Budding Paleontologists using traditional collection methods.

Even Photogrammetry Needs a Vacation.... *yeah right.*

I had busted my hump all year long and now it's time for an escape. Take the young kids and wife to Yellowstone for a week of relaxing. Well, you really don't relax in Yellowstone once you've surmised you're vacationing in the world's largest volcano. Exit the car in the wrong spot and you're on the menu. Relaxing…yeah right.

On the way back from our bucket list adventure, I noticed at a rest stop, a place where there was a large deposit of dinosaur bones. Still in the ground.

My geology geek went ballistic. Since I was the driver, I made the executive decision (I would like to think so, but my wife said "yes"), we could stop for a few hours.

Yes, even while on vacation, looking at Jurassic fossils at a dig site in Thermopolis, Wyoming, my brain went straight to…..how would I document the site as a photogrammetrist? How could I record exact measurements without really expensive equipment? Or more important…..not get dirty.

While my wife and kids looked around the site, I used them as a distraction to do the unthinkable…I leaned over the tape security barrier with my Sony P-93 camera. I took 5 quick near vertical photos in less than a minute and nobody was the wiser.

We learned from 3 university interns, the specimen they were laboring over for most of the summer was a sauropod "***Camarasaurus***". Apparently the guy who discovered the first specimen liked Chevy Camaro's. And there was a lot of data to collect on the 47 ton vegetarian.

BY STUART ROBERTS

Even a simple point and shoot can be a valuable collection tool. I've generated sub-millimeter accuracy with this camera, but that's another story.

The traditional string grid was down and a Trimble theodolite occupied the corner of the temporary shelter erected to give them relief from the sun. The young lady behind the Trimble was shooting in points as another intern held a small peanut prism. The third intern held a sketch pad, doodling the position of identifiable bones in relation to one another. They were working in a dino graveyard. But what made it rare, were the fossilize footprints of other dinosaurs cursing through. The bones they were toiling over were crushed and broken by the weight of the interlopers. Sort of a Jurassic train wreck. These kids had a lot of work to do.

I introduced myself and asked if they had studied about other ways to record data. The interns had heard about laser scanning but seemed totally clueless about the granddaddy, photogram-metry. I explained overlap percentages and even flowed into the beauty of recreating the kappa, phi and omega rotations of the camera positions with integrated radial distortions. My wife rolled her eyes and shook her head. I wept for them.

With my photos securely locked away in the recesses of my SD card, we said goodbye and good luck to those industrious young'un's. My mind ambled back to how I was going to put my ill-gotten photos together. This was 2008 and the best was yet to come.

After vacation, it was back to work performing laser scanning (it pays the bills) on some offshore platform. On my off time, I struggle for days to manually input enough corresponding reference points to solve for the relative and absolute solutions. You see, I photographed the bones without any ready made reference markers. I spent hours looking for unique locations in the dirt which matched at least three photos. Frustration set in before insanity and I filed the photos away to the dusty alcoves of a backup drive. And they sat waiting for 7 years. I hung my head in shame to have misled the interns. However, technology was catching up to my imagination.

Some bright computer programmer had an epiphany. Why not generate a point cloud from photos! There was the ability to finalize a relative solution with-out manually inputting reference marks by using the mathematical enumerations

2D SONY 5.1 megapixel image of "Camarasaurus"
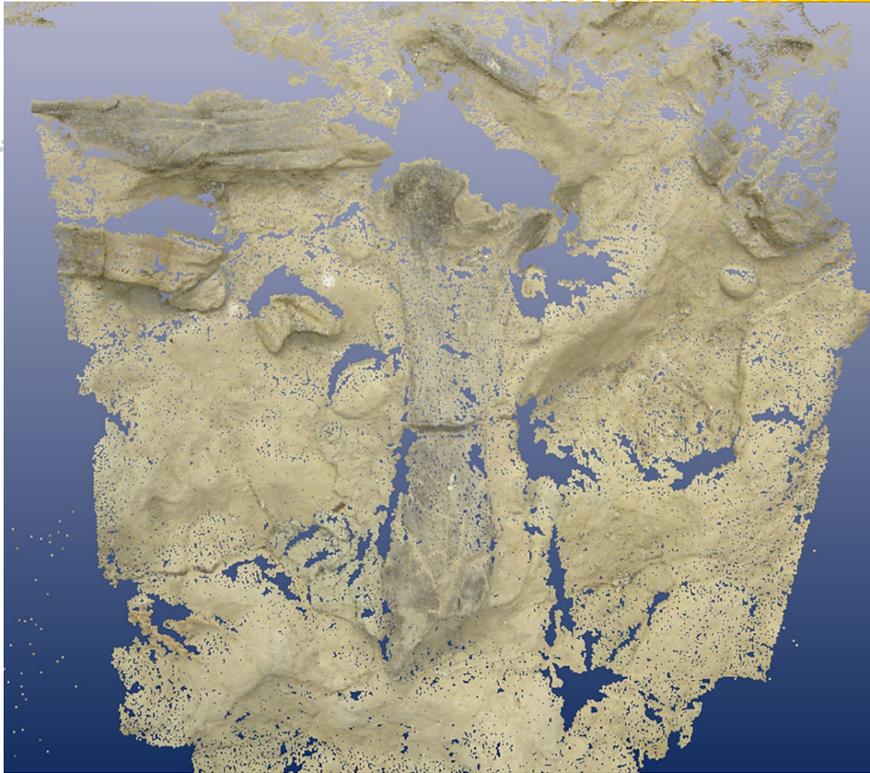
I became skilled at knowing how I could preserve, map and share intricate data with a old 5.1 megapixel camera. And for me, that's the exciting aspect of photogrammetry. I can see my wife's eyes rolling in my mind. ℹ

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on the pixels themselves! Eureka, SmartMatch was born in 2014 and it wasn't until 2015 that I got to do what I had set out 7 years prior. Photomodeler Scanner made it possible.

At long last I could revisit the bones in stone anytime I wanted and dream of eventually getting a chance to document dinosaurs. I could live in my own Jurassic Park. Eat your heart out Dr. Alan Grant!

Yet, still I wanted more detail and less work. Enter Steve Sims and Context Capture from Bentley Systems. Steve and I met at Spar 2014. We exchanged cards and LinkedIn profiles and that was that. It all became a little more serious after oil and gas tanked and left me looking for employment. We met again in 2016 and things started rolling. I had reviewed the YouTube videos and finally secured an evaluation copy of the Bentley software.

The old images were put back to work with the newer software. After about 4 hours of clicking that button and fill in that box, the above illustration was the result. Context Capture has a sensor database and refers to the Meta data embedded in the digital images. My camera was so old (I've had it for 12 years), the software flagged it. I bypassed the alert with the camera calibration file I had performed with Photomodeler and it worked beautifully. I finally realized my goal 8 years after the fact. Being able to revisit the bones in their discovered pristine setting in 3D.