

NEW YORK TIMES BESTSELLING AUTHOR

JOHN
SCALZI

WHEN THE
MOON
HITS YOUR
EYE





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FOR LYNNE, MICHAEL AND CAITLIN THOMAS

PREFACE

HEY KIDS! Let's learn about the moon!

It's Earth's closest neighbor in space and the brightest thing in the night sky—but do you know these other fun facts about the moon? Let's find out about them together!

Earth and the moon are old friends!

The moon has been around for over four and a half billion years—nearly as long as Earth itself.

Question: Who is your oldest friend?

The moon's dramatic beginning

Scientists think the moon was created when another planet collided with the newly formed Earth. In the collision, stuff flew off that would later become the moon!

The moon loves to ROCK!

The surface of the moon is mostly made of rocks! There are two main kinds: basalt, found in the maria (the darker parts of the moon's surface), and anorthosite, found most other places.

Question: What is your favorite kind of rock?

How big is the moon?

The diameter of the moon is almost 2,200 miles: That's close to the distance between San Diego and Washington, DC! The moon's surface area is even larger—about as big as all of Africa!

The moon is always facing you ...

Earth spins, but the moon doesn't! It always has the same side looking at our planet. If you were on the far side of the moon, you would not see Earth at all!

... But sometimes it hides its face!

The moon orbits Earth! And as it does, it has “phases,” which means sometimes you can see all of the moon (a “full” moon), and sometimes you don't see it at all (a “new”) and sometimes it's in between, like a crescent!

Question: What is your favorite “phase” of the moon?

Like to surf? Thank the moon!

Because of gravity, the moon pulls on Earth, and as Earth spins, that creates tides in the ocean! Without tides, our planet would be a very different place!

Maybe it should be called a MOO-n?

The moon is made of rock, but sometimes people like to imagine it made of something else. Some people like to imagine it is made of cheese—that would take a lot of cows! A famous song once compared it to pizza—which is also made of cheese!

One big leap for a kid!

Gravity on the moon is one-sixth of what it is on Earth—someone who weighs 100 pounds here would weigh just under 17 pounds there, and you could jump six times as high as you can today!

Question: How high can you jump?

Other planets, other moons

Earth is not the only planet with a moon! Mars has two, but they are very small. Jupiter and Saturn have dozens, and some of them are even larger than ours! Only Mercury and Venus have no moons at all.

Can people travel to the moon?

Some people have! An astronaut named Neil Armstrong was the first person to do it, way back in 1969. That was a long time ago! Some people are now planning to go back, and maybe one day people will live on the moon all the time!

Question: Would you like to live on the moon?

Out of my way, sun!

The moon is almost 240,000 miles away, and that makes it almost the same size as the sun in the sky! Sometimes the moon moves in front of the sun, and hides it completely. That's called an "eclipse," but it only happens once in a while.

Project: Ask your teacher when the next eclipse is and find out where it can be seen on the planet!



DAY ONE

Wapakoneta, Ohio | The Armstrong Air and Space Museum

Virgil Augustine's cell phone rang just as he was reaching for his coat to go home. It was Bud Roldan, the facilities director for the museum. "You still in the building, Virgil?" Bud asked.

"Just barely," Virgil said. Tonight was the weekly date night for Virgil and Emily Augustine; they would pay their teenage daughter, Libby, to watch her twin brothers, which Virgil knew meant she would be in the living room texting her friends while Andy and Hunter played video games in the basement, and Emily and he would have either Mexican or Chinese food and then watch whatever was showing at the Wapa Cinema. This week it was some animated movie involving waterfowl. This is what passed for romance when you were middle-aged and living in small-town Ohio, and Virgil was not one to miss it. "What is it, Bud?"

"Well, it's..." Bud trailed off, and Virgil waited, eyeing the door of his office, yearning for escape. "You should probably just come see this for yourself," Bud finally said. "It's easier than trying to explain it. We're in the Moon Room. Come on up." Bud hung up.

Virgil furrowed his brow and then stepped out of his office, and wound his way through the exhibit floor of the small local museum devoted to the life and career of Neil Armstrong, Wapakoneta native and the first man on the moon, and down the long, darkened and dramatic hallway that led to the "Moon Room," featuring the exhibit room highlighting the Apollo 11 moon landing. He glanced, as he always did, at Armstrong's backup moon suit in its display, helmet and gloves on the floor, which unfailingly gave Virgil a slight start: Here was a decapitated moon man.

Then as always Virgil got over it. He turned the tight right into the small exhibit room, where Bud and Willa King, Armstrong's curator and communications director, were standing by the room's central exhibit: a moon rock Neil Armstrong had brought back with him from his trip.

"What is it?" Virgil asked.

"Virgil, look at the rock," Bud said.

Virgil looked at the rock. It was small, irregularly shaped, looking either triangular or squarish depending which angle you looked at it, a pebbled gray with glossier darker bits that reflected the light. Virgil knew without looking that the informational plaques on the display would tell him this bit of rock was formed by a meteorite impact fusing the moon's powdered basalt surface back into something more solid, an event that happened some four billion years previously. The rock was mostly pyroxene and plagioclase, and if you found it out in the world you would probably think it was a chunk of concrete, if you thought about it at all. Virgil was so used to looking at the rock that it took several seconds to realize that the rock now looked nothing like it was supposed to look.

"That's not the rock," Virgil said, to Bud and Willa.

"We know," Bud said.

Virgil leaned in to look at the not-the-rock, his nose coming within millimeters of the Lucite encasement the rock was displayed in. The not-a-rock was precisely the same dimensions as the rock, but slightly larger. The original rock had been securely but lightly held between two plastic stoppers on a vise. This large object was also secured by the stoppers and vise, but now it was solidly wedged. It was uniformly off-white, with faint yellow overtones.

Virgil strained his eyes to look more closely. The surface of the not-a-rock had a slightly oily sheen to it.

"What the hell?" Virgil looked up to Bud and Willa.

"We know," Willa said.

"Is that..."

Bud held up his hand. "We're not guessing, Virgil. You're the executive director. That's *your* job."

Virgil looked back to the not-a-rock. "I have no idea. Maybe plastic? Modeling clay?"

Bud and Willa both audibly exhaled. Virgil looked back up at them. "Those are what it looked like to us," Bud said. "We didn't want to say it. But now that you've said it, that's what we think, too."

"Anyone want to tell me what's going on?"

“We don’t know,” Willa said. “I led a school trip through here at two. The rock was still there then. I came through a little after five thirty and this was there.” She pointed at the white object wedged in the display. “I stared at it stupidly for a couple of minutes and then I called Bud. He called you. Here we are.”

“Huh.” Virgil stood up and stepped back from the moon rock display. The outer display was a rectangular prism of metal, ceramic and Lucite. The Lucite portion held inside of it a second triangular Lucite prism, inside which the rock was held. There was a modest shelf that went all the way around the display, in part to keep visitors from greasing up the Lucite with their finger- and nose prints.

Virgil examined the entire display, walking slowly around it. Bud and Willa stepped out of his way as he did so. “It doesn’t look tampered with,” he said, finally.

“Not in any way I could see,” Bud said. “It’s locked up tight.”

“So sometime between two and five thirty, one of our guests entered in here, dismantled the display, stole the rock, replaced it with what looks like Play-Doh, reassembled the display, and then walked out without us knowing,” Virgil said.

Bud, to his credit, looked absolutely miserable. “It can’t have happened that way. But...”

“Why would they bring Play-Doh?” Willa asked. “I mean, I get stealing the rock. It’s going to be worth millions.”

“About three hundred thousand a gram,” Virgil said. He knew this because of a *Washington Post* article a few years back.

“Right. So, all right, a smash-and-grab. But to replacing it with that?” Willa waved at the not-a-rock. “What’s the point?”

“And rebuilding the display once they took it apart,” Bud said. “That’s just *weird*.”

“Stealing a moon rock is weird,” Virgil replied. He looked up at the east wall of the Moon Room, at the security camera there. He nodded toward it. “We looked at that yet?”

Bud motioned to the display. “We wanted you to see this first,” Bud said.

“I’ve seen it,” Virgil said. “Let’s see what the cameras saw.”

The cameras saw nothing. The three of them rolled the video back to just after the 2:00 p.m. school group Willa led through the museum, and then fast forwarded from there. Between then and 4:45, random individuals came through singly, in couples and in small groups. None of them stayed in the room for any unusual length of time. None of them did anything to the moon rock except look at it.

The last guest, a middle-aged man on his own, walked through the room at 4:52, looked at the displays commemorating the various Apollo landings and considered the equipment that was used to get samples and do other scientific work. He walked around the moon rock display, reading the moon rock facts written there. When he was done, he checked his phone and walked off toward the Infinity Room, briefly interposing himself between the security camera and the display.

“Stop there,” Virgil said, to Bud. Bud stopped the video. “Back it up. Watch the rock.”

Bud backed up the video by a minute. The middle-aged man was leaning in to look at the rock. Then he turned and dug his phone out of the pocket of his hoodie. He stood there for a second looking at something on his screen, back to the display, blocking the view of the rock. When he moved toward the Infinity Room, the rock was noticeably brighter in the security feed.

“That’s our man,” Bud said.

“Maybe,” Virgil allowed, unconvinced. The man wasn’t doing anything but standing there, staring into his phone. Unless he had secretly hidden cunning spy technology into the back of his hoodie that could melt and reform Lucite in seconds, and replace a moon rock with a similarly-sized chunk of possibly modeling clay, all this dude was doing was blocking the camera.

Still, better safe than sorry. “Any way we can know anything about him?” Virgil asked.

“If he paid for his admission with a credit card we can probably track him down from that,” Bud said.

“We would need to find out when he came in, then,” Willa noted.

Bud smiled here. “Well, we can do that.” He pulled the coverage from the security cameras at the front of the museum.

The three of them spent the next several minutes watching their mysterious stranger purchase his admission at 4:28 p.m., and then wander through early parts of Armstrong’s life in a leisurely fashion. They skipped viewing the Moon Room again and watched their visitor move quickly through the second half of the museum, skipping past the video presentation of the moon landing and Armstrong’s post-landing career and NASA post-Apollo displays, because the museum was about to close. He paused only at the gift shop, to get a moon mug that had moon facts appear when you poured hot water into it.

He paid for his mug with a credit card and left the museum at 5:01, the last visitor to leave. The parking lot cameras had him pulling out a few minutes later in

a MINI Cooper. His Ohio license plate was clearly visible.

“We have enough to track him down now for sure,” Bud said.

“If he was a criminal mastermind you would think he’d be a little more careful,” Virgil suggested. “Paying by credit card and driving his own car is not the mark of a master thief.”

“You don’t think this guy did it,” Willa said.

“I don’t know what I’m thinking,” Virgil admitted.

“We should call the cops,” Bud said to Virgil. “And we have to tell someone on the board of directors.”

Virgil grimaced at this. “Not yet.”

“Why not?” Bud seemed genuinely surprised.

“Can you get into the display, Bud?” Virgil asked, sidetracking his facilities manager for a moment.

“Yeah, sure,” Bud confirmed. “But do we want to?”

“That would be tampering with evidence,” Willa said.

“When we go to the police and the board of directors with this, I want to be absolutely sure what we’re dealing with. I want to know what our moon rock was replaced with. I need to get a better look first.”

Bud and Willa looked at him incredulously.

“Fine,” Virgil said. “I’ll call Herb Wopat. He’s chief of police and he’s on the board of directors. Two birds with one stone. I’ll get him over here. *Then* will you get into the display?”

“As long as Herb tells me I can, sure,” Bud said.

Herb Wopat arrived ten minutes later—small-town living had its advantages—and ten minutes after that Bud and Willa, fully deputized by Wapakoneta’s police chief, started dismantling the lunar rock display. Virgil took the moment to step outside the museum and call his wife.

“Emily, we have a problem,” he said.

“I guessed that when you weren’t home an hour ago,” Emily Augustine replied. “Anyone hurt?”

“No one’s hurt. We look to have had a theft. I’ve got Chief Wopat here and he and Bud and Willa are getting into it, but I need to be around until we’ve got it cleared up.”

“So it’s serious.”

“If we don’t figure it out I think the board of directors might wonder if I should keep my job,” Virgil admitted.

“That’s not good,” Emily said. “You would have to be my kept man until you found a new job.” Emily Augustine had a family practice at the Lima Memorial Health System Wapakoneta Medical Center, and made more money than her husband. She worked more, too, which is why the two of them had instituted their date nights in the first place. They might not see each other otherwise.

“There are worse things than being your kept man,” Virgil said. “But I would rather keep my job.”

“Perfectly reasonable. Okay, you’re off the hook for skipping date night this one time. You’re going to tell me the whole story when you get home, though.”

“Absolutely,” Virgil promised. “I still feel bad.”

“Then you’ll have to make it up to me later,” Emily teased. “Anyway, it’s fine. I still stuck Libby with babysitting duty, and now I’m sitting on the deck, drinking wine and watching this amazing sky.”

Virgil looked up and saw yellow and orange clouds interspersed with the red of the evening. “It’s amazing,” he confirmed. “What I can see of it. The sunset itself is blocked by a Waffle House and a McDonald’s.”

“You’re missing out,” Emily said. “And it’s not just the sunset. The moon is absolutely stunning.”

“You can see the moon?” The day before had been a new moon, so today the moon would have been the merest of slivers in the sky, nestled up against the sun and usually visible for only a few minutes after the sun had set. Virgil was aware of the moon phases not just as an occupational hazard of being an executive director of an air and space museum, but because in a month there was an annular eclipse coming, the totality of which would slide up much of the Eastern Seaboard of the United States. Ohio would get a partial eclipse, which was still enough for the Armstrong Museum to prepare a number of educational programs about it for schools and nerdy adults.

“See it? You can’t miss it,” Emily said, of the crescent moon. “It’s the brightest I’ve ever seen it in this phase.” Emily and Virgil had met in college at a lunar eclipse viewing, which she had attended with her then-boyfriend, who she dropped in quick order after meeting Virgil. Her interest in casual astronomy had been a positive feature in their marriage. “You need to see it,” she told her husband.

“Waffle House and McDonald’s,” Virgil reminded his wife.

“And yet you have *legs*,” Emily said. “Go look. Love you.” She hung up on her spouse.

Virgil grinned and followed his wife’s suggestion, walking up Apollo Drive to Bellefontaine Street, the main drag of Wapakoneta, which was platted in a mostly

east-to-west direction. The view of the sky there was littered with gas stations and fast food joints, but there was indeed also the sun and, slightly off to one side, a blazingly bright crescent.

Emily was right. It was the brightest sliver of a crescent Virgil had ever seen. Even with the sun still in the sky, the moon was clearly, almost relentlessly, visible.

Even framed by a Murphy USA gas station and an O'Reilly Auto Parts, it was one of the most beautiful astronomical sights Virgil Augustine had ever seen.

It shouldn't be that bright, Virgil's brain said to him.

Shut up, brain, Virgil said back.

Virgil's phone rang. It was Bud. "We got it open," he said. "You should get back here."

"Everything okay?"

"Just get back here, Virgil." Bud hung up.

A few minutes later Virgil was back in the Moon Room. As he cleared the hallway and passed the headless moon suit, he wrinkled his nose.

"Okay, good, you smell that, too," Bud said. He stood with Willa and Chief Wopat, off to the side.

"What *is* that?"

"You tell us," Willa said, and pointed to the display.

The display had been opened and one panel of the outer Lucite had been removed. From there, either Bud or Willa or Chief Wopat had removed the triangular prism of Lucite that surrounded the not-a-moon-rock. It stood bare, in its vise, open to the air.

"We didn't touch it," Herb Wopat said to Virgil. "We figured you should do the honors."

"Was the display tampered with?" Virgil asked.

"Not until we opened it," Bud said. "It was sealed up tight."

Virgil got in close to the display and breathed deeply. The odor was neither the burnt charcoal that astronauts claimed the moon smelled like, nor the sweet chemical smell of children's modeling dough. It was something far more familiar.

Before he could stop to think what he was doing, Virgil reached out to the object inside of the display, scratched it with a fingernail, and put his finger in his mouth.

"Virgil, what in the hell—" Chief Wopat began.

"It's cheese," Virgil said.

"What?" Bud and Willa said at exactly the same time.

“It’s cheese,” Virgil repeated.

There was silence for several moments at this.

Then, “What *kind* of cheese?” Bud asked.

Virgil ignored this, thinking about what had just happened, what he’d just tasted and what he had seen in the sky a few minutes earlier. Then he wiped his finger on his pants, pulled out his phone, and called his friend Dr. Julie Doss at the Space Center Houston’s Lunar Vault, where a large amount of NASA’s lunar samples were kept, in clean rooms where the samples lay in an inert nitrogen atmosphere.

Dr. Doss picked up after the seventh ring, just before the phone would have gone into voicemail. “Virgil,” she said, in a clipped voice.

“How are your lunar samples today?” Virgil asked, and waited.

There was a pause so long that Virgil thought he had gotten disconnected. He was about to hang up and call back when Dr. Doss spoke back up.

“All right,” she said. “What the *actual fuck* is going on?”

From r/astrophotography

Anyone get a shot of the moon tonight?

It was super bright. Is that normal?

There was no visible moon tonight, it was a new moon. You probably saw something else.

Something else that looked like the fucking moon? No, and also, today is the first day the moon is visible this lunar cycle, please read a book

I saw it in Aurora (IL) agreed, it was super bright, no, did not catch a photo, by the time I thought about it, it had already set. Anyone else?

I saw it. I thought it was Venus or Jupiter at first and then it started growing horns. Clearly it's the end times, make your preparations.

You're not serious about that, right?

About seeing it? Yes. About it being the end times? I hope not!

The end times moon is red like blood, not white like, uh ...

Maybe God forgot to change the color on the LED setting.

Dallas here. I saw it and it was extremely bright. As in, no possible way that it could have actually been that bright. The moon is rock that has the general reflective qualities of asphalt, it only seems bright because of the amount of light the sun bounces off it. Last night sure didn't look like asphalt.

Could it have been closer in its orbit? All orbits are ellipses.

If the moon's orbit was that much of an ellipse we'd be having one hundred foot waves right now.

Do we have any actual scientists here? Is there a scientific explanation?

Actual scientist here. Didn't see the moon tonight, but it's actually pretty easy to misidentify other objects for the moon. Weather balloons and blimps are often accidentally identified as the moon or for UFOs, and they are often highly reflective. Either that or some especially reflective clouds. It happens more often than you think.

Next you're going to tell us that swamp gas reflected off Venus ...

Please look right here at the Neurolyzer!

Respectfully, that might explain it if everyone was seeing the same thing from the same location, but people here are checking in from all over the United States. We can't all be seeing weather balloons or blimps. I don't think there are even that many blimps in the world.

Checking in from Santa Monica, CA. There were a whole bunch of us by the pier looking at the moon, and arguing about whether it was the moon at all. What the actual hell?

What was the thinking there on the beach?

No one had a clue. One of the people there was on the phone with a friend of his from JPL to ask about it. His friend told him he couldn't see it because the mountains were in the way.

Doesn't JPL have, like, *actual* instruments on the moon? Maybe check those?

San Diego here. It's the first time I've ever seen the moon that close to a sunset. I've looked before and could never see it. Tonight you couldn't miss it if you tried. I think that's what's confusing

people. A UFO feels more reasonable than that being the moon.

Wasn't there that movie about the moon being a big UFO?

We don't talk about that movie in polite society.

Oxnard here. We saw it. All I have to say is, it better not be the end times, I'm getting married in three weeks. I don't want to honeymoon during the apocalypse. That's not too much to ask.

Original Poster back again. Read all the comments. Okay, but seriously, guys. What's actually going on? Does anybody *actually* know?