural subjects and elevate them through close examination. By using metallic lines, the decorative qualities of the filigree patterns formed by seed heads and leaf veining is enhanced.

I am also interested in the tradition of using nature as idealized ornamental elements in art and design. At the same time, I seek to observe and represent these plants as accurately as possible in all their irregularity and imperfection.





BELINDA BIGGS

Wye Point, Australia

Common Ring-tailed Possum (*Pseudocheirus peregrinus*)

Watercolor on paper, 2015

10.5 × 8.5 in (26.67 × 21.59 cm)

The Common Ring-tail Possum is a marsupial (the embryo is carried in a pouch) found on the east coast and areas of the southwest of Australia, as well as in Tasmania. Their color ranges from dark grey to red-orange, and they are approximately 1 foot (30–35 centimeters) long. The tail adds another 1 foot (30–35 centimeters) and is prehensile, meaning it is dexterous enough to act like a fifth hand. There is a gap between the second and third finger that allows them to easily grasp tree branches.

These possums are gregarious in lifestyle. They nest communally in tree branches or occasionally in tree hollows, in what are known as *dreys* occupied by extended families. Individual nests within the dreys are constructed by both male and females and are lined with shredded bark and grass. They eat a variety of leaves of both native and introduced plants, and also rosebuds! These appealing animals are very common in suburban gardens, and it's lovely to see them scuttle around the trees at night to feed, especially when there is a baby on their back.





A VA VARSZEGI

Providence, Rhode Island, USA

Japanese Beetle (Popillia japonica)

Color pencil, gouache, pen & ink, watercolor on paper, 2018

9 × 12 in (22.86 × 30.48 cm)

I have a BFA in illustration from Rhode Island School of Design (RISD) and have since been pursuing their Continuing Education Certificate Program in natural history illustration. This activity brought my passion for drawing to the surface, particularly when I took an entomological illustration course and was amazed at the chance to analyze subjects under a microscope. For example, never before had I been able to closely examine the translucency of the elytra (the wing cases of insects). The focus on accuracy and applying media is something that has stayed with me.





WILMA ANDER

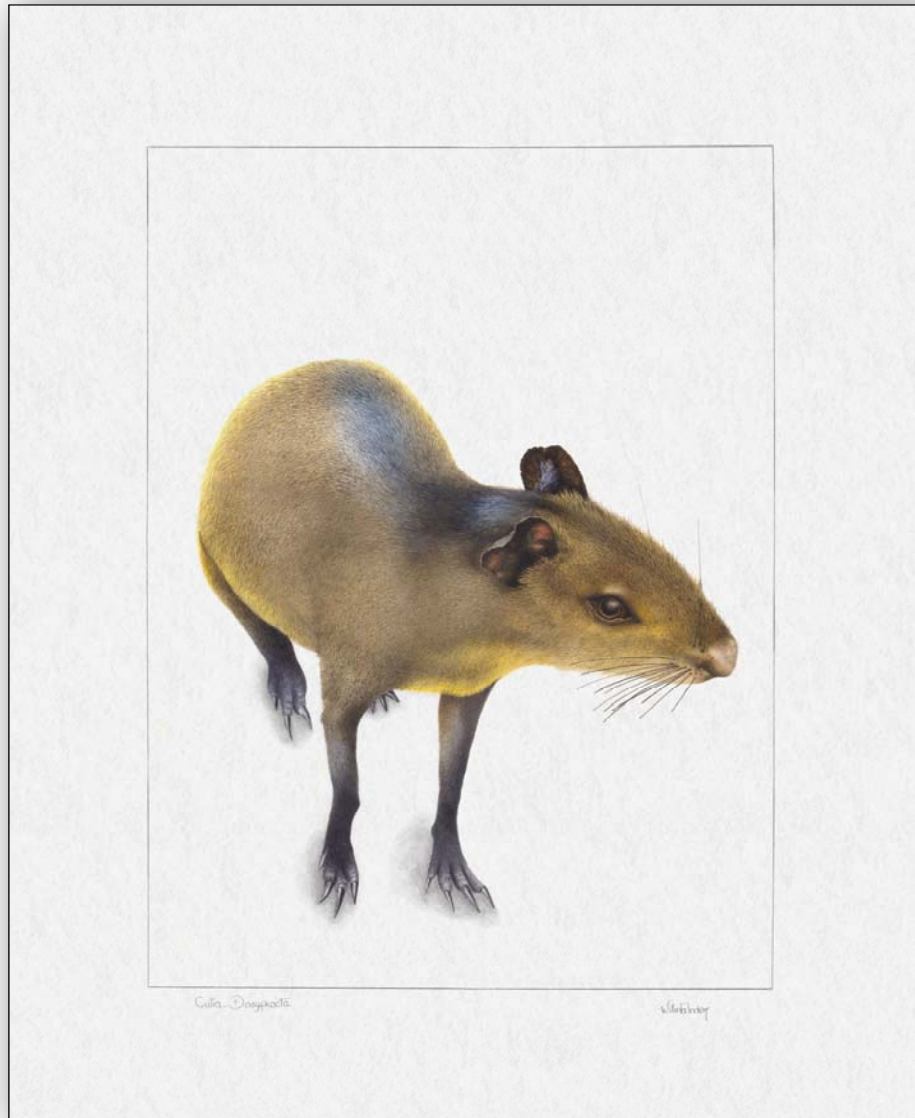
Anápolis, Brazil

Agouti (Dasyprocta species)

Watercolor on paper, 2017

19.6 × 25.5 in (49.78 × 64.77 cm)

This Agouti is a lovable rodent native to Middle and South America. This animal is frequently mentioned in the Brazilian folklore, where it is called *cutia* or *picure*. There is even a Brazilian children's folk song and play about it. The seven species of Agoutis in Brazil are all terrestrial and nocturnal but vary considerably in size and appearance. They weigh between 3.3–13 pounds (1.5–6 kilograms), stand up to 2.1 feet (64 centimeters), and have glossy fur in colors that range from orange to black. This one was calmly walking through the forest when it crossed my path, which allowed me to take photographs as references to complete this painting.



WILMA ANDER

Anápolis, Brazil

Guava (*Psidium species*)

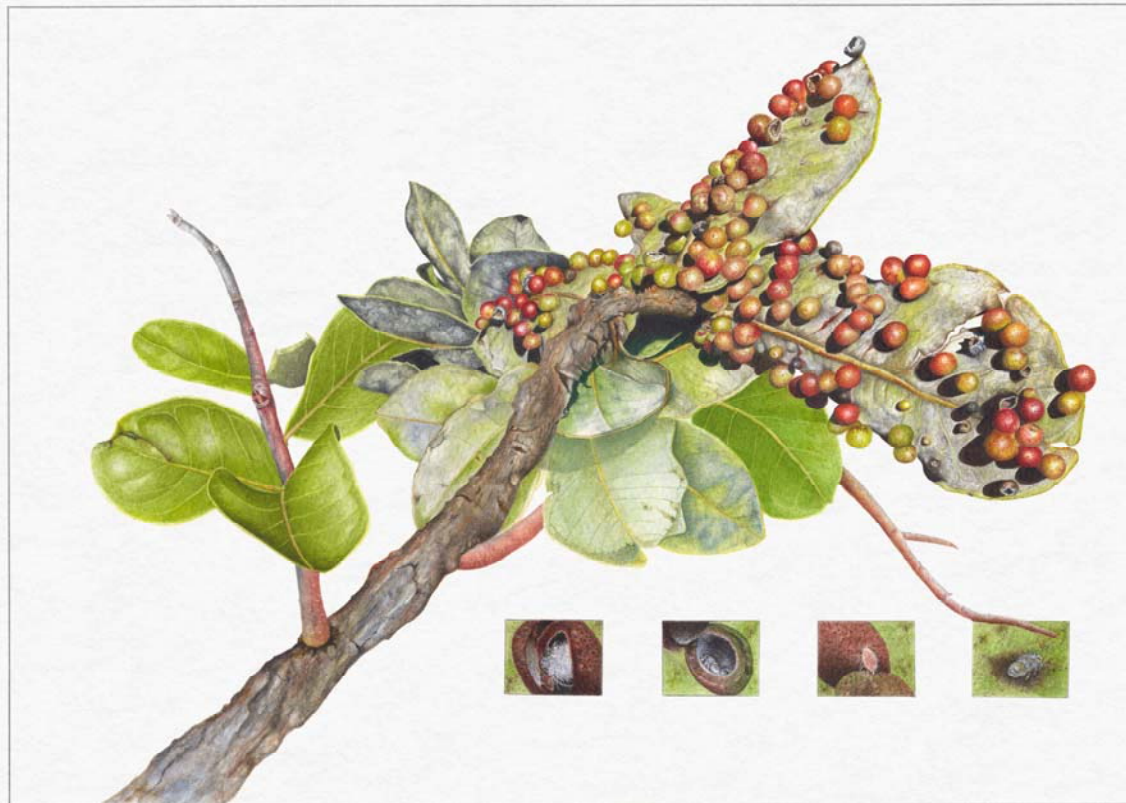
Insect Infestation, *Galha infestação por insetos*

Watercolor on paper, 2016

20.5 × 15.5 in (52 × 39.37 cm)

Insect infestations are usually depicted as bad things to be prevented since they are harmful to plants. While walking through a park with vegetation typical of the Brazilian tropical savanna, called *cerrado*, my attention was drawn to a plant with what seemed to have many balls attached to it. I took photographs with a macro lens and, to my surprise and delight, I discovered there were tiny insects inside. There was beauty right before my eyes even amidst an insect infestation. One can find the most exquisite art in nature!





Galha - injeção por insetos

W. H. H. H. H.

NORA SHERWOOD

Lincoln City, Oregon, USA

Snowy Plover (Charadrius nivosus)

Father Leads Snowy Plover Chicks to Their First Meal

Watercolor on paper, 2018

9 × 6 in (22.86 × 15.24 cm)

The Audubon Society of Portland is monitoring Snowy Plover nests along the Oregon coast in an attempt to help the species recover from its critically low numbers, and to help the public become aware of the plight of this tiny bird. Development and recreation activities have encroached on its habitat, and numbers in Oregon were as low as 50 but are now believed to be in the hundreds. Parental involvement is unusual in this species. The mother abandons the nest close to the time the chicks will hatch in order to initiate another breeding attempt with another male; the father stays with the nest. Chicks are able to forage for their own food within three hours of hatching! The father leads them to a food source, as shown in this illustration. He will brood the chicks periodically during their first few weeks of life, but otherwise they are responsible for their own care.





SUSAN ELMBLAD RUBIN

Denver, Colorado, USA

Silvery Lupine (*Lupinus argenteus*)

Color pencil on drafting film, 2016

12 × 16 in (30.48 × 40.64 cm)

Silvery Lupine grows in abundance in the Colorado Rockies, blooming in late June into July and casting a violet-blue haze on the montane. This *trompe l'oeil* (fool-the-eye) work is intended to show the botanical illustrator's process, with the herbarium sheet for research depicted beneath the live plant. I drew the herbarium sheet in the Kathryn Kalmbach Herbarium at the Denver Botanic Gardens, paying as close attention to the text and spots of glue as to the specimen itself. I located the live plant in flower and drew it on site at 9,200 feet (2,804 meters) near Fraser, Colorado. The composition highlights the science of the static specimen juxtaposed against the liveliness of the fresh flower.

This piece was awarded a Group Gold Medal at the Royal Horticultural Society in London in 2017 and appears in *The Best of Drawing/Strokes of Genius 10: Inspiring Subjects* from North Light Books, 2018.





JANN GRIFFITHS

Morgan Hill, California, USA

Longspined Porcupinefish (*Diodon holocanthus*)

Gouache, watercolor on illustration board, 2018

11.5 × 6.5 in (29.21 × 16.51 cm)

When viewed underwater, because of their boxy shapes, Porcupinefish, like Puffers and Boxfish, have always stood out to me as three-dimensional creatures, in direct opposition to the paper-flat, two-dimensional appearance of other types of fish.

Because of the relatively large size of their eyes, and a face that appears to be smiling, Longspined Porcupinefish are charismatic. These characteristics, along with an almost cartoonish ability to inflate themselves when in danger, serve to encourage viewers to create personal connections with members of these species. Therefore, Longspined Porcupinefish are excellent educational ambassadors, motivating people to understand and learn about the natural world and to care about maintaining the diversity of life in our oceans.





TAMI ELISE WINCH

Valley Falls, New York, USA

Red Fox (Vulpes vulpes)

Oil on canvas, 2011

20 × 10 in (50.8 × 25.4 cm)

The Red Fox is a striking spectacle in the snow! It is always exciting to get a glimpse of one, sometimes while it is out hunting or, on the rare occasion, with a litter of four to six kits. The inspiration for this piece was a series of photographs taken by a friend, Steph Libernaventure, who was lucky enough to see two Red Foxes playing in the snow.

Red Foxes colonized North America from Eurasia shortly after the Wisconsin glaciation that ended about 10,000 years ago. They are omnivores, meaning their diet includes meat, mainly small rodents, vegetation, and fruits. They adapt well to urban and suburban environments and, although rarely seen, are quite common in cities.





MARIA ALICE DE REZENDE

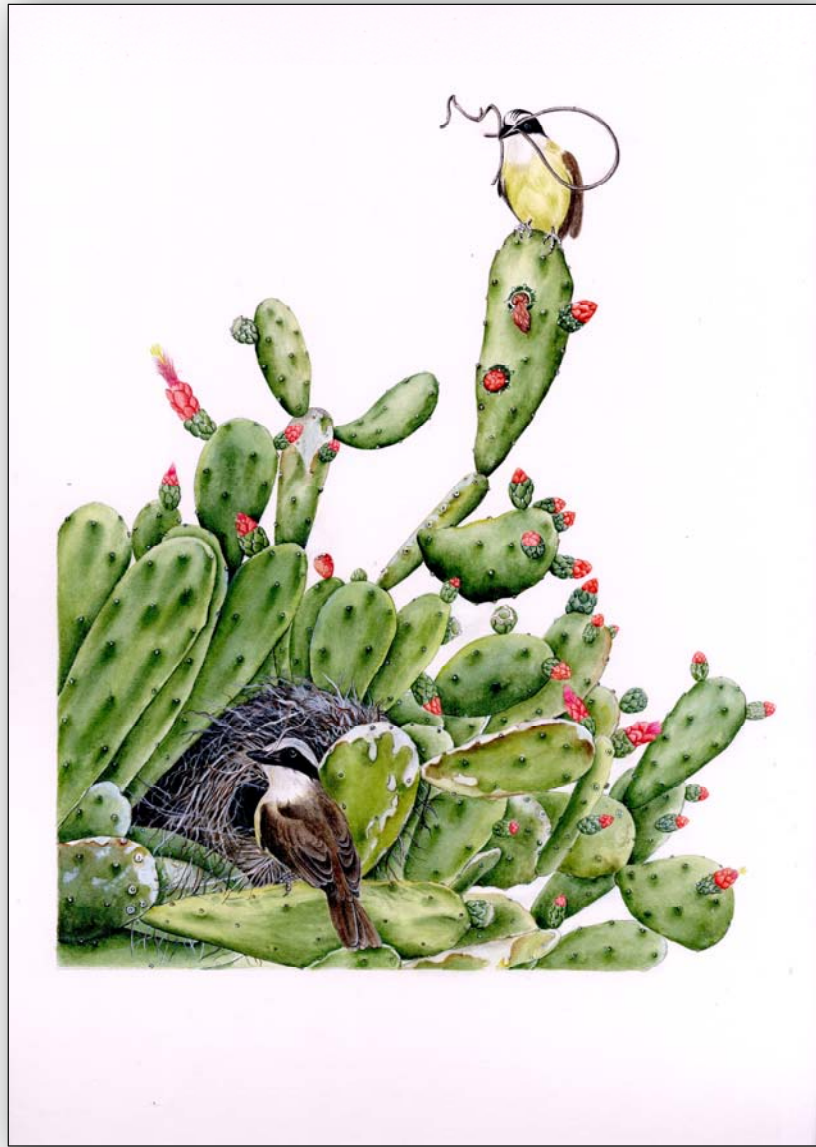
Paracambi, Rio de Janeiro, Brazil

Great Kiskadee (*Pitangus sulphuratus*)

Watercolor on paper, 2016

15 × 22 in (38 × 56 cm)

The Great Kiskadee is a species of flycatcher known in Brazil as *Bem-te-vi*. It has adapted well to urban habitats, where it is often conspicuous and noisy. There is no sexual dimorphism in this species, meaning both male and female have a brown back, a bright yellow belly, and a black tail. The bright yellow tuft on the forehead is only visible when the bird is in a danger or state of alert, such as in the presence of predators. These monogamous birds both participate in building a round, messy nest—often stealing materials from other birds—and share in raising the young. The nests are almost always in tall trees without leaves or, as my illustration shows, in cacti, where they are protected by the spines. They are very protective of their territory, even threatening much larger birds than themselves, such as hawks and buzzards.



MARIA ALICE DE REZENDE

Paracambi, Rio de Janeiro, Brazil

Laelia (Laelia jongheana)

Watercolor on paper, 2008

13.5 × 20 in (35 × 51 cm)

The orchid in this painting is endemic to Brazil, occurring only in the southeastern states of Espírito Santo and Minas Gerais. Its phylogeographical domain (distribution) is limited to trees in the *cerrado*, an ecologically unique region of Atlantic rainforests, at altitudes of 4265–5249 feet (1300–1600 meters). Its species name is a tribute to M. de Jonghe, a Belgian orchid producer of the nineteenth century, who collected hundreds of Brazilian species. The *Laelia* is critically endangered due to predatory collection, small, isolated populations, and perhaps the biggest threat to its survival, slow growth. The species' generation time is estimated at about 10 years, and it is on the Brazilian Red List of Threatened Species of Extinction of Flora of Minas Gerais, as well as on the official lists of the Brazilian Environment Institute (IBAMA) and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).





DICK RAUH

Westport, Connecticut, USA

Morning Glory (Ipomoea species)

Watercolor on paper, 2014

20 × 28 in (50.8 × 71.12 cm)

The fruit of the Morning Glory is a valvular (valve-like) capsule, in this case from a three-carpellate ovary. When the large black seeds are ready for dispersal, the outer ovary wall, now called a valve, falls off, freeing the seeds. The septum dividing the capsules is a silvery membrane, similar to the silique, or the narrow seed pod of the *Lunaria* (Honesty or Money Plant) familiar to gardeners. The contrasting textures of the globular capsule, the seeds, the remnants of the calyx and the silvery septa are what inspired the artwork.





NING TSAI

New Taipei City, Taiwan

Six-bar Swordtail (*Graphium eurous*)

Watercolor on paper, 2018

17 × 14 in (43.18 × 35.56 cm)

The Six-bar Swordtail, *Graphium eurous*, is a butterfly found at middle- to low-altitude elevations in the Himalayas, northern Pakistan, parts of India, Nepal, northern Myanmar, and into China, and Taiwan. Although widely spread, the species tends to be localized, especially the males. The Chinese name for this butterfly means “ascension” because it takes advantage of the rising air during hot weather to fly high. Its sword-shaped tail is a distraction to enemies who attack the tail end rather than the more vulnerable head, and this perhaps is why we often see tailless Swordtail Butterflies. I have included in this painting a sprouted Daikon or White Radish, a common dish in Chinese cuisine.





DOROTHY DEPAULO

Lakewood, Colorado, USA

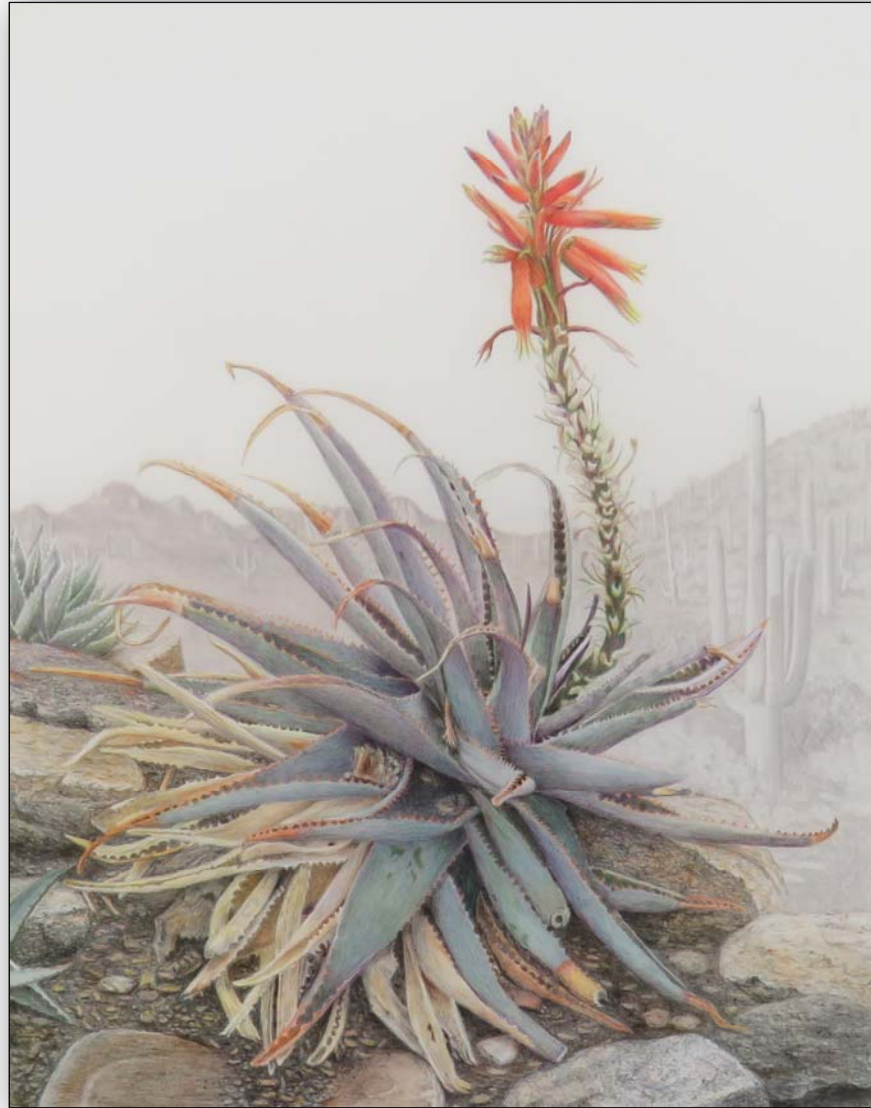
Aloe (Aloe species)

Color pencil on drafting film, 2018

11 × 14 in (27.94 × 35.56 cm)

I work mostly on drafting film, which is a semi-translucent plastic film that allows me to layer one piece of film over another. In this painting, I wanted the aloe plant in a dominant view, and secondarily, I wanted to show it in its native habitat, the Sonoran Desert of southwestern North America. To do this, I chose to use two layers of drafting film, with the Aloe on the top layer and the desert scene in monotone on the underlying layer of film.





DOROTHY DEPAULO

Lakewood, Colorado, USA

Anna's Hummingbird (Calypte anna), Mesquite (Prosopis glandulosa)

The Perch

Color pencil on drafting film, 2018

11 × 14 in (27.94 × 35.56 cm)

This painting is a study in contrasts. I was fascinated by the subtle, monotone beauty of the bark of the mesquite tree and how it contrasts with the colorful hummingbird that lives in the same environment.





YUN-KAE KIANG

Taipei City, Taipei, Taiwan

*Weevil (*Pachyrrhynchus sarcitis kotoensis*), Land Snails (*Reinia eastlakeana yami*, *Nesiohelix kanoi*)*

A Journey to Orchid Island

Gouache, graphite, color pencil on paper, 2018

16 × 15 in (40.64 × 38.1 cm)

This piece is in memory of my favorite naturalist, Tadao Kano (1906–1944), and his expeditions on Orchid Island, off the southeastern coast of Taiwan, in the 1930s. Kano studied the indigenous culture, discovered new species, and published a series of biogeography articles about this unique island. He suggested a revision of the Wallace Line, based on the faunal differences between Taiwan and Orchid Island. Kano went missing in Borneo during World War II. His wife had a romantic explanation to this tragedy: He must be still alive, but just so devoted to the expedition in the jungles that he forgot to return home!

The main medium of this piece is gouache, with some graphite, color pencil, and transfer-printing (for the details on the map and coins). I used polymer clay to make models of the specimens and the nautilus shell necklace, all based on Kano's publication.





EMILY KEARNEY-WILLIAMS

Anchorage, Alaska, USA

Common Octopus (*Octopus vulgaris*)

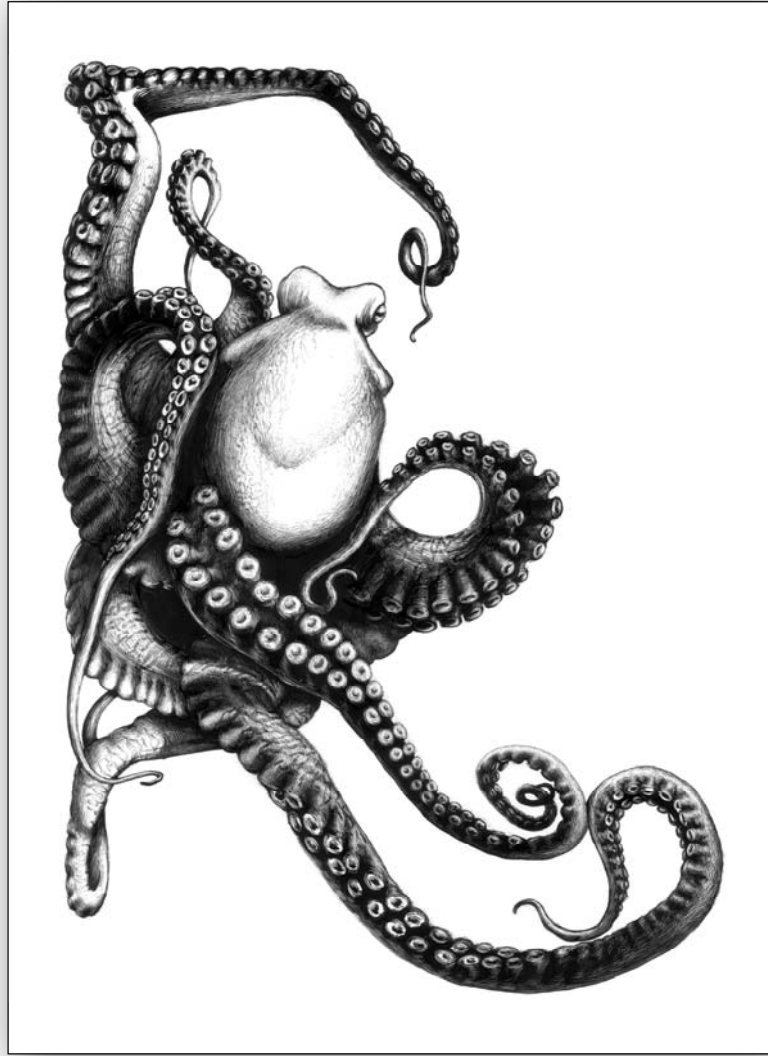
Pen and ink on clay-board, 2017

16 × 20 in (40.64 × 50.8 cm)

This piece was inspired by a lovely Common Octopus residing at the Georgia Aquarium in Atlanta some years ago. It was being uncharacteristically active, and I excitedly took photographs with reference images in mind. I set out to show the more whimsical side of an octopus, limbs extended and playful, but comfortably situated in the corner of its tank. This was my first experience with white clayboard, used as I would scratchboard, and I thoroughly enjoyed it.

Clayboard is a clay-coated hardboard panel on which I painted black ink in the areas where the tentacles outstretched. I used an X-acto brand knife to scratch the ink away and reveal white underneath. Using the subtractive method allows me to build light values from dark and to think about the structure of the piece in a different way. The texture and light created through this technique brings life to an entity already full of energy.





HUGO SALAIS

Rocafort, Valencia, Spain

Atlas Beetle (*Chalcosoma atlas*)

Graphite digital on paper, 2015

11.75 × 16.5 in (29.84 × 41.91 cm)

This portrait depicts a male Atlas Beetle, *Chalcosoma atlas*, an insect in the family Scarabaeidae, also known as Scarabs. The species was named after the Greek Titan condemned by Zeus to support the skies on his shoulders. Atlas beetles are among the largest known, reaching up to 5–5.5 inches (13–14 centimeters) in size. However, the most outstanding feature of the Atlas Beetle (and of sister species in this genus) are three prominent horns in the center and either side of their heads. These horns are found only among males and are used in fights for dominance and for females. In addition to the horns and the intricate details of the head area, the portrait highlights the contrasts and reflections of the shiny, chitinous carapace. The piece was first drawn in graphite, using a variety of hardnesses (Faber Castell 9000, 3H-8B). Then the drawing was scanned; levels of brightness, contrast, and tonal range adjusted; and color and blur added using Photoshop CS3.





XAVIER PITA

Thuwal, Jeddah, Saudi Arabia

Water Strider (Halobates germane)

Ocean Colonizers

Digital (entirely) on paper, 2018

16 × 20 in (40 x 50 cm)

Research conducted at King Abdullah University of Science and Technology (KAUST) shed light on the characteristics that allow Water Striders to thrive in the open ocean. Its light and water-repellent body, specialized legs that can exploit the surface tension of the water, and extraordinary environmental awareness have been found to be essential to its survival in an environment characterized by turbulence, submersion, and predation.

The purpose of this illustration is to explain the specific adaptations and behaviors that have allowed Water Striders to colonize oceans. Given the amount of information involved, I opted to illustrate a scene that summarizes the most relevant characteristics of the Water Strider to survive the multiple threats of the open ocean, including morphology and various behaviors. With this as a backdrop, I then added more information using simple line drawings.

WATER STRIDERS

OCEAN COLONIZERS

Insects have achieved remarkable evolutionary success at colonizing a wide range of land and aquatic habitats as evidenced by the approximately 5.5 million extant species and estimated 100 million species found in such habitats over the course of evolutionary history. Despite this success, only a very few insect species have occupied the ocean, the largest biomes on Earth. Just five species of sea skaters (*Haliobates* spp.) have extended their habitats across the surface of the tropical and subtropical ocean.

This remarkable evolutionary achievement likely involved unique adaptations for the species to thrive in the challenging oceanic environment characterized by extreme turbulence and abundant predators. Experimental assessment of the morphology and behavior of *Haliobates* reveals that its small and superhydrophobic body allows these resilient sea skaters to harness the full potential of the surface tension of seawater to achieve their impressively fast responses to threats, enabling them to colonize the ocean.

STAYING WATERPROOF

Grooming activities aid in maintenance of superhydrophobicity



Wax is spread through the body using the legs



Puffin

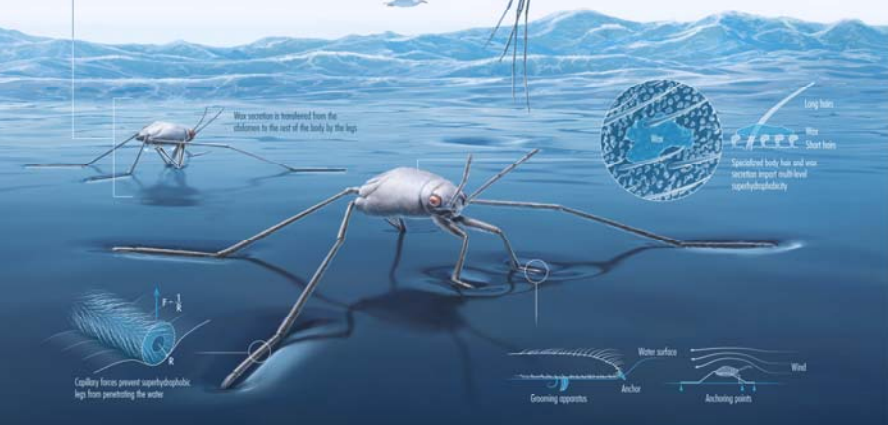
ESCAPING DANGER

Extreme acceleration allows to escape aerial and underwater predators



Bending of water surface

Bounce on water surface



Wax secretion is transferred from the cuticles to the rest of the body by the legs

Capillary forces prevent superhydrophobic legs from penetrating the water

Specialized body has and wax secretions impart multi-level superhydrophobicity

AGILITY

Relatively smaller and lighter body maximizes agility on water



Haliobates germanus

Aegonotus pallidus

AVOIDING SUBMERGENCE

An elastic thorax protects from submergence and provides buoyancy



Swims back to the surface

PAM LITTLE

Hamilton, Montana, USA

*American Bison (*Bison bison*), North American Elk (*Cervus elaphus canadensis*)*

Crossing Slough Creek

Digital (entirely) on paper, 2018

13.5 × 10 in (34.29 × 25.4 cm)

In this springtime scene, American Bison cows and calves are shown crossing a section of Slough Creek in Yellowstone National Park, Montana, while two North American Elk, called *wapiti* by Native Americans, look on. At this stage in their lives, the bison calves are popularly known as “red dogs.” Most are born in early spring, and by fall their coats have darkened to the adult dark brown. You can see some red dogs in fall, however their late birth coming just before winter makes their survival perilous.



R. GARY RAHAM

Wellington, Colorado, USA

Many-head Slime Mold (Physarum polycephalum)

Slime Mold Diaspora

Acrylic on canvas, 2018

16 × 20 in (40.64 × 50.8 cm)

Slime Mold Diaspora, the Many-headed Slime Mold, exists somewhere near the boundary between unicellular and multicellular life. Flagellated, haploid cells wander in cool, wet and moist environments, eating bacteria and fungal spores until compatible mating types fuse to form a diploid organism (plasmodium) with multiple nuclei. The plasmodium flows overland as a yellowish network of flowing protoplasm. When stressed, this flowing tissue differentiates to form a stalk topped with a sporangium filled with spores that will ultimately germinate when they alight on fertile terrain. Recent studies show that this simple creature displays the rudiments of a kind of memory, allowing it to solve mazes and know where it's traveled before. The writer and naturalist Loren Eiseley compared humans to slime molds in his 1970 book, *The Invisible Pyramid*, describing the pioneer probes as "thistledown off to new worlds."





TOMÁS SÁNCHEZ

Salamanca, Spain

Human (Homo sapien)

Medicine Woman

Pen and ink on scratchboard, 2017

13 × 9 in (33.02 × 22.86 cm)

I have always been fascinated by recreations of men painting or recording images in caves. After seeing photographs of stone engravings in North Africa, I considered the possibility that the artists of those graceful and beautiful engravings could very well have been female. I decided to recreate an image that reclaimed the role of women in ancestral art that combined delicacy, precision, elegance, sobriety, and beauty at the same time. The use of the scratchboard technique allowed me to develop a visual journey with a great deal of information and balance. When recreating a nocturnal environment, the reflection of the moon allows one to play with light and with indirect reflections on the woman's back or her engraving thanks to a wall located in the viewer's position.

Depicted here is a scene that could have taken place 3,000 years ago in the south of current-day Libya. The drawing portrays a woman making a propitiatory engraving of the hunting of a giraffe, a species that is still present in North Africa despite the process of desertification. Women who live in this area today still practice Shamanism and art. Agriculture is also known to have been practiced in the area, as indicated by the spikes of grain that adorn her hair.





SUE DELEARIE ADAIR

Schenectady, New York, USA

Purple Martin (Progne subis)

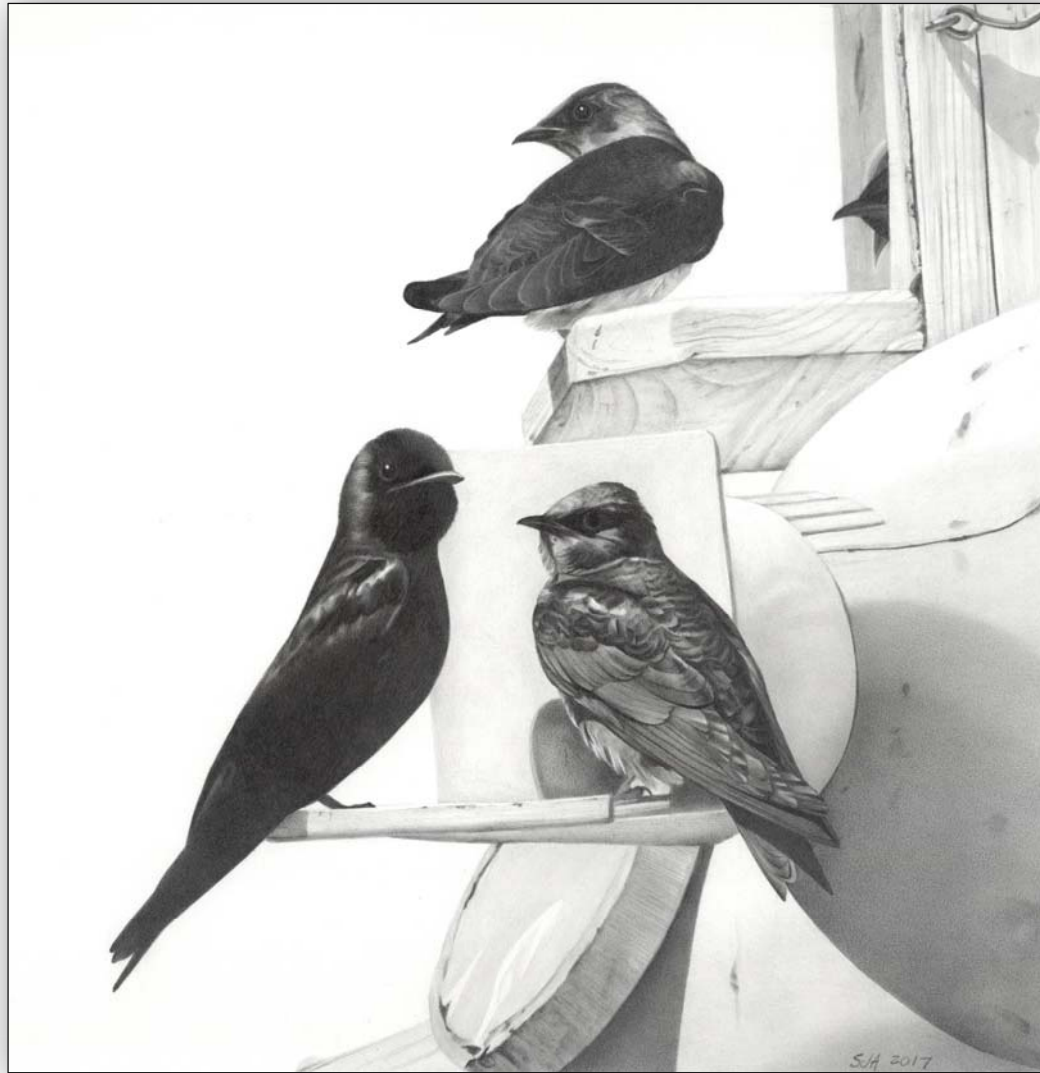
Apartment Living

Graphite on paper, 2017

9 × 9.25 in (22.86 × 41.91 cm)

In 2016 I was one of five jurors for the U.S. duck stamp and learned that a black-and-white illustration of a non-game “companion species” would be included on the reverse side of the stamp. Shortly after the judging was complete, I was asked whether I thought Purple Martins would “work in black-and-white.” When I responded yes, I was asked to create the drawing for the reverse side of the stamp I had just judged! “Apartment Living” is the result. The drawing features Purple Martins, and their nesting boxes, from Bombay Hook National Wildlife Refuge in the state of Delaware. The entire duck stamp process was a rewarding experience!





E LAYNE LEIGHTON

Jackson, New Jersey, USA

Eastern Box Turtle (*Terrapene carolina*)

Color pencil on drafting film, 2014

11 × 8.5 in (27.94 × 21.59 cm)

The carapace of the Eastern Box Turtle has cryptic colors to help it blend in with the deciduous woodland floor where it lives and is often able to escape notice by all but the most observant. When inactive, at night, box turtles hide under the leaf litter. The turtles are most commonly seen in the spring but can be found throughout the summer and early fall. I have often seen them in the strawberry patch of my garden and also where raspberries and blueberries grow in the woods nearby. Males often have red or dark orange eyes, while females have brown.

This image was created using layers of first hard, then increasingly softer colored pencils.





ESTHER VAN HULSEN

Nittedal, Norway

Octopus (Keuppia species)

95-Million-Year-Old Octopus Painted with Its Own Ink

Octopus ink on cardboard, 2016

11.5 × 10.25 in (29.21 × 26.03 cm)

I was given the unique opportunity to paint a portrait of a 95-million-year-old octopus with its own ink. This fossil of *Keuppia* was found in Lebanon and given to the Natural History Museum in Oslo, Norway, in 2014. It was in such good condition that it was possible to scrape some ink from the ink sac and grind it into a fine powder to which I then added water. Even after 95 million years the ink had maintained its sepia color and vibrancy. Knowing that this animal used this very ink to survive is absolutely amazing. Octopus ink has historically occasionally been used for drawing and painting, most notably by Mary Anning, an English paleontologist who made a similar drawing in the early 1800s.





NANCY GEHRIG

Roseville, Minnesota, USA

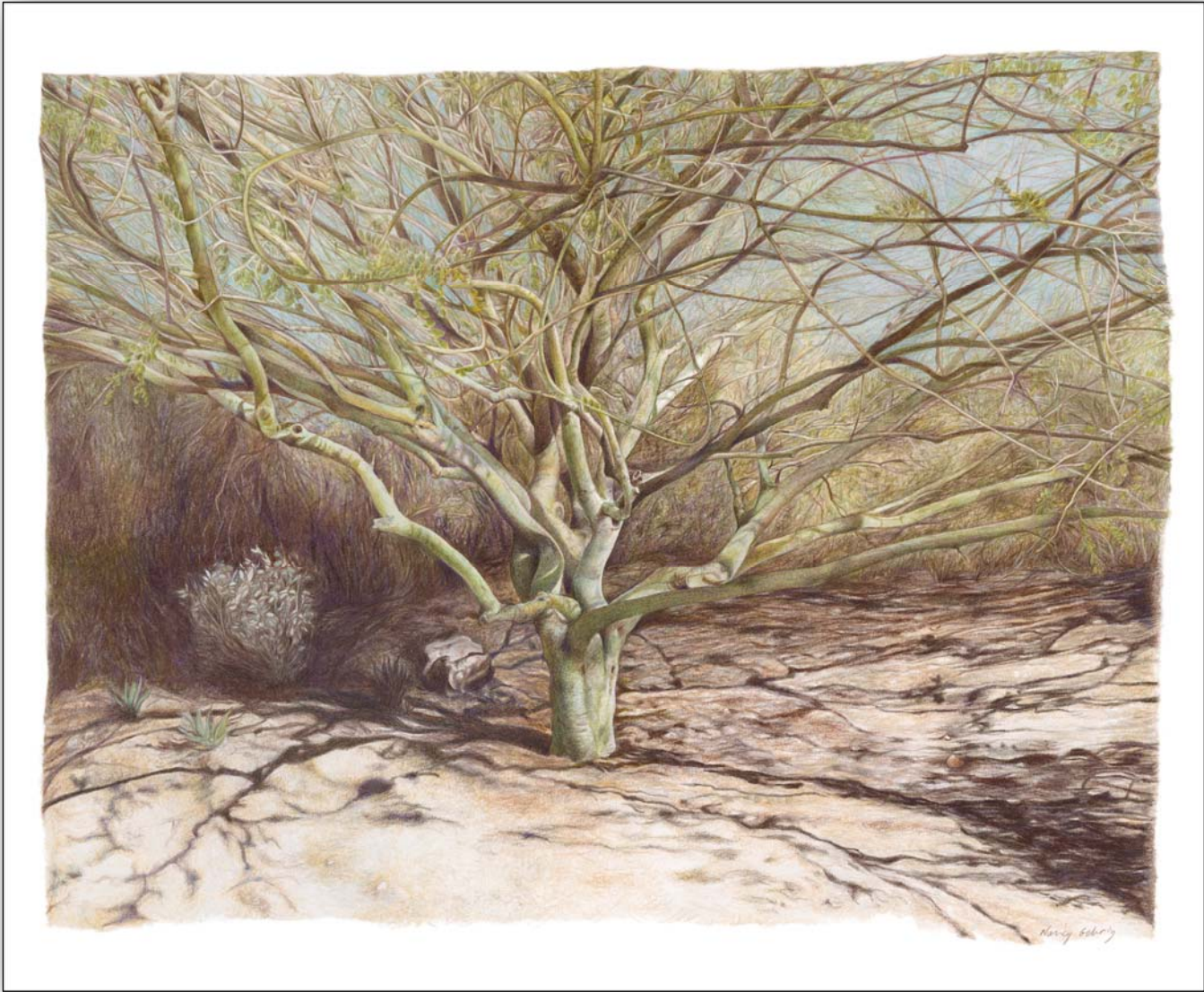
Palo Brea (Parkinsonia praecox)

Color pencil on paper, 2017

17 × 14 in (43.18 × 35.56 cm)

This beautiful Palo Brea tree lives in the Desert Botanical Garden in Phoenix, Arizona. Sonoran Desert trees intrigue and captivate me. I intended to draw it in the traditional botanical illustration manner of placing the tree on a white background. But I was so enamored with the shadow on the ground that I had to include it in this drawing. The tangle of branches was a real challenge and I often got lost and wondered if I would ever complete the piece. I am glad I stuck with it, as I really love the Palo Brea and, in particular, this tree.





C HEN ZHA

Laguna Hills, California, USA

*Potter Wasp (*Delta pyriforme*)*

Digital (entirely) on paper, 2018

11 × 8.5 in (27.94 × 21.59 cm)

This is the cutaway view of a Potter Wasp nest, showing the behavior of storing caterpillars as food for the next generation. Unlike its eusocial relatives (such as hornets and paper wasps, where a single female produces fertile eggs and other individuals cooperate in caring for them), Potter Wasps live solitary lives and the female is good at parental care. The prey is paralyzed instead of killed so that her offspring will be born with fresh food readily available. This piece is a good example of how scientific illustration can visually explain science when photography is not an easy option. It was done completely in Photoshop; a lot of casual and sketchy strokes and markings were applied and rendered in watercolor and gouache style to give it the appearance of a hand-drawn piece.





SOPHIE WEBB

Felton, California, USA

Peregrine Falcon (*Falco peregrinus*), Dunlin (*Calidris alpina*), Northern Pintail (*Anas acuta*),
Flammulated Owl (*Psiloscopus flammeolus*), Allen's Hummingbird (*Selasphorus sasin*),
Pinyon Jay (*Gymnorhinus cyanocephalus*)

Trends and Traditions: Avifaunal Changes in Western North America

Acrylic on gessoed masonite, 2017

14 × 15 in (35.56 × 38.1 cm)

These six small paintings were designed together as a single piece for the cover of the monograph, *Trends and Traditions: Avifaunal Changes in Western North America*, published by the Western Field Ornithologists, 2018 (W. David Shuford, Robert E. Gill Jr., and Colleen M. Handel, editors). Each species has a story behind it about whether a population is recovering, declining, or remaining stable. Peregrine Falcon populations are recovering; the Dunlin's breeding chronology appears to not be affected by climate change in the Arctic; the declining Northern Pintail use the habitat created by the winter flooding of rice fields in California's Central Valley; the Flammulated Owl's breeding habitat is adversely affected by forest fires; Allen's Hummingbird populations are increasing in Southern California due to the extensive use of ornamental plants; Pinyon Jay populations are decreasing because of habitat loss and drought in the Southwest.





B

OBBI ANGELL

Brattleboro, Vermont, USA

Nectar Garlic (*Nectaroscordum siculum*)

Etching on paper, 2017

15 × 20.5 in (38.1 × 52 cm)

Nectaroscordum siculum is a tall, beautiful ornamental Allium from Sicily, in the Mediterranean, that I have grown in my garden for years and always enjoyed watching the buds emerge from the bract like exploding fireworks. I sketched stages of growth as it came into bloom and created a composition for the copper etching, from bud to full bloom. The foliage is as captivating as the flowers, with twisted, convoluted arching leaves. The Latin name translates to “nectar garlic.”





H EIDI SNYDER

Lakewood, Colorado, USA

Biocrust: Fungi, Lichens, Bryophytes, Cyanobacteria

Color pencil on drafting film, 2015

11 × 14 in (27.94 × 35.56 cm)

This piece of bio-crust is located in Arches National Park, Utah, where increased foot traffic has damaged large areas of formerly healthy bio-crust soil. Biological soil crusts are communities of living organisms on the soil surface and are found throughout the world. They perform important ecological roles, including carbon and nitrogen fixation, soil stabilization, and enhanced germination and nutrient levels in vascular plants. Bio-crusts damaged by recreational activities, fire, or overgrazing can require a long time period to recover and function. On the whole, people pay little or no attention to what they step on, so this piece was created to highlight the underestimated diversity, importance, and beauty of healthy soil.



H EIDI SNYDER

Lakewood, Colorado, USA

Pleasing Fungus Beetle (*Gibbifer californicus*)

Color pencil on drafting film, 2016

11 × 14 in (27.94 × 35.56 cm)

Pleasing Fungus Beetles have a worldwide distribution, but the vast majority of species occur in the tropics. Of the 1,800 known species only 51 are found north of Mexico, 18 of which have been recorded in Florida. Most fungus beetles are easily recognized by their reddish-orange and black color patterns, but in the Colorado Rocky Mountains they tend to be blueish.

The Pleasing Fungus Beetles feed on the fruiting bodies of fungi. Each fungus beetle species seems to be specific to a certain group of fungi. Species with larger individuals (such as shown) feed on the harder bracket fungi found on dead trees or stumps. When conditions are unfavorable for the host fungi to fruit, adult beetles often congregate under bark or in other hiding places. The causes for the factors leading to these aggregations are as yet unknown.



HEIDI SNYDER

Lakewood, Colorado, USA

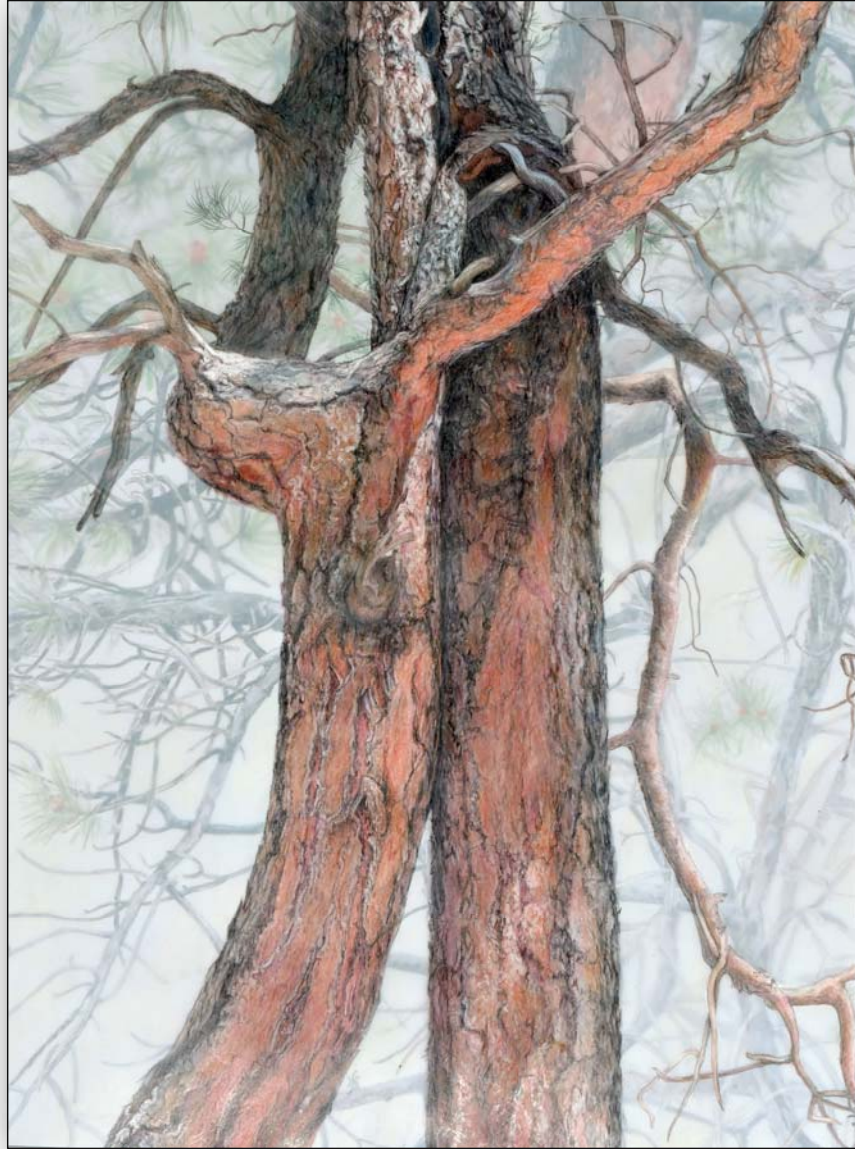
Ponderosa Pine (Pinus ponderosa)

Embrace: Culturally Modified Pine Trees

Color pencil on drafting film, 2017

16 × 20 in (40.64 × 50.8 cm)

Indigenous peoples all over the world have modified trees throughout the ages so they attain certain shapes when grown. Due to the slow growing process of trees, this was a project taken on by entire families and required clear communication over several generations. These shaped trees served to mark game or other trails, water sources, and historically or culturally important locations. The two depicted Ponderosa Pines are located in Colorado where the local Native Americans, the Utes, have modified trees throughout the state. While the specific purpose of modified trees cannot always be ascertained, Ute elders are sure these two trees have ceremonial and/or religious significance, as they are trained to grow intertwined. Additionally, they point toward *Tewa*, which is the Ute word for Pikes Peak, a prominent Colorado mountain peak along the Front Range considered sacred by the Utes.



SUSAN FOX

McKinleyville, California, USA

Saiga Antelope (Saiga tartarica mongolica)

Oil on canvas, 2015

24 × 36 (60.9 × 91.44 cm)

Saiga Antelope are listed as critically endangered on the International Union for Conservation of Nature (IUCN). I had the good fortune to see 40 of these subspecies, in Sharga Nature Reserve, Sharga Aimag, and Khar Us Nuur National Park, Khovd Aimag, in western Mongolia in 2013. I saw another 80 or so, close to 10 percent of the estimated population for the area, in 2015 in and near the same park. I enjoyed the opportunity to paint a species that has survived since the Pleistocene.

Due to a livestock virus, the population of this Mongolian antelope underwent a severe 50 percent die-off starting in 2016. It is hoped that the species' will be able to recover over time.



MICHAEL J. FELBER

Port Townsend, Washington, USA

Brown Bear (Ursus arctos)

Young Mother

Oil on linen canvas, 2016

14 × 11in (35.56 × 27.94 cm)

While on a trip to Katmai National Park, Alaska, I took many photos of a female brown bear as she walked by, which I used for my oil painting called *Young Mother*. Most of the photos were not very interesting, but in one photo she appeared to look very emotional. I could see that she was thinking about something, and I found this photo to be the most compelling to work with in order to depict the expression of her temperament and psyche in my painting.

The bears that I draw are not just any generalized bear. They are very specific bears with scars and thoughts and memories and problems and children of their own. I use the words “mother,” “father,” and “grandfather” in my titles to get people to think about these animals as having a life of their own that has nothing to do with people. I work a lot on the animal’s expression, and this is the way that I project my observations and feelings about this animal’s life to the viewer.





B EVERLY MCKAY

Cole Harbour, Nova Scotia, Canada

Red-wattled Lapwing (*Vanellus indicus*)

Vigilance

Gouache, graphite, watercolor on paper, 2012

17.75 × 11.75 in (45.08 × 29.84 cm)

When I lived in the United Arab Emirates, I often heard these noisy birds calling in the night, long before I ever saw them. Since they nest on the ground in shallow nests, their young and eggs are at high risk of predation. The adults are hyper vigilant and will perch on a nearby rock or stump and rotate all around to watch for predators. This is the action I have chosen to depict in my mixed-media illustration. When a threat is spotted, they engage in a lot of noisy dive-bombing at the intruder.

In this image, to the Western viewer, the bird appears to rotate from left to right. However, for an Arab viewer (who reads text and art from right to left) it seems to be disappearing. I meant this as a subtle warning of the habitat degradation happening in the Middle East. While not endangered, these lapwings are subject to the decreasing habitat due to coastal and lakeside development across western and southern Asia.



SAMANTHA N. PETERS

Dallas, Texas, USA

American Alligator (*Alligator mississippiensis*), Nile Crocodile (*Crocodylus niloticus*),
Gharial (*Gavialis gangeticus*)

Crocodylian Diversity

Color pencil, watercolor on paper, 2018

11 × 15 in (27.94 × 38.1 cm)

The Dallas Zoo, where I work, is committed to creating a better world for animals, both in and outside of its confines. Therefore, scientific and conservation information is provided on all of our interpretive graphics. As part of a multi-year project to update the signage, I created this piece for a panel at the Nile Crocodile exhibit. The side-by-side portraits highlight the differences between crocodylian families. Also, on the panels is information about how the efforts of the Crocodile Specialist Group, and other conservation partners, have helped crocodylians recover from low numbers, as well as how people can contribute to improving their lives.

This watercolor and colored pencil piece was painted on a scrap of paper using mostly photo references since the crocodiles didn't feel like posing. I never expected the original to be seen outside my studio.





C

HRISTIAN GERISCH

Leezdorf, Lower Saxony, Germany

Gorgosaurus libratus, Lambeosaurus lambei

Acrylic on canvas, 2018

19.75 × 15.75 in (50 × 40 cm)

The depicted scene shows the encounter of two inhabitants of the Dinosaur Park Formation in southeastern Alberta, Canada. In the morning hours *Gorgosaurus libratus* enters a river bed where a large *Lambeosaurus lambei* bull was about to drink. Both animals seem rather insecure in what to do next. The hadrosaurid (*Lambeosaurus*) backs off, perhaps remembering a similar opponent of his younger days, and will most likely withdraw. This scene is based on an assumption made by paleontologist Dr. David Hone. According to him even fully grown apex predators seldom go for large, healthy prey. He assumes that this behavior, observed in modern animals, was also present in extinct ecosystems. The commonly depicted image of dinosaurs battling huge prey animals would have been a rare sight, happening only in desperate circumstances. The picture highlights a typical situation in which both dinosaurs seem rather hesitant. It is a calmer portrayal of an often overly dramatized ecosystem.





KATHRYN CHORNEY

Mississauga, Ontario, Canada

Red Pine (*Pinus resinosa*)

Watercolor, casein, graphite on paper, 2017

19 × 13 in (48.26 × 33.02 cm)

Expressions of geometry in nature are among my favorite phenomena. I could not resist a form as intriguing as this starburst-like bundle of Red Pine microsporangiate strobili (male pollen cones). A big attraction of the practice of nature illustration, for me, is the opportunity to look closely at things I have never seen before. I was curious to figure out the inner construction of the pollen cones; however, by the time I had decided to add this aspect to my illustration, it was no longer spring and there were no more fresh cones available. Instead, I dissected some older, desiccated cones I was able to find, shot extreme closeup photographs of them to study, and supplemented my reference by searching for micrographs and sectional diagrams on various educational websites. In this way I was able to reconstruct the form of the microsporophyll with its hidden pollen sacs. This illustration was juried into *Art of the Plant*, Canada's national contribution to the Botanical Art Worldwide initiative led by the American Society of Botanical Art in 2018.



S EAN MURTHA

Norwalk, Connecticut, USA

Mouse-birds (*Tsidiyazhi abini*)

Acrylic on illustration board, 2017

13 x 14 in (33.02 x 35.56 cm)

Today, mouse-birds are in a small family confined to Africa, but at one time they were widespread. *Tsidiyazhi* is the earliest known member of the mouse-birds, from the Paleocene of New Mexico, 62.5 million years ago, proving that this group was already established soon after the extinction event that ended the age of dinosaurs. The genus and species names pay homage to the Native Americans on whose land it was discovered and means “little bird of the morning” in the Diné Bizaad, or Navajo language.



CAROL SCHWARTZ

Holden, Massachusetts, USA

Common Periwinkle (*Littorina littorea*), Smooth Periwinkle (*L. obtusata*),
Rough Periwinkle (*L. saxatilis*)

The Three Periwinkle Species of Maine and Company

Gouache on paper, 2017

11 × 7 in (27.94 × 17.78 cm)

In this painting I wanted to illustrate the three types of periwinkles that inhabit the tidal areas of Maine and New Hampshire. It can be confusing when you see periwinkle shells if you don't know the differences. On the left is the invasive species known as the Common Periwinkle, *Littorina littorea*, which is the largest and most commonly seen in New England. In the top center is the smaller Smooth Periwinkle, *Littorina obtusata*, which is less cone shaped and has swirls that are flatter than the other two. Some are beige or cream colored, but the most striking is the bright golden yellow shell that I have illustrated. To the right are the Rough Periwinkles, *Littorina saxatilis*. Its size is somewhere between the other two and as the shell swirls, deep grooves are created around the shell. The Common Periwinkle swirls are much less grooved, giving it a more conical shape.



Carol Schwartz

CAROL SCHWARTZ

Holden, Massachusetts, USA

Jonah Crab (Cancer borealis), Blue Mussels (Mytilus edulis), Barnacles (Balanus balanoides (synonym semibalanus), Common Periwinkle (Littorina littorea), Smooth Periwinkle (L. obtusata), Rough Periwinkle (L. saxatilis), Starfish (Asterias species)

Hungry Jonah

Gouache on paper, 2017

11.5 x 3.75 in (29.21 × 9.525 cm)

As an artist-in-residence for Shoals Marine Laboratory on Appledore Island, Maine, off the coast of New Hampshire, I was fascinated by the sea tables, aquariums filled with ocean organisms, in the laboratory building. After observing and sketching a lively Jonah Crab in one of these for a few hours, I knew I wanted to capture the intricate details of its shell. The crab was constantly moving and although it didn't eat any of the other captives while I was observing, it certainly could have. I painted the crab tiptoeing toward a few other creatures that were submerged there as I imagined the everyday food chain drama that occurs in the ocean.



M AFALDA PAIVA

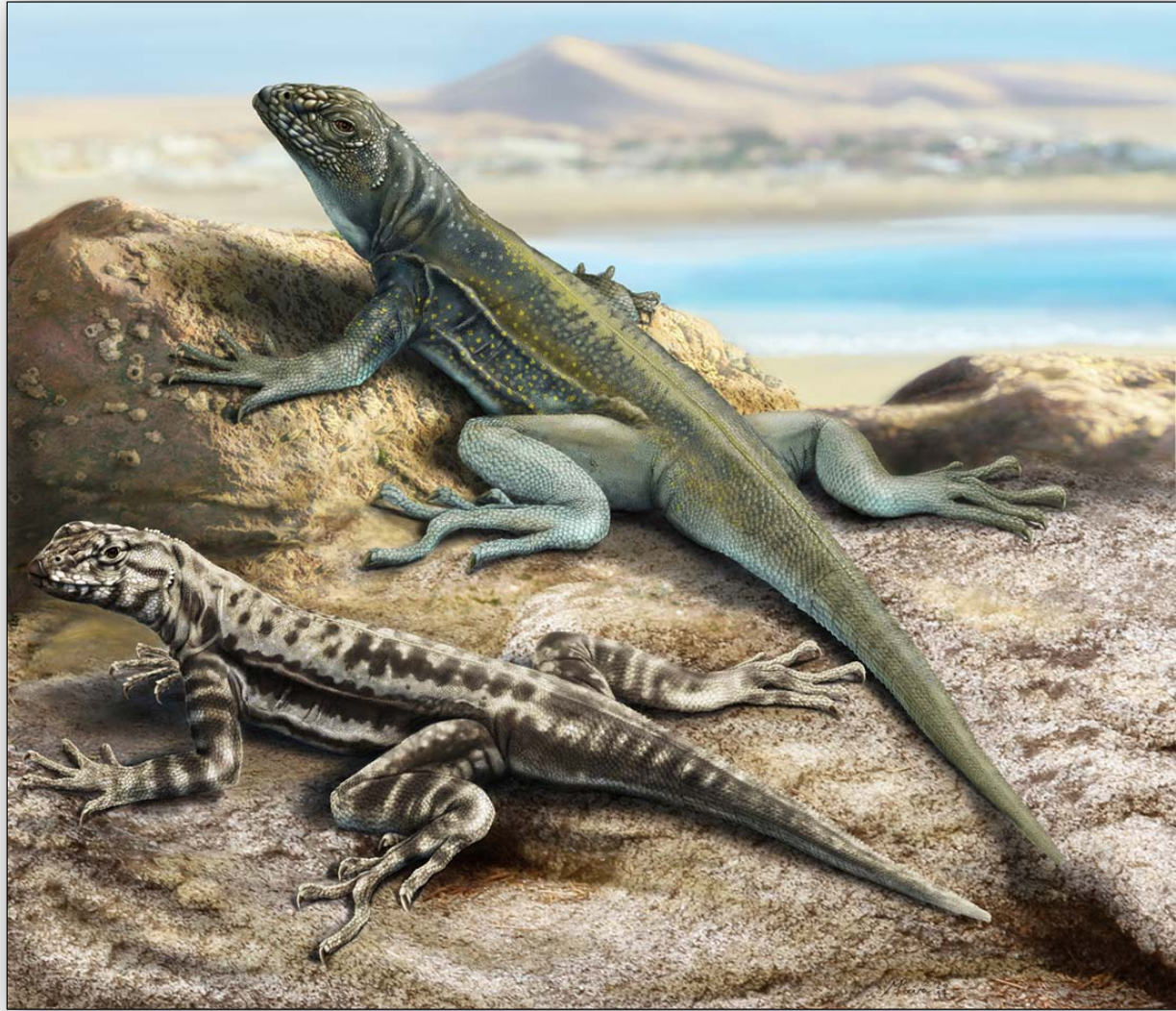
Palmela, Portugal

Atacamen Pacific Iguana, Corredor do Atacama (Microlophus atacamensis)

Digital, graphite on paper, 2017

20.5 × 17 in (52 × 43.18 cm)

This work was commissioned to illustrate a PhD thesis of a biologist from the University of Antofagasta, Chile. I used graphite for the initial drawing and then digital painting once that was scanned. The illustration is based on written materials, sketches, photographs, and conversations via Skype. Each step of the production of the illustration was validated by the researchers in Chile and the amendments based on photographs of specific details of the species. It took about a month of work.



M AFALDA PAIVA

Palmela, Portugal

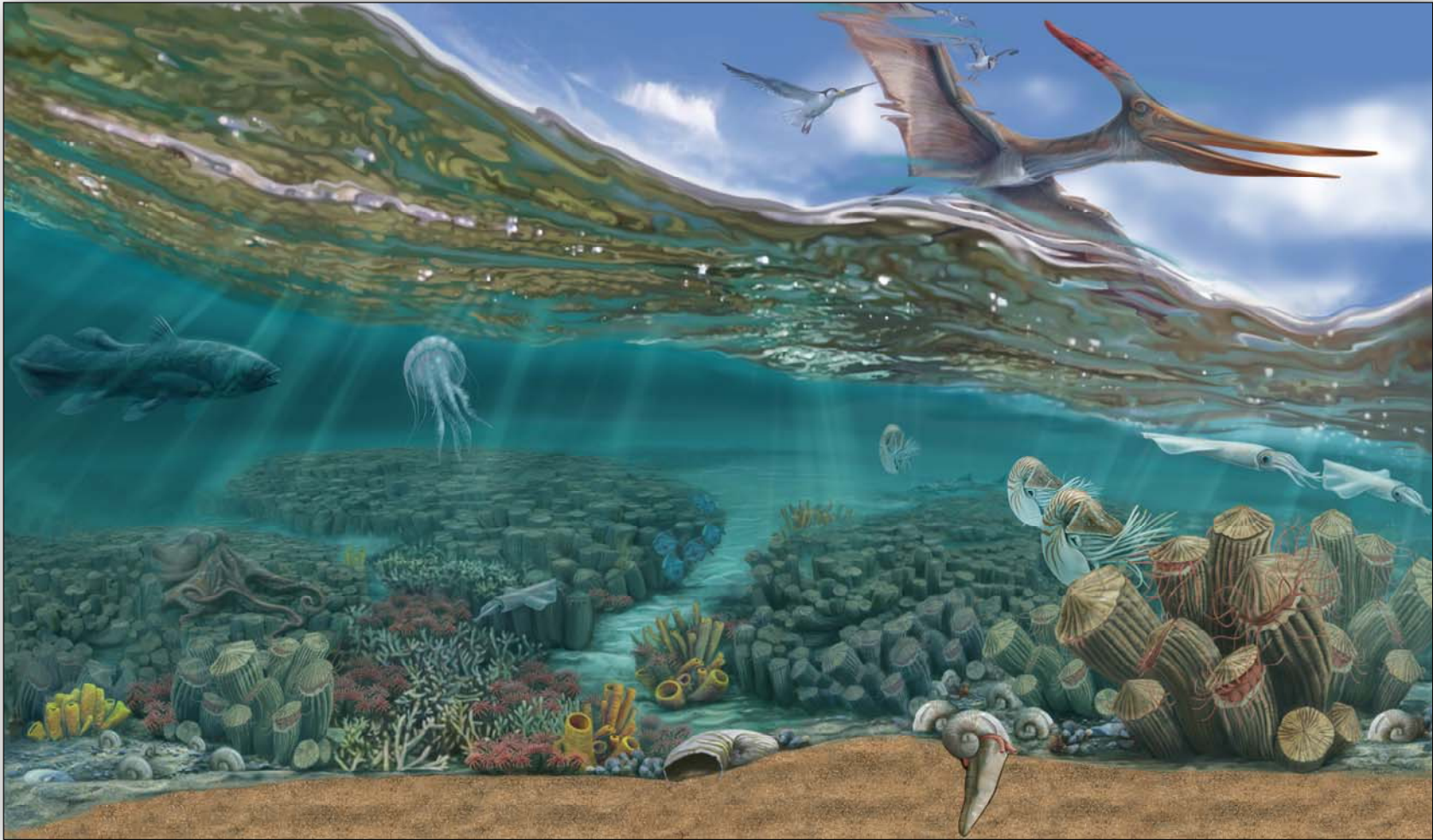
Caprotinidae, Radiolitidae

Reef of the Cretaceous Era

Digital (entirely) on paper, 2018

21.5 × 12.5 in (54.61 × 31.75 cm)

This illustration is part of my work as an illustrator at the Archaeological Center of Lisbon, Portugal. It represents a reef in the time of the Cretaceous Period. In it we can find rudists (box, tube, or ring-shaped bivalves such as Caprotinidae and Radiolitidae) and other fauna of that time and that is thought to have existed in this area of Portugal. This illustration is part of a larger work that will be exhibited in 2019–2020 in a show dedicated to the Cretaceous Period.



REBECCA JABS

Manitowoc, Wisconsin, USA

Winter Wren (Troglodytes hiemalis)

Pen and ink on scratchboard, 2018

11 × 14 in (27.94 × 35.56 cm)

A though not showy, the Winter Wren is a charming, tiny bird with a short tail and big cascading song that rings through northern forests in the springtime. It prefers evergreen forests with a dense understory, favoring areas with fallen logs near streams or wet areas. The male may build several nests among upturned tree roots, dead trees, or stream banks for the female to inspect.

To achieve an accurate sense of form under a single light source, I searched a local natural area for the perfect habitat reference for my Winter Wren. Once I had located a charismatic tangle of roots from an upturned tree in a swampy area, I revisited the site several times at different points in the following days to determine the ideal lighting conditions for this piece.



KELLY FINAN

Hop Bottom, Pennsylvania, USA

Determining Rangeland Health in the Great Basin

Gouache, digital on paper, 2017

23 × 12 in (58.42 × 30.48 cm)

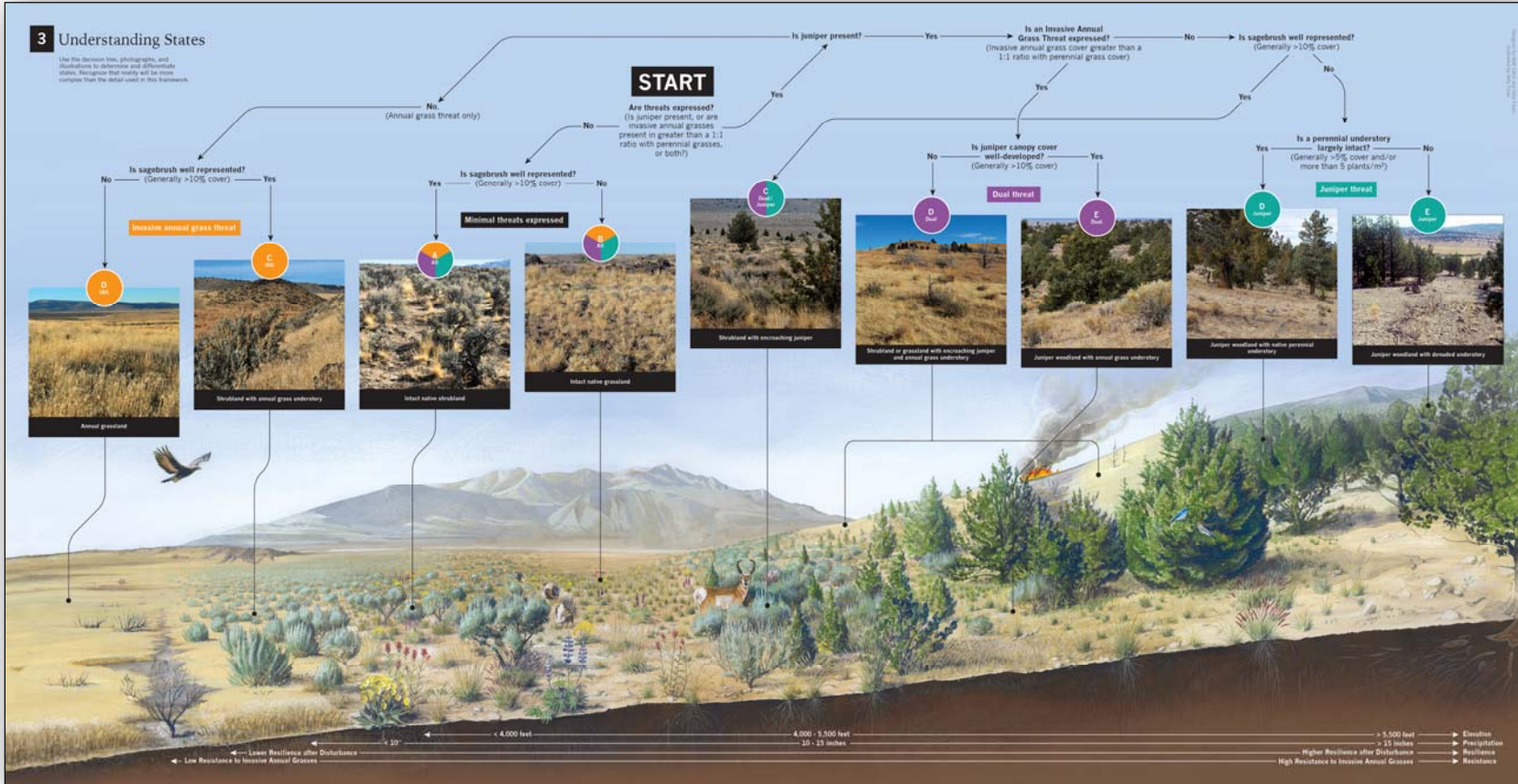
This graphic is the centerpiece of “Threat-Based Land Management in the Northern Great Basin: A Field Guide,” a folding booklet that introduces a new approach to managing western sagebrush landscapes threatened by expanding juniper woodlands and invasive grasses. It combines metrics, photographs, and illustrations to help land managers categorize a massive and complex landscape into nine different states. By understanding the extent and severity of these important threats, managers, ranchers, and other stakeholders can work collaboratively to prioritize and improve rangeland health. This project was completed in collaboration with the Oregon chapter of The Nature Conservancy and was featured as a finalist in the 2018 Science and Engineering Visualization Challenge, hosted by the National Science Foundation and Popular Science.

The background for this piece was painted with gouache on two separate pieces of illustration board, one of which is also displayed in *Focus on Nature XV*. They were scanned and collaged with type and photographs in Adobe Illustrator.

Photos provided by client (The Nature Conservancy) and used with permission, writing by Matt Cahill.

3 Understanding States

Use the Decision Tree, photographs, and illustrations to determine and differentiate states. Recognize that reality will be more complex than the ideal used in this framework.



KELLY FINAN

Hop Bottom, Pennsylvania, USA

Greater Sage-grouse (*Centrocercus urophasianus*), Turkey Vulture (*Cathartes aura*)

Determining Rangeland Health in the Great Basin: Part 1

Gouache on illustration board, 2017

20 × 17 in (50.8 × 43.18 cm)

This is one of the two original gouache artworks used to create the centerpiece for the booklet, “Determining Rangeland Health in the Great Basin.” The booklet is a guide to managing western sagebrush landscapes threatened by expanding juniper woodlands and invasive grasses. It combines metrics, photographs, and illustrations to help land managers categorize a massive and complex landscape into nine different states. By understanding the extent and severity of these important threats, managers, ranchers, and other stakeholders can work collaboratively to prioritize and improve rangeland health.

This project was completed in collaboration with the Oregon chapter of The Nature Conservancy and was featured as a finalist in the 2018 Science and Engineering Visualization Challenge, hosted by the National Science Foundation and *Popular Science*.



KELLY FINAN

Hop Bottom, Pennsylvania, USA

Zebrafish (Danio rerio)

Watercolor on paper, 2017

9 × 11 in (22.86 × 27.94 cm)

Shown here is the comparison of an adult zebrafish, *Danio rerio*, (top) to a normal zebrafish embryo (middle) and a reptin (protein) mutant zebrafish embryo (bottom). The embryos are to scale, but the adult zebrafish is not. Harvard PhD candidate Michka Sharpe studies the zebrafish's unique ability to regrow large portions of its heart. This graphic accompanies Sharpe's preliminary findings, which indicate that normal zebrafish have this ability, while zebrafish that lack the gene for the protein reptin are both physically deformed and are not able to effectively regrow organs.



B ARBARA IERULLI

Port Townsend, Washington, USA

Evening Grosbeak (*Coccothraustes vespertinus*),
Western Spruce Budworm Moth (*Choristoneura occidentalis*)
Evening Grosbeak Launches After Western Spruce Budworm Moth
Acrylic on illustration board, 2018
22 × 15 in (55.88 × 38.1 cm)

For several years I was concerned about the invasion of Western Spruce Budworm, *Choristoneura occidentalis*, into the forest around our Blewett Pass, Washington, cabin. Stopping by the local United States Forest Service (USFS) office, I was assured that an explosion of bird life would help deal with this problem. The USFS in our area was refraining from interfering, as these insects move on to new areas within a few years without doing substantial damage to mature trees. Arriving at our cabin one afternoon, I was delighted to see several dozen Evening Grosbeaks, *Coccothraustes vespertinaus*, in the surrounding pines and firs. Although we had often spotted Evening Grosbeak nearby, this was the first time that we had seen them at our cabin. Watching these beautiful birds dive off branches after the moths (spruce budworms are a much sought-after food for this species I was later to learn), inspired me to illustrate one of these comical passerines in action.



B ARBARA IERULLI

Port Townsend, Washington, USA

Gaudy Sphinx Moth (Eumorpha labruscae)

Life Cycle of the Gaudy Sphinx Moth

Color pencil on paper, 2015

22 × 15 in (55.88 × 38.1 cm)

The Gaudy Sphinx Moth, *Eumorpha labruscae*, caught my attention when I was attending a presentation and drawing session on invertebrates. Gathering additional information about this member of the family Sphingidae compelled me to include additional life stages of this wide-ranging colorful American Lepidoptera. Along with dorsal and ventral views of the moth, I have included the fourth instar larva feeding on one of its favored food plants, the grape, from which its species name is derived. A wonderful example of mimicry in nature, the larval stages of *Eumorpha labruscae* grow to resemble a diamondback rattle snake. I have also included both moth eggs on a tendril of grape vine and pupal cell.





M ARKJOHN GLASS

Brisbane, Queensland, Australia

Lined Seahorse (*Hippocampus erectus*)

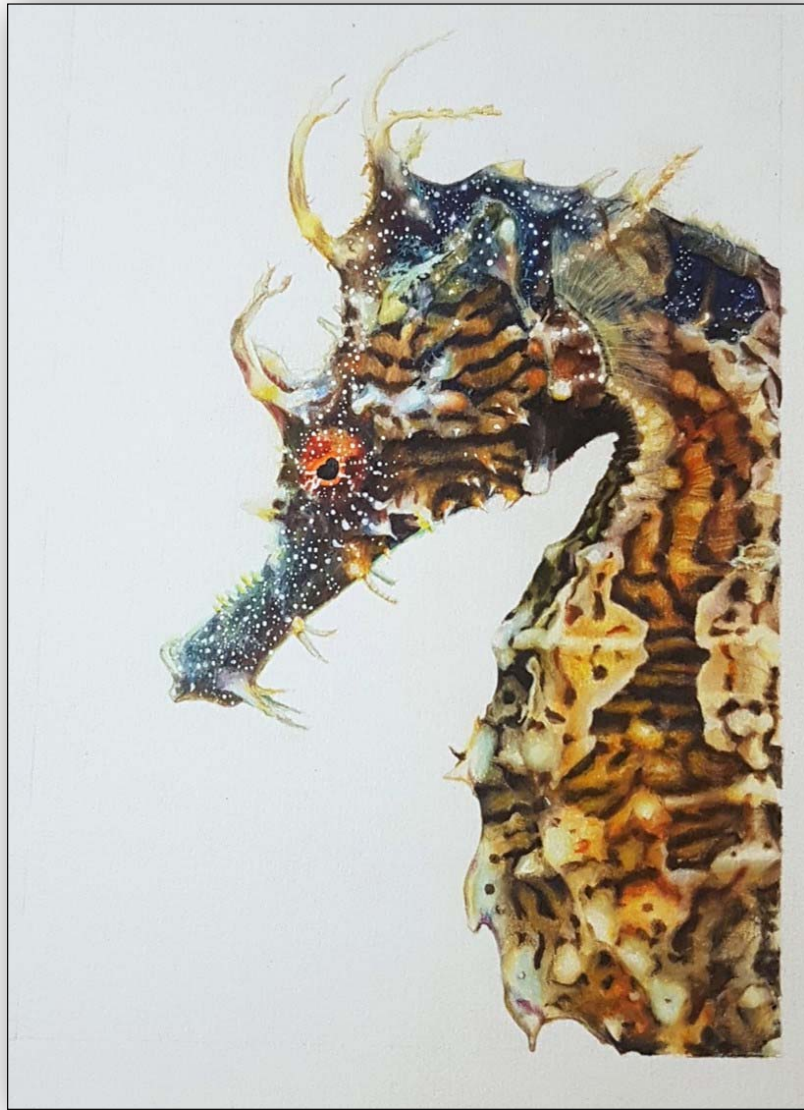
Starry Seahorse

Color pencil, pen & ink, watercolor on paper, 2018

8 × 11.5 in (20.32 × 29.21 cm)

Seahorses capture our imagination not only because of their unusual beauty and form, but perhaps because they are unlike the majority of sea creatures, being very weak swimmers and physically delicate. In the unforgiving and violent environment of the sea, for something so ethereal to form and thrive seems nothing short of miraculous. The Lined Seahorse, with its starry pattern and intense colors, seems to underscore that phenomenon.

Normally, Australia's vast biodiversity, particularly the sea-life, is the focus of my art; but this beautiful organism from the north Atlantic Ocean captured my attention, and I wanted to pay it homage. I used as reference a photograph by professional photographer Matt Sullivan, with his permission.



M. GENEVIEVE HITCHINGS

New Rochelle, New York, USA

Common Eastern Firefly (*Photinus pyralis*)

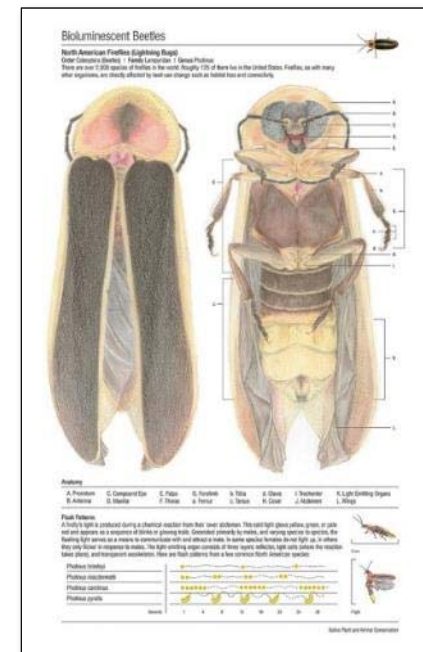
Bioluminescent Beetle with Publication Page

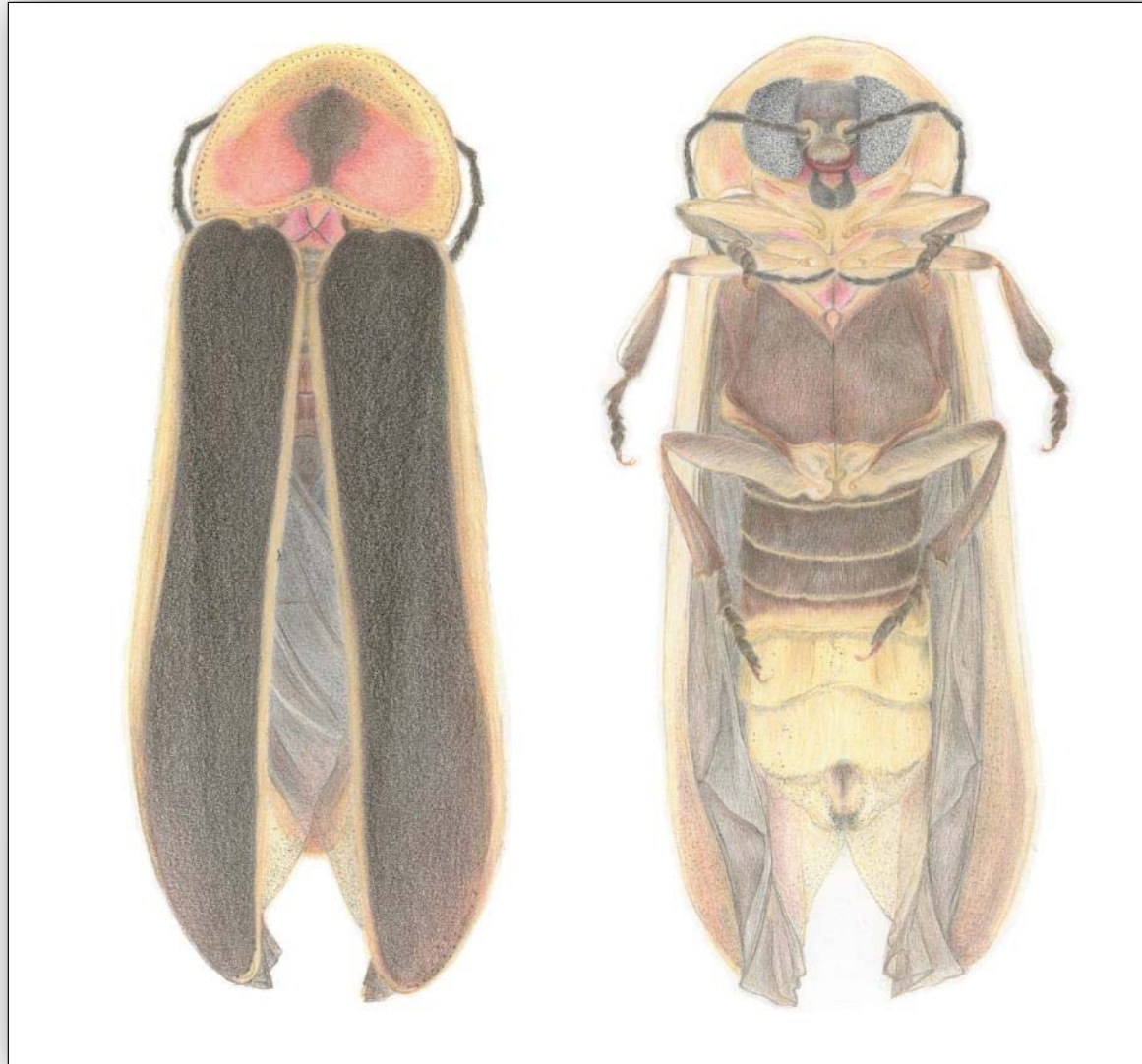
Watercolor, graphite on paper, 2018

8.5 × 11 in (21.59 × 27.94 cm)

These two drawings were created for a poster intended to showcase the anatomy of North American fireflies and explain why they flash light. By showing the dorsal and ventral views of these appealing insects up close, the project aims to call attention to complexities that easily go unnoticed by the naked eye. The poster was designed as a promotional item, thanking supporters for efforts to help researchers track firefly populations during the summer of 2019. The Massachusetts Audubon Firefly Watch is a citizen science project and therefore community-based.

Fireflies, as with many other organisms, are directly affected by land-use change and pollution. They are compelling insects, easy to spot and tending to draw favorable attention. Awareness of them will hopefully encourage greater appreciation for the natural world and the need for people to protect it, particularly gardeners and landscapers.





LINDA M. FELTNER

Hereford, Arizona, USA

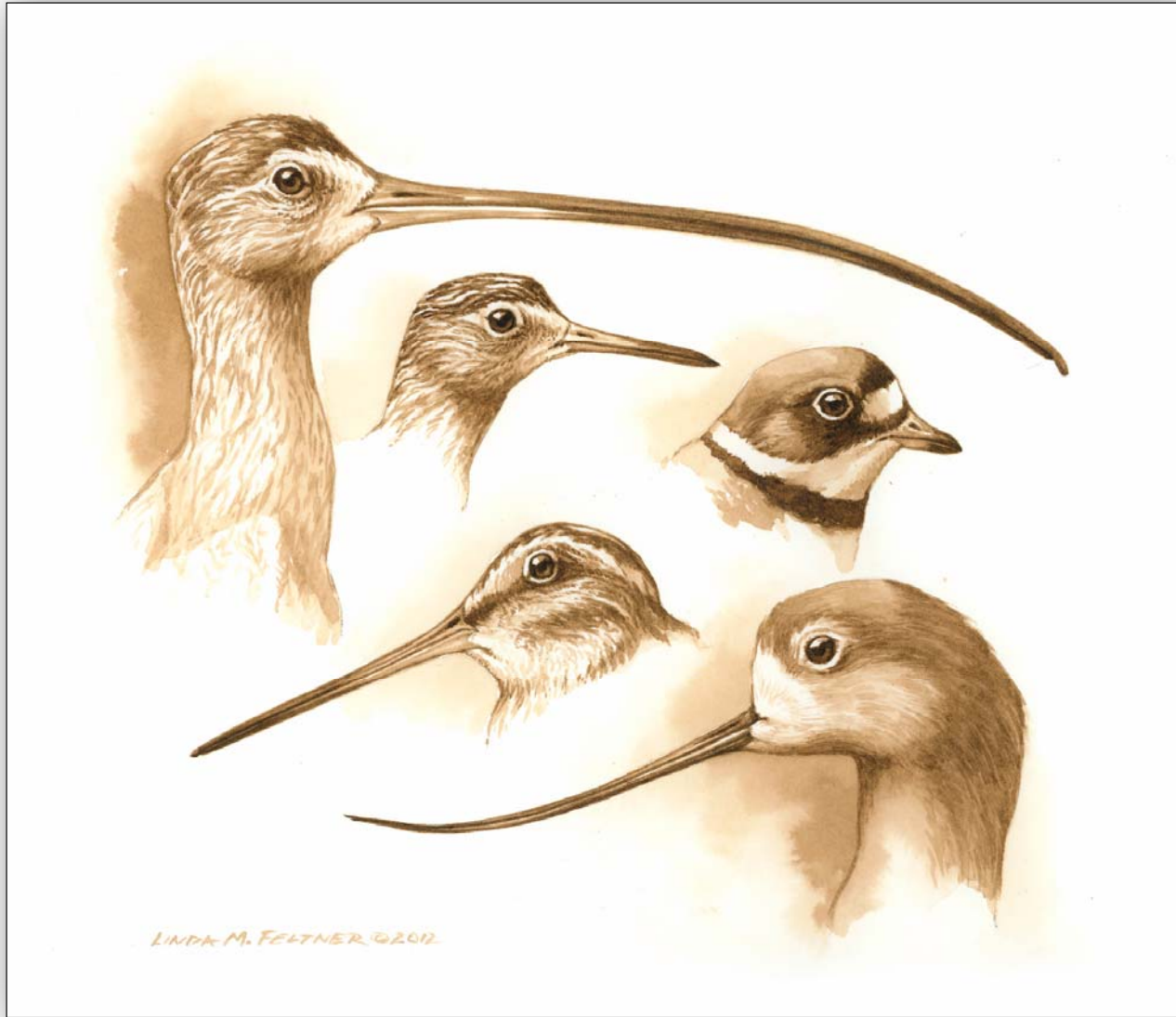
Long-billed Curlew (*Numenius americanus*), Solitary Sandpiper (*Tringa solitaria*), Semipalmated Plover (*Charadrius semipalmatus*), Wilson's Snipe (*Gallinago delicata*), American Avocet, (*Recurvirostra americana*)

Darwin's Shorebirds

Walnut ink on paper, 2013

9 × 8 in (22.86 × 20.32 cm)

Not all of us are able to study Darwin's Finches in their native Galapagos Islands, but we can observe evolutionary adaptations among local birds. Shorebirds developed extraordinary diversity in their bills, enabling them to take advantage of separate ecological niches. Coastal estuaries, inland ponds, grasslands, deserts, and even forests are home to shorebirds because of their varied adaptations to find food. During migration hundreds of thousands of shorebirds feed together at critical stopover sites to quickly refuel for their long-distance journeys. On a mudflat, a mixed flock may feed side by side because they reap a food source from different depths in the mud. Survival of migratory shorebirds depends upon conservation of these rich habitats.



MARCELA GOMES

Aveiro, Portugal

Hentz Orb-weaver (*Neoscona crucifera*)

Digital (entirely) on paper, 2016

13 × 11 in (33.01 × 27.94 cm)

This illustration is of a Hentz Orb-weaver spider of the family Araneidae. It is commonly found in the United States, parts of Canada, Madeira, and the Canary Islands. The cross pattern in the middle of the abdomen makes it distinct from other orb-weaver spiders and earned the specific name *crucifera*, which means “cross bearer” in Latin.

This piece was done for a digital training project for the specialization course in scientific illustration at the University of Aveiro, Portugal. The assignment was to produce a simplified habit portrait that would remain as faithful and objective as possible to the subject while detailing the maximum number of comparative taxonomic characteristics.



MARCELA GOMES

Aveiro, Portugal

European Honey Bee (*Apis mellifera*)

Digital (entirely) on paper, 2018

8 × 6 in (20.32 × 15.24 cm)

Seen here is a forager worker European Honey Bee with recently collected nectar. It was used in an infographic that portrays the major consequences of honey bees' exposure to glyphosate herbicide. Honey bees are the main pollinators in agricultural settings and are highly susceptible to the accumulation of agrochemicals. This can lead to long-term negative effects, such as altered individual and social behavior that means loss of colony efficiency, maintenance, and longevity, as well as population declines. Besides the toxification of the bees, contamination of the products they produce can occur, causing economic loss and negative health effects to consumers. There are few scientific studies on the connection between glyphosate herbicide and the decline of bee populations. However, the results are alarming enough that awareness should be raised about the potential consequences to environmental, economic, and public health interests.





S HARRON O'NEIL

Boise, Idaho, USA

Yukon Gold, Russet Potatoes (Solanum tuberosum)

Watercolor on paper, 2017

12 × 14 in (30.48 × 35.56 cm)

Potato is a starchy, tuberous crop from the perennial nightshade family, Solanaceae. Grown as an annual food crop, all of the above-ground parts are poisonous, but the tubers—the potatoes—are edible and perfectly safe. The tubers are storage organs that develop from swollen underground stems. Each new potato plant grows from a tuber or piece of a tuber which contains one or more “eyes.” The eyes are the small growing points with little stem buds that elongate into stems. They draw nutrition from the tuber and develop into the next generation of plants. The above-ground plant is multi-stemmed, leafy, and bush-like. Little purple and yellow flowers and small tomato-like fruits develop late in the season. Tubers are harvested when the above-ground plant begins to die.

Solanum tuberosum traces its origin to Andean and Chilean landraces developed by pre-Columbian cultivators. The family Solanaceae also includes tomato, sweet pepper, eggplant, tobacco, and even petunia.





S HARRON O'NEIL

Boise, Idaho, USA

Pond Lily (*Nuphar polysepala*)

Watercolor on paper, 2018

9 × 5 in (22.86 × 12.7 cm)

This species of Pond Lily is native to western North America, where it grows in ponds, lakes, and slow-moving streams. This aquatic perennial reproduces by both seeds and rhizomes that are submerged in mud. The bright yellow petal-like sepals surround small, wedge-shaped true petals, which are hidden by the stamens. Anthers are red, and the fruit is an ovoid green to yellowish capsule.

The seeds are edible to humans. They pop like popcorn or can be steamed as a vegetable, dried and ground as flour, or cooked like oatmeal. They were a significant food source for Native people. Ducks eat the seeds, and the large green leaves (not shown) that float on the surface of the water provide cover for fish. The leaves and rootstocks have been used medicinally to treat a variety of health conditions.





S HIRON BIRZER

Seattle, Washington, USA

Ramalina panizzei

Color pencil and graphite on paper, 2018

9 × 13 in (22.86 × 33.02 cm)

R *amalina panizzei* is a fruticose lichen, meaning its vegetative parts are branch-like structures, as seen in this illustration. Lichens are a composition of both algae and fungi living in symbiosis. The alga uses sunlight to make nutrients, while the fungus provides minerals, water, and shelter. Although they are capable of growing in a wide range of habitats and on almost any surface, they get their nutrients from the atmosphere, and therefore are sensitive to the air quality. This makes them good environmental health indicators, or “indicator species.”

I found this *Ramalina panizzei* on a branch in an ancient chestnut grove near a small Italian hill town, Civita di Bagnoregio, only reached by foot.

Lichen names are based on the fungal component. The full classification of this one is Fungi (Kingdom), Ascomycota (Phylum), Pezizomycotina (Subphylum), Lecanoromycetes (Class), Lecanoromycetidae (Subclass), Lecanorales (Order), Ramalinaceae (Family), *Ramalina* (Genus), *panizzei* (Species)





CAT WILSON

Tulsa, Oklahoma, USA

Katydids (Orophus consepersus, Mimetica spp., Phylloptera dimidiata, Parascopioricus fragilis)

Convergent Evolution in Neotropical Katydids

Digital (entirely) on paper, 2018

11 × 8.5 in (27.94 × 21.59 cm)

Convergent evolution is the independent evolution of similar features in species that are not closely related, such as bat, bird, and insect wings. Some species of katydids use their evolved traits to mimic green or dead leaves to avoid predators. In my artwork the katydids on the left of the illustration are in the same subfamily, having a common ancestor. The katydids on the right are in a different subfamily and so are not as closely related to the first pair. This means that even though two katydids might mimic green leaves, it does not mean they are related, as their characteristics of mimicry may have evolved independently of each other.



S

TEPHANIE ROZZO

Novato, California, USA

Monterey County Geology

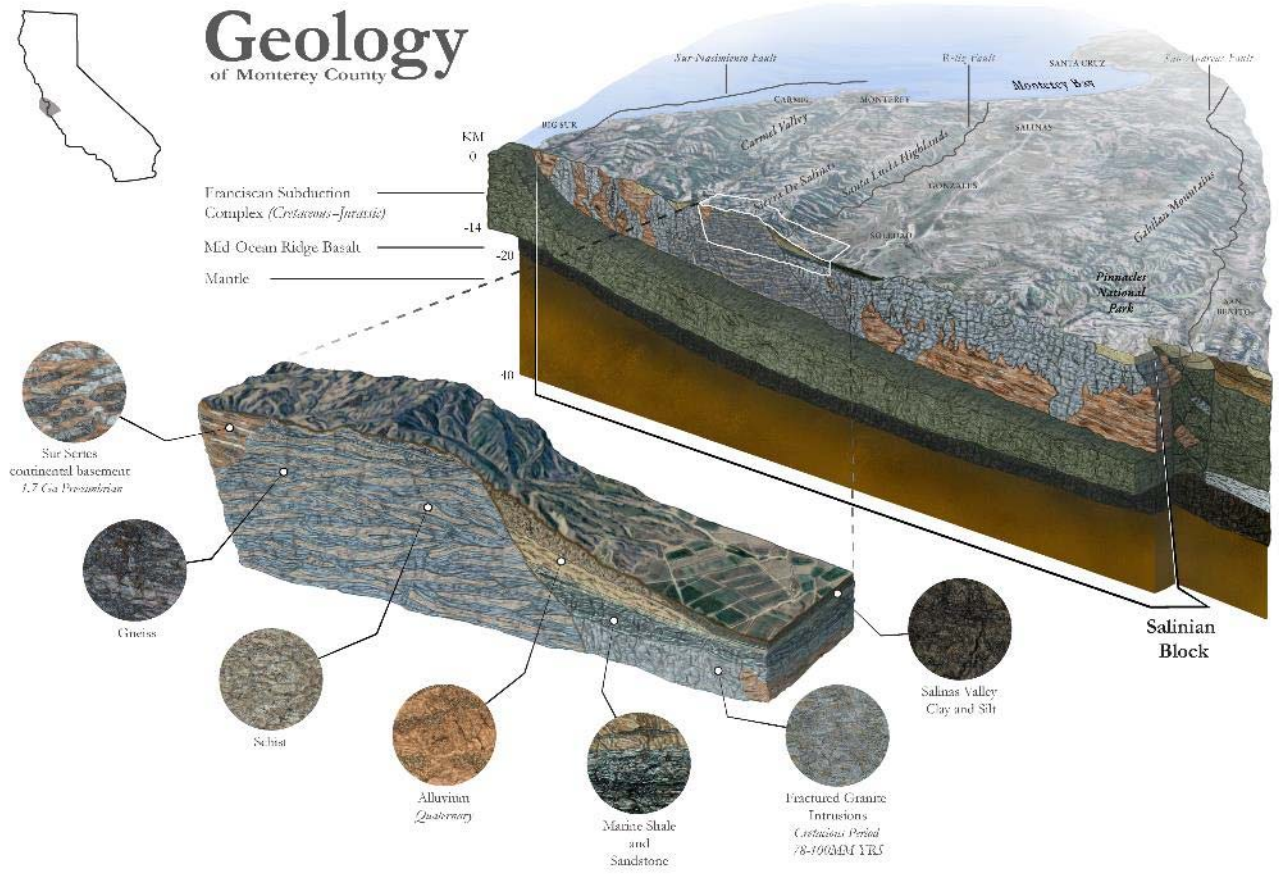
Digital, graphite on paper, 2017

19.5 × 17.25 in (49.53 × 43.81 cm)

This cutaway illustration, done for Pisoni Vineyard, shows the current and prehistoric geological history of the Monterey, California, region. The slow-shifting rock below the surface created a complex soil composition that plays a huge role in the area's wine production. During the Paleozoic Epoch, the granite-based rock was pushed up from Southern California along the path that is now the San Andreas Fault. Around 140,000 years ago, The San Andreas and San Gregorio faults moved together rapidly, uplifting the Salinian block into the Santa Lucia Range. The rapid formation caused granite sediments to run off and collect in the alluvial fans of the highlands. During the end of the last ice age, the ocean crept inland and resulted in schist and gneiss that is full of granite but laced with marine materials.



Geology of Monterey County



LEE MCCAFFREE

Orinda, California, USA

Cobra Lily (*Arisaema dilatatum*)

Watercolor on vellum (sheep skin), 2013

7.5 × 9.5 in (19.05 × 24.13 cm)

This *Arisaema dilatatum* specimen was found at 12,000 feet (3,657 meters) in the Mugecuo Lake Reserve west of Kangding, Sichuan, China. I was with a group of botanical illustrators who had planned to paint wildflowers for two weeks in the Himalayan plateau. This day we hiked on a path along the outlet of the lake with a required Chinese guide. The specimen was in a marshy area and could not be removed, so I made sketches and color notes and took photographs in order to complete a painting when I returned home. I decided to paint on calfskin vellum to emphasize the deep colors and suggest a natural environment. Calfskin vellum requires using a dry-brush technique to minimize buckles in the skin.



LEE MCCAFFREE

Orinda, California, USA

Louisiana Quillwort (*Isoetes louisianensis*)

Watercolor on paper, 1995

13 × 11 in (33.02 × 27.94 cm)

Years ago I was working on a series of “Plants in Peril” paintings for an exhibit that would be at the Royal Horticultural Society in London, England. As a volunteer at Mercer Arboretum in Houston, Texas, I had access to several species that were federally endangered in the USA and were part of the Center for Plant Conservation Collection. One of these was the Louisiana Quillwort, *Isoetes louisianensis*. It was kept in gallon pots under the green house benches in the drainage system to keep it in a stream-like environment. Because it is aquatic, the plant could remain in clear water while I studied the botanical details.

Mercer Arboretum’s conservation program includes *Isoetes* plants rescued by Louisiana Natural Heritage. The plants were propagated and reintroduced into the environment at a construction site that was being rehabilitated after damage by Hurricane Katrina. This was done in coordination with Abita Flatwoods Preserve, owned by the Nature Conservancy.



Isoetes louisianensis

EMILY M. ENG

Bellevue, Washington, USA

Squirrels (Sciurus species)

Squirrel Line-up

Watercolor on illustration board, 2016

20 × 12 in (50.8 × 30.48 cm)

I love squirrels. So, this piece is really an excuse to celebrate every whisker and every tail hair on these adorable creatures. Squirrels come in all colors and sizes, each with a unique attitude and body stance. I grouped them together along a horizontal line, like a police line-up of tree trouble makers. It seemed fitting since they appear so mischievous. I made sure to keep their body sizes proportional to each other and actually had to include Abert's Squirrel, *Sciurus aberti*, (third from the right) on all fours in order to fit him in—he's really tall. I mainly painted with watercolor and sparingly used gouache, an opaque watercolor, that allowed me to highlight the overlapping fur. Since these squirrels live across multiple continents, I used photo references to help draw the ones not in my backyard.



R

OB TUCKERMAN

Douro-Dummer, Ontario, Canada

Common Garden Wasps

(Ammophila, Sceliphron, Eumenes, Oplomerus, Polistes, Stelopolybia species)

Wasp Studies and Sketches

Color pencil, graphite on paper, 2018

16 × 11.5 in (40.64 × 29.21 cm)

Common garden wasps, such as mud daubers, diggers, potters, chimney, and paper wasps, are named for the way they make their nests. The females do all the work of building these elaborate structures. Most are solitary builders, but a few, like paper wasps, are social. All are avid hunters, specializing in one type of prey, such as spiders, moths, caterpillars, ground crickets, or beetle larvae. Wasps' hunting behavior is complex and often involves carrying prey that is bigger and heavier than themselves. One even uses a tool. The wasp, *Ammophila*, a sand wasp, tamps the soil with a small pebble to seal and conceal the entrance to its nest.

I find it fascinating to observe the complicated behaviors of common but little-known animals. This page of drawings was done in my garden and from my lab and specimen collection.

B EVERLEY J. IRWIN

Toowoomba, Queensland, Australia

Northern Quoll (*Dasyurus hallucatus*)

Acrylic, gouache on paper, 2018

11 × 9 in (27.94 × 22.86 cm)

This is Dawn. She is a Northern Quoll, or *njanmak* in Mayala, the language of the native people of western Australia. She was only 4 months old when I was introduced to her and weighed a mere 13.3 ounces (379 grams). Dawn was from a litter of 7 pups who were given to keepers of the Territory Wildlife Park to be hand raised so visitors to the park could “meet and greet” these beautiful, inquisitive little creatures. They are now on the critically endangered list because of the cane toad invasion.

Northern Quolls are carnivorous marsupials, primarily nocturnal, but they do venture out at twilight. Unlike other marsupials, they have no pouch as such, just a low lateral fold that forms after breeding and helps to contain the young who attach to the teats and remain there for 8 to 10 weeks. They are highly omnivorous, consuming a wide variety of vertebrates, insects, and fruit. I chose to place Dawn on a fallen tree covered in lichen, a Quoll’s supermarket, with just a light wash of color to take away the starkness of the white paper.





JASMIN CHANTAL HUBER

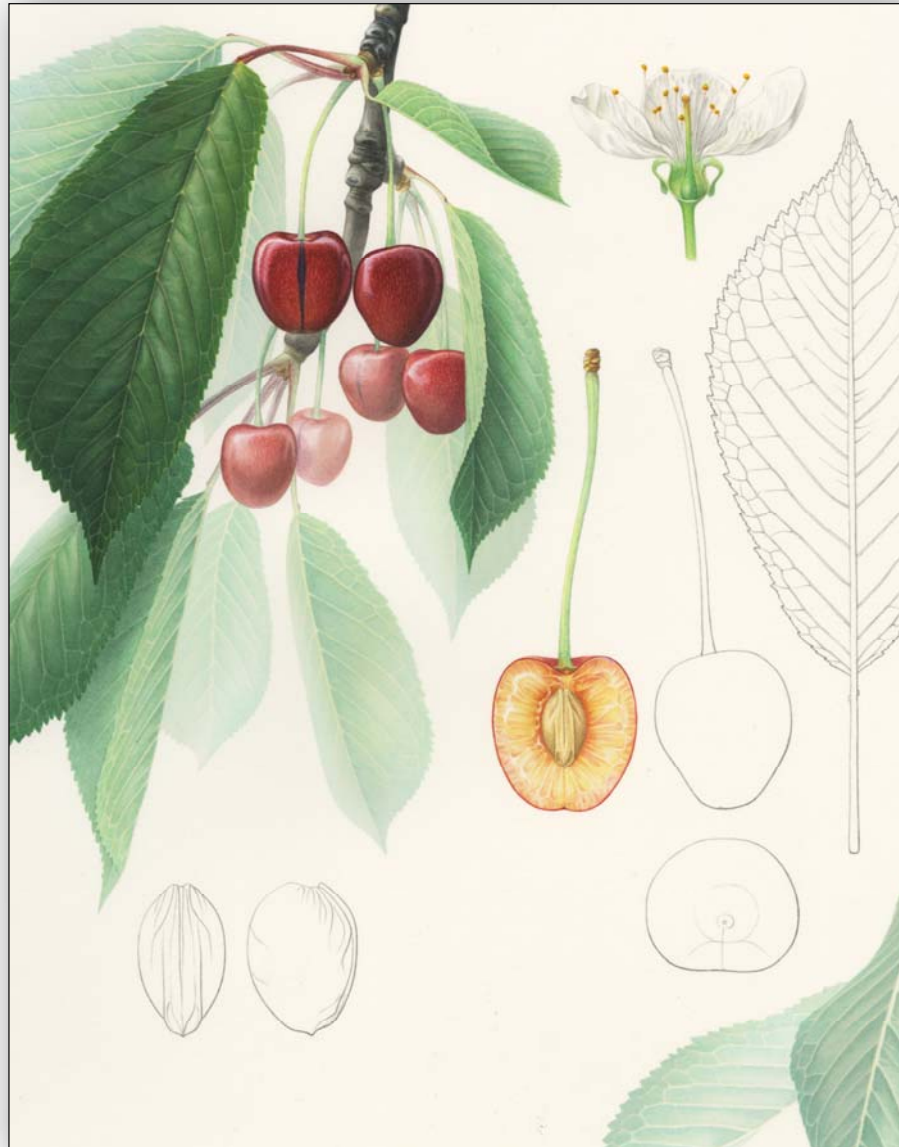
Gachnang, Thurgau, Switzerland

Sour Cherry, Streifenkirsche (Prunus cerasus)

Digital, graphite, watercolor on paper, 2014

8.5 × 11 in (21.59 × 27.94 cm)

This is one of a series of illustrations done for a comprehensive work on cherry traditions in central Switzerland. The publisher was looking for traditional botanical illustrations, and this resulted in the question for me of how to produce traditional botanical illustrations in a short time, without loss of visual quality or information. During my master studies in knowledge visualization at the Zurich University, I had developed a highly efficient work process involving mixed media, and I put the method into practice for this commission. The cherry varieties to be depicted had been described and documented in many ways, including photography, drawings, herbarium specimens, and plaster replicas, all of which I used as references to create digital collages. The suitable digital arrangement was printed on paper and then completed with traditional watercolor techniques. Thus, the high level of detail and the impression of a traditional watercolor was achieved in less time. The result was a series of 15 pages in a book published in 2017 titled *Chriesi: Cherry culture around Lake Zug and Rigi* by Ueli Kleeb, Michael van Orsouw, Sabine Windlin, Atlant Bieri, Andri Pol, Jasmin Huber, published by Ueli Kleeb and Caroline Lötcher, and edited by Victor Hotz Steinhausen.



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A decorative blue floral flourish with intricate scrollwork and leaf-like patterns, positioned to the right of the word 'ARTIST'.

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RESOURCES



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 / patricia.kernan@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.

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, 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.

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.



FOCUS ON NATURE ARTISTS 1990–2020



FON Selection Juror



FON artwork in NYSM Collection



FON artist represented in NYSM Collection

RECOGNITION

BOBBI ANGELL



DICK RAUH



MONIKA DE VRIES GOHLKE



MICHAEL ROTHMAN



Over the course of 30 years, 448 artists representing 30 countries have had their work selected for the *Focus on Nature (FON)* exhibitions. Four of these have participated in all, or nearly all, exhibits. They deserve special appreciation and recognition for their consistent support and high-quality work that has set the standard high and inspired many others. Each have served as a *FON* juror, received Purchase and Jury Awards, and generously donated artwork to the New York State Museum's Illustration Collection.

Many other of the *FON* artists have sold or donated their work to the NYSM Illustration Collection. As a result, there is now a spectacular, publicly owned body of work that records both the status of this genre over a thirty-year period and enhances an already illustrious compendium of natural history illustrations. All *FON* artists are listed on page 183. Those with ❁ are represented by work that has appeared in a *FON* exhibit. Those with ❁❁ have participated in a *FON* exhibit, but the piece in the NYSM collection is not necessarily one that was included in *FON*. Those with ❁❁❁ indicates those artists who have served as jurors for a *FON* exhibition.

milly acharya, USA
Karen Ackoff, USA
Sue deLearie Adair, USA ❄️
Susan Aldworth, USA
Suzannah Alexander, USA
Gionata Alfieri, Italy
Karen Allaben-Confer, USA
Neil Jonathan Allen, Spain
Sergio Allevato, Brazil
Mauricio Alvarez Abel, Chile
Wilma Ander, Brazil ❄️
Francesca Anderson, USA ❄️
Bobbi Angell, USA ❄️
Timothy Angell, USA ❄️
Lúcia Antunes, Portugal ❄️
Judith Aronow, USA
Cecelia Azhderian, USA
Cláudia Baeta, Portugal ❄️
Cindy Lou Bailey, USA
Aimee Baldwin, USA
Nadja Baltensweiler, Switzerland
Maura Barreto, Portugal
Cláudia Barrocas, Portugal ❄️
Petica Barry, USA
Maureen Bartel, USA
Debra Bartlett, Australia ❄️
Lauren Bassing, USA
Lili M. Bates, USA
Brent A. Bauer, USA

John Baumlin, USA
Chiara Becchi, USA
Karen L. Bell-Brugger, USA
Lynn Benevento, USA
Paula DiSanto Bensadoun, USA ❄️
Tara Dalton Bensen, USA ❄️
Leslie Berge, USA
Torsten Bernhardt, Canada
Guusje Bertholet, Netherlands
Michael Beseau, Canada
Laura Bethmann, USA
Luci Betti, USA
Melissa Beveridge, USA ❄️
Cristina Maria Klas Bico, Brazil
Ann Biggs, USA
Belinda Biggs, Australia ❄️
Lloyd Birmingham, USA
Sharon Birzer, USA
Irene Blecher, Israel ❄️
G. Lee Boerger, USA
Gilles Bosquet, France
Evan Boucher, USA
Maureen E. Bourque, Canada
David Bouton, USA
Stephan Boyd, USA
Olivia Marie Braida-Chiusano, USA
Susan Brand, USA ❄️
Robin Brickman, USA ❄️
Betsy Brigham, USA

Wendy Brockman, USA
Therese Brosseau, USA
Sylvie Browne, USA ❄️
Joana Araújo Bruno, Portugal ❄️
Juan Cristobal Calle V., USA ❄️
Lucilla Carcano, Italy ❄️
Diana E. Carmichael, South Africa ❄️
Diana Carneiro, Brazil ❄️
Harriet Carotenuto, USA
Mercè Cartaña Arcediano, Spain
Virginia Carter, USA ❄️
Zoë Carter, New Zealand ❄️
Juan Luis Castillo, Spain ❄️
Kathryn Chorney, USA ❄️
Daisy Chung, USA
Catherine E. Cockerham, USA
James Coe, USA ❄️
Edilma Coelho, Brazil
Brian D. Cohen, USA ❄️
Karen S. Coleman, USA
Anna Collens, USA
Kathryn M. Conway, USA ❄️
Carol Coogan, USA ❄️
Jordi Corbera, Spain
Margaret Corbit, USA
Fernando Correia, Portugal ❄️
Marco Nunes Correia, Portugal ❄️
Kat G. Cruikshank, Canada
Wilson Cunha, Brazil

Mary Jane D'Amico, USA ❄️
Emily S. Damstra, Canada ❄️
Erin Daniel, USA
Bianca Davis, USA
Christina Davis, USA
Maria Alice de Rezende, Brazil ❄️
Dorothee de Sampayo Garrido Nijgh, Australia ❄️
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Sophie dos Santos Ferreira, Portugal
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Gene Gawalt, USA
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Christian Gerisch, Germany
Margot Glass, USA
Markjohn Glass, Australia
Marcela Gomes, Portugal
Helka L. Gordon, USA
Aaron Gore, USA 🌻

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Noel Grunwaldt, USA
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Karen Hackenberg, USA ❄️
Simon Hackshaw, USA
Clem Habetler, USA
Agathe Haevermans, France
Eileen W. Hahn, USA
Nancy Halliday, USA
Gretchen Kai Halpert, USA 🌻
Carol E. Hamilton, USA
Linda Hampson, UK ❄️
Amelia Hansen, USA ❄️
Biruta Akerbergs Hansen, USA
Gillian Harris, USA
Anne Hayes, Australia ❄️
Valerie Hayes, USA 🌻
Karina I. Helm, USA
Douglas Henderson, USA
Brenda M. Herbert, USA
Ankat Hermanns, Netherlands
Asuka Hishiki, USA ❄️
M. Genevieve Hitchings, USA
Ann S. Hoffenberg, USA ❄️
Anika Silander Hokerberg, Sweden
Wendy Hollender, USA 🌻
Alexander Holler, Switzerland ❄️
Barbara Holmer, USA

Irene Horiuchi, USA
Jack Hornady, USA
Gary Hoyle, USA
Jasmin Chantal Huber, Switzerland
Jessica Shult Huppi, USA
Emil Huston, Canada ❄️
Barbara Ierulli, USA
Frank Ippolito, USA ❄️
Beverley J. Irwin, Australia ❄️
Jane Isabella, USA ❄️
Rachel Ivanyi, USA 🌻
Rebecca Jabs, USA 🌻
Sally Jacobs, USA
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Christy Knight, USA
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