

*Can a love of art inspire Jace to solve a geological puzzle, connect with his stepdad, and shut up the local bully all in one afternoon at the dig?*

## Dinosaur Dig

by

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Sighing, Jace stared morosely out the passenger window of his stepfather’s Jeep at the high desert scenery they were passing. Six weeks of looking for bits of old bone, because that’s what his stepfather did. Six weeks of

being light years from LA and his friends, and no

electronic devices allowed, so he couldn't call or text or even listen to his music. At least he'd been allowed to bring his drawing stuff. He could see possibilities in the dramatic rise of lava tubules around them, thrusting into the deep blue sky like fingers pointing toward the light. Still, he'd so much rather have gone to Mexico with his mother. But his stepdad had said no, she'd be busy enough taking care of her dying grandmother along with his five-year-old sister. Half-sister, he'd wanted to correct. Your kid. He knew the score about that and this trip. He'd overheard his stepdad saying Jace shouldn't go to a place that held such painful memories.

Yeah, his real dad had gotten sick and died when they went to visit relatives in Mexico. Sure, Jace missed him and the way his dad, a climatologist, had so patiently explained the difficult processes he studied and anything else Jace didn't understand. But he'd been seven then, a long time ago! He couldn't tell them he'd listened in, though. They'd get mad. Instead, he'd tried to argue he could help his mom. "I'm not a little kid anymore, Dad. I'm sixteen. I watch Alyssa all the time. Besides, I could practice my Spanish. Colleges love for people to have a

second language.” His parents expected him to get a college degree. That was cool, but his stepdad wouldn’t like his desire to go for art or music. Jace was expected to do science like his dad and stepdad, or even “soft” science like his mom, a psychologist. They wouldn’t listen when he told them his brain didn’t want to go that way. He shook his head a tiny bit at this thought. They just wouldn’t listen to him.

“Grab your gear, Jace.”

Jace started. He’d been lost in thought again and missed their arrival. He looked around at the other parked Jeeps and Broncos.

Mr. Renfro suddenly appeared, as if he’d been lurking behind one of the other cars just waiting for his boss to show up. “Good afternoon, Brian. I’m sure you’ll be pleased with the progress we’ve made since you were last here.” Mr. Renfro’s pale face was polite under his broad brimmed hat, the second in command showing respect for his superior. Jace shuddered, knowing full well what—or rather *who*—always came with Mr. Renfro.

“Of course, James. As soon as we’ve dumped our gear, I’ll visit the dig.” Jace’s stepdad smiled easily, the deeply tanned skin of his face lined beyond his forty-seven years. A big, blonde man, he talked easily with anyone, never shy or awkward. Jace, small, dark, and quiet, always felt eclipsed by the man. Jace could never feel as confident, especially when he was around so many super smart scientists. He just couldn’t compete in this arena. Ironically, he understood quite a bit of what his stepfather did. He just couldn’t seem to communicate that. His brain seemed to freeze whenever he felt like he was being put on the spot.

Jace had found the idea of digging up dinosaur bones cool once upon a time, but certain classes, especially math and science, had become increasingly hard for him. At one point, the term “learning disability” had been raised. He remembered his stepfather frowning and telling him he just had to work harder. That hadn’t helped, but a nice older woman, a former teacher who tutored him, had made a difference. “You don’t have a disability, Jace. You just see the world differently and you need a different approach to learning.” She’d helped him with



percentages and fractions by pointing out that he knew how to make change, so he already understood those things. And he'd had a substitute science teacher once who'd taught almost entirely with a hands-on approach. They'd done tons of experiments during the two weeks Mr. Hagar was there. Jace learned more during that time than the rest of the school year. Why couldn't all teachers be like that? He sighed. At least he was good at drawing and playing music.

They put their gear in the main tent and then went back out into the bright sunshine. For a moment Jace was blinded. Then he froze, his mouth hanging open. A girl stood there, clearly a part of the dig by her khaki shorts and shirt, but she could be an actress or something. She had skin the color of golden honey, auburn hair, bright eyes, and a ready smile. Not a girl. A young woman. He sighed.

With dancing eyes and the happiest smile Jace had ever seen, the young woman said joyfully, "Welcome back, Dr. Lamour. How are you?"

“Fine, fine, Lacy. How’s your thesis coming?” By this, Jace knew that she was a graduate student. His parents had both talked about writing a thesis for their degrees. “Oh, this is my son, Jace.” His stepdad turned to him as did Lacy. He felt himself blushing, but she probably couldn’t tell. He just got a little darker.

“Hi, Jace. Nice to meet you!” She gave him a huge smile and all he could say was, “Uh.”

Her smile faded a tiny bit, but she turned back to his stepfather, still sounding elated. “Well, we’ve got a bit of a mystery on our hands. You’ll just never guess! Want to come see?” They walked away, chatting, and Jace stared after them.

A snide voice in his ear startled him. “Hey, bozo. She was really scintillated by that insightful comment of ‘uh.’ What are you going to follow that up with? Um? Er? Duh? Can’t wait to hear your next foray into flirting!”

Jace turned and glared at Todd Renfro, older by a year and a lot taller. As usual when alone with Jace, he showed pure contempt. Jace and Todd had been pushed together

often through the years since Todd's father worked for his stepfather, which Jace had always hated. Sure, Todd shone when it came to science, but he was also a jerk about it. He loved to make other people feel stupid. Just like with using that big word Jace had never heard before. He said nothing, just walked after his stepfather and Lacy. Better to be around more people. Todd was slightly less nasty then.

They reached the site where people were standing around, staring at the rocks. They seemed to see something important which was invisible to Jace. Mr. Renfro was explaining. "So, we've clearly got dinosaurs from the early Cretaceous here, a lot of them. You can see this excellent specimen of a Sauropelta here." Smiling, he pointed to darker bits, which Jace now noticed, encased in the bedrock at their feet. When he drew pictures, he had to pay close attention to those sorts of details. Maybe he should look at rocks as if he were going to draw them. "We've got unbroken bony plates of the head and even some unbroken neck spines plus more indicated. Possibly complete. A very exciting find."

“Hmm, yes, a nice find,” his stepfather repeated, glancing at Lacy. “But we dug up that piece of Stegosaurus last year above this layer. That doesn’t make sense. We haven’t seen any evidence of crustal faulting or folding here.” Something about his stepfather’s expression made Jace wonder. He had that expectant look—a look that Jace had seen so much of, but always seemed to fail to fulfill. He guessed his stepdad did that to everyone.

Jace had a fair understanding of this stuff since his stepdad talked about all of it so much, but naturally Todd had to butt in. With mock kindness, he said, “We should explain for the benefit of Jace. He doesn’t know that the Jurassic Period had Stegosauruses and that it came before the Cretaceous Period. He probably can’t even figure out that the material from the older period should be *under* the newer period, not on top of it. That’s called the law of superposition. Unless there’s crustal overturn, which can happen in a bunch of different ways like faulting or folding of the rocks. But he doesn’t want to know those reasons. He doesn’t want to know any of it. He hates science, don’t you, Jace?”



Jace, barely noticing the disapproving looks on the adult's faces, gave Todd a venomous look, staying silent. He wasn't really that clueless about science even if he didn't know all the big words. It wasn't that hard to understand that the new stuff would be on top of the old stuff: anybody who threw clothes on the floor instead of putting them away knew that! But if he said anything, there'd be trouble.

Lacy smiled gently at Jace and said, "It's not so hard if you approach it in the right way. What *are* you interested in, Jace?"

He blushed, looked down, and answered softly, "Music. And art."

"Great!" she said. "Do you just listen to music or do you play too?"

"I play. A little." He looked at her and saw she was nodding.

"Then you know how music is written, with some notes above the line and some below. Think of a sheet of music as the earth's crust. Then imagine if you folded that paper

just right, you could put those lower notes above the top notes. Or the paper could be folded multiple times, layering the crust or turning it into an accordion shape. And if you had a sheaf of different colored paper all folded the same way, it would be like the rock layers of the crust. You can see examples of these sometimes after excavations for roads where the grader slices into the side of a hill.”

His face lit up. “Oh, yeah. I see.” He had already got the folding thing, but it was so cool that she understood!

Lacy added, “And if you tore that paper lengthwise and then taped it back together so one half was partly raised and the other partly lowered, you’d get the equivalent of deformation from a fault line. Then you’ll see where the lines of rock layers don’t match on either side of the fault line.” Her smiling enthusiasm grabbed Jace, who responded with excitement.

“Yeah! I see. And that’s what all the stuff deep in the earth does, like how it creates earthquakes and volcanic eruptions.” That had been part of Mr. Hagar’s lessons. It came back to him easily now.

Todd spoke suddenly, with dripping sarcasm. “Gee, suddenly Jace likes science. I wonder why? Maybe because he’s got a crush on Lacy?” Jace felt himself flushing. He was more aware, though, of a rising tide of rage.

He wanted so badly to say or even do something to Todd, but in his mind, he heard his mother’s voice. “Watch your temper, Mijo. If you need a time-out to get control of yourself, then just say that.” He turned, gritting his teeth, and walked away. Behind him he heard his stepfather sigh.

Jace walked past the camp and up a hill beyond it, wanting to get as far away as possible. Bad enough when it was just Todd making him look stupid and the others assuming he was. Now he was completely humiliated. Lacy could only despise him as a clueless kid. He trudged along, sliding on the rocky debris that covered the hillside until he found a rock free path. Water had probably cleared it. He knew about erosion. His dad had explained that on the trip to Mexico and a visit to some ancient ruins. He’d helped Jace understand how thousands and

thousands of years of rain had broken down the seemingly indestructible rock building materials, enlightening Jace to the incredible power of natural forces. He had felt awed by the way water could push huge boulders, and how huge mountains were broken down by erosion over long periods of time.

Jace stared at the debris intently, thinking about drawing, always a soothing activity when he was upset. The rocks on the hillside looked a lot like the loose ones around the dig. Maybe water had carried them all the way down the hill and deposited them at the dig site. Jace looked ahead, noticing high walls of sheer rock rising straight up from the top of the hill. Why hadn't he seen that before? Maybe because he just thought of the places where his stepfather did his work as empty, boring areas. But the rock ahead of him was quite striking. He could draw it.

He stared, noting the details. Many cracks ran vertically so the wall wasn't solid. In fact, it looked unstable. Jace could see how columns had pulled away from the wall behind. For a moment, he felt some panic. What if one suddenly broke free and all that falling rock crushed him?



A second later, he felt giddy. He thought he knew the explanation for the older bones being on top of the newer bones. He turned and raced back down the hill.

Rushing back to the dig, Jace felt elated by his revelation. What if there had been an unstable wall of rock like this back in the Cretaceous, a cliff made of what would have at that time been ancient Jurassic rock with stegosaurus bones in it? Those bones might have weathered out and fallen just like chunks of rock from this cliff were doing today. The bones from the Jurassic could have gotten mixed in with Sauropelta at that time and then been buried in sediment where they'd slowly turn into a new rock, a Cretaceous rock containing bones from both the Cretaceous and the Jurassic.

The workers had gone back to chipping away at the rocks. His father and Mr. Renfro stood talking nearby, with Todd hovering around them, trying to look important. Jace noticed Lacy working near them.

His stepdad gave him a concerned look as he approached but went on with what he was saying. Jace waited until he'd finished speaking before saying eagerly, "Dad. I know

how that dinosaur you found last year wound up above newer bones!” His stepfather looked at him in shock, while Todd burst out laughing. Todd’s dad gave him a stern look, though, and he shut up, but continued to smirk.

“OK, I’m listening, Jace.” His stepfather wore his patient look.

Jace took a deep breath, feeling nervous. “OK, see those walls up there?” He pointed, and the others automatically looked. “I think those are that faulting thing. You know where some of the rock gets pushed up past the rest of the crust?”

His stepdad nodded and smiled faintly, amused maybe. But Jace pushed on anyway, determined to show them all he wasn’t ignorant. “Well, the wall isn’t solid. It’s breaking down and chunks are falling off. That could have happened in the past, with another cliffside weathering away and then the chunks getting carried down by flooding. If the older bones were in those chunks, they could have wound up on top of newer bones, right?”

Lacy suddenly spoke excitedly. “Yes, I can see that. Wow, why didn’t I think of that? I forgot how important it is to look at the surroundings and not just what’s right in front of me.” She shook her head. “How did you figure that out, Jace?”

He shrugged, answering shyly, “Well, I used your explanation. It really helped me picture the stuff you were talking about. I was thinking about drawing the rock, so I really paid attention. I have to notice details when I draw, you see.”

Lacy smiled. “That’s cool. You know, you might think about becoming an illustrator for science textbooks and that sort of thing. You could combine your love of art with scientific knowledge.”

Jace straightened with a look of wonder. “Hey, that’s a good idea. It would be great to get paid for drawing.”

Jace noticed his stepfather grinning and suddenly realized he must have had the explanation all along. “This wasn’t a mystery for you at all, was it, Dad?”

His stepfather shook his head. “No. We knew what was going on. But it’s always better for people to find answers for themselves if they can. And I’ve always known you could do that if you’d just stick with things. Just because something is hard doesn’t mean you have to give up on it. We’ve all struggled with difficult scientific concepts. I think Lacy’s suggestion is a good one. You could use your artistic talents to help others understand science concepts. I think that would be a wonderful career for you, son.”

Jace nodded, excited by the idea and pleased by his stepfather’s approval. “Yeah, that’d be cool because I understand how it’s hard to see things sometimes. Now I know how to look. I just need to use my artist’s eye and pay careful attention and maybe think about comparing what I don’t know to something I do know. That really helps me.” He smiled, noticing Todd in the background scowling. Maybe this trip would be fun, after all.





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**Jacqueline Howland** is a retired college English instructor who contributes to Videomaker Magazine, volunteers at her local science museum, and enjoys watching birds at her many backyard feeders.

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