

Three Sources of Light Episode #1: International Year of Caves and Karst

JAMES GUNN: Good day folks. This is James Gunn.

ANTHONY MAZZUCCO: And I am Anthony Mazzucco.

JG: Park guides here at Carlsbad Caverns National Park. And we are bringing you the inaugural episode of the Three Sources of Light Podcast.

AM: Hey James, my notebook says we have a reason to celebrate.

JG: Do we?

AM: By the time the listeners hear this episode, it'll officially be the International Year of Caves and Karst.

JG: Well that sounds like a whole lot of words I don't know the meaning of.

AM: Well it's funny that you say that. Fortunately, we have our colleague Dan Pawlak here to explain exactly what all those words mean.

JG: It sounds like we have an exciting episode coming up.

AM: What better way to launch this new podcast series. So sit back.

JG: Relax.

AM: And find out how you can experience the International Year of Caves and Karst.

JG: Whether that be from a cave park like Carlsbad Caverns.

AM: Or your own backyard.

[Transition Music]

AM: It is my absolute pleasure to introduce the very first guest on the Three Sources of Light podcast, my colleague Park Guide Dan Pawlak.

DAN PAWLAK: Hello.

AM: Great to have you in studio here today to be talking about the International Year of Caves and Karst. Before we dive into that discussion a little bit, I think it would be beneficial to talk about your own background in caves and with the National Park Service.

DP: So, I'm Dan Pawlak. I became permanent here at Carlsbad Caverns. This is the fourth cave that I've worked at with the Federal Government. I started as an intern in college at Oregon Caves National Monument. I eventually became a seasonal there and worked there for two years. Before that though, I was also at El Capitan Cave which is in Southeast Alaska with the United States Forest Service. In between Oregon Caves and here I worked at the Grand Canyon, but sandwiched in-between all of that for different seasons was Mammoth Cave National Park. So, I've worked and lived across the country just with the National Park Service and the U.S. Forest Service and seen a good cross-section of what is underneath the Earth, overall.

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AM: Completely different experience than I have with caves. Carlsbad Caverns, as the listeners will quickly learn as we start to release more episodes of the Three Sources of Light podcast, this is the very first cave park that I have worked at. You have a very very different experience with them. So, I am curious as to what your first impressions of Carlsbad Caverns were, or if you've had any experience before you became an employee here and how that kind of compares to some of the other parks you've worked at. [Dan laughing]

DP: Oh, this is a loaded question. As actually you and James can attest that I am probably the guy on staff that has kind of been on the cave crusade. That all caves are completely different and unique. There is no one best cave. And that kind of plays into my first impression of Carlsbad Caverns. So, what I'm getting at is when I used to work at other caves everyone before a tour would start like, "Have you been to Carlsbad? You should go to Carlsbad. Is this going to be like Carlsbad?" And I got to the point where I don't want to talk about Carlsbad. We are going to talk about Mammoth Cave, we're talking about El Cap today, we are talking about Oregon Caves. So, I was fed up with Carlsbad. But then I came down here as a visitor, and I walked down the Natural Entrance, and I was like, "Oh I get it. I fully understand what people have been talking about for years". And the immense size of the passageways, coupled with formations that will make trees look small, and the diversity of the formations that are here, and the quantity. It really is a standout place and it is a completely unique experience.

JG: Alright Dan, so this is going to be released in the International Year of Caves and Karst but what the heck do those words mean?

DP: [laughing] International Year of Caves and Karst is a big program. What those words actually mean is drawing attention to caves and karst as whole for the entire year of 2021 on an international scale. And if you are unfamiliar with what karst is, everyone knows what caves are, holes in the ground that people go inside of. They could be large, they could be small, they could go for a long way, there is typically a dark zone. However, there is no really standard definition. But people are familiar with the idea of caves as a whole. But karst, that is k-a-r-s-t, is a type of landscape that is typically underlain by limestone. Which then typically has like sinkholes and other features that form gigantic stone cliffs that are pockmarked all over the place, and water is able to move through it very efficiently. So, there is a lot of hydrology involved with this as well. Karst is important because karst landscapes are where caves form.

JG: So, when you use that term karst landscape, what are some of the classic examples that people might know of as being karst landscapes.

DP: The two biggies that come to mind are us here at Carlsbad, we've got huge limestone cliffs with holes all over the place, a lot of limestone breakdown out in the canyons. A good example for a counterpart to that, where we have a nice desert here, you can go to a completely different environment which is Mammoth Cave National Park, and they've got the sinkhole plain. There is a lot of limestone underneath the surface there, which is dissolved away and creates sinkholes all over the place. One of the best examples of this that people might be familiar with is years ago there was national news about the Corvette Museum in Bowling Green being on top of a sinkhole and swallowed up eight priceless corvettes in one of their showrooms. [laughing] It was

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really sad to watch in the car world but really fun to watch for cavers. But that whole landscape is full of holes into the Earth either in the form of sinkhole or cave entrances, but they don't have the huge limestone cliffs that the Chihuahuan Desert has which is where Carlsbad is located.

AM: I'm going to go ahead and take a shot in the dark here and guess that some of those insurance policies on those corvettes maybe didn't cover sinkholes or cave related incidents?

DP: Umm I can't remember what that was, but only one of the cars, maybe two, was actually restored. We are talking like one-off corvettes, like the millionth corvette off the line. I like cars and it hurt. [laughing]

AM: So now that we have corvettes, at least in Kentucky, being a symbol of some of the caves that may exist there, I'm just curious on these two words, you have caves and karst, and now that we have a little bit of a definition about what each one of those terms means to the caving community, I'm just wondering if there's any clear international status of clear cut definition for what can be considered a cave and or a karst feature?

DP: For a karst feature, it gets a little bit different for caves, but for a karst feature, sinkholes are thrown in there. A cave is a karst feature as well. So, you have karst, which is the overlying word, but underneath that in definitions of what is a feature of it is going to be caves as well. Sinkholes are thrown into that. Swallets, what we actually have out here in the basin in front of the park itself where all the oil drilling is going on in the gypsum flats. There are holes that just lead down into the subterranean where water is funneled into. So, a swallet could be the size of a fist or it could be like 10 feet (3 meters) across, a major depression where Earth has been moved underneath. So those are the types of features that we are seeing. For us we see remnants of sponge-work almost up on the surface, where the limestone is pockmarked all over the place, holes that you could stick your head inside of that don't go anywhere. But these are features of karst that have a lot of dissolution, a lot of water moving through using carbonic acid has eroded these features away and given it that pockmarked landscape look. Over on the eastern side of the United States it is more covered up, but because there is a lot more vegetation than what we have here. So that is where you get a lot of your sinkholes, you get some limestone cliffs with holes in them from some dissolution, but not like what we see out here. And they just have smaller cave entrances, typically.

AM: So here in the Guadalupe Mountains of New Mexico we are dealing almost entirely in limestone formations here at Carlsbad Caverns National Park, but at other national park sites in the State of New Mexico you can find lava tubes and ice caves as well.

DP: Yeah.

AM: So, I am just wondering how that fits into this overall feature of a karst landscape?

DP: This is where it gets a little tricky. We do have lava tubes in the State of New Mexico, classically El Malpais National Monument. You've got tons of lava tubes, that is what the park is known for all over. They can be considered a type of cave. Now around that area there are lava tubes with ice inside of them. That is because the air there is in a cold sink and once moisture gets in, it is cold enough to actually keep that ice year-round. And that is also seen up in

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Northern California at Lava Beds National Monument and you also have Craters of the Moon as well in Idaho. So, they are famous for lava tubes which are to be considered caves overall. Some do have ice inside of them, but that is also dependent on their airflow. And they are going to be celebrated in the International Year of Cave and Karst as well. So, they do fit into this. However, they actually fall into a different category. Since it's not an underlying bedrock of limestone, it's volcanic rock, it can't truly be called karst. Which is getting really nitpicky. But that textbook definition basically applies to limestone for karst. So, what we have for lava tubes with ice inside of them, and what we have for ice caves, like actual caves made of ice inside glaciers, and we have talus caves which are gigantic boulders that have fallen at the base of mountains or the base of cliffs that can have passageways inside of them but not have a dark zone, they fall into the category of pseudo-karst. So, fake karst. That is how they all fit into the picture. But they are being celebrated for the international year.

JG: Okay, so let me make sure I've got this all straight. There is karst, which is in-general limestone, but it is the landscape formation that caves form in. You've got caves, which are generally something you can fit into and probably have a dark zone. A dark zone, of course, being a place where there is no natural light visible.

DP: Yes. The dark zone isn't always needed. Per example, in Carlsbad Caverns National Park we have Goat Cave. It is like a 1,000-foot (305 meters) passageway. It is a cave, but you get to the back and there really isn't a true dark zone even though it is still considered to be a cave. It gets very dark, but it is not completely dark. You'd still see your hand in front of your face.

JG: You also have other types of caves like lava tubes, and ice caves in a glacier, and talus slopes that would be considered caves but are pseudo-karst because it is not limestone.

DP: Correct, yes. Our typical idea of a cave is what forms inside of limestone. The public might not think of it in ways, like only caves form inside of limestone. That is not true, we have other caves. But the general idea of a cave is a limestone cave.

JG: In that case, how likely is the average person to be interacting with some kind of cave and or karst feature?

DP: Honestly, pretty darn likely. And there are many ways in which people can interact with this. But the reason I say likely is because twenty percent of the landscape across the entire world is made up of karst, and then had karst features inside of it. The biggest way in which people interact with it is going to be hydrology. It is going to be water, groundwater especially. So, for example, out in the sinkhole plain which is in Kentucky, there are great pictures, aerial photos of the sinkhole plain. The whole area just looks like the surface of a golf ball, just divets all over the place. Those are all sinkholes that are going straight down into the aquifer. So, one of the biggest ways in which people interact with this is by pulling their own drinking water. It is all being pulled from one area, and it can be easily polluted. That is the biggest thing to take into consideration. So, you have clean drinking water because everyone tries to enact good protocols for not creating spills. But, if a spill does happen, especially out in that sinkhole plain, then that pollutant could actually get into the aquifer and into the drinking water supply within days. If there is a rain it could even be hours depending on how fast that piping underneath the Earth is,

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that natural piping, by moving water and carbonic acid has created. I'm from Minnesota, we've got limestone all over the place. We've got water moving inside the Earth all over, and we've got hard water. So that means we've got a lot of calcite. I grew up drinking karst water.

AM: A good way to help make that a little more relatable to the listeners at home, a lot of us have experience with hard water. That same process in which you get that calcium buildup on your kitchen sink or on your shower head, seems to be very similar to the process which creates the self-decorations inside of a cave.

DP: Oh yeah, that's it. Basically yeah. So, the same way in which a hard water buildup is on your sink, that's basically the process in which a cave formation is created inside the Earth itself.

AM: What are some other ways, some other techniques in which the public does interact with caves or the education that does come from these cave and karst landscapes?

DP: You could easily get into bats. Carlsbad is most famous for our bats that fly out every single night during the summertime. They do migrate so they are not here right now, when we are recording this. The caves are the homes for them. This is a little more indirect, but it is the bats that roost in the caves who come out every night and then consume all the insects that harm crops or that want to bite us. A lot of people think that bats just eat mosquito. No, the bats around here eat beetles and moths. Stuff that will go after our agriculture. So, on average, farmers are saved like \$3.7 billion dollars or more just in the United States on pesticides, and that is all due to the availability of holes in the ground created by nature that can then host all these critters that can save us money with farmers and also at the grocery store as well. We can even go further, because there is research, even inside this park, on cancer research due to caves. We've got Lechuguilla Cave, which is a world-famous cave. It is 150 miles (240 kilometers) long, one of the top ten longest in the world. Visitors do not go inside of it because it is only reserved for exploration and research. The bacteria down there, the light, the organisms are showing promising results for finding cures for cancer. Hopefully in the next twenty years or so, whatever the research is going to take, people will be able to live a much better life, who have ever been diagnosed with cancer, and be cured, and have caves to thank because they've hosted the organisms that have evolved in such a harsh environment that we were then able to then study them and see why they've evolved and apply it to us.

JG: So, given all these various ways that people are interacting in cave and karst elements in some way or another, how different do you think life would be if we didn't have these cave and karst features here?

DP: I would say very different. Very different. Caves have provided shelter. There is that classical idea of a caveman living inside of a cave. Which is completely romanticized and wrong. Evidence shows that people used caves as shelters but not as a permanent home. We would not have some of the knowledge that we have today if it was not for caves as a whole, for human society but also for intellectual knowledge as well. Caves are one gigantic time capsule. What is inside of them is pure data. You can sample soil, you can sample a formation and take all of that and analyze what the Earth has been like in the past two hundred and fifty thousand years, however old the formation is, or however far back the pollen will go that is inside of the soil

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itself. Which then gives us an idea of how humans lived in this particular location and how things will actually happen in the future climate wise. Because, Earth is just one gigantic thermometer that repeats itself over and over. It is not only helping to shape the past, but caves can allow us to shape the future, or look at the future as well, to see what is actually coming up. When is the next ice age going to happen? Because that type of data is stored inside of caves and we can figure out well are we on the right track or are we not on the right track? How many years off is this? What is going to happen? What will this landscape look like in another fifty thousand years? That is the type of data that caves can give us. It has made us who we are today, and it is helping us to look into the future as well.

JG: Are these the type of things that the International Year of Caves and Karst is trying to celebrate?

DP: International Year of Caves and Karst is taking this and more. What we have talked about with looking at hydrology, looking at bats, looking at the cure for cancer potentially, looking at the studies that are just being done as a whole, and studying weird life as well. We are talking eyeless crawdads, shrimp, and fish. That is just strange things that live down inside of the Earth. There are all sorts of things like that. That is what is being highlighted by the international year. The International Year of Caves and Karst is highlighting that, but they are using people's curiosity, trying to provoke interest into see what is out there and teaching what is out there. What can you learn? How do we impact it? And how can you explore it? It is all nestled into the theme of the International Year of Caves and Karst, which is learn, explore, protect. You learn about it. You want to explore it. And you want to protect it. The more you see it, the more you are involved with it, the more protection that will go into it. A lot of this is directed at the younger generations. The payoffs aren't going to be seen in 2022 necessarily. The payoffs of the international year on a global scale are going to be seen like thirty years down the road when people our age listen to this podcast or that listen to whatever is happening this year and get inspired by everything being done. All the work that is being put into exploring caves, relaying that information. They think that is pretty cool too. I can get into this and help protect places, maybe on a local level, maybe on a national level, maybe on an international level.

JG: Well I am going to back us up a little bit here because, as our listeners will figure out very quickly, I love a difficult question that maybe does not have an answer. So, let's go back to this idea...

DP: Oh, I'm excited.

JG: ... of exploring versus protection. One of the things we talk about here in Carlsbad all the time is don't touch the cave, it's going to break, it is going to damage it, your oils will be left behind. This has to also apply to cavers going into caves in other places.

DP: Yeah.

JG: How do you balance these two goals?

DP: Okay, this is a big question. If we use any major cave park in the United States, that could be Carlsbad, that could be Wind Cave, that could be Jewel Cave, that could be Mammoth Cave

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National Park. We'll throw in even El Malpais, Craters of the Moon, Lava Beds, Timpanogos, and Great Basin has Lehman Caves. They all have one or two particular caves that they focus visitors inside of. And with the lava tubes visitors have a little bit more access to go exploring these areas. But, how much do you show off with people? How much do you show off on a computer? That is kind of the biggest question because you have to have people at the park in-person enjoying a cave, they are becoming aware of what else is out there and why the other caves inside those parks that I listed off are not accessible overall. Maybe they are accessible to other cavers doing research and things like that. But they are not accessible to the public. And that hard line is drawn because if we grant access to everything, then there is that great possibility that it's not going to be preserved, it is not going to be conserved. For example, all these major show caves in the National Park Service, they focus visitors in one particular location to show them what is going on. It's the sacrifice. Because you have to put in lights, you have to put in a trail, for us it is an elevator here. We've put in a phone system as well so we can communicate to the surface. There are all these different things that go into showing off an environment but putting a trail in harms a cave. That is not necessarily going towards preservation. If we truly want to preserve something, we would just not even go inside of it and not look at it. But every time we take a step there is a little bit of degradation that is happening. So, it is this balancing system of how much to show the public but then how much do we not show. For us Carlsbad Cavern proper is taking the brunt of the impact. Now if we flip that to cavers, cavers have the ability to go into other places the general person does not. Reason being, they know what they are doing in order to get into these places, do it in a safe way. However, they are trying to minimize the impact overall. And there is a classic question that can get directly into this that rangers love to ask at cave parks. If you are an explorer and you find a beautiful passageway, say it goes on for 500 feet (152 meters), you explore all the little fragments off to the side, they are dead ends. But you get to the end of that main passageway and you see that it gets down to an opening that you could actually crawl through, but there are aragonite needles, there are soda straws, there are cave pearls blocking the way in this passageway. So, you physically would have to break through them in order to actually explore further. What do you do? Do you stop your exploration, or do you continue and break those formations? That's kind of what it is when visiting these places, that preservation aspect to it. Do we continue to develop more trails, or do we keep it the same way? And do we have enough of it already to show off that we can get the point across to say, yeah this is what is out here and if we just run wild then things can disappear.

JG: I'm curious, have you ever run into a situation where you had to make a choice like that in all of your caving experience?

DP: I have seen fresh soil, never been touched. I have been around places that are extremely delicate. I've known that maybe people have gone in there like once ahead of me, but I was not willing to take that risk in order to go into that location. If I was on an expedition, I might push the boundaries a little bit more within reason. But if I think in my mind that this looks a little too fragile, I'll probably go with my gut instinct on it and back off a little bit. I've accidentally put my hand in fresh soil before. So, I know my hand exists as a handprint in Mammoth Cave National Park. Like oh I better back up here. And so, until another person goes up there and maybe does

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the same mistake my hand is in virgin soil and I didn't mean to put it there and I kind of feel bad about it.

AM: Well rangers are always trying to leave their lasting impact on a park.

DP: Yeah, I did.

AM: The three of us sitting here as employees of the National Park Service, we are just one small piece of the puzzle that is the International Year of Caves and Karst. I was hoping you could explain a little bit more about the Union of Speleology, whose initiative this is and how the National Park Service fits into their mission.

DP: The Union of Speleology is a collection of countries all around the world that are invested in caves and karst overall. This is the organization to talk to on an international level about what is out there in the world. They are major proponents for protecting caves and karst and there are over 100 countries that are participating in the international year because of the International Union of Speleology. They are the ones heading this all up and kicking it off in the international year. The park service fits into this in the way that we are in a way the poster child for caves. Some of the most well-known caves are within the National Park Service. World renowned even. Not to push aside any of the private show caves across the United States run by families, run by an individual. They're important as well. But we fit into this because we have that platform. We have that ability that we can show off what is inside the Earth. Discover what is under your national park is the theme for the International Year of Cave and Karst inside the National Park Service. That's what we are using to talk about what is under the Earth in the NPS system. We have the prominent locations, and we have a large platform to talk about them. That is what we are using in order to promote this International Year of Caves and Karst overall.

JG: Kind of tagging on that, something that I was thinking about is, I was able to work at the Grand Canyon just like you a little while ago. It is what, the third or fourth largest amount of cave passage lengthwise in the National Park Service?

DP: I cannot confirm that stat, but it has always been touted as possibly the greatest amount of unexplored cave systems, individual caves, in the world because of the red-wall limestone in the middle of the canyon itself. It is so vast and extensive, and you have big hole in the middle of it called the Grand Canyon that there's many different openings into all these caves. It is just that they are almost impossible to get to. So, you can see a hole, not be able to get to it, and that is a lot of the case for the Grand Canyon. And from what has been mapped out there already is rather extensive and surprising. But to know how many different holes there are inside the Grand Canyon itself, that makes it one of the top mileages that would add up over time and possibly just annihilate other places in the world for what is under the Earth in distance.

AM: The bashful elephant surrounding the entire world right now is the COVID-19 pandemic. As the National Park Service, the park rangers, park rangers all around the world are trying to expand their audience, trying to expand the programs and education towards these cave and karst features, the shutdowns that are happening across the world right now are certainly impacting the events and celebrations that would have been planned for the International Year of Caves and

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Karst making these physical caves inaccessible at the moment. So, I just wondering what the National Park Service or some of the other events, or even here at Carlsbad Caverns National Park, what these organizations are doing to celebrate while also doing it in a safe and responsible manner.

DP: I want to give you kudos at first though because you used the phrase bashful elephant. That is a formation inside of Carlsbad Cavern, so I like that a lot. But COVID. It's been difficult. I'm also on the planning team for the entire National Park Service (NPS) planning out what the NPS is going to be doing for the International Year of Caves and Karst and it's been difficult. It's been very difficult trying to figure out appropriate ways that people still have the ability to experience what is under their national park without being there. It's making it very hard and on an international level, celebrations are going to be pushed back. There was even talk in one of our last meetings of possibly expanding into 2022 for a lot of this, just so there is the potential that there could be in-person events around the world that people can go to. We've been open here which has been nice. But it does make it tough because not everybody can visit this place due to COVID. How do we celebrate and reach the greatest amount of people? Well, it's actually not in-person. To reach the greatest amount of people it's that digital age that we are now in which is going to be the greatest thing, the greatest ally for us today. People are starting to fall back on the digital aspect and in our last meeting we had about 43 people on the call across the entire United States, not only in the National Park Service, but also from the private show caves across the United States as well. We are getting them involved, jumping on our bandwagon for the international year and we emphasize that hope for the best plan for the worst. Because, we can build a program that can be done in person, but when it comes to the day that it is supposed to be executed it would not happen because COVID is here, depending on what the state of the world is. So, Facebook, Instagram, podcasts, Twitter, YouTube, all those different platforms are going to be some of the greatest ways in which people can experience these places. All the national parks have their own feed on the social media platforms, they have YouTube channels. You are going to want to follow parks that are participating. Because, for example, St. Louis Arch is most likely will not be participating in the International Year of Caves and Karst. They might, they might not. Don't know. They might give a shout-out, something like that. It's going to be difficult. It's going to be difficult overall. Here at Carlsbad we've come up with ideas that we could do in person but if necessary, we could record it and then upload it so the world can experience Carlsbad in a different way. What we are looking at here is doing more podcasts, maybe reaching out to local radio stations in the area to tell what is going on with the international year and get locals to start to celebrate in the surrounding area as well. Possibly doing videos of sections of cave, or photographing sections of cave, that have not been seen by the public, at least in the recent years and showing that off in a digital library of some kind. We emphasize that to all the other parks that were on our last webinar, our last meeting, to think like that as well. And the whole world is going to have to do that. Hope for the best, plan for the worst, but the worst is not too bad because that digital outreach can go to the entire world.

AM: Could you maybe point our listeners in the direction of some other resources, maybe some non-National Park Service resources or organizations that are also going to be participating and creating content for the International Year of Caves and Karst?

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DP: Yeah, so one of the big websites that people can go to is www.iyck2021.org. That is the website run by the UIS, the International Union of Speleology. So, you can get an idea of what is going for the international year like that. There's also the National Speleological Society (NSS). They are going to be doing celebrations as well, we are going to be working with them, partnering with them. Their website is caves.org. So those are going to be two major websites in which people can actually go to.

JG: If people wanted to be starting to understand about caves and karst in their own particular areas how would they go about doing that?

DP: One of the best ways is to actually go on caves.org which is the NSS run website, National Speleological Society. This society is the largest caving organization in the United States. A lot of different countries have their overarching caving organizations and the NSS is ours. What it will actually allow for is people to go on there, they can search for their local grotto. A grotto is a caving club. No matter where you are in the country there's going to be a caving club relatively close to you. And it is actually fairly easy to join right now because everyone is actually having zoom meetings. There might be a few grottos which are in-person but spaced pretty far apart. But everyone is on the digital platforms of zoom, whatever streaming service they are using, and you can look up the information for the cabinet members. You can look up the president's name, you can look up the vice president's, secretary, treasurer, get their emails, get in contact with them and say hey I'm interested in caves, this is my experience, this is the gear that I have. And, it could be none for both of those, but you are interested in adventuring into caves in a safe and efficient manner. Look it up, get in contact with your local grotto. Cavers are very welcoming. They'll get you in that first meeting, they'll pick your brain a little bit about who you are, where you are going, what you are doing, and they'll get you on-board and get you caving. You can start to see some of the craziest stuff in the world.

AM: I definitely want to emphasize that last point. The caving community being so welcoming to new recruits. As I mentioned in the beginning of this podcast, Carlsbad Cavern was the very first cave I had ever stepped foot in. First day of work here, walking down the Main Corridor and the Big Room, first time underground. And since then because of the connections I've been able to make as an employee, but also through the local grotto, and becoming a more established member of the caving community, I have been invited to go on different caving trips in a safe and responsible manner given the summer of 2020. I've gotten the chance to see some really really incredible sites. We are celebrating the International Year of Cave and Karst, so these grottos and clubs are going to exist on all continents I'd imagine.

DP: Totally. Yeah, there are caving clubs all across the world. I've been looking to contact caving clubs for my own project, which is Cave Week, which started in 2018. It has gotten a great response. It's part of the celebration for the international year here and I'm just exploring every single continent on the internet, looking where caving clubs are, and I stumbled across the only caving club in Kenya. And I'm hoping to hear back from them because I want to learn more about their caving club. From their photos it looks like they've got some pretty cool places they get to go explore all the time. You get to go to different places across the world, and in your own backyard too.

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AM: Yeah, and these opportunities, they're not just limited to one's professional career or limited in ages as well. I believe there is news that for the International Year of Cave and Karst and for the upcoming Cave Week there is going to be a brand-new Junior Ranger booklet produced by the National Park Service?

DP: It is new version of the Junior Cave Scientist booklet. So, this Junior Cave Scientist booklet came out a few years ago. It was a solid book when it first came to light. But just like everything it ages, photos need to be updated, information needs to be updated as well. So for the 2021 year, there's going to be the new Junior Cave Scientist booklet that can be printed off off-line, but you can go to your National Park Service site that is close to you, or email, or even just send them a letter. Ask, hey do you have the Junior Cave Scientist booklet. At participating locations because, once again, St. Louis Arch does not have caves so they would not have the Junior Cave Scientist booklet. So, you'd want to contact the sites that are going to have the booklet most likely.

AM: Some really exciting news to look forward to. Especially given the long-term goals of the International Year of Caves and Karst of promote and encourage that youthful stewardship. Also, you can find similar programs at your state and local parks as well.

DP: Completely. There are always programs across the United States at various levels that kids can get involved with. It is great to see the younger generation get energized about caves overall. That fresh blood is definitely needed and that is what the international year is all about. It is reaching everybody but hopefully that younger generation will be the focus and the ones that carry the torch in another thirty years or so that help protect caves and help expand the knowledge of caves and karst as a whole.

JG: So, we've been kind of dancing around this question a little bit, but what does a successful International Year of Caves and Karst look like to you?

DP: If we take COVID out of the equation, would be a greater visitation to the sites that have caves and have karst. So those National Park Service sites, those forest service sites, those private show caves across the United States and across the world, there would be more interest in what is happening in the underground in-person. Otherwise, it's putting out all the information that we can to promote the underground world and see the reactions we can get only and maybe we get phone calls. Whatever way the public is responding, and just seeing all of that and knowing that we put everything out there and it is reaching a greater community than what it actually once did. Caves have been forgotten about. Karst is forgotten about. This is one of the most underappreciated types of resources there is out there. And just knowing that it has become an international year, that's almost reward enough. But putting out that information, it makes it a whole lot better and that is the greatest goal.

JG: Okay, so we have all this great information, we know how caves and karst is important to us, we know what the International Year of Caves and Karst is trying to shoot for, how can our listeners, today, participate in this? And how can they today work towards those goals you were talking about?

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DP: Today, how they can participate is if we are open, come visit us, if possible, in a safe manner. Plan a trip. See it. But also check out the websites, checkout social media, contact the park itself to see what is actually happening. Contact the International Union of Speleology and see how you can attend maybe a virtual unveiling of the year itself. Start looking and you will find any way in which you would want to interact.

AM: I'd even propose that if you've enjoyed listening to this conversation, bookmarking Carlsbad Caverns National Park and the Three Sources of Light podcast. Dan as we wrap up our conversation here, is there anything else that you'd like to share with our listeners?

DP: I guess since I have this type of platform here, I'll do my plug that I do on a daily basis with visitors. You may have a favorite cave, but all caves bring something to the table. All caves are going to be different. You can compare and contrast all day, but each cave is unique in its own matter. So, everyone always asks, is this the best cave in the world? Is Carlsbad the best cave in the world? And I say no. They drop their jaws, eyes get wide, I can even see them in the dark down there, just the whites of people's eyes, gasping. But the best cave is your favorite cave. But also appreciate what other caves have to offer. That's the biggest thing. Why is this place special? Why are you visiting it today? What's the reason it is a National Park Service site? What is the reason it is a state park site? What makes this place special?

JG: You heard the man. Go out there, learn something. Caves are an amazing thing to get into. It is something I'd always known about before I got my job here. But something that, no pun intended, I am always surprised at the depth of every time I start digging into it. So, go out there and see what you can find, because you might be really surprised at just how much access you have to caves and how much interaction you have with caves on a daily basis.

[Conclusion Music]

GABE MONTEMAYOR: Hello listeners. Thank you for listening to Three Sources of Light. This podcast is produced by the Interpretation and Education Division at Carlsbad Caverns National Park. Episodes are researched, developed, and hosted by Park Guides Anthony Mazzucco and James Gunn. Today you also heard the voice of Dan Pawlak. All audio engineering, music, and sound effects are made in house by Park Guide Gabe Montemayor. This episode was recorded in November of 2020. For more information about Carlsbad Caverns National Park please visit our official National Park Service website at www.nps.gov/cave. Thanks for listening.