

Syndesiology with James Burke

Ologies Podcast

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Oh hey, it's that friend that tells you about your new favorite show, Alie Ward, and this week is a really exciting episode for me, interviewing one of my literal science communication, writing, and broadcast heroes, who you likely know from his years of hosting the science history program *Connections*, which looks at how events in history and science shaped our lives today. It's always an absolutely boggling journey through bonkers events that you'd never be able to dream up because they're weirder than any fiction. You may also remember this guest from his series *The Day the Universe Changed* or his coverage of the space program in the 1960s and '70s. But if you have ever seen footage, especially recently, of a man in the 1970s walking into frame, delivering an impeccable soundbite about rocket engine combustion, and then casually pointing off to his right as a spacecraft shudders flames into the sky, you know his work. He's a science historian, he's a humble and very wry man and he's an icon. He's 86, he's funny and brilliant as ever and he just came out with this new season of *Connections* on the platform Curiosity Stream. I want you to know, they did not pay me at all to do this episode. It was my idea and I'm excited about it.

Also, a little secret that I have been keeping from you and can finally tell you from about a year of behind the scenes, his producers out of the UK gave me a spinoff of his series and it's called *Quick Connections with Alie Ward*. [DJ Airhorn] That was a giant honor and because we shot on different continents, I never got to meet him. So, I gently begged the team who made our shows if I could interview him for *Ologies* and they said of course, and again, they did not pay me.

Now, we will get to that in a moment but first, a quick thanks to all the patrons at Patreon.com/Ologies for always keeping this show going. You can join for as little as a dollar a month. And thank you to each of you who has ever left me a review, I read them all and I thank you with a somewhat dramatic reading of a new one each week such as this one from MurryBurry123 who wrote:

Thank you for creating this lovely weekly brain escape from the stress and the sadness of the world... Hooray for science!

Oh MurryBurry123, hooray for you.

Okay, syndesiology, it's a real word, all right? It comes from the Greek for 'connections' and it has been used officially to describe the study of connected events and the person who coined the term used this guest as an example, citing his research and writing on the topics of science history and how events cascade into new circumstances and how history is just a series of random and accidental happenstance. So, he is the reason syndesiology, as a term, was coined.

So, after much recording finagling, scheduling, time zone calculating, and honestly, on my part, some nerves and some deep breathing, I hopped on a virtual hang-out and got a chance to ask a hero about his journey into science communication, his writing process, rabbit holes, rough drafts, daily rituals, how to keep an audience interested, the importance of your own voice, the future of nanofabricators, the history of shipworms, animal pee, bridge collapses, Apollo missions, battlefield mysteries, and of course, the backstory to that famous shot of him and the rocket. So please, give a little bow to the one and only broadcast archetype and syndesiologist, James Burke.

James: Hello everybody.

Alie: Hi! Nice to meet you.

James: Well, I've seen you lots of times, so we've sort of met.

Alie: Likewise, obviously. *[laughs]* It's really exciting to get to talk to you.

James: Okay, sure. Anything!

Alie: Wonderful. First off, many, many people are quite envious that I'm getting to talk to you today. Most of my friends, family, and colleagues are thrilled that I'm getting to chat with you, as am I. For me, I study a lot of different ologies, and I wonder if you've ever heard the term syndesiology.

James: Syndesiology?

Alie: Mm-hm.

James: No. I can't think what it could mean.

Alie: It comes from the Greek for 'connections.' It's been only used in the literature once or twice, but it is a study of how things are interconnected.

James: My goodness. Thank you.

Alie: So, you are indeed a syndesiologist, I believe.

James: Good, I'm glad I'm an ologist of some kind.

Alie: You're probably an ologist of multiple kinds but if there's one leader in that field, I'd have to say it's going to be you. I wanted to talk a little bit about what inspired you to do the work you do; if you had always seen the connections in things; if you'd always wanted to go back in time and history and figure out the origin of events or objects. When did you start to see these connections?

James: Well, I suppose early on, my mother field, if you like, was old English. So, I spent my early university years in the 9th and 10th centuries. And as well as the language, you learned about what the language is talking about, which is the world at the time. So, I wasn't a historian in the classic sense of the word, but I was stuffed with history because of what I was reading. And the great thing about history is it's not now, it's different. So, if you spend a lot of time doing what are essentially historical studies, you can't help but notice the difference between then and now [*"Very different."*] and this interest in difference, I suppose, comes from that source.

Early on in my life, I was born in Northern Ireland and my parents cross-married, as it's called, with disapproval of both sides. *[Alie laughs]* And after my father came back from the war, they thought it was a good idea to get out of there, so we came to England. So, very early on in my life when I was about 7, I switched cultures and backgrounds, and places, and everything else.

Aside: So, this was the Second World War in the mid-1940s. James was born in Derry (also called Londonderry) in Northern Ireland, which is the westernmost port city, and it was a crucial location for naval and military presence during the war. At the end of the war, several dozen surrendered German U-boats or submarines wound up in Derry's harbor. But yes, James's family picked up and left Northern Ireland to England, where James adjusted to new people, customs, and accents and of course, was the new kid at school.

James: Then very quickly after that, by the age of 10 and a bit or 11, as lots of people did in those days, I went to a grammar school, one of those great schools founded in the Elizabethan period with marvelous opportunities for anything you could possibly want to learn. So, this was a spur, if you like, to look around and that's what the school did. Anything you wanted to do at that school you could do, and it made me what I am.

Aside: So, just a side note. In the UK, a grammar school doesn't just mean K through 5 but it's a publicly funded but selective school for smart little dumplings who meet certain admission criteria. James went to Maidstone Grammar School which is about 90 minutes outside of London and it's one of those just gorgeous red brick castle-like schools that have different houses and uniforms involving blazers embroidered with a golden crest on the breast pocket.

James: I think it was founded about 1549. I ended up, obviously I had to do military service because in those days you had to do two years in the military and that was an exceptionally unusual experience, I've got to tell you. And after having left there, I went to the, as it were, the opposite end of the experiential scale because I went to Oxford. And after years at Oxford, it was time to decide what to do about life which is a really boring thing to do so I decided to opt out. [*Oh really?*] So, instead of doing what my colleagues did which was get jobs with major corporations as one did in those days in the '60s, I ran away to Bologna in Italy where I spent three of the happiest years of my life, mainly because Bologna is known as the food and sex capital of Italy.

Alie: [*laughs*] Quite different than a corporate life after Oxford.

James: Somewhat, somewhat. So, I had three wonderful years in Bologna, followed by another two wonderful years in Rome, doing the same kind of thing; running a language school and teaching medieval English. And I think I met somebody, not quite in the street, but maybe at a party or over a ninth drink or something who said, "Some pals of mine are coming out from England, they want to find someone to direct a movie," and I said, "I haven't the faintest idea how to do that," and they said, "They don't know you haven't." [*Alie laughs*] I said, "I've got some chutzpah but not that much. So, thanks but no thanks." He came back and said, "They said they don't care if you can't direct, will you come and help, because you speak Italian." And I said yes.

So, I joined this film crew from England, and they said, "We're going to do a show about the mafia," and I said, "No, you're not," and they said, "Why?" And I said, well, "It doesn't exist," and they said, "Come on." And I said, "You find anybody who says it exists and I'll be very surprised." So, we went to Sicily, and we did this film on the mafia and every single person we talked to said, "Mafia? What's that? What are you talking about?" So, we finally came back with this hilariously funny movie with many, many people saying, "Don't know, what? Eh?" [*Alie laughs*] And it won a prize. People said, "You've got a job," and I said, "What did I do?" And they said, "Whatever you did, you can do it." So, we did a few more films. I remember one memorable one, five minutes long, called *Why Doesn't the Leaning Tower of Pisa Fall Over?*

Alie: It's a great question.

James: It's a film about why the Leaning Tower of Pisa... Answer, after five minutes, nobody knows. [*Alie laughs*] I just went on in the same vein, and after a while, I'd been in television long enough to be in television so the BBC said, "Would you like a job?" And I said yes because there was nowhere else to work at the time and I found myself in television and the job they had was a job on a science program and I said, "I don't know about science," and they said "Great! The whole point is that the audience doesn't either so if you understand what you're talking about, they will." Very clever. And from then on, it was downhill all the way.

I mean, I suppose the biggest thing that happened to me after that was Apollo. My boss at this program said, "What do you know about Apollo?" And I said, "Fire one end, pointy at the other," and he said, "Don't be stupid." [*Alie laughs*] I was approached by the bosses who said, "You're in the science division, you'll have somebody who knows about Apollo."

Aside: So, there was this additional consultant who had written *the* book on NASA's Apollo program which ran from 1961 through 1972, and the later-named Apollo 1 mission in 1967

resulted in the deaths of three astronauts during a fire in a test launch. Then the Apollo 7 mission, about a year and a half later, successfully orbited Earth for 11 days and it was the first flight with a crew on it of the Apollo program and this was in 1968 and people, wheuf, they could dig it. It was groovy, it was culturally a blast and far out, technically, also.

James: So, about six months later, I was ready, and Apollo 7 happened, and I stayed with the Apollo missions until the end. I mean, you didn't have to do much, just do the program because the audience is inviting themselves. I mean, they got colossal audiences around the world. So, it's quite unfair because Apollo made my career not anything else. Only to say, I did well after that, but I did because of Apollo.

Aside: So, the Apollo 8 launch was on Christmas Eve 1968, it was about two months after that Apollo 7 first crewed flight, and this saw astronauts go even further. They left Earth's low orbit, and they cruised around the Moon for about a week, and it was that the most-watched television event in history at the time. But when the Apollo 11 rolled around in July 1969, 600 million people back then watched it live to see humans landing on the Moon and bouncing around like happy bunnies. 16 million UK viewers tuned in for this all-night 11-hour broadcast and it really launched James Burke into the eyes and lives of millions of people and into science communication history which is why I was barely keeping my shit together during this interview.

James: And then after Apollo you couldn't fail really, could you? My last audience was XXX million, they'd say, "What would you like to do?" And you'd say, I don't know, and I just said the first thing that came into my mind. And they said, "Okay, how much?" And I said, "Don't know, have to think about that." And they said, "Well, there's plenty of money," which doesn't get said anymore.

Alie: No, no. That's not something we hear.

James: Yeah. So, that's when I started *Connections* because I thought, I'll do this because it's more fun than not.

[clip of James Burke introducing Connections]

It's about the things that surround you in the modern world and just because they're there, shape the way you think and behave. And why they exist in the form they do and who or what was responsible for them existing at all. The search for those clues will take us all over the world and 12,000 years into the past because it's in those strange places and in those long-gone centuries that the secret of the modern world lies.

And it looked like a kind of detective story style, which might work. And the great thing that I had already learned in a few brief years of television was the most important thing to do is to keep the audience wondering what's coming next because if they think they know, they'll switch off. *[Alie laughs]* So, it was really a matter of doing a number of programs that would be surprising in their content and in their direction and in their result. So, I did *Connections* and they worked because of those reasons; surprise, whodunit kind of thing.

The interesting thing about doing *Connections* was it struck me fairly quickly that the way to do it was backwards. If you're looking for unexpected links to keep the audience interested because they don't know what you're going to do next and they want to think they're better than you and cleverer than you are, and they want to get ahead of you, you keep them guessing. The trouble about coming forward through history is that you start, you know, 1066 the Battle of Hastings, blah, blah, where do you go? Well, there are probably 50 ways to go from the Battle of Hastings so choose one, choose the strangest one.

Aside: Just a quick aside. So, the Battle of Hastings took place in 1066 between the Normand army of what is now France and the English near the South England port town of Hastings, which is about 65 miles, or just over 100 kilometers, across the English Channel from the coast of France. This took place over about a day and the bodies of possibly 10,000 fallen soldiers are buried in a mass grave that somehow no one has found yet. But boy howdy, some jabroni with a metal detector is going to come along and just hit a jackpot, archaeologically, one day. But this battle mattered so much because England lost and William the Conqueror was like, "I'm your king now, deal with it." And some people call this guy William the Bastard. Anyway, he reigned until he died about 20 years later. So yes, in a syndesiological way, you could follow the Battle of Hastings in so many directions it would break your brain.

James: And whatever that is, again, how many ways to go forward from there, and each time you choose the most surprising route. Well, this is all very well and good, but it may not end you up anywhere at any point of any value of any interest in the future or the present, as I did many times, [*Alie laughs*] which encouraged me to turn it around and do it the other way.

So, if you decide, as I did, in all the *Connections* but especially in this recent one, to go backwards from the future, then you start with something like the nanofabricator, which is a machine that is already operating at a very simple level, and what it does is put atoms together to make new things.

Aside: Okay, so imagine giving a machine raw materials like dirt and water and then telling it to just scramble up those things on an atomic level to make you a sandwich or a sun bonnet or whatever. How does that relate to the time the French aristocracy had an outbreak of syphilis? And how is that related to the guy who took LSD with dolphins? For more on that, you can see the Delphinology episode about dolphins and yes, we dive deep on all kinds of cetacean gossip.

But in the new series of *Connections with James Burke*, and me, on Curiosity Stream he traces all that in an episode called "The End of Scarcity." Augh, history, it's just so beautiful and inspiring, it's full of dark, juicy scandals and discoveries. It's gossip that actually matters and it's more interesting than strangers making out on an island, if you can believe it. So yes, James, who has not only hosted but also written and researched *Connections* for decades, travels backward in his detective work.

James: There's a limited number of ways you can go because five days ago, so to speak, there was no nanofabricator so where do you go? Well, the link is that there's something in a nanofabricator that was there, so go there. And each time you go back, you're really looking to solve a riddle, and what you do is you go back far enough to the point where you think you've got 50 minutes of program, each piece of which is between four and five minutes, because four or five minutes is enough for the audience to say, "We've had enough of this," so, you've got to be ready to move on. So, if you go back that much, you end up with some weird choices which work because when you turn around and go back to the future, you've done the trip already. And so, I was able to sort of, this last one, was able to do jolly things like starting with the Inca use of the potato and ending with perovskite or virtually free energy, you spray it on the walls and the wall becomes an energy source.

Aside: And genetic engineering had what to do with coffee?

James: Or Frederick the Great's coffee police because he didn't have any coffee and he had to import it and all kinds of people started making coffee on their own and it was genetics. 17th-century shipworm was a little thing that bored holes in ships and helped them to sink and that story with avatars in the 21st century.

Aside: So, these are stories from his new *Connections* series in episodes with titles like “Designer Genes” and “Limitless Energy.” One is titled, “None of This Is Real,” and I enjoy that.

James: My favorite one, Napoleon’s toothpick, which ends with predictive analytics in the next century. [Alie laughs] and the last one will be Louis XIV wig, which is what ends up with the nanofabricator. So, they’re going to hang on and see why on earth they should bother and four or five links later, you’ve trapped them, and they can’t get out and it ends with whatever it ends with and then you say, “That’s it, that’s the end. Goodbye,” and disappear. [“Okay, bye!”] The great thing about history is that there are so many ways forward or backward at any time and for a television program maker, all you have to do is look for the thing that’s going to give everybody the most fun and you come across extraordinary things. Can I tell you one?

Alie: No... [James chuckles] Yes, [laughs] of course! Of course!

James: I think the one that got me most of all was a bridge disaster in which carriages fell off and people were killed, and the royals decided to set up a commission to discover why this had happened.

Alie: Mm-hm. Around what year was that?

James: I can’t remember exactly but it’s something like 1802 or 1830. I did all the research on these programs three years ago, my dear, so I don’t remember a bloody thing.

Alie: [laughs] I meant like era-wise. But okay, 1800s.

James: Right. So, the guy running the commission’s investigation was the secretary of the Royal Society, a very big wheel, and one of his jobs was to run the Royal Society of scientists, eminent harrumphs, and one of the harrumphs he invited into the society was a chemist nobody knew Herapath, I bet you’ve never heard of him.

Alie: I haven’t.

James: Really? Good. Herapath invented stuff called, wait for this, herapathite. Yeah.

Alie: Well, he was a modest, humble man. [chuckles]

James: That’s right. Now, the thing about this is, and this is why I thought this is something worth following, what Herapath was interested in was dog urine, [“You have my attention.”] with which he did various things. I won’t go into too much detail but the one that mattered to me was he put a couple of chemicals in, two chemicals, and it made dog’s urine produce crystals. Okay, all right. But when you turned these crystals sideways to each other, they blocked light out and that’s the beginning of what we call polarization. And the straight thing out of there is sunglasses and polarizing and all kinds of stuff like that and it’s picked up by a young man called Land at Harvard, and the result of his work on polarization ends up on a camera, which sees the first sign of the Russian space effort. [Alie gasps] So, from dog’s urine to that was just too good, I couldn’t leave it. [Alie laughs] And it led me straight to the future because you go from U2 to a space race, and there you are, bingo, somewhere in the future.

Alie: How do you narrow these down? You must have so many... Do you have a notebook or a file somewhere? How do you choose? You could go anywhere!

James: Well, you do. You do many scribbles, yes. So, lots of sheets of paper with scribbles all over them and arrows pointing up, down, and then sideways. After a while, these scribbles, sheets of paper, that’s it down there next to me now, you throw them on the floor because it’s the safest place to put them. [Alie laughs] I can’t tell you, now and again you get a bit worried because too many scribbles and too many arrows going in too many ways and they all look really good, that’s the worst thing. Some of them look really good. Now and again, a program will totally fail, and it will do

so easily because all the scribbles and arrows are pointing in extremely dull ways, so you just chuck it away. But as to remembering it, no, I don't. *[laughs]*

Alie: *[laughs]* When you've done this so long, I imagine it must really change your frame of mind, the way you look at things. Do you feel like the more you've done this, the more connected you feel to other people? Or do you feel like looking at history, the more wary you are of other people?

James: No, no. Not that. The former. If anything has happened to me over the years of doing this kind of stuff, it's that I've become more and more interested in other people, not to the point of bothering them, but nobody is boring. Nobody is boring; everybody has something that is exciting. They may not know it, or other people may not have found it out about them yet, but if you look hard enough, you'll find it. I often wish there was something one could do, like an evangelist, that you could say to people, "Think about this and think about yourself and realize that you're enormously more than society has let you believe about yourself." It doesn't have anything to do with education or... I nearly said brains, but I take that back because everybody's got one.

Aside: So, James elaborated, noting that every person's brain has roughly 86 billion neurons. So, be nice to it, get rest, and don't huff paint when you're sad or bored.

James: So, it's all there to be used and you just have to find that trick. I'm fortunate in the sense that I found a trick for myself, but the vast majority of people live lives of quiet solitude because they don't know how to trigger this extraordinary ability we all have.

Alie: And how would you say it gets triggered? How do you find other people could trigger that?

James: Well, if I knew that... *[chuckles]* I think... If somebody said, how do I trigger it in me, I can't tell you, you just have to look at the world and see if there's anything more than it looks. I'm just looking across my room here and there's a clock on the mantle shelf. And looking at the clock, I'm thinking, why would anybody want something like that? Why would you want a clock? Why would you want to know what time is? What does it mean? Now, all I would say to people is look around and think like that about things and you find that there will be some things that will be easier to think like that about and that's something to do with what you've got. But that's as far as I can go because, you know, who am I?

Alie: No, that's a beautiful thing. At dinner parties, do you ask more questions or do people ask more questions of you?

James: The dinner parties I like to be at are where everybody else does all the talking. *[Alie laughs]* I like holding thoughts to make a program or write a book because that attracts me, it's exciting to structure the thought and put it on screen or... You know, you do it!

Alie: Love it.

James: Put it on screen or whatever. In a sense, I guess what I said just now about putting myself inside an audience, in a sense you kind of have to forget the audience and make the program you'd like to make and then you have to hope they like it.

Alie: For me, if I'm writing or researching and I get stuck, I always have to think, what's the truest that I feel about this? Or what's the truest impulse because typically, the audience is feeling something along the same lines.

James: The danger in that is you suddenly realize it's awful, it's boring. *["Shit."]* *[chuckles]*

Alie: *[laughs]* I'm curious about your writing process because with so much of *Connections*, you've done so much of the research, so much of the writing, do you have tips or hacks on how to get over

writer's block? Do you have a process where you sit down at 7:00 AM with the same piece of toast and write until noon? What's your process like?

James: It's a little bit like that, yes. There's only so much time you've got, and you have to use it properly and that time, obviously, is eaten up by the rest of society doing things that require your time. So, it's a little bit like, yes, toast and on, and finish at noon because at noon I've got to go do something or whatever. [*Alie laughs*] So, I think you need that sort of discipline even if all it is is sitting in an empty room, looking around, and feeling desperate because nothing has come to your mind, which is often the case. [*chuckles*]

Alie: Well, now that we are so much more connected via social media and via the internet, how do you feel people relate to each other now that they have this digital connection but less, maybe, in-person connection, especially the last couple of years?

James: Well, I think first I would disagree with you in the sense that although people spend maybe less hours together in company, they probably spend more time with more people in company on the net. And I think that's the key difference. It seems to me that when two people come together, one and one make three and what you're looking for is what the three is. And sometimes the three will be something one of them produces, and that turns into something they do, or a book, or whatever. Or one and one makes three becomes something you do or whatever. I think public media, digital media, have made it immensely easier to be creative in the sense that I believe creativity, the strongest figure for creativity is one and one makes three. You know, you can be very clever by yourself, but you can never be as clever as you can with somebody else.

Alie: That's a beautiful thing to remember because sometimes, especially if you're really trying to hunker down you think, "I have to isolate and really work on this," but sometimes the best information and the best inspiration comes from going outside, looking around, having a conversation.

James: Yes, yes. And sitting and saying sometimes to people, "I'm stuck with this, and I don't know what the hell to do," [*Alie laughs*] and they say, "What's your problem?" And you tell them, and they tell you the answer, or they do something that makes you realize what the answer is. The worst thing is to not tell anybody and keep it to yourself.

Alie: Agreed.

Aside: I will say that in all the people I've interviewed over the years, hundreds of hundreds, for this show and for *Innovation Nation* on CBS and some other shows, one piece of advice I hear a lot is to ask for help and to collaborate with people and don't sit on ideas thinking that you can perfect them in solitude just thinking about them. You have to do things and get help if you need it. And as James Burke says, one plus one equals three, which is wonderful. Even in the last few years when we've been in quarantines and tough times, we get more work done and good stuff and creativity and we go further when we work together. So, take it from a syndesiologist, an expert in connections; togetherness, even online, could save us.

Another thing saving people is the generosity of charities and foundations and each week, we donate to a charity of choice. When we recorded this, just by chance, James, who now lives in France, happened to be experiencing a heating outage in his home due to some mechanical issue and it just so happened that it was taking days for the repair people to come out. But living in the south of France, it's warmer there, he said he was fine with a sweater and waiting it out.

But this winter, many people in the UK, where it's much colder, are struggling through an energy crisis the last few years that has left them having to choose between heating or food. So, this week we're donating to the NEA.org. The National Energy Action is a fuel poverty charity and they're

working to ensure that everyone in England, Wales, and Northern Ireland is warm and safe at home by distributing energy bill help. So, we will donate to them for some winter warmth and that was made possible by sponsors of *Ologies*.

[Ad break]

Okay, now let's resume our biggest questions for James including the backstory of the most legendary shot in television history from the late 1970s from a Connections episode titled, "Eat, Drink, and Be Merry..."

Alie: I have to ask about "Eat, Drink, and Be Merry..." the legendary shot of the 1978 episode at Cape Canaveral. That shot is known as one of the best shots in television history. I was talking to my brother-in-law about it yesterday and he started crying, he said that that shot is so beautiful that it brings him to tears when he thinks about it.

[clip of James speaking from the "Eat, Drink, and Be Merry..." episode of Connections]

Three men had understood that certain gasses ignite and that the thermos flask permits you to store vast quantities of those gasses safely in the frozen liquid form until you want to ignite them, at which point you take the top off the flask, the gasses evaporate, you apply a light and boom!

Can you share any backstory? Did you rehearse for that? What was that moment like?

James: Well, of course, we rehearsed like crazy. Mainly, I don't want to be rude, but mainly for the camera. If the camera didn't get it there was no point in doing it. So, we had to be absolutely certain that the cameraman was as happy as possible, so he had to be in a place where he could shoot that shot without any fear or worry that anything would stop him doing a wonderful shot, and the same for the soundman. The sound was coming, as you know, usually, from a distant NASA source, a loudspeaker of some kind, and the soundman had to be happy about that. So, we spent a lot of time on the technicalities of how you recorded this stuff.

Aside: Okay, so picture an overcast cloudy day at Cape Canaveral, Florida. James is wearing beige slacks and a deep brown button-up shirt, buttoned a few buttons down, it's got kind of late-1970s wide lapels, and he's wearing thick-rimmed glasses and has wild salt and pepper hair, past the nape of his neck and he's walking along this grassy expanse past huge monolithic research buildings and a retired Saturn rocket to a spot that's across from some water. In the background, is the launch pad with the towering Titan 3E rocket launch system.

James: I mean, it was pretty clear what the shot was going to be; it was me in the foreground and it in the background, that's it. And all I had to remember was when I pointed, I had to point off to one side because of parallax. So, we did lots of practicing of me pointing and the cameraman saying, "No, you idiot, not there. Slightly right." *[chuckles]*

Aside: So, he had to point not toward the rocket but in a direction a bit off so the shot's foreshortening would line his hand up with the rocket. And then with his back turned to the launch pad, he had to remember exactly where at that point in space to position his arm and do it on time.

James: And they said, "That's good." And that was it really. The rest of it was how much can you remember to say with absolute accuracy before the moment when the thing lights up? And we figured I could probably do about 12 seconds without any doubt whatsoever and I just didn't have to trip or make a mistake or anything because there's no chance to say, "Wait a minute!"

[clip starts playing in the background, "... were hydrogen and oxygen..."] And so, I stepped into the shot, *["If you release those two gasses into a confined space, with a hole at the other end of it and mix*

them as you do so..."] turned, said 12 words ["...and then set light to them, you get..."] and pointed ["That."] and it lit. And we stood there, scared to death because then, anything could go wrong. I couldn't be in charge of any more words, the cameraman could only go on shooting film at that thing, the soundman could do nothing about the noise it was making, and we just hoped that some dog wouldn't run through the shot and knock the camera over so we had people looking out for dogs who might run in or whatever. [Alie laughs softly] The thing went up and then finally the cameraman said, "Okay," and everybody sort of fainted. [James chuckles, Alie exhales] It was one of the scariest things I've ever done.

Alie: I'm sure. So, they knew before the film came back like, "We got it, everything was good."

James: Oh yeah, yeah. Of course, of course.

Alie: They didn't have to check for a hair in the gate, or anything like that?

James: Well, you don't have any choice really. If there's a hair in the gate, that's too damn bad. [Alie laughs]

Aside: Just a PS, a hair in the gate refers to this shard of broken film that can get caught between the film itself and the lens of a camera which then ruins the shot. So, when you're shooting on film after a scene or a setup, the camera department has to pause filming and has to check the gate and open up the camera and look for those little slivers of broken film, or hairs in the gate, to ensure that what they shot is not garbage, with a chunk of film in the foreground, which makes everyone so sad.

James: They were not going to come back and say, "Let's do it again."

Alie: [laughs] Right.

James: The NASA loudspeaker was a few yards away and pointing the other way because it was pretty noisy and they were doing "10, 9, 8..." as I was talking. So, half my brain was going "10, 9, 8..." and the other half was going, "Blah, blah, blah." But we were all together at the time.

Alie: Were you aware that that has gone really, really viral on TikTok and social media? That that clip and you have had an explosion in popularity?

James: No. You see, I live in France, and they don't know or care who I am, [Alie laughs] which is very good for you. I've had some emails saying, "We saw this thing and we liked it." I even got somebody who told me that there was some large number of people having seen it.

Aside: So, a Twitter posting in May from the account @HistoricVids garnered 15 million views with millions more on TikTok accounts, 5 million on the BBC's YouTube archive, and another 16 million on some random YouTube account. Most captions were a variation on the sentiment that it's the single greatest shot in the history of television and that James Burke is everyone's hero. So, what do these 50 million plays and a newfound appreciation from younger fans, what do they mean to him? He explains...

James: It doesn't make any difference to my life. ["Okay."]

Alie: Mm-hm. Well, when it comes to the new season of *Connections* on Curiosity Stream, you now have a huge base of a new generation of people who are very familiar with you as this absolute legend. When you were coming up with the episodes for this season, did you find that it was almost, not more frustrating but more inspiring because there's so much going on technologically and with futurism to structure these episodes? Were you thinking about what this generation might be excited about?

James: Well, no. Because first of all, they're going to get what they get. [Alie laughs] They don't watch it, they don't watch it. ["Good point."] Second of all, it was cheap. So, I'm not even worried about

spending money that the producers don't want to be spent. Television has changed so much since the very first *Connections*, you don't cross the world with a massive film crew to check on the spots on a New Guinea sand flea on a beach. We just don't do that because nobody will tell you you can do it. We had interesting and exciting things to do ourselves with the virtual reality technology, green screen technology, that would allow us to do fancy pictures but without going anywhere. You know, I have had one or two notes saying, "You do realize it's going to look as though you've only got one shirt and one undershirt." And yeah, true, sorry.

But that's, I think, at my ancient age, I just wanted to make, I had a chance to make a half a dozen programs starting in the future and going backwards, things like Napoleon's toothpick and it's just too good a chance to throw away.

Alie: Can you tell me the most frustrating shot of your career? The most frustrating shoot you've ever been on? Something that was just... One of those shoots that you remember like, "Augh, that one was tough." I remember once I was on a shoot where I had to change in a public restroom that was coin-operated and I had to come up with my own quarter for it *[laughs]* and I was like, "Come on, y'all."

James: You didn't have a quarter?

Alie: I had to borrow a quarter from someone so I could change in a very dirty bathroom. There are always those moments when you have the privilege of getting to go around the world or interview people you wouldn't have access to and let your curiosity lead the way, there are so many wonderful moments. But there are sometimes those moments where, you know, you're battling an ice storm in the middle of the night to get to a location so you can shoot something by sunrise and you're eating Cheetos for dinner. People don't see those moments but are there any moments that stick in your memory?

James: No.

Alie: No? That's good!

James: I think because it was all like that. *[Alie laughs]* I think I remember things constantly going wrong, so I don't really remember one in particular, no.

Aside: I love this man.

Alie: We've talked about obviously that August '77 shoot. Any others that you really thought, how did I get so lucky to have this be my job? Or any that were just thrilling?

James: Right, okay, when Armstrong was walking down the steps. *[clip of Armstrong's Moon landing starts to play. "Clear Neil, we can see you coming down the ladder now..."]* and voices in my ear were saying, "What's he going to say? Say something!" And I thought, I'm going to keep my damn mouth shut because the worst thing you can do in the world is talk over the man who says the first words on the Moon. And I was being shouted at, I mean like, shouting, "You're paid to talk!" *["I'm going to step off the LM now..."]* and I just kept quiet because what could you do? And then he said, "That's one small step..." *["That's one small step for man... One giant leap for mankind."]* And I nearly cried. *[laughs]* So, it does have its compensations, doesn't it? Yeah.

Alie: It does. The power of shutting up. Who knew?

James: The power of shutting up, exactly. *[both laugh]*

Aside: On the topic of not shutting up, last week I recorded a solid 90 minutes of me reading you an audiobook of samples from books written by your favorite guests. But on the topic of literature...

Alie: I've been curious about this. What are you reading? Any books? I feel like if there's ever a person to ask if they've got a good book recommendation... What are you reading right now? Anything in particular?

James: I spend most of my time online reading. It's interesting, there's so much now in the world that you can access easily that the idea of sitting down with a book and leafing through it slowly, slowly is not as sexy as it used to be. *[Alie laughs]* So, most of the time I do reading which is very oriented toward whatever project I'm working on.

Alie: Do you fall victim to Wikipedia rabbit holes like the rest of us? Where you click on one thing, then you click on the source, then you click on another, and before you know it it's 1:00 in the morning? *[laughs]*

James: Yes, that's my life, my life. *[both laugh]* I have a Wikipedia rabbit hole.

Alie: *[still laughing]* As expected, which is one reason why the world is so enamored with you. I am very, very honored to get to talk to you and ask these questions that I've wanted to forever. Are you doing anything to celebrate the premiere? Did you have a glass of sparkling cider? Did you just go all out and stay out all night and get arrested and...?

James: No, I didn't. I'm not even sure if it's been seen by anybody yet.

Aside: So, *Connections with James Burke*, the new 2023 episodes, are up now on Curiosity Stream. And my spinoff, *Quick Connections with Alie Ward* is also up on Curiosity Stream and we've been waiting months and months for this to come out so I'm pretty stoked. Self-promotion is absolute agony for me, I hate it so much, but I'm so proud of the shows and the team at Bigger Bang who made this show happen and it's really been a career highlight for me and such an honor to work alongside the absolute legend, Mr. James Burke, who really should be Sir James Burke. Can we get on that? Can anyone send an email? Anyway. Upon the release of these episodes a few weeks ago...

Alie: But you didn't go out on a bender?

James: No ma'am, I didn't.

Alie: *[laughs]* Well...

James: I stay in on benders. *[chuckles]*

Alie: *[laughs]* The night is still young. I'm so glad I got a chance to talk to you, it really is an honor. Your work is amazing and the curiosity and the wonder that you bring to it and the humility and energy that you bring to it is really what's carried the series and what carries every episode so much. So, good work.

James: Much too kind of you. Thank you.

Alie: Well, thank you so much for talking to me and I hope that we didn't take up too much time. I hope you're warm enough. Are you warm enough?

James: Yes, just about. I've got to put another layer on now.

Alie: *[laughs]* How long has it been out? Only a couple of hours or...

James: Five days. *[Alie gasps]* Oh yeah. No, this is the south of France, they don't fix heaters quickly in the south of France. And they say things like, "We'll be right around," which means, "We'll give you a call in a couple of weeks."

Alie: Oh no!

James: Oh yeah, so we're wearing pullovers and things.

Alie: I hope you have some goose down.

James: [laughs] Something like that anyway, yes. Thank you so very much for being such a nice interview, I loved it and I like your work too.

So, I guess *do* meet your heroes and ask them about dog pee and such. Again, that was James Burke of the series *Connections with James Burke*, which is streaming now, a new season on Curiosity Stream and yes, I have a spinoff on there called *Quick Connections with Alie Ward*. We'll link those in the show notes. So, I hope you enjoy it, everyone worked so hard to teach you weird things and it was really a joy to make.

Okay, so we are @Ologies on Twitter and Instagram, I'm @AlieWard on both. *Smologies* are shorter, kid-friendly episodes of classic *Ologies* but cut down to smaller size and cleaned of my filthy language so that they're classroom-safe. The *Ologies* Podcast Facebook group is adminned by Erin Talbert, Noel Dilworth is our scheduling producer, Susan Hale is our managing director and did fact-checking and additional research on this episode. Emily White of The Wordary makes our professional transcripts, and Kelly R. Dwyer does the website and can make yours. And the one who makes all the editing connections is Mercedes Maitland of Maitland Audio, whose family name, she told me, dates back to the Battle of Hastings. I don't know if they killed anyone, hopefully they didn't get killed. Anyway, Nick Thorburn made the theme song.

If you stick around until the end of the episode, I tell you a secret and this week it's again, no one paid me or put me up to making this episode, it was entirely my idea and suggestion and it was my pleasure. But I hope y'all enjoy the show if you tune in. Also, here's another secret, if you're going to any holiday parties and you're not sure what to bring, I highly suggest being the person who comes with two 12-packs of La Croix or sparkling water and a bag of ice. It's cheaper than a bottle of wine, and you don't have to decide which one to pick based on what has a cool label and everyone always needs water, especially folks who don't want to drink. I've been at parties where I'm like, "Why did no one do this?" And then I'm like, "I'm just going to do this next time."

Another little secret at the end here is some audio from one of my *Quick Connections* episodes, just so you can get a little feel for it and because I thought it was fun.

[clip from *Quick Connections with Alie Ward*]

Alie: Russia is at war with several countries at this time and if you're involved in lots of wars, you need lots of metal and lots of weapons and lots of money. So, Russia, hungry for metal and gold, speedily digs a bunch of mines in the Ural Mountains.

In 1761, one geologist named Johann Gottlob Lehmann is studying the rocks in a Ural gold mine when he spots a funny-looking spikey red crystal, it's unlike anything he's seen before. It looks like this, and it's called crocoite. Lehmann analyzes the crystal and finds that it contains lead but there's also some other elements in there that he doesn't recognize.

Over the next few decades, crocoite serves very little purpose besides being an odd curiosity for people who really like rocks. Then, in 1797, one of those people, a French chemist named Nicolas Louis Vauquelin becomes determined to figure out what crocoite is made of. He finds that when he mixes it with various different chemicals, it consistently produces brightly colored liquids and solids and finally, during one experiment, mixing crocoite and hydrochloric acid, Vauquelin produces a network of gray metallic needles. He's found a new element and he calls it chromium from chroma

the Greek for 'color' because of all those brightly colored chromium compounds that he produced during his experiments. And color these compounds did.

Chromium oxide paint or Viridian goes on to be used in just a few paintings that you might recognize. It's used to paint the blinds and railings in Manet's, The Balcony, the green shadows in the roof of Monet's paintings of the Gare Saint-Lazare, and in all the vibrant greens of Van Gogh's, Wheat Field with Cypresses. And that's just a few of the famous paintings that owe their color to chromium. But it's a different use of the colorful chromium compounds that's going to take us another step toward our bionic future.

In the 1870s, Italian biologist, Camillo Golgi, is trying to figure out what the cells in the nervous system look like and how they work. Golgi believes that the nervous system is one long, connected system of nerve cells, and he wants to prove that but at this time, the nervous system is difficult to study because no one has managed to isolate the cells in tightly packed neural tissue. So, Golgi comes up with a clever solution to make these tricky little cells visible. He combines a bright red chromium compound, potassium dichromate, with silver nitrate and he soaks the neurons in it, and this hardens the neurons, and it turns them black so they can be seen. He calls the process the black reaction. The problem is, it only dyes a random 1-5% of cells per sample, and this enables Golgi to see individual cell structures, but it doesn't help him to understand how those cells interact with each other or even to prove that his theory about nerve cells being connected is correct. Enter a brilliant young artist, Santiago Ramón y Cajal, whose father is the local surgeon in their village and is desperate to get his son interested in medicine.

One night, in 1868, when Cajal is 16 years old, his father leads him into a local graveyard, hands him a shovel, and tells him to dig up a corpse, which they carry back to the family's barn and there, under the light of gas lamps, the elder Cajal demonstrates father-son bonding and the art of dissection, explaining the intricacies of the body in detail. Cajal is entranced. From this point on, anatomy becomes his favorite subject, he becomes obsessed with reproducing it in his art and as his brother will later articulate in the eulogy at Cajal's funeral, he "Enters the castle of science through the door of art." He enrolls in medical school, inspiring his father's pride, and it's there that he becomes interested in the field of histology, the study of tissues and cells on a microscopic level. It's while researching histology that he stumbles across Golgi's black reaction and here comes one of those moments that will change the world in hundreds of really surprising ways.

Okay, thanks for listening. Stay safe out there. Berbye.

Transcribed by Aveline Malek at TheWordary.com

Links to things we discussed:

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[This city has the best food in the world](#)

[BBC Archive - #OnThisDay 1966: How do you solve a problem like Pisa?](#)

[Tomorrow's World](#)

[One small step for man, one giant leap for BBC Television](#)

[The World Watched Apollo 11 Unfold - Together](#)

[James Burke Connections, Ep. 1 "The Trigger Effect"](#)

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Editing by Mercedes Maitland of [Maitland Audio Productions](#)

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