

Oology with Dr. John Bates

Oologies Podcast

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Oh haaaay. Hi, it's that lady from your mom's book club, the one who apologizes even when she brings cookies, Alie Ward, back with another episode of Oologies. Oh man! I never knew I needed this episode.

We've had an episode about ornithology (birds), but now, we're gonna get to the heart of the matter. And by heart I mean butt, and by butt I mean cloaca. What is a cloaca? Well, as I've said before, it's like the home button on an iPhone, like if Steve Jobs has designed an orifice; a multipurpose lil' boop that's good for sensual adult times, egg laying, and poo. Today, we'll be cracking wise about eggs. Oh, so many eggs! So many glorious eggs, what a wonder!

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I read all of your reviews. I'm upfront about it, alright? I'm like a concerned parent, reading the diary you left open on the counter. So to prove it, just like I do every week, I'm going to shout out one reviewer, and this week I would like to thank Beyonce23706 (maybe that's Beyoncé? Perhaps it's a different Beyoncé), who says:

This podcast makes me want to make the world a better place. I love hearing all of these people who I would normally think of as existing on another plane, and finding out that they're just people, and I could be one of them too!

I read that earlier today and literally started crying, so thank you, Beyoncé, for that!

So, let's get the shell back to this egg-cellent episode, shall we? (By the way, THAT is why I call myself your Dad.) Okay, so why is it called Oology? Why are there so many goddang O's in this word? It comes from... one guess! Yes, the Greek word 'oion' meaning egg, and it's a branch of ornithology that deals with eggs. I would like to think the "oo" in Oology is because them O's look like lil' eggies! But, that's not true.

Okay so this interview - what a treat! I was in Chicago for a few days and I reached out to the wonderland that is the Field Museum, via The Brain Scoop's Emily Graslie (hey gurl!), and they hooked me uuuuuup. Not only did they give me a quiet room to record the Epidemiology episode with the Erins of *This Podcast Will Kill You*, BUT ALSO, they were like, "yo we got an egg dude for you."

So, Kate Golembiewski, I owe you, like, ten puppies. Kate met me at the Field and she walked me through the ornithology lab:

Alie: Whoa, whoa! Hiiii, so many jars!

Up some steps:

Alie: You know, what I didn't realize also, is that this museum is so big that our commute from one office to the other, that's a good 10-minute commute! I should have left a trail of bread crumbs.

To the office of an egg-spert in bird babies. A kind-faced bespectacled gentleman with thick salt-and-pepper hair and a desk piled with egg books and field notes. It was a Friday afternoon at 4pm and I hated to keep him from his weekend, so some of the questions and answers are super rapid fire. But then, we had such a jolly time hanging out that afterwards he offered to give me a tour of the egg bunker, and hell yes I took him up on that.

So, throughout the interview are the audio notes from that tour as we continued to gab in the stacks. This episode is a feast of facts about speckly eggs, and outlaw birders, and falcon mysteries, and vaults of delicate treasures, and can you eat cookie dough? And modern research done with old artifacts, and there's some Easter bullshit, and chicken hatching, even snake trivia, it's got it all! So buckle up, alright?

Let's settle our feathers and ready ourselves for the ornithological treasures of Oologist, Dr. John Bates.

Interview in John's office

Alie Ward: Hi, nice to meet you! Thank you for talking about eggs with me.

Dr. John Bates: Nice to meet you.

Alie: Are you technically an oologist?

John: No, I am not.

Aside: *[record scratch]* What?! Not an oologist?! He literally edited *The Book of Eggs*. It's called, *The Book of Eggs* and his name is on the cover. Not an oologist? But he studies bird eggs! Okay *[sighs]* I gotta breathe... More on this situation in a minute. But he is definitely an evolutionary biologist/ornithologist, and officially an associate curator of birds AND head of the Life Sciences Division at the Field Museum in Chicago.

Alie: What do you study about birds? Do you study particular eggs of different species? Feathers? Beaks? Like, what's your bag?

John: Well, I'm a curator, and we have one of the world's greatest collections of birds here in the museum, and so one of the things I've been interested in over the years is all aspects of avian biology. The egg part actually came about because we have an egg collection and I feel like it's my responsibility to know something about eggs.

Aside: So, after the interview at his desk, John took me down a labyrinth into the bowels of the museum, stuffed with millions of scientific artifacts. For real, actually millions of artifacts. What you see on displays at museums is a laughably small representation of the actual shit they have in files, and drawers, and boxes behind the scenes. So, behind these scenes, we came upon a room labelled 'Egg Collection', to which John had the keys.

Tour audio

[door opens]

Alie: Wooooowwwwww!

John: So, this is our egg collection.

Alie: What! This looks like a bank bunker! They really look like you're breaking into a bank vault

John: They do, yeah.

Alie: Oh my God... So how many specimens in this room?

John: So, probably around 100,000 eggs

Alie: *[gasps in awe]* Wooooowwww.

Interview in John's office

Alie: But, so, why do you say you're not an oologist even though you study bird eggs?

John: Yeah, that's because... basically I don't know if you could find anybody who would describe themselves as an oologist anymore. It's an extinct ology at some level, which is too bad. That's actually one of the things that some colleagues and I are interested in, we're actually working on a paper right now trying to encourage people to remember. And that is that there are these incredible collections of eggs around the world and a lot of times they're pretty underutilized or people tend to forget they're there.

So, oology was really popular in the 1880s to the 1920s or so, and then it died out. Some of that was because people were a little concerned that there might be issues with respect to collecting eggs, in terms of affecting the population biology of birds and things. And so, it kind of fell out of favor with a lot of people.

Aside: Soooo, oology can mean the study of eggs, but it can also refer to the hobby of collecting wild bird eggs, also called *egging*. Now, at some point, these amateur egg scholars stopped egging because it became illegal. People were like, well, you *are* stealing babies. Now, Wikipedia says, “Despite this, some of those who engage in egg collecting show considerable recidivism.” (That’s legal speak for doing bad shit again, like, chasing the dragon egg.) Wikipedia continues:

One, Colin Watson, was convicted six times before he fell to his death in 2006, while attempting to climb to a nest high up in a tree. Another individual has been convicted nine times and imprisoned twice. And a third has been convicted 51 times, imprisoned four times, and barred from entering Scotland during the breeding season.

People are addicted to egg collecting!

Also, one historical amateur ornithologist, Charles Bendire - whose stash of 8,000 formed the base of the Smithsonian’s egg collection - climbed a tree for some hobbyist egg thievery and was rightfully (if you ask me) shot at and scared away, but escaped climbing down the tree *with a raptor egg in his mouth*. And the egg was so big that he had to (and was willing to, rather) have his teeth broken to get it out of his mouth. Like a cloaca face. So, these were the oologists of yore. Perhaps that’s why the term fell out of favor.

Interview in John’s office

John: But then the other thing that happened was the advent of things like cameras, and suddenly you could make an argument that you didn’t need the specimen per se, if you could take a picture of the eggs.

Alie: Do you think that if you’re not out actively collecting and studying eggs and you’re not an oologist?

John: Well, I like to describe it, in an interesting way I think, from the perspective of humans, that on some level it’s like pediatrics. Here’s this field where people study children, and this is a field where people studied eggs, but it’s a specialization within pediatrics, right? They studied a specific thing, and I think that in part it was just because collecting eggs kind of literally fell out of favor, and so the term “oology” actually fell by the wayside at some point.

Alie: I think it’s time to resurrect it.

John: That’s actually... There’s a lot of science that can be done with eggs.

Alie: Yeah! So, tell me about the collection you have, and what do you like about eggs? Because I feel like you have to be into them in order to study them. I think aptitude is backed by passion, I’m guessing. So, what is it about birds and bird eggs that you love or that you’re drawn to?

John: So what I'd say, eggs themselves are just beautiful things in nature, for one thing, but when you look at these collections you start realizing that they're incredibly valuable pieces of our understanding of early natural history. One of the things I always like to say to people is that you go back to our collections of bird specimens from the 1880s, a lot of times they have very little information on them.

But with the egg collections, it's very common for them to have these detailed nest cards, which describe exactly when the person found the nest, how many eggs were in it, what kind of tree it was in, very detailed locality information. And so, these guys were actually collecting really excellent natural history data, probably 10 to 20 to 30 years earlier than a lot of the specimen collectors were. So, it's incredible data. As a matter of fact, one of the things we're trying to do right now is work on various projects where we can use these data to look at what's going on today.

Aside: So it's kind of like, eh-h-h-h thank you for nest plundering back then, you monocled derelicts, but yeah, no, we don't do that now. That's not a pastime. Let's just play video games or scroll through pictures of other peoples' vacations on a tiny screen. But, the *dates* in all of those amateur egg collections are very helpful.

John: So, for instance, we can look at nest laying dates for birds in the Midwest and ask the question... If we have data from modern birds on when they were laying, (and this is based on field observations from some of my colleagues), we can look at individual species and ask the question, are bird populations in the Chicago region laying their eggs at different times than they were historically? And it looks like the dates of laying have advanced, actually, which is consistent with some of the potential issues that you'd expect due to climate change.

Alie: Right.

Aside: Climate change IS a biggie, as are the effects of pesticides and pollutants. So, one huuuuge detective story is often cited when the topic of vintage eggs comes up:

Tour audio

John: When I show this to people and I talk about why we have these collections, one of my favorite examples is peregrine falcon eggs. So, these were collected in the 1890s in North Dakota.

Alie: Oh my god, wow!

John: In the 1960's, along with ospreys and bald eagles, peregrine falcons had their populations plummet, and peregrine falcons actually went extinct in eastern North America. What was going on is that they weren't having any reproductive success, and it was because every time females laid eggs, they would start sitting on them to incubate them, and they would crack. And scientists thought that this pesticide, DDT, was causing eggshell thinning. One of the big pieces of evidence that led them to ban DDT in the US was this study by these

guys named Hickey and Anderson, where they went in and they measured pre-DDT era eggshell thickness in these birds, compared with post-1960 (during the DDT era) eggshell thickness, and they were able to show that they were demonstrably thinner in a bunch of the key areas.

It was a great scientific design that was possible because they had access to these collections, and what I always like to point out is that this guy that collected these things (Forsyth, in 1917) had no idea that 40-50 years later his eggs would be used for a study like that.

Alie: Right. It's so cool to see current research being done on specimens that have been collected 100 years ago.

John: Exactly.

Aside: So just think, some of the citizen science you do today might help future generations to study, like, which plants existed before the robots that we download our consciousness into took over the earth and mined all the gold to make toilets and then darkened the sky with clean coal emissions... is that too dark? [*silly voice, Gilly from SNL "Sorry"*]

Alie: When they would collect the eggs, would they blow the eggs out or would they just rot? What was happening?

John: Yes, they would drill a little hole in them. It was a real art, and they were really good at it! They would carefully inject a little bit of air, and once you do that you can blow the contents out of a very small hole and you're left with the eggshell.

Alie: Can you explain to me how an egg is formed? Because it is kinda odd to be like, "hi, I'm a bird, I'm soft, I'm fluffy..." and then BOINK, there's this hard thing that comes out of your cloaca – what IS it?

John: Basically, the female has this developing ovum in her oviduct, and it goes down, and there are glands that produce the shell material, and it gradually rotates and forms, and you get the production of this perfectly layered, hard and yet thin thing, covering that developing embryo in an incredible way. And then there are all kinds of interesting things that happen after that, with respect to making the eggs colorful or spotted or things like that.

Alie: Yeah, so is it like layers on a jawbreaker, like layer after layer of calcium? Or is it like one layer of shell that happens at once?

John: My understanding of it is that it's a layer thing, and as they're going down the oviduct, the shell gland is actually layering on that material, so that when it comes out it's a perfectly formed egg.

Alie: And then, where is the airbrushing station in the oviduct? Like, where are they putting on the speckles and, like, the robin egg blue colors?

John: It's done as it's passing along through the cloaca and in the oviduct. There are these melanin producing cells that will actually make the color. But some of the aspects of that are still debated by scientists, we don't know how some colors on certain types of eggs are made.

Alie: I understand we're surrounded by these beautiful posters of eggs, and I understand eggs that look like granite. Boom. "Is it an egg or a rock? I don't know, I can't tell. I'm not going to eat it." I get it. But a bright blue Robin's egg in a green tree.... What's happening there? That seems so conspicuous.

John: Yeah. So, quick answer: we don't know. But if I showed you the eggs of a tinamous, which are neotropical birds, a bunch of species that look like little chickens, that run around in the forest or open country, and they lay these incredibly enameled eggs that can be anywhere from blue to brown to green, and they're just incredibly enameled. And we don't know why they do that. One hypothesis, which is kind of crazy, is that they want it to look so weird that no predator would look at that and go, "yeah, that's something we should eat."

Alie: *[laughs]* They want them to look like a weird toy or a piece of ceramic or something?

John: Yeah, because they literally don't look like anything you would find in nature.

Aside: So, down in the oo-vault John showed me another egg that looked like a prop. Like, no way did a bird butt make this:

Tour audio

Alie: Oh my god, are you kiiiiidding meee?

John: These are these common murre eggs. This is a cliff nester. You can see, these are from Ireland and they would have been laid by different females, such that the female could actually individually recognize each egg. And you can see these things, like all these little squiggles, come from the egg twisting as it's coming down the oviduct.

Alie: It looks like you just took a sharpie or marker to them. It looks like you let your like four-year-old nephew color them in, you know what I mean? Or Jackson Pollock. Oh my God, they're gorgeous though!

John: You can see this one sat for a while

Alie: Oh, inside of the oviduct? So it gets more of that speckling from all of those cells?

John: Exactly.

Alie: I never knew that's how it happened! I mean, it's so crazy to think of it twisting and turning and making those marks.

Aside: Just squiggling down the bird-butt canal, getting a streaky paint job on the way? It's so delicately, magically gross and beautiful.

Interview in John's office

Alie: What about egg shape? Why are they the shape that they are?

John: So that's an interesting question that's been studied and published on fairly recently, and one of the hypotheses is that it's related to body shape at some point. Eggs have a fairly defined shape for the most part, but there are really interesting aspects of certain eggs. For instance, eggs of some of the birds that breed on cliffs, like common murres, have a thick base and then a long pointed tip, and one of the hypotheses is that they've evolved that way because they're on a cliff face, and if you roll that egg on a cliff face it'll just roll in a tight little circle because of its shape. Now, some other people have come along and said, no, that's not what's going on, but that's a plausible explanation for that egg shape.

Alie: And, do you eat eggs?

John: I do eat eggs.

Alie: Oh ok, so you don't have a situation where you're like, "Oh I can't do it!"?

John: Yeah, no.

Alie: Is it bad for us to eat chicken eggs?

John: So, I always like to say that my pediatrician used to flip back and forth every year that I went to him, which drove my mom crazy. Like, he would say, "eggs are good for your son." Good. Next year, "eggs are bad for you."

Aside: Sidenote; I was like, yeah what's up with eggs having a big reputation? So, in 1968 the American Heart Association advised people not to have more than three egg yolks per week. It's like, "Eggs are cancelled! Unfollow eggs on Twitter. Do not invite them to breakfast." And then, years later, some news came out that was like, naaah, eggs are fine. Then, in the last few years, a new Cholesterol Kills campaign came out by an organization called The Truth About Eggs. BUT, that turns out to be a vegan advocacy group.

So, I turned to official science papers for some sanity. There was one about how eggs have gotten such a bad rap and seriously, they are fine. I was like *[takes a quick, deep breath of relief]* okay, cool. Science paper, I trust you. AND THEN I scrolled down to the author bio of this science paper, and he worked for the egg industry!

Good God, eggs! How is your PR more complicated than the JFK assassination? This is like if the mob specialized in brunch scrambles. I cannot keep track! So, I guess if you are at risk for heart disease, consult your physician, read some papers, and pay attention to who's writing the papers. I may be your weird uncle, but I am no doctor. Well, John is technically a doctor but:

John: I'm not an MD.

Aside: Not that you'd be making a bunch of omelets now (sorry) but if you were, you'd have to break some eggs. BUT, what if it's a museum egg, and you're an oologist?

Tour audio

Alie: Have you ever broken an egg, and been like, "oh, shit!"?

John: Well, the quick answer is no, but...

Aside: Back in the cool egg dungeon, John withdraws a drawer slowly, and he tells me a tale of a thousand cringes.

John: One of the greatest curators of birds at the field museum, a guy named Mel Traylor, apparently, at one point, pulled this drawer too far out and dropped it. *[laughs]*

And so, even the greatest people can make mistakes! Now, the truth of the matter is, it looks bad, but you're not really losing the information.

Alie: You're not losing the data, but... still...

John: No, but it's still just... I can't even imagine what it was like the day that that happened.

Alie: What kind of words do you think came out of his mouth?

John: I... he was an incredible gentleman, so I bet he swore quite a bit!

Alie: Oh my god, that is just devastating!

John: *[chuckles]* Yeah.

Interview in John's office

Alie: What has been the rarest or most beautiful specimen that you've seen?

John: I think some of the coolest eggs in the world belonged to a bird called the guira cuckoo from South America. They're these incredible eggs that they lay in big numbers; they're cooperative breeders. And I'm not exactly sure, some of their relatives actually have multiple females on the same territory, and they'll actually throw eggs out, on average, but they'll end up with a mixed nest of multiple eggs of different females.

These guys will have up to 10 or 12 eggs in the nest, and they start off with this white powder around them, but it's a blue egg, and over time the blue wears off in this kind of patchwork fashion that just gives a really beautiful color to them

Alie: Ooooooh, so they have almost like an opposite patina effect? Oh wow.

John: Exactly.

Aside: Later, on the tour, I got a chance to see these bad boys and they're this lovely minty aqua, like a tourmaline blue, with white patterns overlaid, and it was a gasp-a-thon:

Tour audio

Alie: They're gorgeous! I mean, they look like ceramic. We just don't ever have an opportunity to see a lot of these, you know? Ever! Because when are you going to come across a cliff nest, or you know, something that's 30 feet off the ground, hidden behind leaves?

Aside: So that guira cuckoo with the gorgeous eggs is sneaky and she leaves them in nests that are not hers! A bunch of cuckoo birds do this. And then their babies hatch and then they bump out the other babies. The parents just don't seem to notice that all of their babies are gone, and they now have one giant baby that does NOT look like them. Such gossip. And then this bamboozlery happens with other species, of course.

John: These are Anis, which are these black birds from the tropics, which are cuckoo relatives. These are the ones that have these nests that multiple females in the group will go lay in.

Alie: Like daycare?

John: Yeah. With the caveat being that apparently there's an older female that'll come along and throw most of the eggs out over time, and then lay most of hers in there.

Alie: Oh my god! What a bitch!

John: Yeah.

Interview in John's office

Alie: Are there any eggs that you know of that are so valuable, monetarily wise? Are there any that are, like, under glass?

John: Well, if I told you....

Alie: *[laughs]* That's true, you would have to kill me.

John: Well actually, we have plaster cast downstairs of an elephant bird from Madagascar, which is a bird that was one of these giant flightless things. It was living in Madagascar up until the time the first humans got there. The beaches of Madagascar, in some places, are

littered with small pieces of the elephant bird eggshell, and there are a few elephant bird eggs that have been found whole, and a lot of those are in museums. My understanding is those are worth sometimes upwards of \$30,000 to \$50,000.

Alie: *[softly]* That's a lot of money for an egg

John: But think of how many omelets those things would have made.

Alie: *[shouting to the sky]* So many omelets! Which is probably why they're extinct!

John: Exactly right.

Alie: What's the biggest egg you have ever cracked? I once tried to eat an emu egg and it required a hacksaw.

John: Was it any good?

Alie: It was very rich. It was huge. It was overwhelming. But we whipped it up and made an omelet, and it was the most buttery and kinda fatty-tasting one, but it was huge. It looked like a giant avocado.

John: Yeah, I have to admit that most of my time has been spent with chicken eggs, in terms of actually cooking and eating, so... I'm trying to think if I have ever actually... I don't think I ever have actually eaten another bird's egg. Not even a duck or, yeah...

Alie: Really?? I once had devilled quails eggs which was weird. I just felt like a giant because they're so little. But, how do you take your eggs?

John: Over easy.

Alie: So, does that mean runny yolk?

John: Yeah.

Alie: Why does that gross me out? But it doesn't gross other people out? Should I be grossed out?

John: Well it's supposed to soak into what's left on the plate, like if you've got potatoes on the plate and it makes the potatoes taste better.

Alie: I don't know why. There's something that grosses me out about it.

Aside: Another thing that grosses people out: the chalaza, [ph: kah-lay-zuh] those two coiley white threads attached to the yolk. *[drawn out with vocal fry; disgusted:]* What arrrrrrre theeeeyyyy?

Oh, nothing much, just ropes of protein.... They're actually markers of a fresh egg, since they disappear as it ages. Why are they there, like tiny, slimy party streamers? Well, they

suspend the yolk in the middle of the egg. Kind of like the Slingshot ride at the county fair. But depending on how you feel about egg protein squiggles and carnival rides, one may have more screaming than the other. *[rollercoaster noises, screaming... then a comical BOI-OI-OI-OING of a spring]*

Also, sidenote: oh my god. I just went down a hole watching a compilation of GoPro footage of couples on the Slingshot ride, and it was horrifying and so, so amusing. And I only know from the Gelatology episode that it's funny because we know everyone is safe in the end. But my God, watching adults screaming for their moms on carnival rides is somethin' else. Wow. Oh my god. Also, never, ever going on that. Ever. Okay back to egg boogers.

Alie: I need to get over it because other people seem to love it. But for some reason the yolk, the yolk is with the chic eats inside the egg. Correct? Or is the yolk the chick?

John: The yolk is what it's going to eat.

Alie: Okay, so that would be the baby chick's food... so I should be ok with eating that right? Right.

John: Except, of course, that's the stuff that my pediatrician was always worried about every other year.

Alie: The cholesterol and stuff.

John: Yeah.

Alie: When you're cracking hard-boiled eggs, do you have a better strategy because you understand the mechanics and the anatomy of eggs?

John: No. That's one of the things that you just go for. I think it's a satisfying thing because in the end you have something solid in your hand that you can eat. I think actually, cracking raw eggs is more of an artistic technique that I've never fully developed.

Alie: I know, the people that can do one in each hand...

John: Yeah, those people. Like, how do you learn that?

Alie: Masters. They should be oologists, just to be honest, they need to take up the term as well.

And now, how many eggs do you guys have at the Field Museum in collections?

John: So, the actual number is probably on the order of about 100,000.

Alie: Oh my god!

John: But the interesting thing about eggs, in collections like this, is that it's not the number of eggs individually, but the number of sets of eggs. So, we have about 20,000 sets of eggs, which means that the eggs laid by a given female at a given time. There's what's called the clutch size, which is how many eggs they've laid for that nest. And that's actually a truly interesting thing about avian biology because there's lots of variation. So, we were talking about those elephant birds; clutch size of elephant birds was two, which is, like you said, probably why there are no elephant birds left.

John: If you think about it, ostriches are another big flightless bird, and multiple females lay in the same nest, but there'll be upwards of 20 eggs in the nest because each female lays 10 to 11, and they're basically just hedging their bets with respect to producing their young, because a lot of them are going to get picked off by predators over time.

Alie: And now, they also have super thick shells because they have to drop, like, 12 feet from the ostriches' cloaca to the ground. Not quite 12 feet, but you know what I mean?

John: No, I'll bet the ostrich actually lays them sitting down for the most part. But they are really thick, and they're used by bushmen of the Kalahari to store water in.

Alie: Oh my gosh, what a cool purse. I mean, talking about a clutch, that would be quite an evening clutch. That's what they call little evening handbags. You'd be like, "ta daaa, it's an egg!"

John: I'd be willing to bet that's been done.

Aside: Just FYI, yes, it has been done.

Alie: Is there any flimflam about eggs that you'd like to debunk? Any myths about eggs that you're like, "that is not how it is"?

John: *[thoughtfully]* Myths about eggs....

Alie: That bunnies don't lay them, despite Easter...

John: No, they don't, that's absolutely true.

Alie: Do you love springtime because of the egg imagery? Or are you like, "come on guys"?

John: No, because it gets really weird because of the bunny aspect of it, and I think that confuses the biology. I think Easter Egg hunting is great. I think Easter Egg dying is great. The whole bunny aspect of it really gets messed up.

Alie: Right. *[laughs]*

John: I don't know how that happened.

Alie: But, how do you feel about platypi, and mammals that lay...

John: Oh see, that's cool, because they're just trying to be birds!

Alie: Right! Well how did that even come about?

John: That's a good question. From an evolutionary standpoint it would be, potentially, a retained characteristic from their ancestry with reptiles.

Alie: And now, reptiles, were they the OG when it comes to egg-laying? Because, birds, reptiles... similar evolutionary pathway? Dinosaurs?

John: I mean, birds are dinosaurs.

Alie: Yeah, birds are dinosaurs!

John: So, we're looking at just... I think birds are just better dinosaurs.

Alie: It's funny because for so long it was like, "dinosaurs are extinct," and they're like, "no they're not, there's a pigeon!" Done. Boom. Also, where do pigeons have nests?

John: They nest on little ledges and stuff. But that's a really great observation, because as many pigeons as there are in the city of Chicago, I almost never see a nest. And the other thing is that this group of birds, the Columbidae, lay clutches of two eggs. That's the total number. So, you would think that if you were laying two eggs on a ledge, any predator could come down and eat those things. And they're not particularly tough birds, so how are there so many pigeons?

Alie: I don't know! I have a theory that maybe they just asexually bud, and a feather falls off, and then a whole 'nother pigeon sprouts around it.

John: The only thing I would say that argues against that, is that I could show you pigeon eggs in our collection, so we know they do it.

Alie: Dang it. Once, I lived in an apartment building and a pigeon got inside. I did see a pigeon build a nest inside, on the carpet, and I told my landlords. I was like, "Yo, there's a pigeon like inside, like on the carpet," and they're like, "mmm... leave it alone." And I was like, "what about bird mites? I feel like we need to worry about that. Like, can we scoot it?" So I did see one pigeon nest once but it was, like, one foot away from my door, inside on a carpet, and that it was just all kinds of wrong.

John: And did you see any pigeon mites?

Alie: No, but I think I moved before. Last thing I needed was bird cooties. *[makes disgusted sighing sounds]*

John: You could do a whole 'nother ology on parasitology.

Alie: Because birds have mites.

John: Oh they do! We actually go into the field now and do an active job of trying to collect them, because they're coevolving with the birds, essentially. So there's some really interesting questions you can ask with mites.

Alie: Do you get a lot of gifts that have eggs on them? Do people say, "I saw this and I thought of you"?

John: I do, because we did a book of eggs, and so people kind of know that I've worked... yeah.

Alie: How many books about eggs do you own in reference?

John: So, I benefit by being in a place where our bird library is right down the hall, and that means I don't have to buy as many books on eggs, and I can just go down and surreptitiously grab them off the shelf and then check them out. And then the librarians have to come track me down to get them back.

Alie: You're not too far though. I mean, and who's going to make better use of a book about eggs than you?

John: Well that's my argument, but when somebody else wants it, they need to be able to find me.

Alie: Did you ever have to do the thing in high school where they gave you an egg and they're like, don't break it, this is what parenthood is like. Did they ever make you do that?

John: No, I never did that.

Alie: I think they used to do that to scare teenagers away from becoming parents too early. They'd be like, "you have to take care of this egg for a week and if you break it you fail," or whatever. I feel like taking care of an unfertilized egg chicken egg is a lot easier than an infant. But what do I know?

John: Now that you mention it, the one thing I remember like that is at day camp and doing egg tosses.

Alie: Oh, right!

John: I was always one of those kids that didn't want to break the egg. I did not want to do it. Some kids didn't care. I did not want to break the egg.

Alie: You had an early appreciation! Now, if you bought a fertilized chicken egg, (like from Whole Foods because for you believe that for some reason fertilized chicken eggs were better) could you take it home, put it on a heating blanket and have some chicks in a couple of weeks?

John: Good question... And I wouldn't want to find out actually, to be honest with you.

Alie: Yeah, what are you gonna do with those chickens?

John: Yeah, exactly. And I wouldn't buy fertilized chicken eggs.

Alie: What is the difference of when you're eating an egg, being fertilized or not?

John: It could be taste or something, but again, I don't have any intention of finding out anytime soon.

Aside: I looked this up and apparently, you CAN hatch chickens from fertilized eggs from like, Trader Joes, provided they're pretty fresh and actually fertilized.

Alie: Have you heard of balut?

Aside: Hi, sorry, me again, with another necessary aside. So, balut. What is it? Southeast Asian snack, often consumed with beer, that consists of a boiled duck egg. What's the big deal? Oh, also the duck egg was fertile, and the baby duck has been developing for 2-3 weeks and has like, bones and a beak and stuff. Just all boiled and eaten. But a reminder: lobster was once served as prison food because the idea of eating a sea cockroach was considered disgusting, and punishment. And I don't even know what's in nacho cheese, but I could eat it all day long. Now, if you have ever boiled a fertilized egg from the grocery store, you have eaten balut. Just very, very under-ripe, if you will. So, balut. Has John heard of it?

John: Yes, I have.

Alie: *[sounding disgusted and strained]* OHHH what do you think about it?

John: I... Don't think I would.... Uh... yeah.

Alie: Yeah, I think I'm good without eating balut. When I first found out what balut was, I was like, "is this a real thing or am I living in a nightmare right now?"

John: I think, you know, you go around the world and, and people do a lot of interesting things...

Alie: I know. I mean, I've eaten shrimp eyeballs, so whatever, you know.

John: Was it good?

Alie: I didn't... I did it for a dollar, so that part of it was good.

John: Well there you go. Let's see, what would somebody have to pay me to eat a balut... I'm not coming up with an easy number there.

Alie: \$2,000?

John: I would do it.

Alie: Okay. I... *eeeeuuughhhhh!* How many bites? You'd have to eat the whole thing though.

John: Yeah, for \$2,000 I'd eat the whole thing.

Alie: Okay, alright! So that's your going rate for eating a whole balut.

John: That wasn't that hard, was it? *[laughing]*

Alie: *[laughs]* No! We came up with a number!

John: Are you sure you want to waste \$2,000 on me and a balut?

Alie: You have to really set it up, like, you've gotta have like it's your wedding day. Send out invites. Everyone's in formal wear, like, "We're gonna get him to eat the balut!"

John: It's the Twitter age...

Alie: It is! Now, I have some questions from listeners, can I ask you?

John: Yes, you can.

Alie: Okay. Uhm... Some of them are from my dad,

Aside: Hi dad! But this first question though is from Neal Williams, and it's a good one. One that has plagued me ever since songwriter Joe Raposo posed it on *Sesame Street*. *[sung by Sesame Street cast: "Which came fiirst, the chicken or the egg?"]*

Alie: Chicken or the egg? What came first?

John: Yeah, good question. Uh...

Alie: I mean, I guess the egg, because dinosaurs?!

John: I mean, it's funny, because if you look at chicken as a common name for gallus gallus, which is a bird, and dinosaurs (the ancestors of chickens) laid eggs, then the egg came before the chicken in that sense *[Ding! Ding! Ding!]*

Alie: Yes! We figured it out.

John: There we go.

Alie: God, everything in my life is so much easier now

John: You're going to get a lot of letters about that.

Alie: Well, you know what? I'll be like, why don't you consult an oologist? I have one. He's right here.

Jerry Davis wants to know: Are there any eggs that are poisonous to eat?

John: Wow, that's an interesting question. The quick answer to that is, no, not that I can think of. Today we were just talking about, there's a bird that was found to be poisonous in New Guinea called a pitohui, [ph: pitta-hooey] but it's because it eats beetles and is able to sequester the poisons, but I don't think its eggs would be poisonous.

Alie: Oh! Good to know. Way to go, bubuhui... buhui, hui?

John: Pitohui.

Alie: Pitohui. Spencer Toth wants to know: Is a breakfast chicken egg really only one cell?

John: Yes.

Alie: *[high pitched in surprise]* REALLY?! It's one cell?

John: Yep!

Alie: Where's the nucleus? And the ribosomes and the organelles and stuff?

John: They're there. Yeah.

Alie: *[gasp]* I guess that makes sense! Because, like, any egg that a female of any species produces is one cell.

John: Right, is one cell.

Alie: Oh, that's weird! Oh I've never thought about that. That's awesome.

Sarah Nichelle wants to discuss century eggs. How did they get started? Have you heard about these?

John: So, these are these ones that have been sitting around for a long time? You know what, they probably started because somebody had an egg and forgot to eat it, and then found it again, and they said, "well, I'm gonna eat it!" What I would tell them is, that doesn't make it a good idea.

Alie: *[laughing]* Yeah, Rae Casha asked the same thing: How can I deter my husband from eating 100-year eggs (barf)? So, I gotta look that up. But just because you can do it, doesn't mean you should.

Aside: Now, I was not familiar with Chinese century eggs, but they're traditionally made by coating duck or chicken eggs in salt, alkaline clay, and rice hulls, and then they're left to ferment for a few weeks. The alkaline addition creates a black, jelly-like egg white and a creamy dark green egg yolk. They have a lot of aliases: hundred-year eggs, thousand-year eggs, even millennium eggs. All of them an exaggeration, they're really only

fermenting a few weeks. Now, one name which may or may not be an exaggeration is the Thai term, which translates to, 'horse urine egg,' due to the smell. I cannot verify the veracity of that comparison. Can John?

John: Well again, you give me 2,000 bucks and now we're talking.

Alie: I love that you're going rate... You just switch from a bird researcher to just a daredevil bird egg eater. Brooke Bussone wants to know: What's the smallest egg in the world? Is it a hummingbird?

John: It'll be one of the hummingbirds, and there are enough small hummingbirds that probably have similar sized eggs. The smallest hummingbird in the world is a bee hummingbird from Cuba. And then, you know, the amazing thing there is they have clutch sizes of two, and the egg of a bee hummingbird would take up a large amount of the internal space in a female bee hummingbird.

Alie: Is it just, like, the size of a Tic Tac? Bigger than that?

John: It actually looks very much like a Tic Tac. That's exactly what you'd think.

Aside: I got a chance to see some on the vault tour and yep, they're just a skosh larger than a Tic Tac, but waaay smaller than a Mento. They are 0% refreshing. Do not eat them on a date.

Tour audio

John: And so here are the chicklets. That's a black-chinned hummingbird from Arizona.

Alie: *[whispered]* Oh my gosh, that's so tiny. I've definitely eaten breath mints larger than that.

John: Exactly.

Interview in John's office

Alie: Oh my God, how cute and tiny!

John: Which reminds me of an old joke from when I was a kid, which was: what did the hummingbird say when she laid an ostrich egg?

Alie: What?

John: Ouch. *[ba-dum tshhhhhh! canned laughter]*

Alie: That actually segues perfectly into Katie Cobb's question: Here's a stupid question. Does laying an egg hurt? It hurts for a human woman to give birth, but we don't do it a few times a week.

John: Yeah, I was actually looking as I prepped for this, and you know, we eat 5 billion eggs a year in the US alone, and the average chicken produces, like 360 or something.

Alie: Yeah. Like almost daily, right?

John: Yeah, I mean just, like, it's incredible. And so does it hurt? I mean, I don't know. It's not the same as childbirth in humans.

Alie: Right. In childbirth, we have real messed up pelvises, like our pelvises are not so great.

Aside: See the *Ologies* episodes on Primatology and Gynecology for more on that.

Alie: Did you ever see the movie *Cool Hand Luke*?

John: Oh gosh. Yes.

Alie: You did? What did you think?

John: I liked *Cool Hand Luke*.

Alie: What about the egg eating part?

John: Yeah, it never bothered me

Alie: Really?

Aside: [clip from *Cool Hand Luke*: "Nobody can eat 50 eggs." "My boy say he can eat 50 eggs; he can eat 50 eggs!"]

Just thinking about that sometimes, when I make, like, a lot (a clutch if you will) of hard-boiled eggs. Sometimes I think about that, and I think, "oh God..."

John: See, I think *Rocky* is the same way, where he comes in after the run, and just like... so yeah, I would never do that.

Alie: The funny thing is if you asked me to eat an undercooked egg, a raw egg, I'd be like "Absolutely no. Get out of my face." But if you asked me to eat cookie dough, which contains them, I'm like, "Sign me up. I'm there." What's the deal?

John: Right. It's completely illogical.

Alie: Mind over matter.

Todd McLaren actually asked what's your favorite egg art? Ukrainian Easter Egg? Madiera? Lace egg? Fabergé egg?

John: Oh, I think those Ukrainian eggs are incredible. Really amazing pieces of artwork.

Aside: These Ukrainian eggs, or Pysanka, are ornately detailed using melted beeswax, and they just keep dunking them in dye, over and over again. And yes, there is a museum of Pysanka eggs in Eastern Europe in case you're into that. Now, onto a very special question from someone who is technically like, your grandpod, Larry Ward, a.k.a. my pops.

Alie: He wants to know: How are snake eggs incubated? Does the mom or dad snake sit on them?

John: Yeah, they do actually. Yeah, they provide some... but it's funny because... that's a good question, actually. We need a herpetologist, because they're ectotherms.

Aside: For this I brought out the big guns, and by guns I mean snakes, and I reached out to Dr. David Steen of the Herpetology episode a.k.a. @AlongsideWild on Twitter and he responded swiftly and with informational precision:

Not all snakes lay eggs, but of those that do, the vast majority lay them and leave; they incubate on their own. Pythons are a notable exception. They coil around the eggs and can use muscle contractions to generate heat.

So I like to think of Pythons doing a twitchy dance like, "lets hatch these dang babies!"

Alie: Alysia Mansfield asks: What causes color variations in eggs are the same species, for example, chicken eggs coming in brown, white or blue?

John: Some of it's just individual variation, there's some kind of genetic variation in the DNA that's producing the compounds that are being deposited on the shells eventually. But there are these birds, like these common murres, where they've actually evolved the capacity... they're nesting in colonies on these cliffs, and everybody looks alike, and so the females have the ability to lay unique-looking eggs that can be completely different-looking from the bird right next to them. And that allows them to imprint on those eggs and then find them when they fly to and from the colony to eat. It's an incredibly cool thing.

And they're still trying to do the research, so they're trying to figure out whether females lay the same kind of eggs from year to year, whether that's a genetically encoded pattern. And those are really interesting questions.

Alie: That's great. I never even thought about that. When you see speckled eggs that maybe look like granite, are those carbon copies of each other every time? Or are the speckles in different places?

John: I used to think that it probably was, there was probably a lot of variation that was genetically based. It may very well be that most of it's just randomly involved with how fast they are passing through the cloaca at the time, and when they come out it's literally

just something different every time and the birds can imprint on it and then find it the next time.

Alie: Wow, that's so fascinating.

Aside: Also fascinating, of course, how people treat and eat eggs all over the globe:

Alie: I'm told that you don't have to refrigerate eggs. In Europe, you just leave your eggs on the counter.

John: Those Europeans!

Alie: I know! They leave their butter on the counter, they have healthcare. They're crazy!

John: Yeah... When I was working in Brazil the first time, people used to leave mayonnaise unrefrigerated out in the forest.

Alie: Oh hell no.

John: And after a while I started eating it, and it was fine!

Alie: *[gasp]* Did you lose a lot of weight just because you were constantly sick?

John: No.

Alie: Really? Now speaking of salmonella, is that something that you worry about?

John: Yes.

Alie: Okay. Now, salmonella it comes maybe from an infected. It comes right down the ol' poop chute, and then you need to wash the eggs to avoid the salmonella. Right?

John: Yeah, and I think one amazing thing about the industry is how well they're able to actually keep those things from being issues. When there's a salmonella outbreak these days, it's kind of stunning how quickly we know about it, and how quickly, in most cases, they figure out exactly where they come from.

Alie: I know, isn't it crazy?

Aside: P.S.: Salmonella, I just found this out, is the same genus of bacteria that causes Typhoid fever and, of course, a whole bunch of food poisoning. It can get on the eggs when it passes through the oviduct of a chicken, or IN the egg as it's forming. Now, not all chickens have salmonella and some will show signs, like lethargy, if they do have it.

Now, before you go hatching a crate of fertilized eggs, do know that backyard chickens, if they have salmonella, they can pass it along, especially – as the CDC warns - if there has been 'snuggling' of the chicken. And salmonella poisoning does land folks in the hospital, or it can be fatal. So, don't go licking a bunch of chickens or eating raw eggs or poultry.

Ironically, eating raw salmon seems to be fine but that's because the name salmonella was derived from one Dr. Daniel Elmer Salmon, a veterinary surgeon for whom it was named.

[old timey scratchy phonograph effect] "Here. Dr. Salmon, we have bestowed you with a legacy for generations: a very confusing fish-sounding disease of the chicken butt that scares people away from cookie dough."

Also, if you're a real cookie-dough trollop like myself, go ahead and make it with pasteurized eggs and feel free to eat the whole bowl. Does anything in John's work cause him to eat entire salad bowls filled with raw cookies?

Alie: What is the most annoying thing about eggs, or your job?

John: With eggs, I would say it's keeping track of them. So, you have a clutch, but you have four or five eggs in that clutch. They number them all, and you've gotta be careful with respect to getting things mixed up. And then you don't have anything else to go on if they do get mixed up.

Alie: Oof. Yeah, that's true. I mean, you can't put a little number on it?

John: They do put little numbers on them, but let's say there are a bunch of little numbers and they were put on 120 years ago. It's possible that you could have a hard time deciphering what was done.

Alie: Do you find that the notes are like, very poetically descriptive? More so than they would be these days?

John: Not really. What's beautiful about them is the different handwriting. People had so much better handwriting.

Aside: I did notice this when I was looking through/swooning over field note calligraphy among the vintage eggs stacks:

Tour audio

Alie: I mean, that font too!

John: He had good handwriting.

Alie: I wonder... Do you think he was amateur? Do you think he was pro?

John: He was an amateur. All these guys were amateurs. Almost all the egg collecting was done by amateurs. That's really amazing.

Alie: Really? Wow. And they called themselves oologists. And yet you've edited book about eggs...

John: Yup. I'm not calling myself an oologist.

Alie: Oh my god. Ooh, just pathologically humble!

Interview in John's office

John: It's just beautiful cursive and things in ways that nobody would do today.

Alie: We got to get back into that, I feel like, you know? Because those were the original fonts.

John: Maybe they'll make some computer programs that'll do it, and I can actually effectively do some of that, but it's not going to be me by handwriting.

Alie: It'd be so funny if field biologists had to take fountain pen courses, like, "We got to keep it up guys!"

John: There's no doubt that one of the things we should do is take printing courses. And I'm Exhibit A of somebody who is not good at that, and I have immense amount of respect for my colleagues that actually write impeccable scientific field notes, and labels, and things.

Alie: I'm looking at some handwriting you have over here. Not bad!

John: No, I can't. I could tell you stories... "Let us write this for you."

Alie: Whoa. That's one way to get out of doing work! That's like, someone asks you to do the dishes so you break a dish, you never get asked to do the dishes again.

John: ... Except in this case, like, I really wish I could do it.

Alie: Yeah, aww! Well, I can't type, so you can learn to print and I'll learn how to type.

What do you love the most about eggs?

John: Just that they are such an important part of the biology of birds. I think that's the most interesting thing to me. And the other thing is that, actually, with all the birds in this world (and there are around 800-10,000 species) we probably don't know anything about the eggs of upwards of 30 to 40% of the species, maybe.

Alie: Wow, that's crazy.

John: Which is kind of interesting, you know? There's a lot we don't know about eggs.

Alie: There's so many mysteries.

And what about your job? What's your favorite thing about your job?

John: Well, my favorite thing about my job is learning new things and getting to work with a group of organisms that I love, and really, kind of getting paid to do my avocation.

Alie: So you're a professional bird nerd?

John: Yeah, absolutely.

Alie: *[laughs]* I mean that's the dream for a birder! That's like making the major leagues.

John: Oh yeah. I tell students that I started out wanting to be... I was a pre-med and I took a cell biology course and I realized, "Really? Somebody might pay me to actually study birds the rest of my life!"

Alie: So you were like, *[vocal sound effect of car tires screeching]* veering off?

John: It was an easy veer.

Alie: Now, if you would have told yourself, a young birder, that you would get to do this for a living, would you have been so stoked?

John: Yeah, my dad was a very active birdwatcher and I actually started birding because my brother was four years older and I realized if I wanted to spend any time with the two of them, I'd better learn something about birds. So, that's how I got interested in it, and even back then I fell in love with the idea of being able to study birds up close and in that kind of way.

Alie: And now you get to study them every day.

John: Yup.

Alie: And things that come out of them.

John: Yep.

Alie: *[laughs]* The inside and the outside

John: Yeah! Exactly. And things that last like that.

Alie: I think your only job left is to come to terms with the fact that you're an oologist. I think you need to accept that.

John: See... I could put that on my door and my cards and stuff... That's just not gonna happen.

Alie: Imposter syndrome is everywhere. It's like, "I don't know if I know enough." And like, wrote a book about eggs! What more do you want? *[laughs]* You manage a collection of 100,000 eggs!

John: But I think the notion of... I mean how many oologists can you actually be? At what point in time will you end it? Because I want to be an ornithologist. I liked the fact that I study birds, right?

Alie: Right! You can be more than one: I'm Italian, I'm also English. You know what I mean?

John: Yeah. Good point.

Alie: You can be all kinds of things. I mean, I live in LA, everyone's a hyphenate: yoga instructor-actor-life coach. So, I hereby proclaim that you are an oologist.

John: Fair enough.

Alie: Yay! Thank you so much for doing this. This was so fun.

John: My pleasure.

Alie: I could ask you a million egg questions, all day.

John: You'll have to come back and talk to an oologist!

Alie: Okay, (which is you)! *[laughs]*

So once again, Dr. John Bates of the wonderful Field Museum of Chicago. If you like this podcast and the Field Museum, you should definitely check out [The Brain Scoop](#), which is the Field Museum's web series hosted by the amazing Emily Graslie. She is a wonderful person and a great science communicator, so you might enjoy those. Also, those videos are family friendly, so you can watch those with your kids all you want.

Again, John was an editor, alongside Barbara Becker, of [The Book of Eggs: A Life-Size Guide to the Eggs of Six Hundred of the World's Bird Species](#) written by Mark E. Hauber and available through Chicago University Press. Warning: This book is gorgeous and if you see it you will want to purchase it. *[clip of a man saying "treat urself"]*

And while you're at it, [OlogiesMerch.com](#) has you covered, in terms of hats, and backpacks, and totes, and sweatshirts, and baby onesies. Thank you Boni Dutch and Shannon Feltus for managing that. Also, I hear they may have some back-to-school type of things coming up. They haven't even told me about it yet! Stay tuned.

Also, thank you to the Patrons, who support the podcast for as little as 25 cents an episode for making this happen.

Thanks Hannah Lipow in Boston and Erin Talbert for keeping [Facebook Ologies Podcast Group](#) fun and cool, and full of curious non-jerks. And thanks as always to dinosaur egg baby Steven Ray Morris for editing *Ologies* all together every week.

The theme song was written and performed by Nick Thorburn. At the end of the episode after the credits you know I tell a secret, and this week my secret is:

These asides aren't *that* long, but it has taken me almost double the amount of time to record them, because I keep starting one and then messing up a word and then having to start over. I think it's because I'm recording this in my closet, and it's a thousand degrees. But this has been one of the most tongue-tied episodes I've ever had. I cannot figure it out. I'm just like, "ha blaahhh hablah."

Thank you for making it this far; I am about to collapse from heat on my computer. Oh my god!

Berbye!

Transcribed by Rika Eringa, your Australian Chem Eng friend who simultaneously studied and partied harder than you in college, and you're not sure if/when she slept.

Some links which may be of use to you:

[Eggin' Old School Style](#)

["The Book of Eggs"](#)

[Ming Vase or Egg YOU DECIDE](#)

[Eggspensive elephant bird eggs](#)

[In case you need to hacksaw an emu egg](#)

[Chalaza — kind of like the slingshot ride](#)

[Are you afraid of the boogeyman because I am](#)

[Eggs yeah nope I guess?](#)

[How to boil eggs:](#)

[You can buy an ostrich egg purse](#)

[Can you hatch Trader Chickens?](#)

[Balut 101](#)

[Century Eggs mmmm](#)

[Making Ukrainian Pysanka](#)

[Pitohui bird: poisonous berb](#)

[Say No to Dough](#)

[Emotional support chickens](#)

[We named a bacteria after you, Dr. Salmon!](#)

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