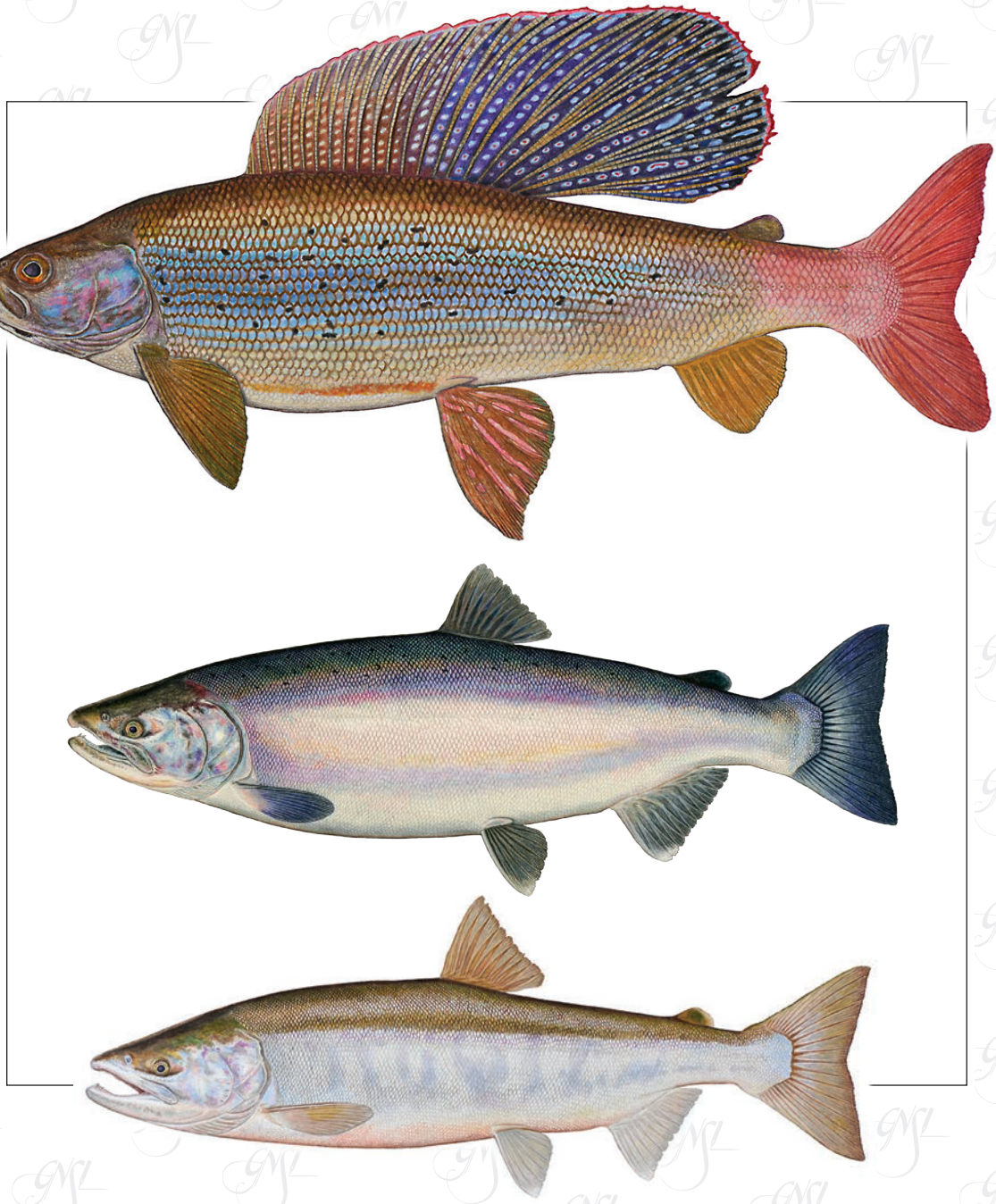
Journal of Natural Science Illustration

GUILD OF NATURAL SCIENCE ILLUSTRATORS



VOLUME 53 • NUMBER 1 • 2021

A Note From...

Gail Guth, Managing Editor, JNSI

Welcome to the first issue of the Journal for 2021! Although many of us are still in the throes of winter, spring is coming fast, and nicer weather always gets our artistic juices flowing a bit faster. To help this process along, we present a wide variety of topics, from painting iridescence in fish, collaborating with other artists on fund-raising projects for the community good, finding science illustration resources for kids, to dealing with clients, or reviewing a newly published book on rendering science subjects using traditional techniques. We also have reports on two of the GNSI's newest Groups, Florida and Georgia, and a fascinating article about the challenges and processes involved in creating a flora.

The pandemic and its accompanying lockdowns have prompted the GNSI to get a bit more creative in our programming. Building on the success of the first-ever virtual conference this past summer, we are launching new virtual experiences that will enrich us all and should continue long after the lockdowns are history. You can find links to more information on these initiatives on the back cover.

As always, we are deeply grateful to our authors for their contributions to this publication. Please consider making your own mark! Any topic involving science illustration is welcome; send us a brief abstract/summary of your topic. gnsi.org/gnsi-journal

I also want to take a moment to thank our entire Journal Team for all their hard work and patience. It's a dedicated group and we all take enormous pride in producing this Journal! Kudos to a great team!

—Gail Guth
journal@gnsi.org

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Cover: (*Top*)Arctic Grayling, male, *Thymallus arcticus*;
(Middle) Coho Salmon, female, *Oncorhynchus kisutch*
(Bottom) Chum Salmon, male, *Oncorhynchus keta*.
Illustrations © Paul Vescei

NATURAL SCIENCE ILLUSTRATORS

The Guild of Natural Science Illustrators is a nonprofit organization devoted to providing information about and encouraging high standards of competence in the field of natural science illustration. The Guild offers membership to those employed or genuinely interested in natural scientific illustration.

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GNSI JOURNAL

Volume 53, Number 1/2021 • © 2021
JOURNAL OF NATURAL SCIENCE ILLUSTRATION (JNSI) (ISSN 01995464) is published at 2201 Wisconsin Ave., NW, Suite 320, Washington, DC 20007, by the Guild of Natural Science Illustrators, Inc.

$28 of your GNSI dues is dedicated to your JNSI subscription; no separate subscription is available.

This paper meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper).

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Collaborative Publishing

Creating Meaningful Group Projects

—Cordelia Norris

On a hot, bright morning in June of 2018, I was in the Atlanta airport, holding my then 10 month old son, Jake, and watching the news. The administration had just announced its "Zero Tolerance" policy, also known as the family separation policy.

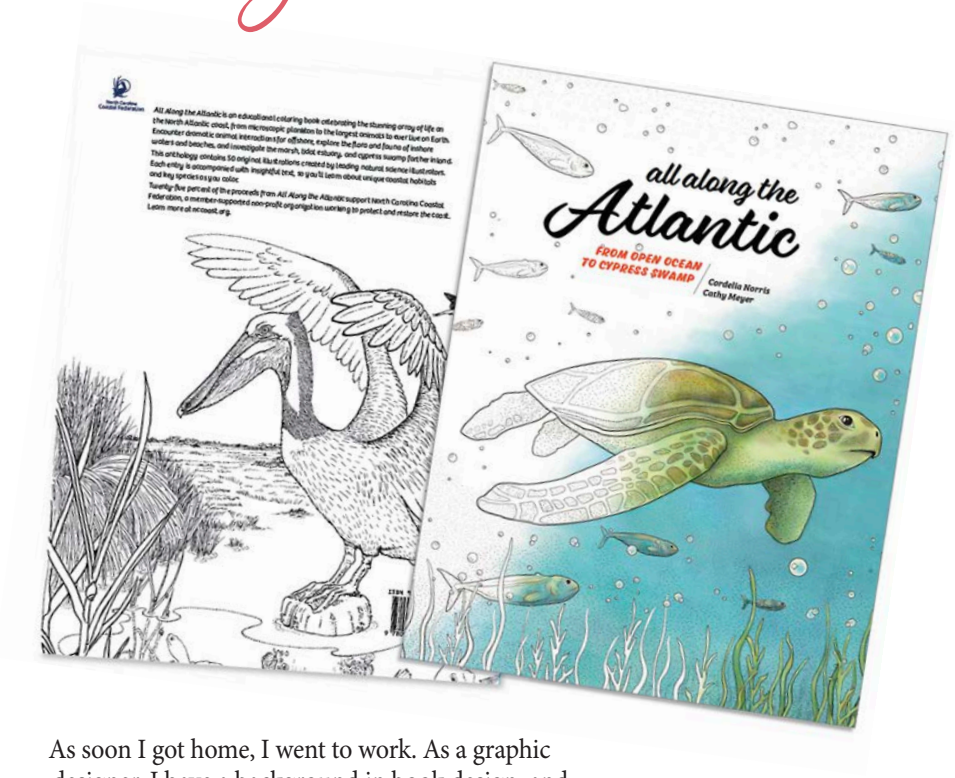
It was shocking and deeply upsetting. As a parent, the thought of Jake taken from my arms, with no idea of where he was going or for how long, was devastating.

In situations like this, when powerful forces are making sweeping changes, it's natural to feel powerless or overwhelmed. My first thought was: "I'm not a bilingual human rights lawyer practicing in a border state—how can I help?"

Right there in the airport, holding my son, I had an idea. Previously, I'd illustrated two brown pelican parents nervously watching their chick emerging from its shell as a whimsical pregnancy announcement card.

I'd been wanting to do something more with this illustration, like make it into a series about nesting birds, but the idea was just tantalizingly out of reach. I would almost have the shape of it, but then it would slip away. I think it was waiting for the right time.

At the airport gate, it struck, fully formed, like a lightning bolt. I'd design a book, a collaborative, educational book about nesting birds and their young, to raise funds to help migrant kids suffering through the ordeal of detention. It would be a big project but I knew that I could enlist help. The idea for *Hatchlings* was born!



Above: *All along the Atlantic*, back cover ©2019 Anne Runyon, front cover ©2019 Kara Perilli

As soon I got home, I went to work. As a graphic designer, I have a background in book design, and my husband, Joseph, is an editor and runs a governed publishing collective. Together, we have some insight into the complicated process of self publishing. We've worked before with Ingram, an established book printer and distributor in Nashville.

Even being familiar with Ingram, the set up process was still quite involved, requiring a lot of digging through various PDFs and an annoying amount of calling customer support. Once we nailed down the format and got through the initial set up for the book, I put out the call for illustrators through GNSI, the Illustration department at SCAD, and some social media groups, which brings us to tip one.

TIP 1: Have an elevator pitch for your project. Write down a 3–4 sentence overview of the project and keep it handy. Run through it with a few people who are unfamiliar with what you're doing. Refine it for clarity and emotional impact. You'll need an elevator pitch throughout your project for a variety of audiences: collaborators, marketing, online sales, social media, and so on.

Since *Hatchlings* was a new project with a number of contributors, I spent some time thinking about how to best explain the project.

TIP 2: Tap into your network to find collaborators, to get feedback and advice, and to help get the word out.

Our group came together quickly. It turned out that a number of illustrators were distressed by the administration's family separation policy and the haunting images of kids in cages and the heartrending recordings of these kids crying. The sheer talent drawn to this project and the energy of the group was delightful, and it kept me going throughout.

Above: *Hatchlings*, front cover ©2018 Amanda Surveski, back cover ©2018 Clara Hunt

TIP 3: When collaborating, decide on the best tools to communicate with an understanding of your coworkers and how they work.
To help avoid overlap and have good range of species represented in the book, each of the illustrators claimed a species on a shared list.

We used email, a private Facebook group and Google's sheets, docs, and drive to communicate. The Facebook group was particularly important for fostering a friendly, open, and transparent culture. I solicited input in the Facebook group using polls and discussions. With a larger group, the emails were more unruly and took more time to wrangle.

TIP 4: Research relevant projects for interesting ideas and to ensure that your offering is sufficiently unique.
Early on in the process, I researched other nature-themed activity books, especially bird-focused books. The best activity books were well-designed and obviously well-researched. From what I've seen in the market, our offering stands out for being an anthology, and featuring such a diverse range of exceptional work along with carefully researched text.

TIP 5: If you want to partner with a nonprofit, reach out and start the conversation early.
As a group, we decided which one of three worthy nonprofits to support using a simple Facebook poll. At the time, it seemed to make sense to wait until the book was published to approach our chosen nonprofit with the finished product.

Now I know now that it's important to get buy-in early in the process and seek out the best organization to work with. Some organizations are delighted to partner on new ventures, others are overwhelmed or understaffed, and don't have the bandwidth for anything extra. This is the single most important lesson that I learned in this process.

While The Young Center did post about *Hatchlings* on Instagram, we had to follow up with them multiple times to get on their radar. Not only were they understandably overwhelmed with their core mission, but they were also between social media marketing staff. I finally reached my contact while she was visiting the Smithsonian on vacation.

Going forward, I've added the criteria of "easy to work with" to list of considerations when evaluating the partnership potential of a nonprofit. Now, I reach out in advance to start a conversation, gauge their interest level, and availability to help promote the future work. When possible, working with a local nonprofit can significantly improve the potential for more in-depth collaboration and promotion.

TIP 6: For more in-depth projects, think through the business model early on and determine your break-even point.
Not surprisingly, we received a number of excellent submissions, which we curated with an eye to draftsmanship, line quality, composition, and species variety. It was important that everyone included in the book was compensated for their work and continued to have rights to their work.

We wrote a simple contract to have in place with the contributors and paid all of the contributors upon publication. Accepted submissions received $25, the front and back cover illustrations received $150–$250, and the coauthor received compensation based on their level of contribution.

Once we had a sense of the number of pages, we could get a rough idea of the pricing per book (both wholesale and retail). The payments to the

contributors, the co-author, the cover artists, and setup fee with Ingram typically totals about $1,500. With a profit margin of around $5 per book when sold in stores and $1 profit for wholesale sales.

Contributors can order copies wholesale and sell them either online, at events, or in retail stores. This model helps increase our reach and get the book into reader's hands across the country. Some of us offer the book for sale through our Etsy shop or other online sites, and Ingram distributes the book to major online retailers.

TIP 7: Don't try to be an army of one. Work to your strengths and bring in people with diverse talents/perspectives to boost your efforts. The end result will be significantly better.
In short order, we had the illustrations and the basic structure of the book in place. We then needed the accompanying text. At this point, I knew I was in over my head. I'd done some background reading about each of the species included in the book, but didn't really know enough to credibly write about them for publication.

At the time, I wasn't a birder and didn't own a field guide. And here's where another note of grace came in; one of the contributors, illustrator and fellow GNSI member Suzanne Mattheson, offered to write the entries that accompany each of the illustrations.

As birders and bird lovers know, there's a LOT to talk about with any bird species. So we defined the scope of the entries, their overall length, and what we could leave out while still providing a good overview. We use the traditional field guide structure to frame the entries and make them easier to draft.

After Suzanne drafted the entries, my husband, the editor, further refined them, and I made a final pass, trying to reconcile sometimes contradictory information from Cornell, The American Bird Conservancy, and Audubon. We then reviewed the revised entries, made final passes, and decided that we were happy with the result.

We started the project in late June/early July and published that year in mid-December, just in advance of the holidays, and a little over 5 months. The fast pace from concept to product really demonstrates the power of collaboration!

The second book in the Coloring Nature series, *All Along the Atlantic*, took about the same amount of time. It's a longer book, and I was very lucky to be introduced to local author and naturalist Cathy Meyer in the process of creating it. So that leads to tip 8, which you're all familiar with but bears repeating:

TIP 8: Plan your schedule in advance, create milestones, and give yourself plenty of time.

For the first two books, we did not give ourselves plenty of time, but we had a lot of momentum and some prior experience. For the third and most complicated book to date, *Backyard Pollinators*, we're taking a bit more time. Regardless of your timeline, developing and keeping to a schedule is vital to keeping up the momentum and the energy.

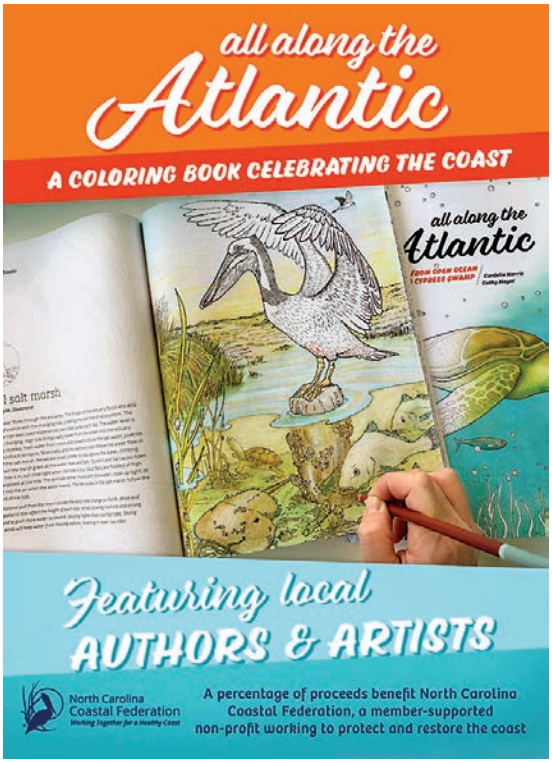
TIP 9: Have a plan for promotion and outreach for the project AND for the collaborators. Create a marketing kit to help them promote their contribution to the project, and start promoting in advance of the roll-out.
Throughout the process, I was thinking about what marketing materials we'd need. The design of the book informed the look and feel of the print and electronic collateral and helped keep everything cohesive and on-brand.

Our marketing kit for the books includes:

- Customized postcards and fliers for individual illustrators to have on hand at their events or images for their site. I update the file with their info, email them the PDF, and the contributor prints them or displays the image on an iPad at events.
- Printed postcards to promote the book at point-of-sale locations, like bookstores, and as leave-behinds.
- A variety of social media graphics for Facebook and Instagram, available for all of the contributors to share on their social media feeds. Each platform has its own size requirements and conventions, which change every so often, so check the specific size requirements before you create.
- Press releases, which we send out to relevant media locally and statewide when the books launch. I work with a local public relations pro to research potential media contacts locally and in North Carolina. So far, local media has been the most receptive.
- A launch/coloring party to formally announce the book and promote it to the public (pre- and hopefully post-pandemic). Community events are a wonderful way to engage a broader audience and raise awareness for your cause. Look for quieter weekends to avoid conflicting

with bigger events, and be sure to list the event on all of the community calendars.

- Posters to promote the launch party around town.
- Paid Facebook ads. The need and platform for paid advertising varies widely and depends on your product and audience. It can be a good way to initially raise awareness and is very affordable. Having most of the marketing collateral in place in advance of the roll-out was very helpful.



Above: Promotional postcard for *All Along the Atlantic*

Since Ingram distributes to online retailers, including Amazon, Barnes and Noble, and Books-A-Million, and the big box stores' sites, we haven't yet created a site for the books, although we may in the future as we add more titles.

TIP 10: Celebrate the wins, learn from your mistakes, and document outcomes. Everything that we learned from *Hatchlings* informed the next two books in the series, *All Along the Atlantic* and *Backyard Pollinators* (in process) and helped streamline our efforts. Like *Hatchlings*, *All Along the Atlantic* features work by over 40 illustrators, many of whom are GNSI members. Unlike *Hatchlings*, it was not driven by one specific shock force event, but by a deep love of place and the desire to protect the Atlantic Coast from numerous threats.

Both books have been very special projects, meaningful, and a lot of fun to develop. The biggest challenge right now is the pandemic, which makes some marketing and outreach efforts harder. Some of our retailers are still closed, and, locally, bookstores and toy stores are only open limited hours and have lower volume. Going forward, I'd like to boost sales by finding a distributor and getting into stores that have multiple locations, or white labeling the books for the gift shops of aquariums, zoos, and the like.

Coauthor and illustrator Tiffany Miller Russell and I are currently developing the third book in the *Coloring Nature* series, *Backyard Pollinators*. This book highlights some of the tremendous diversity of pollinators and pollinator strategies in North America, and features bees, wasps, beetles, butterflies, moths, birds, and bats, as well as a few surprises. This book will also feature hands-on activities to help pollinators, like how to build a bat box.

Final thoughts

The *Coloring Nature* series is just one example of how we as creatives can bridge the gap and make a difference. With our training and our tools, we are uniquely qualified to share and amplify information, develop innovative messaging strategies, frame narratives, and drive action by tapping into emotion.

In addition to boosting a movement, creating a shared identity, or sharing information, art can meet people where they are. You don't have to be at a protest or on the front lines to engage, inform, or inspire an audience—you already have everything you need and you can get help along the way.

About *Hatchlings*

This activity book showcases North American nesting birds and their young. The subject speaks to the beauty and sanctity of the family and the love between parents and their young. A full 25% of the proceeds support The Young Center, a leading nonprofit providing social and legal services for migrant children, *theyoungcenter.org*. Authored by Cordelia Norris and Suzanne Mattheson, edited by Joseph Cadotte, released in 2018.
Purchase: *amzn.to/2ZaCJ3r*

About *All Along the Atlantic*

This activity book celebrates the stunning array of life on the North Atlantic coast, from plankton to the largest animals to ever live on Earth. Opening with dramatic activity offshore, you're guided to inshore waters and beaches, and then inland to marsh, tidal estuaries, and cypress swamp. A full 25% of the proceeds support North Carolina Coastal Federation, a nonprofit empowering people to protect and restore water quality and critically important natural habitats of the North Carolina coast, *nccoast.org*. Authored by Cordelia Norris and Cathy Meyer, edited by Joseph Cadotte, released in 2019.
Purchase: *amzn.to/3qbNKgK*

To participate and stay informed: just search for the *Coloring Nature* group on Facebook and answer the questions, or email *cordelia@lunacreates.com*.

Figure 1: Female steelhead rainbow trout (Oncorhynchus mykiss). © Paul Vecsei

The Allure of Ichthyological Structural Color

—*Stephen DiCerbo*

PART 2: CHASING THE RAINBOW—ILLUSTRATION TECHNIQUES

*After understanding how pigmental and structural colors (iridescence) exist in nature in fish (*Journal of Natural Science Illustration, *vol. 52, no. 1), illustrators and artists move to answering the question of how to recreate the same in the subjects of their work (*Fig. 1*).*

The media that we are most familiar with are either pigment or dye-based. Like the pigmental color cells of our finned models, these products present color to our eye through the filtration or absorption of wavelengths of the visible light, to the exclusion of the reflected wavelength that we see. The products at our disposal allow us a means of reasonably reproducing these pigmented effects in our work.

But how does one recreate iridescence? Strictly speaking, it cannot be done in its true form. At least not in the manner that nature does it. We have seen that structural color in fish is created by biological systems involving nanocrystalline structures that exist on the cellular level. The structures create and change the iridescent colors we perceive through constructive and destructive interference (refraction) of the wavelengths in the visible light. This is done by biological processes enacted on arrangements of prism-like guanine crystals in the fish's iridophores and cannot be reproduced with nonliving materials.

What can an artist/illustrator do? If you consider that your images represent a snapshot in time, it is reasonable to use this mindset to strive to reproduce the *appearance* of iridescence, by rendering the colors that could possibly be visible at any given instant. Using a carefully measured approach in applying light valued pigment or dye-based colors, the illusion can be created. We'll take a look at a couple of approaches to doing this with conventional media, and consider the possibilities of using interference paints. Most of those paints involve powders made from mica.

Figure 2: Chum salmon parr with chromatophores and iridophores. © Paul Vescei

In a future issue:
Look for the third part of this article , *Chasing The Rainbow: Additional Illustration Techniques.*

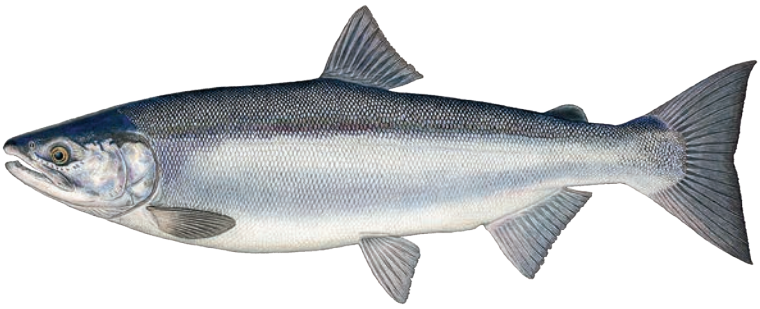


Figure 3: Sockeye Salmon, female, *(Oncorhynchus nerka)*. © Paul Vecsei

Mica are silicate minerals that form in distinct layers and are called sheet silicates. Mica reasonably mimics the guanine crystal plates that are found in fish, and in theory, incorporating them into the color mix would provide the reflected interference of the visible light (albeit without the ability to fluctuate) that is not possible with pigmented colors.

MEDIUM: COLORED PENCIL

One of the most proficient fish Illustrators that I know is Paul Vecsei. Paul is a fisheries biologist, photographer, and ichthyological illustrator extraordinaire. He works with colored pencil on illustration board and his work is something to aspire to. In the inset, Paul shares with us his

Figure 4: Cisco (*Coregonus artedi*) © Paul Vecsei

Drawing iridescence and sheen

—Paul Vecsei

By definition, iridescence is "a lustrous rainbow-like play of colour caused by differential refraction of light waves that tends to change as the angle of view changes". Such effects are commonly produced by scales along the flanks of fish (*Fig. 2, page 7*).

The iridescence of fish scales is caused by photonic and guanine crystals in the skin layer beneath. This is quite different from the so called "sheen" that is also reflected off the fish body and head. A sheen can occur over iridescent and non-iridescent scales. "Sheen" is simply defined as the visual property of something that shines with reflected light.

Iridescence is a diagnostic feature and its emphasis in an illustration can be important. Sheen is not a diagnostic feature, but for the illustrator, can be used to make the drawing appear more real and to give shape and volume to the specimen being drawn. Coregonids (*Fig. 4*) are good examples of having both iridescence and sheen. However, care must be taken to not overemphasize these effects. While flanks are typically silver, copper or colourless and predominantly dominated by iridescence, the dorsal surface can be a complex mix of true colour via chromatophores and effects produced by iridescence. How the illustrator conveys this is open to some artistic interpretation, but true colour should always supersede lighting effects (i.e. iridescence caused by sunshine).

Figure 5: Steelhead (*Oncorhynchus mykiss*). © Paul Vecsei

My Approach

My early attempts were somewhat naive. I thought by using the most direct method, I could create true silver effect. I used a "silver" and "gold" pencil and was disappointed by the muddy grey-brown effect they created.

The solution was simple. Iridescence creates the illusion of pink-blue-purple-yellow so why not directly apply those colours? And for those bright specular highlights, I used white, or better yet, the white of the paper (by leaving small areas blank).

This example (*Fig. 5*) shows the application of these colours. If stronger contrast and increased shine or iridescence is required, then all colours should be applied in a shade darker but still using light or "bright" highlights. Iridescence can also be much simpler at times. Rather than a rainbow array of colours, it can be primarily dominated by cold and warm shades/tones of grey. The range would thus be white to mid grey. Recreating absolute white (255R, 255G, 255B) is not possible due to paper type and how colour is laid down by pencil, paint or pastel. This is a problem because it never allows for quite as strong contrasts as seen in photos.

The challenge is remembering that this is scientific illustration and not art, so the morphological attributes and morphometric/meristic information supersedes the value of creating iridescence or even sheen. Those attributes are primarily for creating the effect of realism. However, an expert illustrator can stay within the rules of scientific illustration as stipulated for ichthyology, but also give an increased level of truthfulness to their rendering.

As for the pencils used, it makes little difference for those well experienced in this medium, but wax-based and oil-based colour pencils are not the same. I find that for building colours through layering, oil-based pencils work much better. But for direct application of a colour "out of the box," a wax-based pencil has a wonderful intensity. However, if you need the same colour to fluctuate from a dark to lighter value, then blending is the way to go, and for that I recommend oil-based pencils.

thoughts about rendering iridescence with colored pencil.

MEDIUM: PEN & INK AND WASH

The fish illustrations that I produce are first sketched in pencil on Bristol, then inked with a waterproof permanent pen, and finally colored with thin color washes. For the color washes, I use a product called Chromacolour Artist's Color® (*Fig. 6*) that dries to a permanent waterproof matte finish.

They are pigmented colors that use a special polyurethane resin binder, different from the polymer used in acrylics. It allows for super dilution of the colors with water for transparent washes that maintain the intensity and vibrancy of the color while accommodating layering methods. For a review of the product, visit this URL: *www.artistsnetwork.com/art-mediums/watercolor/chromacolour-paints-put-to-the-test/*

While working toward the objective of creating the illusion of iridescence, I use bright, light colors that are thinned out, and layered in some areas, but laid in next to each other in other places. The hues seen in iridescent colors can be wide ranging. In the subject species visited in this article, the Spotted Seatrout, we see principally greens, blues, yellows, and even some browns. I rely a lot on reference photos for the markings and colors of fish, and iridescence is no different. Good, clearly-defined photos are a boon. (*Fig. 7*) Collect them from friends and associates, find them online, or take them yourself. Always seek pictures that are taken in the best available light, immediately after capture, and in a manner that allows for release of the fish alive if desired.

Figure 6: Essential tools for pen & ink and wash technique. © Stephen DiCerbo

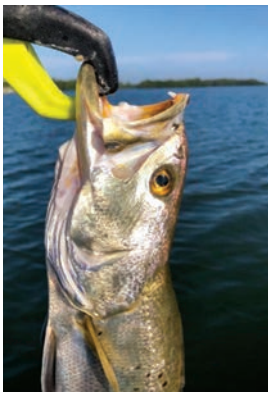


Figure 7: Spotted Seatrout. © M. Strutz

After I have sketched and tweaked the outline of the fish and the desired amount and location of details such as the scales, the image is then rendered by stippling permanent waterproof ink with either a

Figure 8 (***middle***): Spotted Seatrout (*Cynoscion nebulosus*). Stippled pen & ink. © Stephen DiCerbo

Figure 9 (***bottom***): Spotted Seatrout (*Cynoscion nebulosus*). Pen & ink and wash. © Stephen DiCerbo

Figure 10: Iridescence products by Arteza.® © Stephen DiCerbo

One Artist's Pursuit of Iridescence:

nautil.us/issue/26/color/-the-quest-to-mimic-natures-trickiest-colors

www.franziskaschenk.co.uk/science/interact-iridescence-in-butterflies-and-paints

Golden's interference paint products:

www.goldenpaints.com/technicalinfo/technicalinfo_iridint

www.nisenet.org/catalog/interference-acrylics-painting-structural-color#product-files

rapidograph or fiber tip pen. Shading that produces a depth of field to the fish is accomplished by varying densities of ink stipples (*Fig. 8*). I use waterproof media, both ink and washes, so as to allow overwashing in layers if needed, without reactivating the ink or the colors already laid in.

Accenting individual or small areas of scales slightly with more intense color produces one effect and can help differentiate between areas of iridescence and the surrounding areas of pigment color washes. Using controlled "overwashes" of general areas in close proximity to one another with the chosen iridescence colors produces a softer, gentler indication of the effect. Both approaches can be seen in Figure 9 (*previous page*).

MEDIUM: INTERFERENCE PAINTS AND ADDITIVES

The temptation is there. The pull is seductive, but the fear is real. These products extend an implied promise of a magical solution to the quest of recreating ichthyological iridescence in illustration. As Paul's experience in utilizing gold and silver colored pencils while in search of a solution proved unsatisfactory, my first inclination is that the use of the mica magic can easily be overdone and the end result would be more suitable for the illustration of a unicorn.

Still, they deserve some exploration and experimentation. There is plenty of information out there, from both the manufacturers and from artists. I, for one, am hesitantly intrigued and have obtained both mica powder and interference paint (*Fig. 10*). A lot of interference paint uses mica, but it is also manufactured with other additives. There are some very serious artists that have devoted their time to chasing the rainbow; some internet links for information about those efforts and products are shown below the photo on the left.

It is my hope to investigate this media in the future and discover if it could possibly be added to the arsenal of weapons we have to slay this dragon, but for now I am confident that gaining experience through the practice of using conventional media results in wonderful renditions of ichthyological creatures. And in doing what illustrators and artists do best, presenting the illusion of iridescence on paper and canvas, can be every bit as beautiful and ethereal as nature's phenomenon itself.

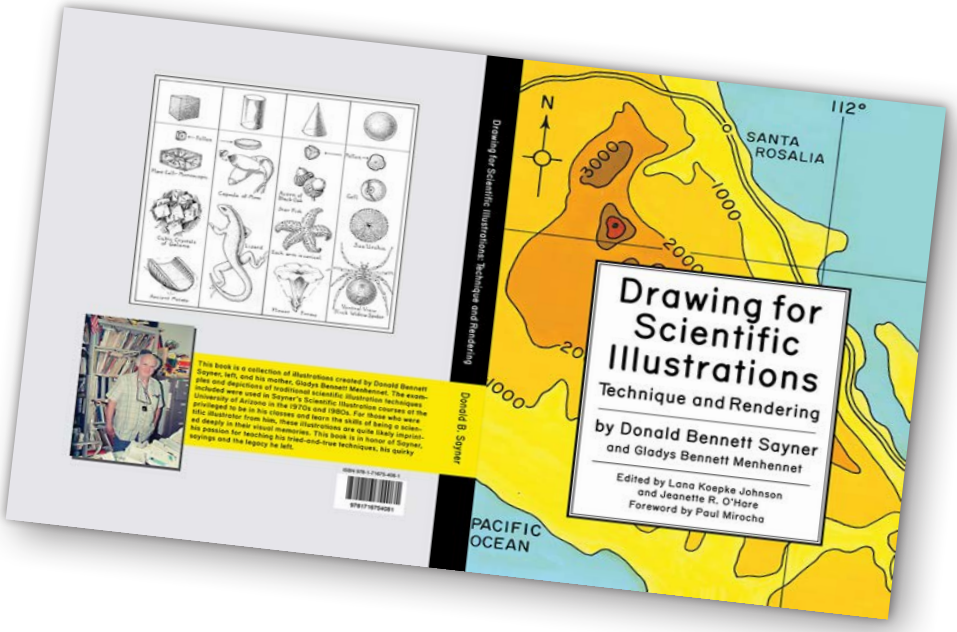
Paul Vecsei

Paul Vecsei is a PhD fisheries biologist and scientific illustrator. His illustrations have appeared in numerous journals, magazines and books. His work is primarily a multimedia mix of oil- and wax-based colour pencil but also some aquarelle watercolour pencils for base layers. Paul's work emphasizes the importance of meristic and morphometric accuracy and detail in fish illustration. He is currently finishing illustrations for a book *Fishes of the Genus Salmo*. He lives in Yellowknife in the Northwest Territories of Canada.

Book Review

Drawing for Scientific Illustrations: Technique and Rendering—How To Keep Illustrating When the WiFi Goes Out

Written by Donald B. Sayner and Gladys Bennett Menhennet. Edited by Lana Koepke Johnson and Jeanette R. O'Hare, foreword by Paul Mirocha.



— Reviewed by Joel Floyd

I first learned this book was in the making from Lana Koepke Johnson and Jeanette O'Hare while we were on a field trip bus in Queensland, Australia, as part of the 2019 GNSI Conference. Lana explained how she had possession of the scientific illustration class archives given to her by the family of Donald B. Sayner after he passed away in 2004. She and Jeanette have been working on pulling together a book to document and commemorate that amazing class we all had taken.

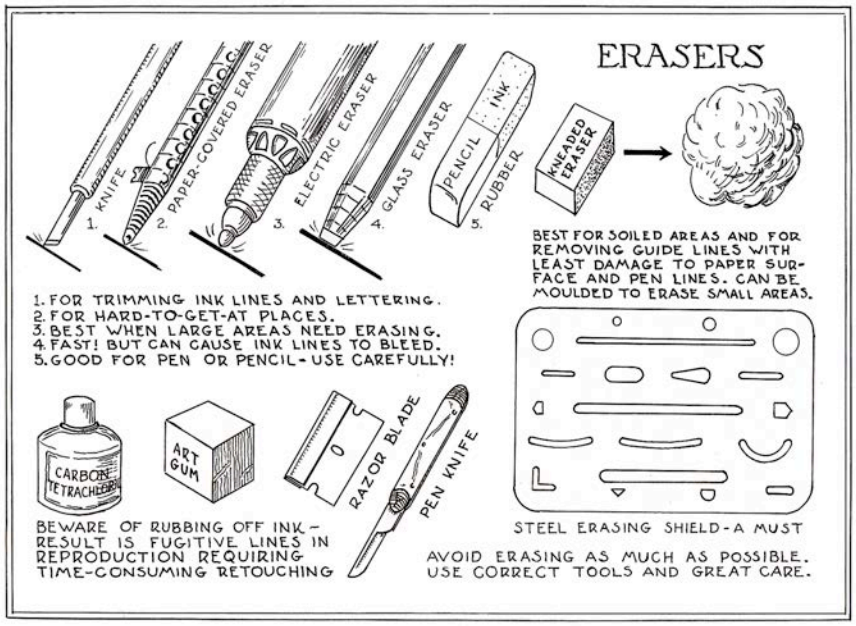
I was so excited to hear this, having treasured my time in Sayner's very popular class at the University of Arizona which was my privilege to take (1979–80). I was a graduate student in entomology there; the class was originally designed for students like me—to help in developing illustrations, maps, and charts for theses, dissertations, and journal articles.

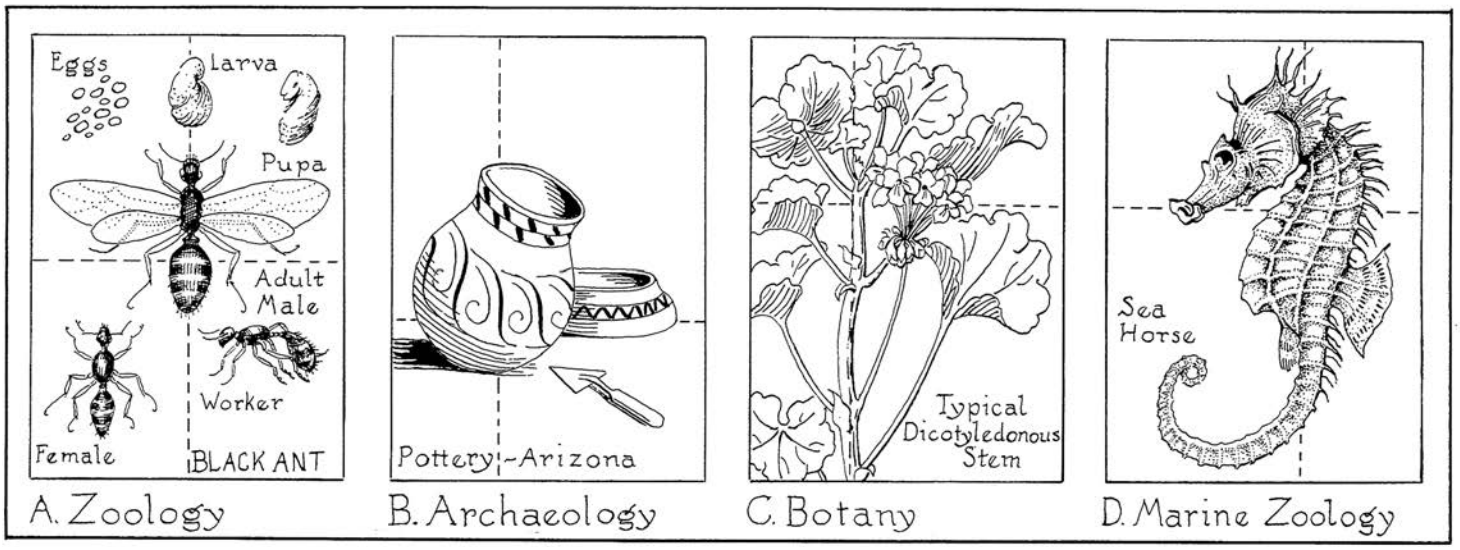
Lana and Jeanette had been in another category of students who heard about Sayner's classes from afar and sought him out from Nebraska to enroll. Lana ended up teaching scientific illustration at the University of Nebraska–Lincoln and based her early course on much of what she learned in Tucson. Likewise, Paul Mirocha, who wrote the book's foreword, made a pilgrimage from Minnesota to Tucson just to take his classes. As many in GNSI know, Paul became an accomplished freelance natural science illustrator. He remained close friends with Sayner over the years and helped preserve class materials after Sayner's passing. In the 35 years that Sayner spent teaching at the University of Arizona, thousands of students had taken his classes, many of whom went on to careers in a variety of scientific disciplines. Some became professional illustrators or specialized in some aspect of science communications.

As the book details in the introduction, and in engaging essays by former student and science writer Jill Carpenter (aka Jillyn Smith), Don Sayner (or just "Sayner" as everyone called him) was a special and beloved human being. The book is a kind of time capsule and tribute to the man who used his wit, experience, caring, and dedication to teaching

Above: Book Cover

Below: Image from the book about erasers.



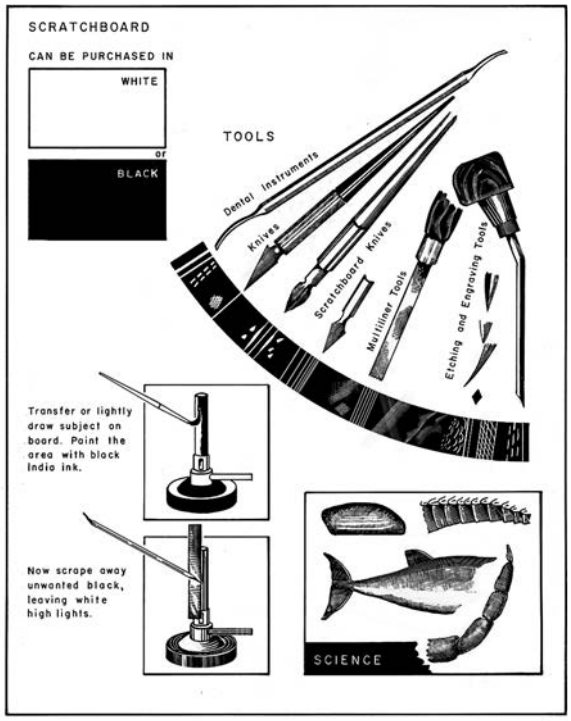


Right: Image from the book.

the craft to his interested students. His lectures were full of information, with instructional technique handouts with illustrations done by Sayner, his artist mother, Gladys Bennett Menhennet, or class assistants. These form the main content of the book.

In class, his delivery was rather quiet and understated, yet full of expressive surprises, eyebrow raises, and askance looks interspersed with jokes, anecdotes, and dozens of his little sayings, many of which are included in the book thanks to Lana's great note-taking during class. He was very practical in his approach, encouraging improvising with the materials at hand, making adjustments for field conditions, but always demanding excellence in striving for accurate and clear illustration and communication of concepts.

Below: Image from the book; Scratchboard tools and technique.

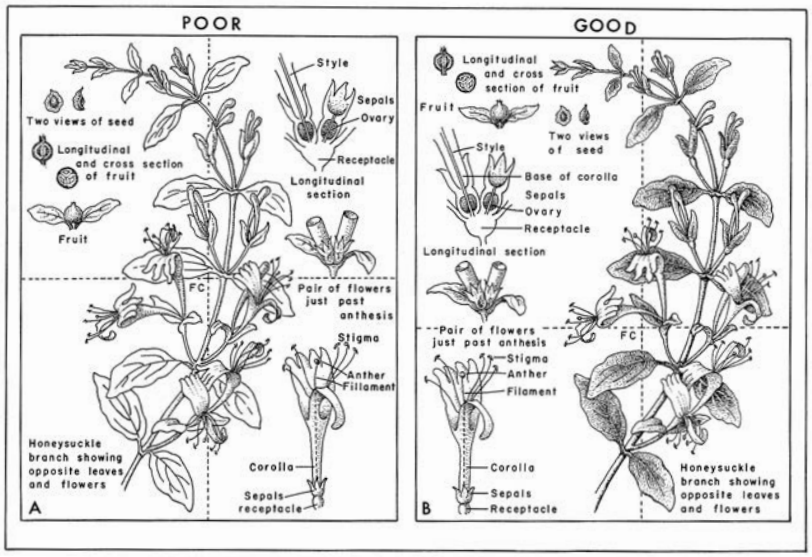


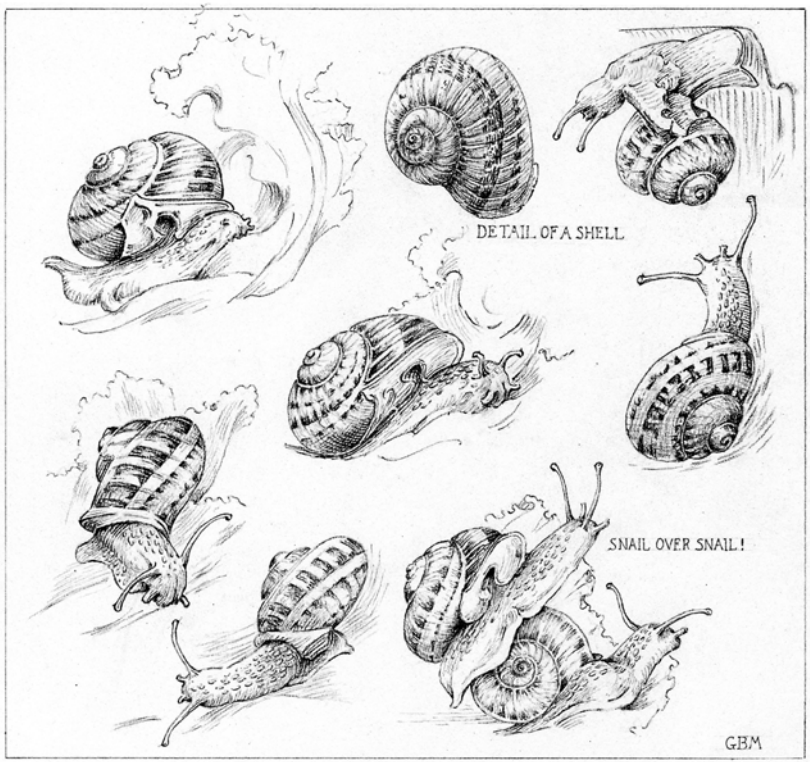
While the time period of the class offerings was years ago, the information in the book is classic and highly relevant. The emphasis is on basic rendering skills, the use of traditional tools, and tricks of the trade to produce a good quality illustration that is reproducible in print. Chapter topics include: knowing your tools, drawing techniques, drawing in perspective, shading, sketching animals, drawing maps, and graphic arts photography.

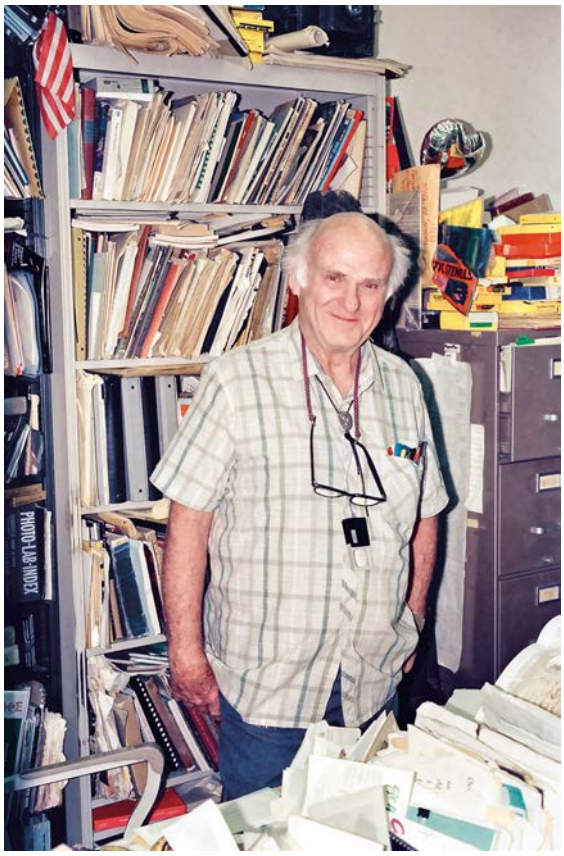
Sayner was near retirement just as computer graphics were becoming possible and more widely used. The techniques in the book are all traditional; thus the book's tongue-in-cheek subtitle. As we know, mastery of traditional techniques form the basis for good digital illustration skills. Learning observational techniques, how best to draw with various ink pens, graphite, and how to paint with brushes are well covered along with a variety of other required skills.

While some of the methods documented in this book may become lost arts, they form the basis for how digital tools were developed and often named. For example, one of the most valuable topics of Sayner's class for me was how illustrations were captured on graphic arts film with a copy camera to produce printing plates for use on an offset printer we used in the classroom. Understanding these basic processes, nicely displayed in the book, helped me later better understand printing specification options required in Adobe Photoshop and Illustrator.

Anyone who took the courses will recognize the map of Baja California, Mexico on the book cover. This was one of the required exercises executed in pen-and-ink with ruling pens, triangles, a T-square, a mechanical Leroy lettering template, and something called a railroad pen for making parallel lines. It is two ruling pen heads on a swivel that takes some practice to use properly for drawing rail lines on maps. The book has a photograph of a railroad pen after the title page with a dedication to Sayner, his students, and the pen. I still have mine.







Above Left: Drawing from the book showing best practice for botanical layout.

Above Right: Sayner in his office. Photo by Lana Koepke Johnson, 1986.

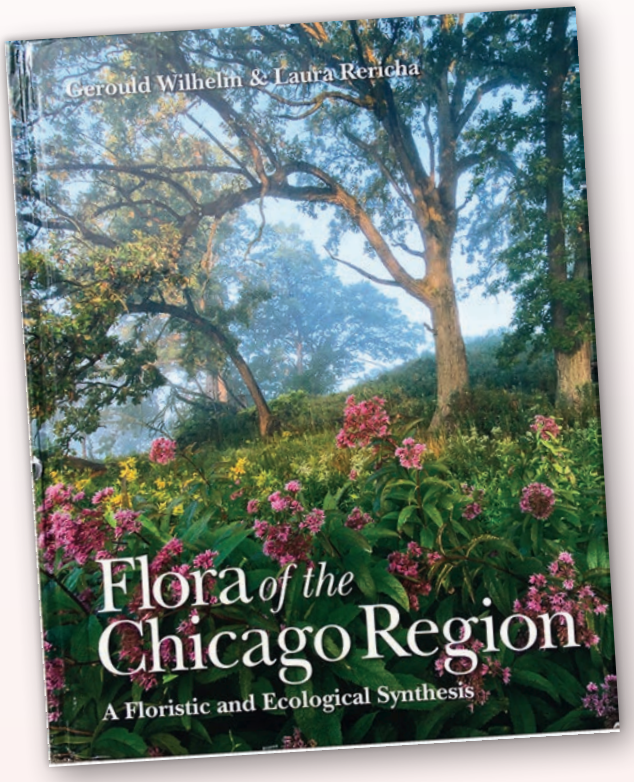
Left: Snails by Gladys Bennett Menhennet.

Right: Railroad Pen

GNSI owes a debt of gratitude to Don Sayner for his legacy. His courses were one of the few options at the time for those of us seeking to learn natural science illustration practices. I first learned about GNSI from taking Sayner's classes. Appropriately he was honored at the 1995 GNSI Conference in Flagstaff, Arizona. Many of his former students attended and he was touched by the recognition at the banquet by our group. This book further honors him posthumously, and is a testament to his contributions.

It is fortunate that a few dedicated former students did the work to make a book of his valuable teachings, something Sayner never had time to pull off himself.

Order your copy at bit.ly/2JLLMmZ. Proceeds benefit the Guild of Natural Science Illustrators Donald B. Sayner student scholarship fund: gnsi.org/donate.



Above: Book Cover, Flora of the Chicago Region

What is "Flora of a Place" and What Can It Tell Us?

—Gerould Wilhelm, Director of Research
Conservation Research Institute

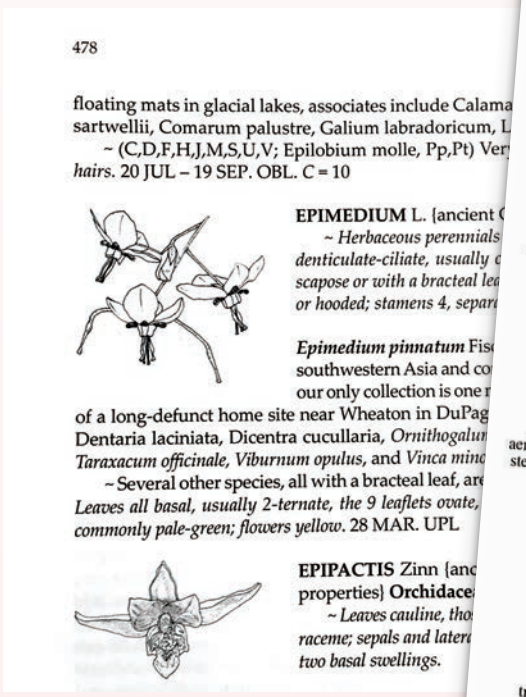
Traditionally, a "flora" is a compilation or compendium of the plant species known to grow in a certain area. Such an area can encompass a particular woodland or prairie, a forest preserve, a county, a state, or even a whole country, so long as all of the plants in the described area are accounted for. It is a simple fact that each flora, irrespective of the area or its size, is utterly unique to that area. No other area, not even right next door, has the exact mix or assembly of plant species found anywhere else.

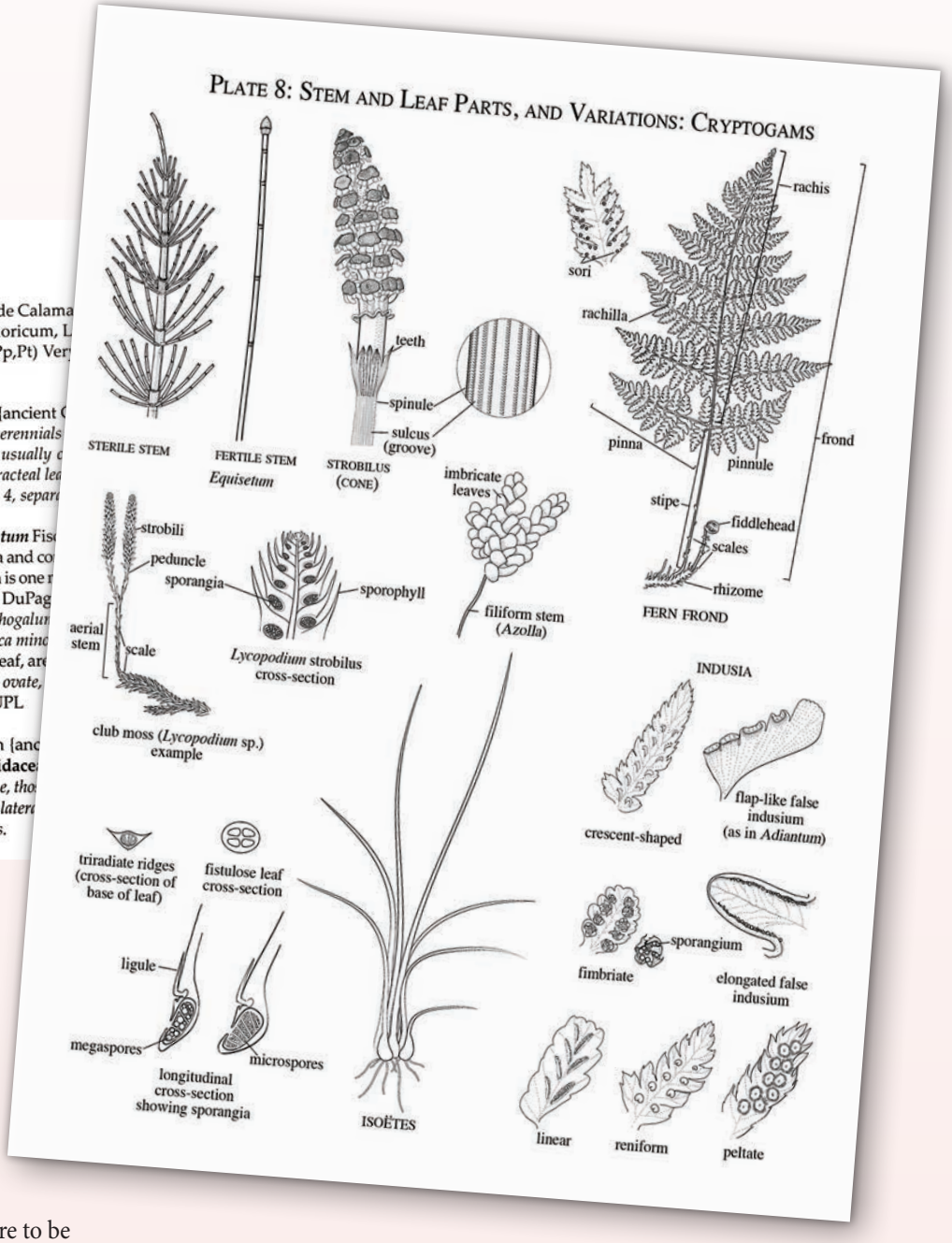
Remarkably, it is unlikely that any two areas of similar size have even 70% of their plant inhabitants in common. Indeed, notwithstanding wholly man-made facilities such as lawns and agricultural areas, each area of naturally growing plants is as unique as each baby born of the womb. It is important for peoples of places to know that any such area growing in their community is special to that extent, and that in all likelihood, if the area is forsaken for some other contrived purpose, the loss is irreplaceable.

The efforts to produce floras are important in helping naturalists, ecologists, and an informed citizenry having custodianship over natural areas understand the nature of a particular system. While the ecological sciences represent ongoing understandings of natural processes, including the human cultural relationships embedded in the genetic memory of each place, the plants themselves do not change to accommodate political, economical, academic, logistical, or ecological doctrines. They will continue to prosper so long as the ancient, Holocene-aged cultural relationship with them and their community sustains, or they will languish if the relationship becomes one that their human stewards abrogate. The plants tell only truths about their place, truths that transcend such factors as ignorance, cupidity, obliviousness, politics, tenure-tracking, and other such factors that complicate human efforts to be congenial with the other living members of creation.

Most north-temperate and temperate plant communities co-developed with human cultures after the recession of the last glacier. The people were dependent upon all critical life resources present within walking distance. The more obvious cultural relationships that sustained and amplified local biodiversity were the application of regular landscape fire, certain kinds of agriculture, and harvesting. When one changes the habitat, the inhabitants change. As the relationships between people and place changed over the short period of time since European settlement, the resulting change was characterized accordingly by a shift from aboriginal diversity and system stability to weedy simplicity and system instability.

All things made by man specifically rust and crumble over time. They may be considered beautiful for a time if love and talent are engaged in their creation, but they often become passé eventually; or they may be cheap and ugly from the start if they are manufactured at an industrial scale.





Genuine, timeless beauty is seen in the faces of newborn babies and all of the infinite array and diversity of healthy living things and their natural environments. Such beauty will pass to our posterity only if it is nurtured and loved generation after generation.

If we, as a people, are to sustain in a world where beauty and wholesomeness are to be experienced by people yet unborn, then we must learn from the plants themselves the truths as to how to care for them. Each generation must come to know them, to learn the salubrious relationships between and among them and us. If, through cultural or intellectual arrogance, we default to generalizing our relationship with natural areas by developing and applying "universal" theories as to their essence, ones that do not rely on the behavior of individual plants in unique communities, they will fade away leaving us to glory in our own genius and facsimiles of creation—a truly empty world.

In order to know the plants of a given area or district, one must have detailed guides to their identity. Such guides are usually included within "floras." Guides may include pictures and photographs, but such features are usually supplied as supplemental to identification "keys." Keys provide the user with very specific, often rather recondite, morphological features that enable the skilled user to make reliable distinctions between species. Recognizing plants at that level is crucial.

Some plants that have nearly identical appearances, but have subtle morphological differences, can be quite different in their behavior insofar as it can relate to us important aspects of their inhabitance and our relationship with them. For example, *Symphyotrichum pilosum* is a plant of highly disturbed ruderal areas that have suffered greatly with our stewardship. The presence of lookalike plants, *Symphyotrichum parviceps* and *S. pilosum* variety *pringlei*, tell an altogether different story.

Above Left: Illustrations from the book, *Flora of the Chicago Region.*

Above Right: Plate 8: Stem and Leaf Parts, and Variation: Cryptogams

The former is confined to high-quality dry prairies on shallow soil over limestone, while the latter is confined to high-quality remnant fens and base-rich flats near the coast of Lake Michigan. A key tells us how to tell them apart:

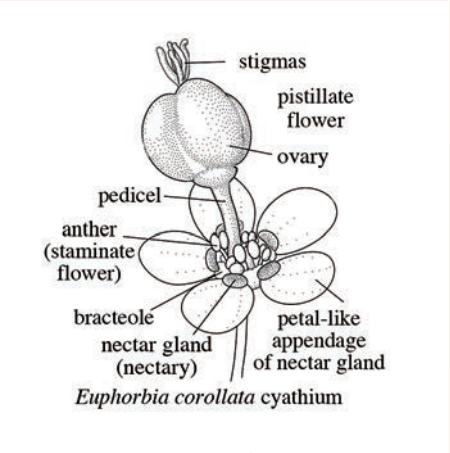
A. Ligules fewer than 15, to 5 mm long — *S. parviceps*

B. Ligules more than 15 and usually more than 5 mm long.

Stems and often the leaves hirsute or villous — *S. pilosum* var. *pilosum*

Stems and leaves glabrous or glabrate, except for ciliate petioles — *S. pilosum* var. *pringlei*

Those who study plants must learn a descriptive patois, which is why many floras include a glossary. Some floras also include details about the habitat of each species. Floras provide each generation of people with the ability to see the truth about their own unique community of plants. Knowledge of them will allow each generation to hone its relationship with the natural remnants of creation and ensure that the sublime attributes of health, beauty, humility, and good conscious choices are part of our ongoing sojourn with the land around us.



Euphorbia corollata cyathium, flower morphology cutaway from the glossary in "Flora of the Chicago Region".

In 1969, Floyd Swink, botanist at the Morton Arboretum, presented an annotated checklist and distribution maps of local plants of the Chicago area. This edition of "Plants of the Chicago Region" was so well received that the arboretum produced a 2nd edition in 1974, but minted twice as many to accommodate the growing demand. Dr. Swink, along with this author, produced a 3rd edition which added identification keys, a glossary of terms, and even an approach to using plants in the forensics of plant community quality assessment. By the 1990's, the naturalist clientele in the region had become so sophisticated in their use of plants presented in this last edition that they prevailed upon us for even more information.

Working under the aegis of the Indiana Academy of Science, which specializes in books on natural history, we presented the public with yet another edition of *Plants of the Chicago Region* in 1994. It greatly updated all of the features presented in the previous addition but added an extended glossary with line illustrations by Paul Nelson, and became quite popular amongst botany students throughout the country.

This new, illustrated volume was so popular with an ever more knowledgeable and insistent public that the academy commissioned a whole new concept in flora writing. Consequently, I teamed up with Laura Rericha to produce the "Flora of the Chicago Region," which appeared in 2017. This book carried forward nearly all of the features of the previous work, but added detailed records of any insect observed locally to have an intimate relationship with local plant species. This flora also provided a treatise on plant communities with many photographic examples, and it presented over 1,500 exquisite line drawings of plants by Mary Marguerite Lowther to represent each genus recognized in the flora.

In order to clear up a number of literature reports that had attributed plants to the region, which were possibly misidentified or identified under another taxonomic philosophy, we visited nearly 40 herbaria that altogether contained a couple of 100,000 specimens that vouchered Chicago area plants—on top of 60 odd thousand of our own more contemporary ones. A usable flora must be grounded in herbarium specimens that testify to the concepts presented by the writers.

Space limitations precluded the continued inclusion of glossary illustrations, but allowed more than doubling of the entries. Although many had access to the previous glossary, Bill McKnight, of the Indiana Academy of Science, our publisher, entreated scientific illustrator Kathleen Garness to produce a new version of the glossary in the *Flora of the Chicago Region*, accompanied by 4 or 5 times the number of original illustrations. Available online at the Conservation Research Institute website, this glossary has become about as popular as a compendium of abstruse botanical terms can get. Illustrations of genera and plant terms have broadened public access to the identity of local flowering plants and an appreciation for what knowledge of them can provide. Inasmuch as botanical terms are not peculiar to Chicago, this glossary is useful throughout the world: *conservationresearchinstitute.org/forms/CRI-FLORA-Glossary.pdf.*

The Business of Illustration

Working With Clients

—Gail Guth

Many of us, like myself, are largely self-taught in illustration in general and in running the business of illustration in particular. Dealing with clients, time management, file and asset management, and billing are all skills—and they ARE skills!—that are often hard-learned over time. Maybe you are just starting out on your career as a freelancer or perhaps the Covid meltdown has put you into freelance status for the first time.

It's one thing to know how to illustrate a given subject, but it's quite another to work with various clients and their idiosyncrasies, budgets and timelines. Often you need to deal with their entire workplace: bosses, supervisors, and/or the rest of the project team.

NEW PROJECT, NEW CLIENT

Working on a new project with a familiar client isn't too scary; starting in on one with a new client is a huge challenge. You don't know each other at all and therefore you don't know how they like to work, how flexible or impatient they are, how scattered or organized, how tolerant or demanding. Of course, they don't know any of this about you either. Your first big steps are the same as with any new job:

- Do some homework if you can on the client or company; know what they are all about. If you can't do this ahead of time, ask up front politely. Show interest in what they do and what they want from you. Inquiring about their work and their project lets them know you are interested in them and their project, and not just the paycheck. If there is a written proposal for the project, ask to take it home (and READ it!); you'll learn a lot. Tour the facility, get to know people.
- Project a calm and professional demeanor; let them know you are up to handling this job. Speak clearly and directly, make eye contact, don't mumble, don't fidget.
- Dress appropriately. It's a job interview! Dress neatly and formally; leave the paint-spattered jeans at home, they already know you are an artist (and may have their suspicions already!) You need to show you are also a serious business professional.
- Take notes; ask questions. Follow up later if you still aren't clear about the project's parameters or your tasks.
- Follow up with a phone call or email thanking the client for the interview.
- Put it in writing: Submit an estimate, proposal and/or contract.

Summarize the project in reasonable detail as you understand it to ensure you are all on the same page. This can be as simple as a letter clearly stating your understanding of the project and your part in it, so you both know you are on the right track. Or work up a formal proposal with your estimate. Either way you are stating your understanding of the project and your terms.

If you send a simple letter, be sure to state that the letter constitutes your proposal, and request follow-up or feedback to establish the "contract". I have asked clients to return a signed copy of the letter indicating their acceptance of my proposal.

If you are asked to bid on this, you should submit a formal proposal. There are many resources available to help you with what to include in a formal proposal and how to word these documents. Be sure to include details: what happens when major changes are made after the initial approvals, what the Kill Fee will be, etc. (*see sidebar on page 19*). Once you develop your proposal, store it as a template for future projects.

VITAL CLUES ABOUT CLIENT BEHAVIOR

Every client has their own little quirks and methods of approaching a project. Compounding this is the fact that a lot of clients you encounter will have NO idea of what it will take for you to complete this job. It always falls on us to educate our clients as to the

EDITOR'S NOTE

This is the second of two articles that offer a few suggestions for all of you who are taking that big step into the world of freelancing. The previous article (published in the *Journal of Natural Science Illustration*, vol. 52, issue no. 3) offers tips on organizing your projects.

nature and limitations of our work. Definitely do so, but always in a polite and informative way.

Be sure to discuss what you expect of them. Are they supplying the reference material? If not, you will have to do so and that should figure into your fees. Let them know you will communicate regularly and expect the same in return. You will need feedback when requested so you can keep moving along on the project. They are busy of course, but you are too, and need to hear from them to keep the project going on time.

Use any down time while you wait for approvals to check over your work, work on another project, or clean your refrigerator.

BUSY, BUSY, BUSY

Some clients will not pay close attention to what you are doing until it's nearly time to go to press or hang the work; then suddenly they focus and suggest "minor" changes. Sometimes these "minor" changes will result in considerable readjustments, or even rework of original art. Hopefully your contract spells out your compensation if this happens.

Explain (politely) that even seemingly minor changes aren't necessarily made by just clicking a key or "just redrawing it." Your estimate/proposal should include time for basic changes, but also indicate additional charges if substantial changes are made after the final approvals.

You don't like it when people nickel-and-dime you, so don't do it to your clients. If the fixes are relatively minor, even after the final OKs are given, make them and move on. It builds goodwill for possible future projects. If they amount to substantial amounts of extra work, discuss this with them before you make the changes and inform them of your potential additional fees.

Many projects (most?) are very organic in nature; your client wants something special but doesn't know exactly what is needed. It often takes considerable back-and-forth effort, which is extremely difficult to estimate ahead of time. This is where good communication is essential. If your client is changing his or her mind endlessly, let them know that the time clock is ticking, they've used up the estimated budget, and extra billing will have to begin. That usually spurs them to make a choice; if not, at least they won't be surprised by a larger-than-expected final bill.

VITAL HINTS ABOUT YOUR OWN BEHAVIOR

Never lose your temper, never cry, never be sarcastic, learn to bite your tongue—even if your goofy clients deserve it! It's not professional. Go home and bang your head against the wall if you are angry or frustrated, but do not show this to the client(s). If they are driving you crazy, discuss your concerns with them and offer suggestions to smooth the process.

COMMUNICATE

However you set up your files, and whatever situation you find yourself in with your client(s)—always, always, *always* COMMUNICATE with them. Obviously, contact them if you have questions; definitely do so if you have an unavoidable delay (you get sick, or you need to deal with an emergency). Even if everything is going along smoothly (it happens!) but it's a long-running project, check in every now and then to let clients know how the project is progressing. They will appreciate being kept informed.

If you mess up, own up immediately. Offer a discount or a replacement. It happens, just be honest and straightforward about it.

If they mess up, be gracious and deal with it as best as you can. Move on. Never burn those bridges no matter where the blame lies!

THE KILL FEE

Sometimes a project needs to be canceled. Your proposal/contract should include a Kill Fee clause (*see sidebar*), so that you can get paid for the work you have done to date.

DEALING WITH A CROWD

Find out as soon as possible exactly who will be weighing in on your project. The more people are involved in the final say, the longer this project will take—guaranteed. You need to take this into consideration when estimating your charges and build in plenty of time for changes.

Best case scenario: The only one making decisions will be the person you are speaking to. This can still be difficult if that person is difficult but at least it's only one person.

Worst case scenario: Several upper-echelon types (or horrors, a committee) will be giving the final OK. (If you are dealing with a government organization, you can count on lots of people being involved.) If this is the case, be mentally prepared for a lot of nitpicking and changes. Probably most, if not all, will want to put in their two cents and add their mark to the project ("This was just OK until I suggested such-and-such, now it's GREAT"). This can get difficult. Some may want to send the project in a direction that is wildly different from the one you are taking, often in a way that you know will ruin or dilute the final results. Be flexible, but also be prepared to stand your artistic ground. The bottom line, though, is that they are your client and they are paying for it. Don't let your artist's ego get in the way.

If you are dealing with a large group, and it's very early on in the process, try to avoid showing work that appears to be too finished as a sample. Someone/several will assume that this is how the final will look and inevitably zero in on minor, changeable details they don't care for, like the font or the color or the layout, and dismiss the whole approach outright. It's sometimes hard to convince them that this is a draft only. Start with sketches.

I was starting a project that involved a large committee, and I was getting zero input on where to start. No one seemed to be focusing at all on what I needed to know; they were only concerned with their own part of the project. In frustration, I went home and came up with a purposely awful idea, but at least it was an idea. At the next meeting they all immediately jumped on my terrible plan and started to add their input, which of course was clearly much better than what I had suggested. I had gotten their attention and focus, and got their input at last—at a small cost, but it was worth it. I would *only* suggest this if the group already knows the extent of your talent. Don't try it if they don't know you at all, or they will assume you are not up to the job.

ANY PROJECT, ANY CLIENT

Write up your notes as needed so you don't forget any details. This will help you clarify the project in your own mind and ensure you have all the information you need. If not, ask for it.

Be sure you know the extent of your part in the project (are you just supplying the art or will you be required to work with the printer/fabricator?). Find out who that entity is and communicate with them as to what they require from you:

- What's the file format?
- Do you need to include a full bleed?
- Do you need to supply the call-outs on a separate layer, or in a separate file?
- What's the color space? Etc...

This could save you a lot of headache later on.

Good luck with your new projects! We welcome any questions or, if you are a seasoned professional, additional suggestions and thoughts to help others get their careers going smoothly.

WHAT IS A KILL FEE?

A Kill Fee is an important contract clause that ensures payment for the work you have done to date if the client decides to cancel all or a portion of the project before it is finished. It can be a set percentage of the agreed-upon total or a total of the work done to date (this is where good record-keeping comes in handy!). Your contract should spell out ownership of materials in case of a cancellation (can you re-use the work elsewhere or does the client own them?). There are a number of online resources that discuss kill fees; here's a good one. *www.crunch.co.uk/knowledge/get-paid/kill-fees-explained/*
Also refer to the *Graphic Artists Guild Handbook of Pricing and Ethical Guidelines.*

Art © Stephen DiCerbo

Scientific Illustration Resources for Kids

This conversation about providing help for youth artists is from the GNSI Sciart-Listserv. It is lightly edited for readability and clarity. Enjoy!

—Britt Griswold, RRRRipped Guest Editor

THESE POSTS are from the GNSI's SciArt-L Listserv, a friendly place where members can e-mail questions and share ideas about science illustration. If you have not yet subscribed to the Listserv, please visit *gnsi.org/listserve* for instructions on how to sign up. We would love to hear from you!

ORIGINAL INQUIRY

From: Natalya Zahn

Hi All,

I sometimes get approached by the parents of middle school and high school age kids who are interested in scientific illustration and curious to talk to me about what I do and "how it all works." I am typically more than happy to chat with these students, but I'd like to be able to refer them to other groups or activities that might further help them dip their toes into the joy that is natural history and scientific illustration. Do the regional chapters of the GNSI entertain membership from students at this age? Anyone have any other good resources for kids—specifically in the New England area?

*I teach undergraduate illustration students and whenever I get an individual who is leaning towards a specialty in scientific subjects, I always recommend they check out the GNSI, but that may not be appropriate in this case.

RESPONSES

From: Gail Guth

A Junior GNSI division would be interesting to explore!!!

.....

From: Tricia Cassady

The New England Chapter has events where families can attend. Usually we get a lot of adults and college students but older school age children are always welcome to learn about Scientific Illustration with us.

.....

From: Gail Guth

We have had youngsters attend the conferences in the past, but not often. There was a 12-year-old at the Bozeman conference. Her mom accompanied her; she was very interested in science and art and I believe enjoyed the meeting very much.

.....

From: Carol Creech

I love this whole idea, too, Gail! I see lots of interest at the elementary level when I do the Science Olympiad. I would have loved this sort of junior membership as a kid.

.....

From: Natalya Zahn

That is so awesome, Gail—if I had known about the GNSI when I was younger I definitely would have wanted to attend a conference! Truly inspirational for all audiences.

.....

From: Kirsten Carlson

I love the idea of GNSI for non-grownups. I'm on a quest to share how I combine science and art through presentations to all ages—2nd graders to retirees. I think a great first step as GNSI members could be to gather and share our already existing resources.

Recently, I wrote and illustrated an article for MUSE magazine (January 2019) highlighting the sciart I'm doing in Antarctica and I also wrote a sidebar on being a scientific illustrator. MUSE is science themed and geared for 9–14 year olds. If you're interested in seeing the article or sidebar contact me at *kc@kirstencarlson.net*. Here is the sidebar text about being a sciart-er:

Do You Have What It Takes to Be a Natural Science Illustrator?

If you are passionate about both art and science, the answer is YES. One of the most important things you can do to practice is carry a sketchbook and capture your everyday experiences by drawing and writing down what you observe. The pages can be very messy and unfinished, or they might have a perfect drawing or an answered question. Often, it isn't what ends up on the page that matters. It's the discoveries made through the process. A sketchbook is your personal encyclopedia.

Above: *Artists' Tools Ecosystem* ©*2016 C. Olivia* Carlisle. Promotional art for "Full-House Exhibition", Lyndon House Arts Center, Athens GA. Illustrates the Guilds' art tools; also used with a question page for exhibit visitors.

Try this: sit down, take three deep breaths, and set a timer for 60 seconds. During that time, do nothing but observe your surroundings using your eyes, ears, and nose. Then, on a blank page describe everything you perceived—what colors did you see? Did anything move? How big or small were things you saw? What kinds of sounds did you hear? How loud were they? Describe the smells. Did you feel the heat of the sun or the breeze on your skin? Can you draw what you saw? Maybe you sketch the scene or draw one object. Write down your thoughts, and finish up by recording the date, time, and location. A sketchbook develops our abilities to see the world. Observing, recording, and interpreting and sharing what we experience develops a curiosity and passion for understanding the natural world and our relationship with it. The sketchbook is the tool used by scientific illustrators to fathom the world as explorers and share it with others through art.

From: MaryBeth Hinrichs

A junior/youth GNSI division would dovetail really well with the Drawing Portal project currently underway in GNSI. The Drawing Portal's primary aim is public outreach to get adults/kids drawing to learn more about the natural world and thereby foster increased caring about the same; drawing also fosters cognitive anchoring which is very important for learning in Science, Technology, Engineering, the Arts and Mathematics (STEAM).

From the GNSI Newsletter

THE LEONARDO PRINCIPLE, RESOURCES FOR INTEGRATING ART AND SCIENCE

The Leonardo Principle is a new site created by Sally Bensusen, Nate Erwin, Jessie Nathans, and Jonathan Tourtellot. The goal of this resource is teaching science through art and observation: A STEM to STEAM teacher resource offering free step-by-step activities developed to enhance the appreciation of science, to improve learning, and to inspire curiosity for K–12 students

Ultimately, we would like this website to become a growing, go-to library of free, downloadable, step-by-step ideas designed to inspire K–12 students to gain an interest in science and art through accurate drawing practice, the development of verbal skills, and the use of critical thinking to analyze visual content.

Resources and additional information can be found here: *leonardoprinciple.org*

—Sally Besusen

Chapter Updates

GNSI Florida

—Shauna Lee Lange, GNSI Florida (Founder)

The newly formed GNSI Florida Group is open to Florida-based natural science illustrators, medical illustrators, and botanical illustrators. Formed in July 2020, we are currently a Group working to formal Chapter status within the GNSI. The no-fee Group welcomes all illustrators working in the field of science in an effort to grow diversity and potential membership within GNSI. In 2020, Grouporganizers attended the GNSI Annual Conference and participated in the Twitter #SciArt promotional week.

GNSI FL grew their Facebook page at *facebook.com/gnsiflorida* to 64 followers over a six-month window. Daily content for the Facebook page included images of natural science departments at universities, announcements for natural science zoom talks/workshops, articles about books and authors, career opportunities, and much more. GNSI FL also has an Instagram page at *instagram.com/gnsiflorida* which we hope to enhance in 2021. The Group is presently led by GNSI member Shauna Lee Lange of Venice, Florida or *shaunaleelange@gmail.com*. Shauna hopes to highlight individual artists in the year to come.

Sketch of winter leaves. © Linda Chafin, GNSI Georgia Group Member.

GNSI Georgia Group Sprouted and Now Growing

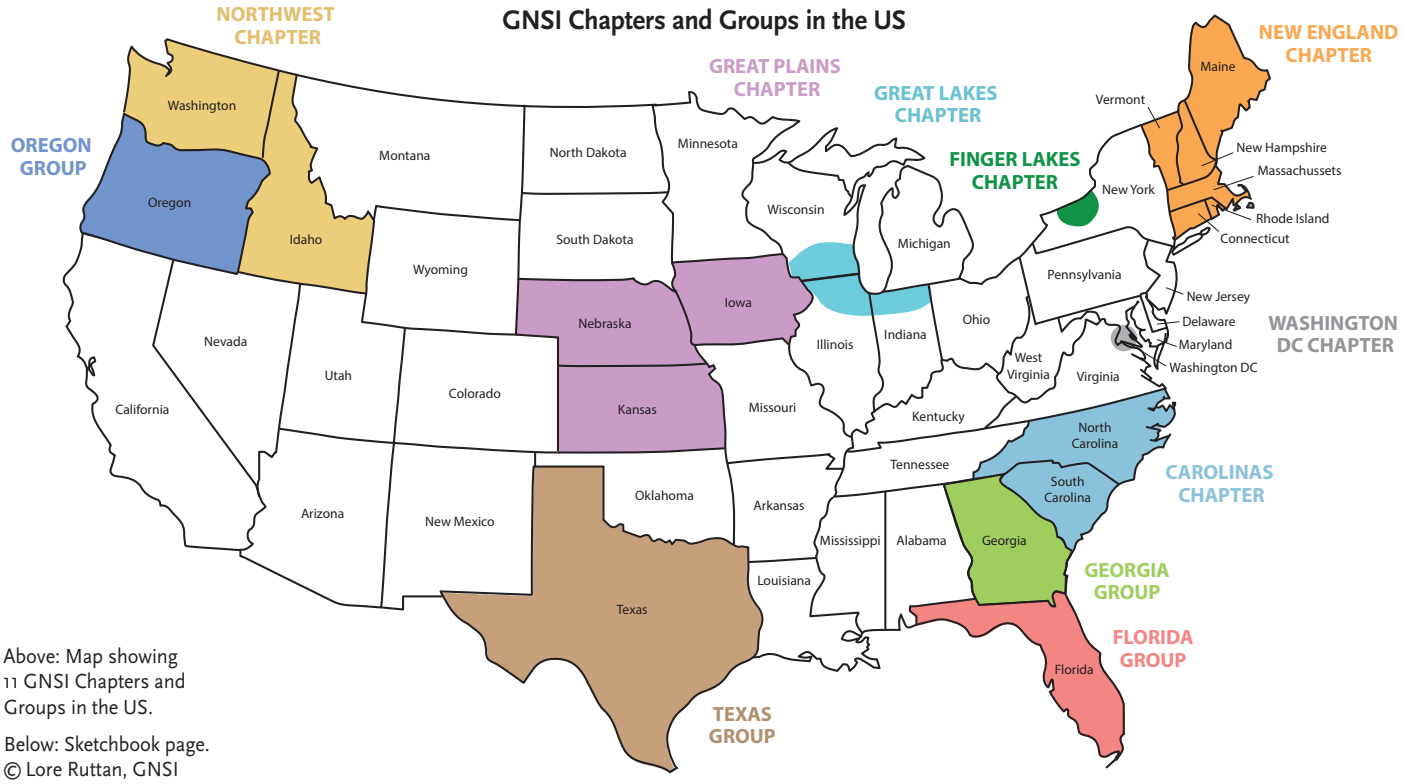
—C. Olivia Carlisle, GNSI Georgia Co-founder and President

The GNSI Georgia Group, founded September 2018 at the State Botanical Garden of Georgia, is one of 11 USA Chapters and Groups. Our global network includes GNSI members in 14 overseas countries, extending our international presence. For our first meeting, the six of us enjoyed the presence of a beautiful green guest, a *Phyllium philippinicum*.

Saracenia. State Botanical Garden of Georgia. © C.Olivia Carlisle, GNSI Georgia Group Member.

Professional and emerging illustrators, university professors, students, GNSI teachers, as well as clients and patrons of our art make up our Georgia Group of 15 members. Our meetings include outings in the State Botanical Garden of Georgia, state parks, and wildlife and nature centers where we hike, sketch, photograph, and discuss the science of flora, fauna, ecology, and archaeology. Our business meetings are conducted online with additional discussions held through a private Facebook page, where we can introduce critique sessions as well. In addition to our active GNSI listserv, web sites, and social media, many of our members partner with area schools, community activities, and groups such as the Amphibian Foundation in Atlanta, Georgia. We can be reached at *facebook.com/gnsigeorgia* and *instagram.com/gnsigeorgia*.

Lore Ruttan, who had initially discussed forming a Georgia chapter, teaches Middle and Upper Learning at the Galloway School in Atlanta, sharing science and illustration skills she acquired at five universities and the Atlanta Botanical Garden. Lore organized a month-long GNSI Art Exhibit at the Galloway School; featuring 10 illustrators. C. Olivia Carlisle, GNSI GA Group President, has taught several natural science illustration classes at the State Botanical Garden of Georgia and at the Environmental Educational Alliance Conferences, and is partnering with the Rocky Branch Elementary School in Oconee County, GA. Olivia and the art teachers are planning a series of drawing sessions with strawberry plants for the second grade students, hopefully in the Spring of 2021.



Above: Map showing 11 GNSI Chapters and Groups in the US.

Below: Sketchbook page. © Lore Ruttan, GNSI Georgia Group Member.

Trillium cuneatum (little sweet Betsy) and reference photo. ©Tamara Betteridge, GNSI Georgia Group member.

Since the pandemic has interrupted our group field trips, we are encouraging each other to get out in their back yard, or a nearby dirt road to sketch. The opportunity is now: energetic young plants are pushing and shoving their way out of the crusty mulch-laden soil in our yards and Botanical Gardens as well! Hopefully when the pandemic departs, we can start exploring more of Georgia's 59,425 square mile area where incredible biodiverse ecosystems await our members, bringing pencils, pens, notebooks, cameras, and a passionate curiosity to explore them!

A Collection of Field Kits

Deborah B Shaw *dbShaw Studios*

GRAPHITE

I have been enamored for some time of the Pentel ORENZ® 0.2 mechanical pencils. I have multiple pencils so I can have H and HB leads handy at all times. My Japanese friends tell me "orenz" translates to "no break" and it's absolutely true. I have them on the table in the studio for initial sketches and drawing; I carry them in the field, I use them everywhere. I also carry a glass emery board which I use to sharpen them when I need a microscopically sharp point. Yes, I know how it sounds to confess to sharpening a 0.2 lead(!), but it is really lovely to use.

I don't even want to start estimating how many pencils I have: it must be every hardness in every brand, both pencils and leads. My hands-down favorite is Palomino Blackwing®. I'm old enough to remember being heartbroken with everyone else when they were discontinued, and then elated when they were brought back in the same formulation. I always have on hand: the Blackwing 602 ("Half the pressure, twice the speed"), a favorite of John Steinbeck's; the Blackwing Pearl (a softer lead); and the Blackwing Matte (very soft).

Water soluble graphite is still a "new thing" for me, even though I've been using it and experimenting with it for a number of years now. I've explored a few brands, but I keep coming back to ArtGraf®. I'm not attracted to the "colored" graphite, but enjoy using their art sticks with water and a small brush to get rich blacks. I'm also enjoying using the water soluble graphite powder with graphite dust techniques for large areas, and then mixing with water and using with a brush for sharp detail. All of the water soluble graphite can be used seamlessly with graphite pencils. ArtGraf also makes a graphite putty. I keep insisting to myself that I have a use for it and it's a necessary item, but truthfully, for now it has just been very messy "play." The operative word is messy.

WATERCOLOR

To have the perfect amount of water at the ready for dry brush technique, especially when working on large paintings, I attach a white plastic bottle cap to a length of Velcro and wear it as a "ring" around two fingers on the inside of my hand. This allows me to keep a small amount of water close to the painting, without worrying about drips from the brush. It makes it much easier to control the amount of water too. I wear the old cut tube sock on my wrist that I carry in my travel and field painting kit on the same hand, so I don't have to reach for anything. A little porcelain palette completes the "studio in my palm."

Gretchen Kai Halpert
Illustrator, Educator

My field sketch kit has changed little since the GNSI article in 2013! My red case is now often a smaller tool roll (*see pictures*). Sketchbooks are either a small Moleskine® watercolor book or my medium sized handmade sketchbook with Arches® watercolor paper, Canson Mi-Teintes® toned paper, and Strathmore® 400 series. If I'm not hiking, this chair from Harbor Freight is perfect for sketching 5–10 minutes from the car. It offers a side table for supplies, lots of pockets, and a wide seat. Otherwise, I'm standing or sitting on rocks or on a backpacking stool.

Above: Sketch roll with contents and sketch of traditional candle making process.

Right: Chair from Harbor Freight

Above: Sketch Roll, a gift from the National Museum of Natural Science in Taiwan with Moleskine sketchbook.


FIELD OPS:
Developing A Portable Studio

Above: "Field Ops" from the *Journal of Natural Science Illustration* vol. 45 no. 1 (2013).

Dorie Petrochko

I use a simple watercolor pan set by Sennelier®, three water brushes, a Stillman and Birn® 8" x 8" sketchbook and a Hannemuhle® zig-zag accordion watercolor book, an Artgraf® graphite watercolor block, a set of 12 Faber Castell® watercolor pencils, three Micron® pens: .01, .005 .003, a Tombow® mono zero retrac eraser, a kneaded eraser and a KUM® portable pencil sharpener. Also a Staedtler® .03 technical pencil and several wooden pencils HB and 2B.

Sarah Morrish

Instagram: @illustrating_natures_details

My main field kit (by Vaschy) is contained within a nylon woven fabric pouch with a useful carry handle attached. It fits easily in a backpack too. In the zip-up compartments I keep a folding rule, erasers and specimen bags, and then in the first central area graphite pencils and my travel paintbrushes which are Da Vinci Kolinsky® sable. The handle of these screws off and forms a cover over the brush hairs when not in use.

The next central area of the pouch is removable; which is useful when I do not need to take so much of my kit, such as when I work in a museum setting. The Pigma Micron fine-line pens come everywhere with me. The water brushes are not used a lot, but are useful when I have restricted access to water in the field. I also carry a scalpel, tweezers and measuring dividers.

The base of the pouch is quite deep, and as you can see I can carry my Etchrlab® travel palette as well as another kit including: water pot, small palette, washi tape, plant tubes, hand lens, fold up magnifier, specimen pot, pen knife and a clip on macro lens for my mobile phone. This effectively turns my phone camera into a portable microscope. When I am working in a museum and am unable to take paints and fluids, I can fit my square or A5 sketchbook in the base of the pouch. The key thing for my field kit is portability and flexibility so that I can adapt it to my current needs.

C. Olivia Carlisle

My sketchbook supplies—small paint box, Velcro on bottom, that connects to Velcro on sweatband worn on the wrist. Sweatband can be used to wipe off brushes. The paints are handmade from Pinto Art Supplies® (Etsy).

Danielle Ivey

Creative Nature Adventures

I have used a lot of different supplies over the years, but I think I have found my go to portable field sketch kit. I was introduced to the Art Toolkit® through the Wild Wonder Conference and immediately thought it was such a brilliant idea. The Art Toolkit comes in two different sizes, the regular tool kit which is 6½" x 10" closed and the pocket, which is 5" x 7½" also measured closed. I purchased the pocket size. The Pocket Art Toolkit is small enough to throw in a cargo pocket, purse, backpack, or toss it in the car. It comes with a durable case, water brush, Sharpie® fine liner, a Moleskine® art sketchbook, water syringe and a small palette. I lost the fine liner, added two mechanical pencils, a pouch with three Microns and a Posca® paint pen, cheater glasses, a sharpener, eraser, hand lens, and a carabiner to hook it anywhere. I loaded my palette up with Daniel Smith® watercolors and white gouache. Normally I work in at least a 9" x 7" or larger sketchbook and am not a fan of working small but when I saw this kit I wanted to give it try. I now have no excuses not to sketch, this toolkit comes with me everywhere. I can even hook it to my water bottle. I have absolutely no excuses not to sketch anywhere, anytime. It has seriously become my go to piece of gear, even if I want to sketch in a larger notebook the toolkit provides everything I need.

I also did a review on YouTube: *youtube.com/watch?v=em4y2zbTX4k&t=674s*

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GNSI GOES VIRTUAL!

Building on the success of our first ever Virtual Conference last summer, the GNSI is excited to announce two new virtual series.

Education Series

The GNSI is relaunching the Educational Series Workshops, and this time we're bringing them to you virtually, so you can learn from experts in the field about selected areas of scientific illustration from anywhere in the world!

Join us in May for Mastering Photoshop™ with Frank Ippolito. Stay tuned for more details and announcements at *gnsi.org/workshops*.

Frank Ippolito

Symposia Series

The GNSI is excited to bring you a new online learning experience in the form of the GNSI Symposia Series, a collection of online lectures open to members only, free of charge. The series will take place every few months and cover a wide array of topics.

You can read more about the Symposia Series at *gnsi.org/gnsi-symposia*.