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The Sky Island News

Vol. 17 No. 6

June 2026

"To me, the fly is one of nature's great marvels and I have been captivated by them since childhood."

Erica McAlister

One of the great pleasures of my life has been to see so many fascinating places and wondrous animals and plants. It would be very difficult, if not impossible, for me to pick a single highlight of time in the field. They have all been special in their own way.

But another great pleasure is the people I have met on the journey. So many individuals that I have had the joy of meeting and spending time with. If you read this newsletter, or have attended a class, field trip, or festival, you are who I am talking about. Thank you for your interest in the natural world. Thank you for giving so generously of your time to allow me to do what I love to do. We have work to do but the natural world is in good hands.

I hope you like this month's issue!

June Field Trip

Mount Lemmon Mt. Bigelow Road Birding. Thursday, June 25. 7:00 – 11AM. Cost is \$10/person. Email (jeff@skyislandtours.com) to register.

LIMIT 15 PARTICIPANTS.

This month we bird the Mt. Bigelow Road in the Santa Catalina Mountains, walking along the graded dirt road for avian delights like Golden-crowned Kinglet, Hermit Thrush, and some warblers. We will meet in the McDonald's parking lot on the corner of Catalina Highway and Tanque Verde Road and carpool to the site. All vehicles will need a Coronado



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National Forest annual pass, an America the Beautiful Interagency Pass, or a day pass.

June Classes

Butterflies of Arizona. Wednesday, June 17. 6-8 PM. Cochise College Center for Lifelong Learning. Call (520)-515-5492 or visit the Center for Lifelong Learning website ([Center for Lifelong Learning – Cochise College](#)) to register. This is a hybrid class, students having the option of attending virtually via Zoom or in person at Cochise College's Center for Lifelong Learning (2600 E. Wilcox, Room J-115, in Sierra Vista).

Butterflies captivate us with their beauty, color, and graceful flight, and Arizona is home to an incredible variety. Take a closer look at the vibrant butterfly species found in southeastern Arizona, one of the richest butterfly regions in the country. In this class, you will learn how to identify common species, understand their life cycles, and discover why this area is such a hotspot for butterfly diversity. You will also explore practical, easy-to-apply tips for creating a butterfly-friendly yard, so you can enjoy these remarkable insects right at home. Come see butterflies in a whole new way!

The Wonderful and Bizarre World of Flies. Friday, June 19. 10AM-12PM. Las Campanas (565 W. Belltower Dr., in Green Valley). To register, call 648-7669 or visit <https://www.gvrec.org>.



Flies suffer from a public relations problem. On the one hand, mosquitoes, biting midges, and horse flies bite people and can transmit disease. On the other hand, flies are important pollinators, nutrient recyclers, and provide other ecosystem services. Many flies are beautiful insects. Others are predators of other insects. In short, they are a



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fascinating group. In this class we explore the order Diptera, the flies. There is a lot to like!

Gymnosperms. Friday, June 26. 10AM-12PM. Virtual Class Via Zoom.
Tucson Botanical Gardens. To register, use this link <https://tucsonbotanical.org/class-schedule/>. Part of TBG's Botanical Master class.



Gymnosperms include such familiar plants as pines, firs, spruces, ginkgoes, and many others. They make up a large part of northern and mountain forests but also occur in more arid areas. This class looks at the diversity and natural history of

these plants.

Pima County Presentations

These online programs are free but you must register in order to receive the Zoom link to the presentation. The programs are recorded and all who have registered will receive the link to the recording. If you have questions or need assistance, contact us at: eeducation@pima.gov.

Visit our Eventbrite page at <https://bit.ly/Nature-Online-Tickets> to register. Once registered you will receive a link to the Zoom presentation.

Adventures in Birding: Cormorants. Tuesday, June 2. 7-8PM. Virtual Presentation via Zoom. Free, but registration is required. To register visit



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<https://bit.ly/Nature-Online-Tickets>. Once registered you will receive a link to the Zoom presentation.

Cormorants are excellent swimmers and divers, found on coastlines and inland waterways around the world. This month we explore cormorants, sometimes also called shags.

Order Up! Talussnails. Tuesday, June 9. 7-8PM. Virtual Presentation Via Zoom. Free, but registration required. To register visit <https://bit.ly/Nature-Online-Tickets>. Once registered you will receive a link to the Zoom presentation.



Did you know that the Sonoran Desert is home to air-breathing snails, many of which are protected under the Sonoran Desert Conservation Plan? In this episode we explore these mysterious mollusks.

The World of Mammals: Jumping Mice. Monday, June 15. 7-8PM. Virtual Presentation via Zoom.

Free, but registration is required. To register visit <https://bit.ly/ticketsEE>. Once registered you will receive a link to the Zoom presentation.

Jumping mice are a small group of 12 species that are not often seen. They often live in areas of dense grass and are nocturnal. But they are prodigious leapers! Join us for a look at these under-appreciated rodents.

Lifestyles of the Smooth and Scaly: Herps of the Sonoran Desert Conservation Plan. Monday, June 22. 7-8PM. Virtual Presentation via Zoom. Free, but registration is required. To register visit <https://bit.ly/Nature-Online-Tickets>. Once registered you will receive a link to the Zoom presentation.



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We continue our celebration marking the 25th Anniversary of the Sonoran Desert Conservation Plan by looking at the 8 species of reptiles and amphibians that are covered in the Multi Species Conservation Plan.

The Hand Stander

The Grand Canyon State is home to a diverse assemblage of mammals, from Elk and Black Bears to Desert Shrews and Pygmy Mice. Did you know that the state has more species of skunk than any other? Somehow that information is yet to make it onto the tourist brochures, but I am sure that oversight will be corrected soon. Regardless of this slight, 4 species of skunk make Arizona home. One of them is the spectacular Western Spotted Skunk (*Spilogale gracilis*).

Spotted skunks are the smallest of the skunks. Western Spotted has a head-body length of 8 – 11 inches, tail length of 4.5 – 6 inches, and weigh about 2 pounds at most.



The pelage of these animals is black with 3 horizontal stripes anteriorly and 3 vertical stripes posteriorly. A white spot is present in front of each ear and on the snout.

Skunks are omnivores that

feed mostly on insects, small mammals, birds and their eggs, seeds, fruits, and carrion. During the cooler months, mammals make up a larger percentage of the diet.



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Western Spotted Skunk is nocturnal and rarely observed even though it can be common. They seek shelter during the day in hollow logs, burrows, tree cavities (they are good climbers), and under rocks or buildings. They do not hibernate but they become less active in very cold weather.



These animals have a fascinating warning display. The black and white coloration of skunks is a visual warning signal to potential predators that they can ably defend themselves. If the visual signal is ignored, skunks will stamp their feet and hiss. If the situation escalates further, spotted

skunks do a handstand with the tail fur flared into a plume. They can eject their musk from this position. More typically, they will bend their body into a U-shape with all 4 feet on the ground, both head and rear directed toward the threat before ejecting musk. They can also spray musk while up in trees.

The musk itself is yellowish and housed in glands in the anus that are surrounded by muscle. Several different compounds with names like 2-phenylethanethiol and 3-methyl-1-butanethiol make up the musk. In addition to the foul smell the musk can cause irritation and visual impairment if sprayed into the eyes.

The 2 species of spotted skunk currently recognized in the US (more on that later) can be differentiated by their reproductive biology (geography and genes also help). Western Spotted Skunk breeds in September but do not give birth until April or May. This is due to delayed implantation of the



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embryo into the uterine wall. The total gestation time is 230 – 250 days but fetal development after implantation is 30 - 50 days.

In contrast, Eastern Spotted Skunks breed in March – April and give birth in May – June. Thus the 2 species are reproductively isolated.

Litter size in Western Spotted averages 4, ranging from 2 -5. Young are born with eyes closed and are nearly hairless. They reach sexual maturity in 4 -5 months. The record longevity in captivity is 9 years 10 months. Sources of mortality of wild Western Spotted Skunk include vehicle collisions and trapping, poisoning, and shooting by people. Golden Eagle is a known predator (most birds do have little or no sense of smell).

Recent genetic work suggests that both Western and Eastern Spotted Skunks are actually multiple species. More work is needed to clarify the taxonomy of these animals. If this is indeed the case, *Spilogale gracilis* is found in northern and central New Mexico and the northwestern corner of Oklahoma's panhandle. The form in Arizona, most of New Mexico, and western Texas would be *S. leucoparia*. Eastern Spotted would be *S. putorius* (the current name for the species) and found in the current eastern part of the species range. The western part would be *S. interrupta*, which ranges west to most of Oklahoma and Texas. It will be interesting to see how all of this works out.

The genus name comes from Greek words meaning 'spot' and 'an animal of the weasel kind.' Skunks were formerly placed in the weasel family (Mustelidae) but are now recognized in a family of their own (Mephitidae). The species name is Latin for 'slender.'

Perhaps you will get to see this black-and-white furred gymnast sometime soon. Just make sure to keep a respectable distance.

What's in a Name – Cormorants

Cormorants are large birds most often associated with coastal habitats but also range inland to ponds, lakes, and rivers. Unusually for a swimming bird, cormorants cannot waterproof their feathers and are often seen perched, wings spread, drying the plumage. During the breeding season,



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many cormorants sport snazzy plumes and bright coloration of the bare parts. They are placed in the order Suliformes and are related to frigatebirds, anhingas, boobies, and gannets.

The word cormorant is derived from an Old French word which itself was derived from Latin and means 'sea raven,' as they were thought at one time to be corvids. An alternative name applied to some cormorants is shag, which is a reference to the shaggy crest noted above.



Neotropic Cormorant
William Richards

The most frequently observed cormorant in southern Arizona is Neotropic (*Nannopterum brasilianus*), which, at 26 inches in length, is the smallest cormorant in North America. The genus name means 'dwarf winged,' as the genus also include the Flightless Cormorant (*N. harrisi*) of the Galapagos. In 2021

the American Ornithological Society raised *Nannopterum* from synonymy with *Phalacrocorax* and moved Neotropic and Double-crested Cormorant into *Nannopterum*. Formerly known as Olivaceous Cormorant, Neotropic was described in 1789 by German ornithologist Johann Gmelin for specimens collected along rivers in Brazil. The common name reflects the largely Neotropical distribution of the species.

The other cormorant birders are likely to observe in Arizona is Double-crested (*Nannopterum auritum*), described in 1831 by French naturalist Rene Lesson. The specific epithet is Latin for 'eared,' a reference to the breeding tufts that are suggestive of ears. At home in coastal and inland waters, Double-crested is the most widespread of North America's cormorants and is the default species in most of the continent. Larger, thicker, and shorter-tailed than Neotropic, the 2 often occur together in southern Arizona.



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The largest cormorant in North America is the Great Cormorant (*Phalacrocorax carbo*) found in the North Atlantic from Maine to Greenland. It ranges widely in the Eastern Hemisphere in Eurasia, Africa, and Australia. At 36 inches in length it is almost a foot longer than Neotropic. The rather tongue-twisting genus name is the Latin word for cormorant. It was formerly a much larger genus but recent taxonomic changes have reduced the number of species included from 17 to 11. The species name is Latin for charcoal, referring to the largely black plumage of many cormorants. Carl von Linne described the species in 1758 from birds collected at nesting colonies in the North Atlantic.



Red-faced Cormorant
Gerrit Vyn

The 4 species in the genus *Urile* were, like Neotropic and Double-crested Cormorants, which were formerly placed in *Phalacrocorax* until genetic data showed deep divergence between the 3 groups. The genus name is the Russian word for the Red-faced Cormorant (*U. urile*). This genus is coastal

on both sides of the North Pacific. Red-faced Cormorant breeds from Alaska, Aleutian, and Kuril Islands to the northern Sea of Japan. Relatively poorly known and often confused with Pelagic Cormorant, Red-faced was described by Gmelin in 1789 from birds collected in Kamchatka, Russia.

Pelagic Cormorant (*U. pelagicus*) is the smallest cormorant in the North Pacific (26 inches). It has a thinner bill and less red on the face than Red-faced, which is also larger (31 inches). It was named in 1811 by Prussian zoologist Peter Simon Pallas from birds collected in Kamchatka and the Aleutians. The species names derive from the Latin word for 'of the sea.'



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The name is something of a misnomer as the species is not really pelagic (coastal better describes the habitat).



penicillatus), the largest of the family on the West Coast. The species name derives from Latin words meaning 'brush tail,' referring to the brush-like tufts of the breeding plumage. The common name is a patronym honoring German zoologist Johann Friedrich Brandt, director of the

Zoological Museum at the Academy of Sciences in St. Petersburg, Russia. Brandt scientifically described the species in 1837 but it is unknown where the material he used to do so originated. Brandt did not name it after himself, as indicated in the scientific name. The common name came later and from someone else (it is considered poor taste to name organisms after oneself).

Cormorants are impressive swimmers and divers, adept at catching fish, squid, and other prey. It is odd that they lack the uropygial gland that produces oils that other birds use to waterproof their feathers. But they seem to do just fine without this luxury.

Black-headed Snakes – Scaly, Worm Look-alikes

The natural world is chock full of creatures that go about their lives unnoticed by most people. These unobtrusive animals may lack the bright colors, beautiful songs, large size, and other attributes that make others popular, or at the least detectable, to the least observant among us.

However, sightings of the skulking beasts is always an unexpected delight and opens a window into their mysterious world.



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An example of such beasts are Black-headed Snakes, small serpents in the genus *Tantilla* of the Colubridae. There are 11 species of Black-headed Snake in North America, with 4 found in Arizona. Overall, there are 67 species ranging from the southern US to Argentina.

There are 2 factors that makes these snakes elusive. They are easily overlooked because they are small and thin, with maximum lengths of about a foot to 16 inches. Second, Black-headed Snakes spend most of their lives underground or beneath objects like rocks, logs, and debris.

Recently I was out doing some yardwork that required some digging. While doing this, my wife noticed 2 small things crawling in the newly turned soil. She matter-of-factly said, 'I don't see worms very often.' Looking down, the 'worms' were actually Southwestern Black-headed Snakes (*T. hobartsmithi*), also called Smith's Black-headed Snake. My wife was correct – there are few worms in the desert but there are snakes that easily pass for them!



This species tops out at about a foot in length. The body is gray, often with an olive tinge. True to its name, the head is black, with the rear margin straight to convex and is sometimes bordered by a faint light collar. The belly has a broad red stripe.

Southwestern Black-headed Snake is found in a variety of habitats, including the Arizona Uplands desert scrub, riparian woodlands, conifer forest, semi-desert grassland, and chaparral. While it may be common, the snake's subterranean habits would suggest otherwise. If not uncovered during yardwork or some other type of excavation, these little snakes can sometimes be seen crossing roads at night.



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Like other *Tantilla*, Southwestern Black-headed Snake feeds on invertebrates, including centipedes, scorpions, and larval insects such as caterpillars and beetle grubs.

It is known that a clutch of 1 – 2 eggs (occasionally 3) is laid during the summer. Mating occurs in the spring (possibly also in the fall). The reproductive biology of Southwester Black-headed Snake is not well known.

This species was described by Edward Taylot in 1937 from specimens collected near Guaymas, Sonora. The genus name is Latin for ‘a small thing.’ The species name and alternative common name are patronyms to honor American herpetologist Hobart Smith, who collaborated with Tayloe on many projects.

Southwestern Black-headed Snake is a secretive animal that is more common than sightings would suggest. Be on the lookout for them the next time you are doing some yardwork. You may just get an unexpected surprise glimpse of these elusive serpents!

Butterfly Profile: Two-tailed Swallowtail

A stroll through mountain canyons during the warm months of the year throughout much of western North America will yield sightings of a big lemon yellow butterfly effortlessly soaring through the air. This is Two-tailed Swallowtail (*Pterourus multicaudata*). It is such an impressive insect that it was named Arizona’s state butterfly in 2001.



Two-tailed Swallowtail is one of the largest butterflies in North America, with a wingspan of up to 5 inches. The bright yellow wings are crossed with black stripes that are narrower than those of Western Tiger Swallowtail (*P. rutulus*), making a good field mark for separating them across the broad zone of range overlap. The rear margin of the hindwing is extensively black with orange and



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blue highlights. The underwings are similar in pattern but paler yellow with more blue on the hindwing, which is more extensive in females. The hindwing has 2 'tails' on the rear margin.

The main habitat used by Two-tailed Swallowtails in southern Arizona is mountain drainages but can occasionally be seen in desert valleys. The lowland sightings may reflect local movements between Sky Island mountain ranges. Further north the range of habitats occupied is broader and Two-tailed Swallowtails can be found almost anywhere the caterpillar food plants occur.

The larvae consume chokecherry (*Prunus serotina*), ash (*Fraxinus*), and hoptree (*Ptelea trifoliata*) throughout most of their range. Arizona host plants add Mexican Orange (*Choisya dumosa*) and Arizona Rosewood (*Vauquelinia californica*).

Females lay a single egg on host plant leaves. The caterpillars can be green, orange, or bird dropping mimics. They have a pair of eyespots on the thorax.

In much of their range, Two-tailed Swallowtail has a single flight per year. In southern Arizona, however, they have multiple generations per year and records span mid-January to mid-November.

If you head up into the mountains of southern Arizona this summer to escape the heat, you will likely encounter these beautiful and impressively large butterflies. The sighting will be one of the highlights of the day!

Moth in the Spotlight

One of the joys of mothing, indeed insects in general, is the opportunity for discovery. Practically every time I turn on the lights, gaze upon flowers, or turn over a log, there is a good chance that I will see something that I have not seen before.

One morning when I was checking the moth trap I saw a gem that I did not recognize but it was distinctive. Upon consulting some of my reference books and a couple of online resources, I was able to identify the mystery



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moth. I was looking at a Desert Bantam (*Psuedoschinia elautalis*), a member of the Crambidae.



The forewings are ocher and white, with the median area paler than the basal and terminal areas. The antemedial and postmedial lines are dark brown and border the median part of the forewing. The hindwing is white but is covered by the forewings at rest.

The genus name means false Schinia, a reference to the similarities in pattern between Desert Bantam and the flower moths in the genus *Schinia*, which are in a different family (Noctuidae).

There is some confusion regarding the food plants of Desert Bantam caterpillars. Some, including Seabrooke

Leckie's new *Moths of Western North America*, state the food plants are unknown. Others, however, claim that prickly pear, cholla, and other cacti are used.

The flight season of adult moths is during the warm months of spring and summer. The Moth Photographers Group website has March – August. The range of the species extends from southeastern California and southern Nevada to Texas.



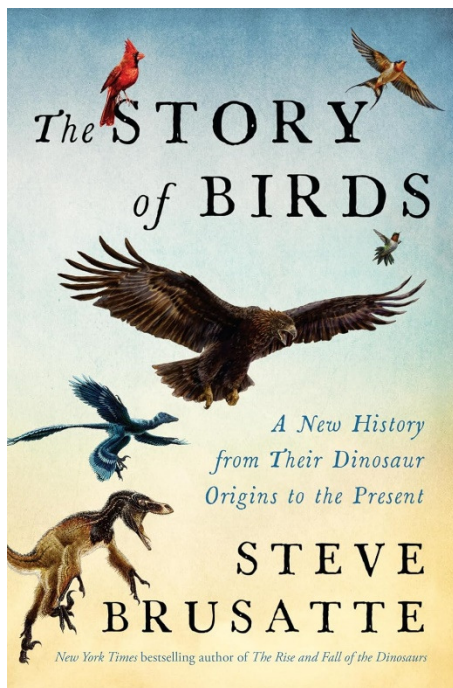
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Book Review *The Story of Birds.* Steve Brusatte. 437 pages. Mariner. 2026.

Birds are remarkable creatures. No matter where you are on planet Earth, there are likely birds nearby. They dazzle with brilliant colors. Their voices are the largest element of Nature's soundtrack. They amaze with their long distance migrations. Ornithologists recognized over 11,000 species of birds alive today.

But the birds we see today are the manifestations of over 150 million years of evolution. Where did they come from? Steve Brusatte's fantastic new book explores their journey from the Mesozoic Era to the present. It is a wondrous journey indeed!

I have reviewed two of the author's offerings in this space in the past – *The Rise and Fall of the Dinosaurs* and *The Rise and Reign of the Mammals*, both of which I highly recommend. His new book continues the excellent storytelling of its predecessors.



Brusatte is from Illinois but lives in Scotland, where he teaches at the University of Edinburgh. He has a gift for breaking down complex topics into a form that any of his readers can understand (not all PhDs can do that) and he does it in a lively fashion. He makes these long extinct animals come alive. While reading the book I almost felt as if I might see an ancient bird when I look outside.

The book begins with a chapter, *Birds are Dinosaurs*, which goes back to the very origins of the creatures we call birds. We meet the theropod dinosaurs (the coelurosaurs) that started the bird lineage. While the birds are dinosaurs idea is now widely accepted it was not

always so. But in these long gone beasts, like *Velociraptor*, which by the way, the *Jurassic Park* films got very wrong, we see the beginnings of birds.



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One cannot talk about the evolution of birds, or evolution in general, without *Archaeopteryx*, the earliest creature to be called unquestionably a bird. This creature flew (probably not with the skill of most modern birds) over the heads of *Tyrannosaurus rex*, stegosaurus, and other fantastic beasts that live on in fossils, movies, books, and our imaginations.

The bird story continues after the asteroid struck the Earth near the Yucatan that signaled the end of the dinosaurs (at least the non-avian dinosaurs). From the ashes of that catastrophe rose the groups that dominate the planet today – mammals and birds. Both radiated in dramatically rapid fashion to take over the niches formerly occupied by dinosaurs. Most modern bird lineages appear in the fossil record within a few million years after the asteroid hit.

Brusatte introduced readers to birds like *Vegavis* and others that arose during this time. As the story continues we meet terror birds, demon ducks (what a cool name for a fantastic beast!), and birds with wingspans that dwarf the largest flying birds alive today.

Brusatte explores one of the reasons for the success of birds – they are smart! Many modern birds have significantly more neurons in their brains than mammals of equivalent size. One of the themes of bird evolution is downsizing – they generally got smaller for better flying abilities. But they did not lose neurons in their brains. Instead, they just packed them more tightly together.

The Story of Birds is brilliant. I was completely absorbed reading it. I would start a chapter and next thing I knew, I had read 50 pages. If you like birds, I think you should read this book. It tells the tale of how birds got to the modern day. Even if you don't like birds, this is a remarkable story of evolution.

We are fortunate that Dr. Brusatte is such a good writer with the gift of being able to make science digestible for non-scientists. All of his books, including his newest, are fantastic. Do yourself a favor and read them. You won't be disappointed.

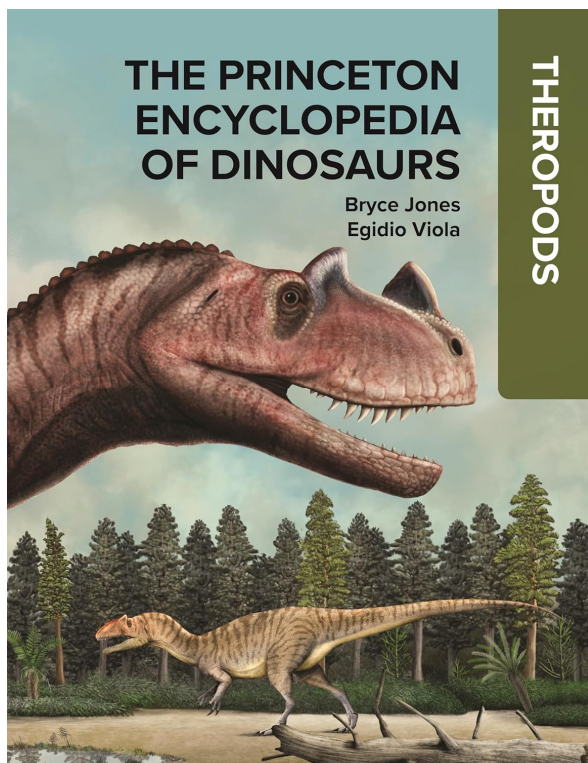


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The Princeton Encyclopedia of Dinosaurs: Theropods. Bryce Jones and Egidio Viola. Princeton. 2026.

Princeton University Press has published many volumes about ancient life over the past several years. To this list can be added *The Princeton Encyclopedia of Dinosaurs*, a trilogy that summarizes much of what is known about non-avian dinosaurs. The other 2 volumes cover the ornithischians and sauropods and will be reviewed in upcoming issues of the newsletter.

Theropods were the carnivorous, bipedal dinosaurs that is the lineage that eventually led to birds. Included in the group are such famous dinosaurs as *Allosaurus*, *Tyrannosaurus*, *Velociraptor*, *Deinonychus*, and more. They were the stars of the *Jurassic Park* franchise, despite some inaccuracies in their portrayal.



The book begins with a brief Introduction that discusses geological time periods, plate tectonics, and a how to use the book sections. Also included here is mention of how the brilliant artwork by Viola was produced. We clearly do not know the colors and patterns of fossils (with some exceptions) and how these animals are portrayed in this series is defined.

The main part of the book is divided into several chapters, each discussing a particular group of theropods, proceeding in taxonomic sequence from the most primitive to most derived. The bird-like theropods are, therefore, at the end. Each chapter begins with a brief discussion of the classification of the group, accompanied by an illustrated 'family tree' or phylogeny.

Each chapter includes species accounts of the members of that group, which are packed with information. The main body of the account includes several



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paragraphs that discusses such information as the origin of the name, how and where the fossils were found, the skeletal parts that have been found so far, inferences about the biology, and taxonomic debates regarding the fossil. Also included is a geological timeline that shows the period when the dinosaur lived, a silhouette showing the skeletal elements discovered, a map showing the location of the fossils, and its classification. There are also gray silhouettes that show either a mouse, cat, dog, or human figure that allow for a quick size reference.

Each account includes the authors of the scientific description and its date, length, height, hip height, body mass, and a bar graph showing the amount of the skeleton found. Each account also includes a beautiful illustration by Viola that impressively rendered. As discussed in the introduction, the colors and patterns of these animals is unknown and probably always will be. While the form of these dinosaurs is accurate, based on the hard evidence provided by the fossils, the colors and patterns are more guesswork. Regardless, the illustrations are fantastic. I like to think that the portraits are of how the animals looked in reality. If that is true, some theropods were spectacular!

Many readers, like me, were (and are) fascinated by dinosaurs and other ancient life. These books do an amazing job of summarizing what is known about these long lost beasts and portraying them in sensational artwork. Dinosaurs may not be your thing, but this book and the others in the series will make you want to invent a time machine and go back in time to see them in the flesh. Except for some of the really big ones, like *Tyrannosaurus*, because that is nightmare fuel.

New Species Report

This month we go in a different direction for this column. Instead of describing a new species of animal, we look at new species from an entirely different group. While new species of animal are described on a daily basis, the same thing is happening elsewhere in the biological world. Fungi, for example.

A paper came out recently describing 3 new species of Earthstar (*Geastrum*) from China. Earthstars are related to puffballs, those white rounded



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mushrooms that kids enjoy stomping on to see the cloud of spores be released. Subterranean and round when young, they emerge from the soil when mature. The outer layers split into 3 to 6 star-like rays, revealing the puffball-like spore case. They look a bit like a flower (the rays forming the petals, and the spore case the center) from a H. P. Lovecraft novel.



Chinese mycologists used morphological and genetic analyses to examine earthstar diversity in the country. Specimens collected in Heilongjiang, Jilin, and Shandong provinces proved to be not 1 but 3 new species. The morphological analysis used characters such as size, color, and shape of different layers of the fungus. Genetic

analysis looked at 3 genes.

The new fungi, *G. capillitiononramosum*, *G. villopanosum*, and *G. kunyuense*, raise the number of earthstar species to about 130 species, with 43 now found in China. All were found in temperate forests of eastern and northeastern parts of the country.

It is a fact that many undescribed fungi await discovery on all continents. One of the problems with describing new fungal species is that there are few mycologists out there, though the ones that are out there are very enthusiastic about their favorite organisms. Another challenge is that species that look alike may not be the same thing. There are examples of fungi in Eurasia and North America traditionally classified as the same species that turn out to be different species on each continent after more detailed examination.



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This is true on a single continent as well. The Barometer Earthstar (*Astraeus hygrometricus*), a widespread mushroom of sandy soils, is actually 3 species based on molecular work.

While many fungi are edible, earthstars are not, as they are very fibrous. But unlike some mushrooms, they do not contain deadly toxins. They are, however, very distinctive fungi that consume dead or decaying organic matter (such organisms are known as saprobes) and add a little flair to their habitats.

Did you know?

... that a bird not seen since 1931 was recently rediscovered? Rusty Lark is found in arid savannas of Niger, Chad, and Sudan. Possible reports of the species came in the late 1960s and mid-1980s but they could not be proven. The French duo Pierre Defos du Rau and Julien Birard work for the Office Français de la Biodiversité and Tour du Valat, respectively, were in Chad doing waterbird surveys. They had been studying up on African larks, as there are many of them.

They stopped at a site looking for a couple of other species when they spotted a bird on the ground. They snapped some pics and then went on looking at these other birds. After 20 minutes, the other species had disappeared but the lark was still there. They took more (and better) photos. Looking at them later they realized that they had found a bird not conclusively seen in almost 100 years. Not only that, but the duo also got the first photos ever of the species!



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Congratulations to Pierre and Julien on this extraordinary find! Another example of never knowing what you might find. You just have to get out and look.