Sauropod Vertebra Picture of the Week

New paper out today on the Dry Mesa *Haplocanthosaurus*

Matt Wedel

Published June 18, 2024

Citation

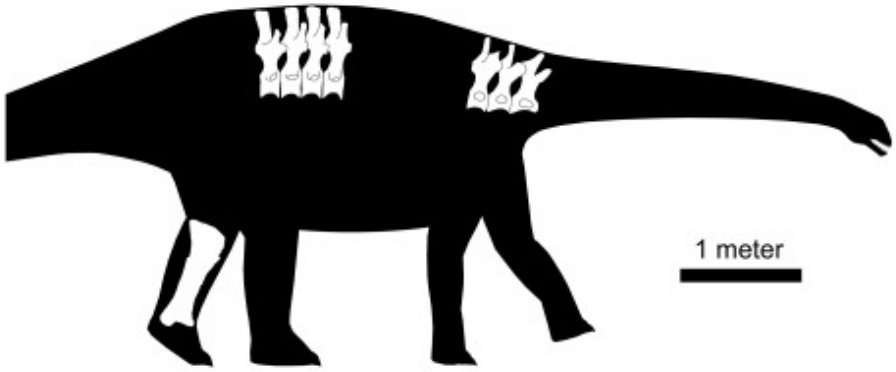
Wedel, M. (2024). New paper out today on the Dry Mesa *Haplocanthosaurus*. *Sauropod Vertebra Picture of the Week*. https://doi.org/10.59350/xfex2-2b397

Keywords

Conferences, Dorsal, Haplocanthosaurus, Morrison Formation, NAPC 2024

Abstract

This morning saw the publication of my new paper with Colin Boisvert, Brian Curtice, and Ray Wilhite: Boisvert, Colin, Curtice, Brian, Wedel, Mathew, & Wilhite, Ray. 2024. Description of a new specimen of Haplocanthosaurus from the Dry Mesa Dinosaur Quarry.



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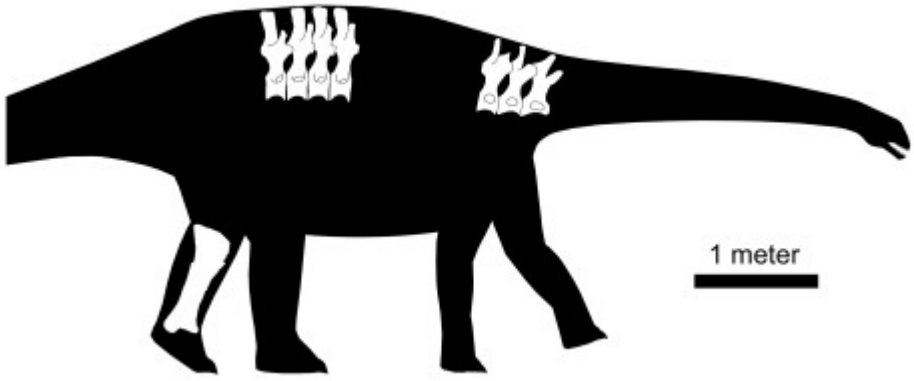

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Skeletal inventory of the Haplocanthosaurus bones found at Dry Mesa Dinosaur Quarry. Scale bar is 1 m. Boisvert et al. (2024: fig. 2).

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Skeletal inventory of the *Haplocanthosaurus* bones found at Dry Mesa Dinosaur Quarry. Boisvert et al. (2024: fig. 2).

This morning saw the publication of my new paper with Colin Boisvert, Brian Curtice, and Ray Wilhite:

Boisvert, Colin, Curtice, Brian, Wedel, Mathew, & Wilhite, Ray. 2024. Description of a new specimen of *Haplocanthosaurus* from the Dry Mesa Dinosaur Quarry. The Anatomical Record, 1–19. http://doi.org/10.1002/ar.25520

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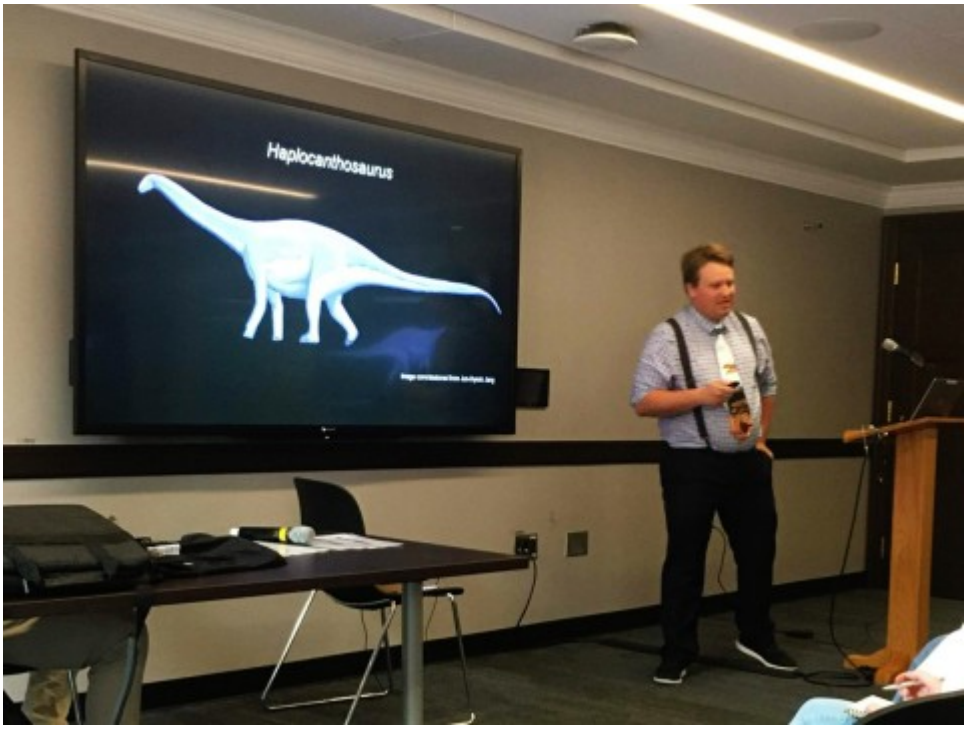
Colin's nexus of sauroponderous awesomeness

First off, big congratulations to Colin, who is having a banner season. On May 22 he gave his Masters thesis defense talk at BYU, on digital and physical articulation of the neck of BYU 18531, the "big pink apatosaur" from the Mill Canyon Quarry. You've seen that specimen in a few of our previous posts (notably here, midway down here, lurking in the background here), and Colin and his advisor, Brooks Britt, kindly gave Mike and me permission to publish some photos of one of the vertebrae in our recent cervical rib paper (Wedel and Taylor 2023).

As luck would have it, Colin is at NAPC this week, and this very morning he gave back-to-back talks. His second talk was a shorter version of his thesis defense talk, and his first talk was on (drumroll) *Haplocanthosaurus*: "Eleven specimens from ten locales in eight collections across three states, the diversity of known *Haplocanthosaurus* specimens in the Morrison Formation", with Brian and Ray and me as coauthors. By sheer dumb luck, our paper dropped literally an hour or two before Colin's Haplo talk, so when he got to the Dry Mesa individual he was able to plug the hot-off-the-presses new publication. That timing could not have been more perfect. Incidentally, the NAPC program and abstract book are both free downloads at this page; Colin's abstracts are back-to-back on pages 125 and 126 (by internal numbering, pp. 135-136 of the PDF).



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Colin Boisvert, dropping knowledge at NAPC 2024.

It's an especially momentous day because this is Colin's first peer-reviewed journal publication — or, more accurately, of the several things he's working on, this was the first to make it across the finish line. You'll be hearing a lot more from Colin in the near future. (As Brian Curtice has pointed out, when someone has "vert" right in their name, we should be primed to expect great things. [NB: Colin's last name is pronounced "bwa-VAIR" not "BOW-iss-vert"; replacing 'vert' with 'air' is, of course, the most sauropod-appropriate thing ever.]) We shall watch his career with great interest.

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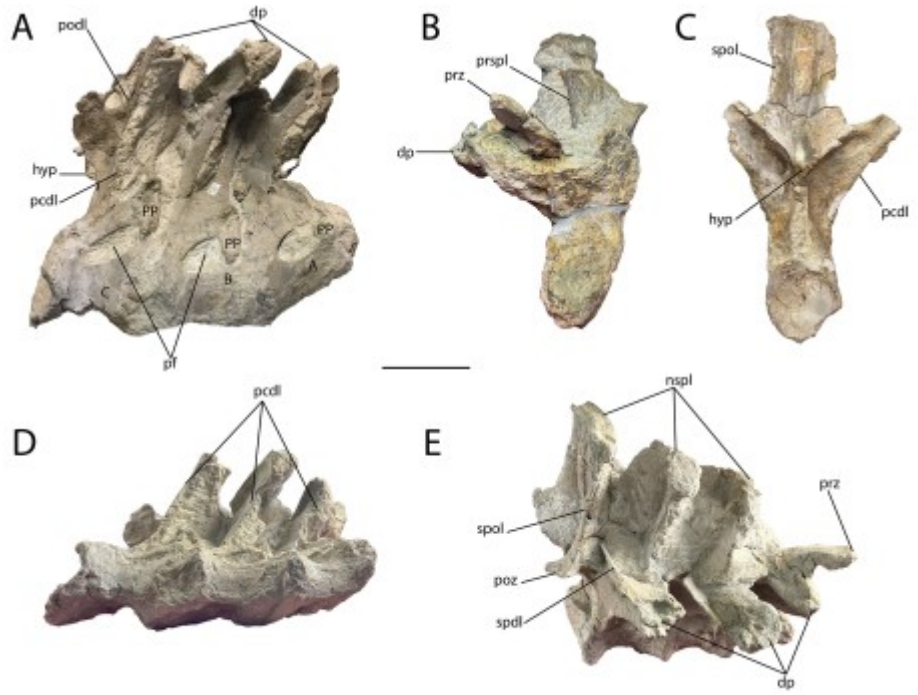
Enough back-patting, what's this paper about anyway?

The quick version is that this paper is the longer, more complete, and more paleobiologically-informed version of our short paper for the 14th Symposium on Mesozoic Terrestrial Ecosystems and Biota (MTE14) last June (Curtice et al. 2023 and this post). As soon as we'd presented that, we realized that we needed to properly describe and illustrate every element of the Dry Mesa Haplo. Colin took point, and a year later, here we are.

So what do we have of this beast? Seven dorsal vertebrae and a right tibia, all found reasonably close together in a little pocket in the vast expanse of Dry Mesa Dinosaur Quarry. The vertebrae are obviously referable to *Haplocanthosaurus* because of their dorsally-oriented transverse processes, which instantly mark out Haplo from all the other known Morrison sauropods (note the caveat and hold that thought for ~~the next~~ a future post). The tibia is also referable to Haplo based on its chunkiness and the flared distal end, and it's the right size to be from the same individual as the vertebrae.



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BYU 17531, a block of three anterior dorsal vertebrae preserved in articulation. The vertebrae are shown in right lateral (a), anterior (b), posterior (c), ventral (d), and dorsolateral (e) views. Scale bars are 10 cm. **dp**, diapophysis; **hyp**, hyposphene; **nsp**, neural spine; **pcdl**, posterior centrodiapophyseal lamina; **pf**, lateral pneumatic fossa; **podl**, postzygodiapophyseal lamina; **poz**, postzygapophysis; **pp**, parapophysis; **prz**, prezygapophysis; **spol**, spinopostzygapophyseal lamina. Boisvert et al. (2024: fig. 3).

Our best bit is BYU 17531, a series of 3 articulated anterior dorsal vertebrae. They record the migration of the parapophysis from low on the centrum up onto the neural arch, which is always nice to see. The block of three is a little sheared left-to-right, as shown in part D of the above figure. I'd love to get them CT scanned to investigate the articulations between the zygapophyses and the centra, a desire that only manifested as I was writing this post, looked again at the figure, and thought, "Oh, hey, intervertebral joint spacing!"

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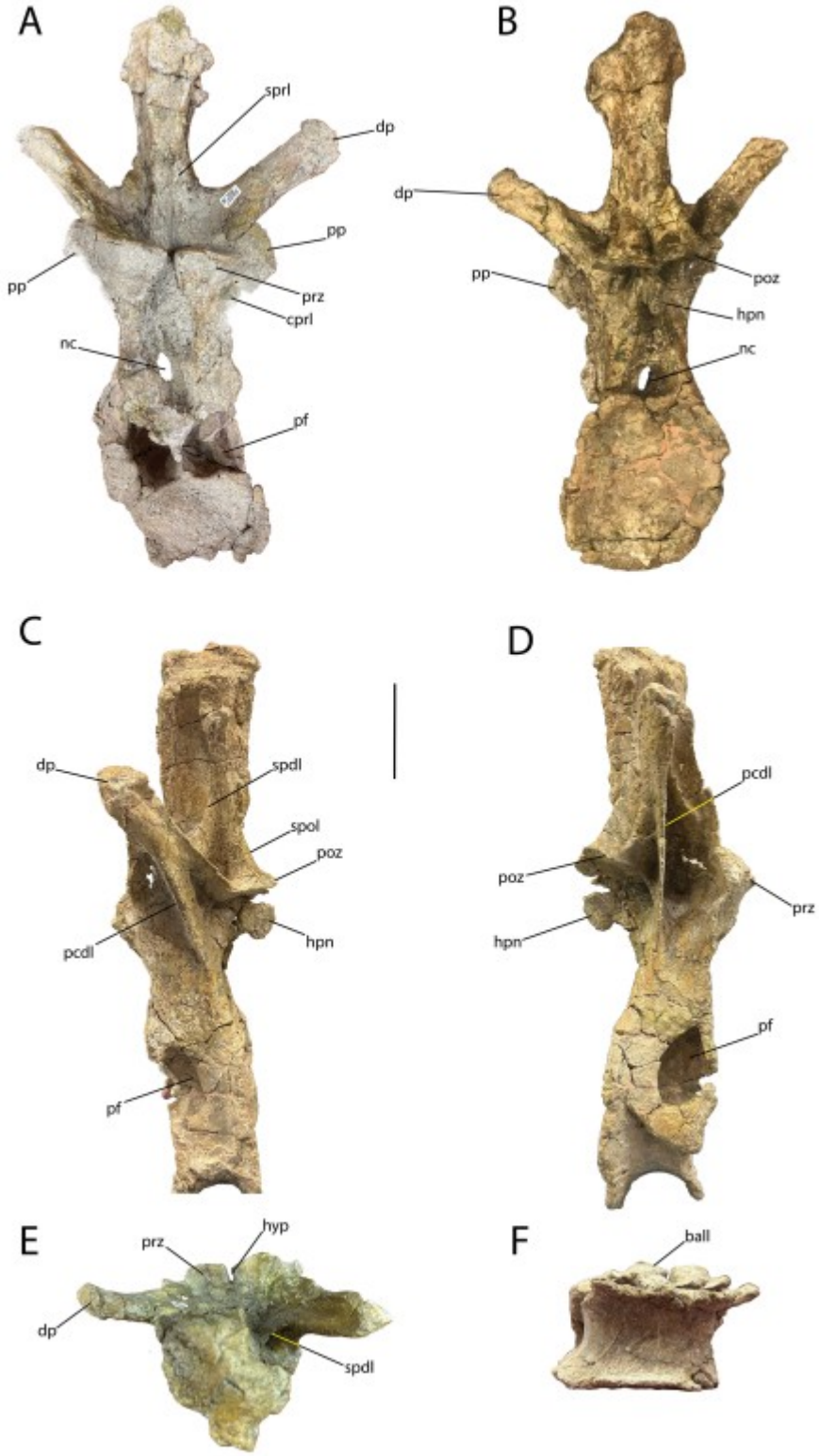

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BYU 17530, a posterior dorsal vertebra. The vertebra is shown in anterior (a), posterior (b), left lateral (c), right lateral (d), dorsal (e), and ventral (f) views. Scale bars are 10 cm. **cprl**, centroprezygapophyseal lamina; **dp**, diapophysis; **hpn**, hypantrum; **hyp**, hyposphene; **lat. cpol**, lateral centropostzygapophyseal lamina; **nc**, neural canal; **pcdl**, posterior centrodiapophyseal lamina; **pf**, pneumatic fossa; **poz**, postzygaphopysis; **pp**, parapophysis; **prz**, prezygapophysis; **spdl**, spinodiaapophyseal lamina; **spol**, spinopostzygapophyseal lamina; **sprl**, spinoprezygapophyseal lamina. Boisvert et al. (2024: fig. 6).

We also have four more posterior dorsals. I put them side-by-side in the skeletal inventory figure, but that was mostly out of ~~laziness~~ parsimony; most are too poorly preserved for us to get a firm fix on their serial position. We know that the best preserved of the bunch, BYU 17530, must be a pretty posterior dorsal, because the transverse processes are skinny and the neural spine is flared laterally (more anterior dorsals have dorsoventrally thicker transverse processes and narrower neural spines — see Hatcher 1903: plate 1, crucial bits of which are replicated at the top of this image).

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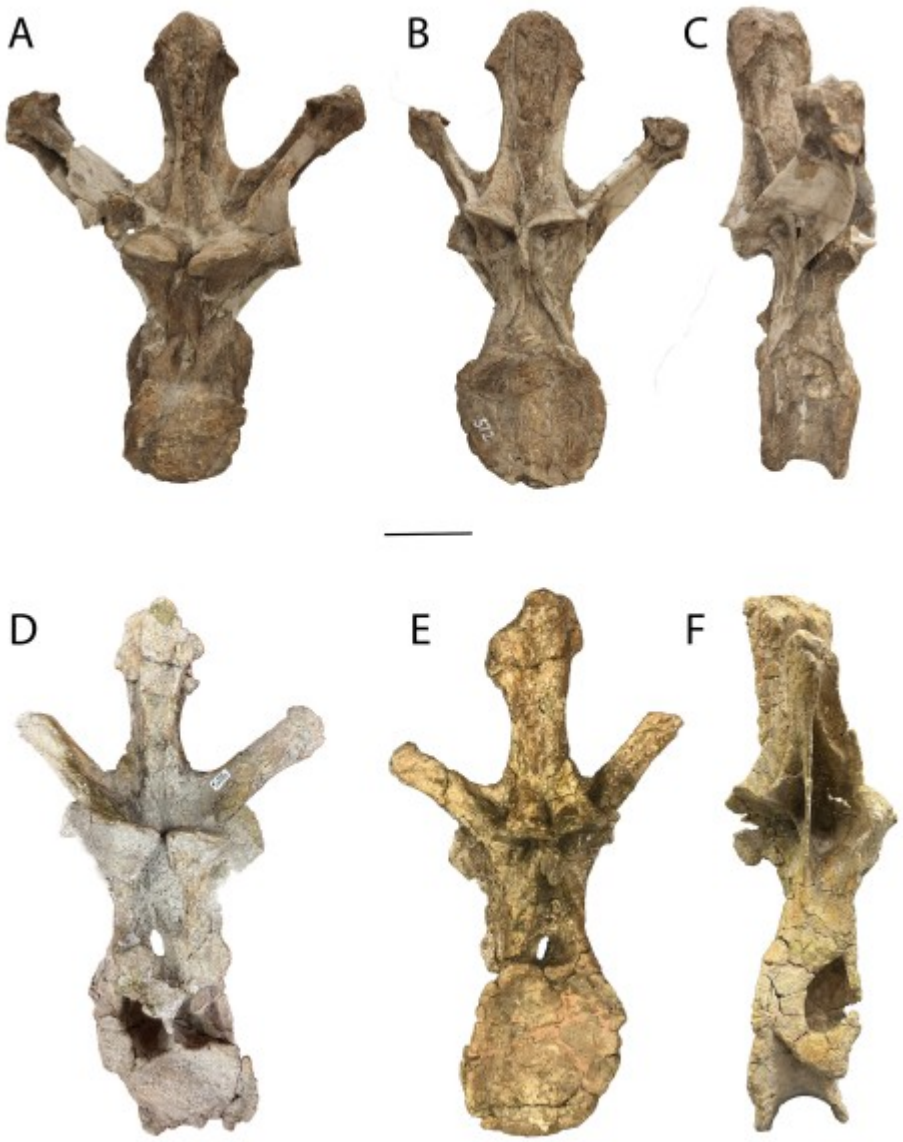

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Sauropod Vertebra Picture of the Week

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Dorsal 12 of CM 572 in anterior (a), posterior (b) and right lateral (c) views, compared to BYU 17530, the best preserved posterior dorsal vertebra in anterior (d), posterior (e), and right lateral (f) views. Scale bar is 10 cm. Boisvert et al. (2024: fig. 7).

BYU 17530 is a pretty good match for D12 in CM 572, as shown in our figure 7. The top half of the anterior centrum face of the BYU vert is blown off, so we can see the large pneumatic fossae in the centrum, as well as the narrow median septum of bone that separates them. But that's about the only significant damage, so I call BYU 17530 the "good dorsal".

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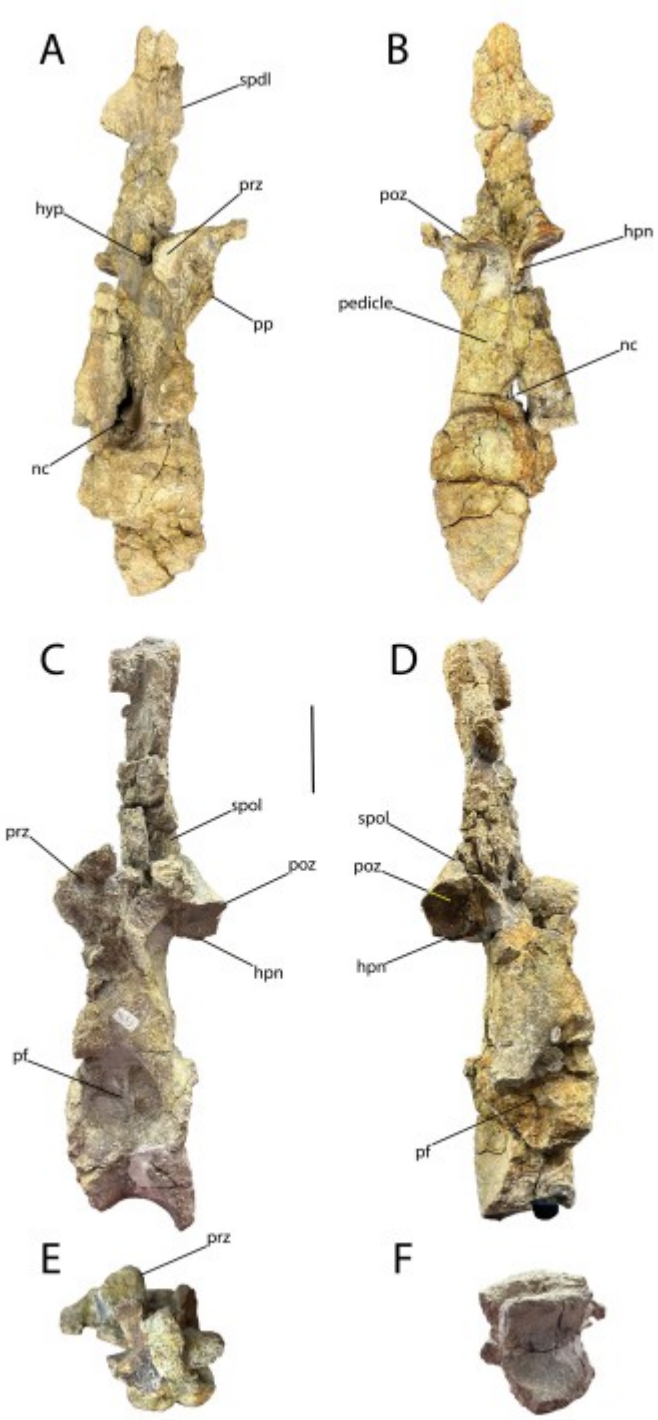

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BYU 17689, a posterior dorsal vertebra. The vertebra is shown in anterior (a), posterior (b), left lateral (c), right lateral (d), dorsal (e), and ventral (f) views. Scale bars are 10 cm. **cprl**, centroprezygapophyseal lamina; **dp**, diapophysis; **hpn**, hypantrum; **hyp**, hyposphene; **lat. cpol**, lateral centropostzygapophyseal lamina; **nc**, neural canal; **pcdl**, posterior centrodiapophyseal lamina; **pf**, pneumatic fossa; **poz**, postzygaphopysis; **pp**, parapophysis; **prz**, prezygapophysis; **spdl**, spinodiapophyseal lamina; **spol**, spinopostzygapophyseal lamina; **sprl**, spinoprezygapophyseal lamina. Boisvert et al. (2024: fig. 8).

At the other end of the preservation quality spectrum, BYU 17689 is just happy to be here. The very tall neural arch pedicles and vaulted space over the neural canal are pure Haplo, and it’s from the same part of the quarry, same preservation, and right size to belong to our critter, but whew, that is a shard of excellence* for sure.

* For newer readers, sauropod vertebrae are never “pieces of crap”, no matter how badly broken. Rather, they are “shards of excellence”. The same idea could be extended to other clades. I can envision referring to poorly-preserved pneumatic vertebrae of theropods as “fragments of adequacy”. Broken ornithopod vertebrae are the “morning eye-boogers of Time”.

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Haplocanthosaurus and *Camarasaurus* tibiae compared. USNM V 4275, a left *Haplocanthosaurus* tibia and astragalus (a), compared to BYU 12865, a right tibia (b), and YPM 5861, a left *Camarasaurus* tibia (c). Scale bar is 20 cm. The yellow line on USNM V 4275 represents the transition from tibia to astragalus. The cnemial crests for the two *Haplocanthosaurus* tibiae are

incomplete. **ap**, anterior process; **cc**, cnemial crest; **pp**, posterior process.
Boisvert et al. (2024: fig. 10).

The tibia, BYU 12865, is a little crushed and has some mid-shaft damage, but the flaring distal end is in good shape, enough to show that the bone is consistent with *Haplocanthosaurus* morphology.

What's it all mean?

Why do we care about this critter?

First, as the title of Colin's NAPC talk makes clear, there aren't that many Haplos in the world — 11 to date, compared to over 200 for all the camarasaurs in the Morrison — so each new one is nice to have. In particular, the Dry Mesa Haplo has only the second set of articulated anterior dorsals for the genus, and the tibia helped us figure some things out regarding other Haplo specimens; more on that another time, perhaps.

Second, as we punched up in our MTE14 paper last year, this *Haplocanthosaurus* means that a minimum of six sauropod genera were present at Dry Mesa, making it the most diverse sauropod quarry in the world. I already wrote a whole post about that (link), so I'm not going to belabor it here, but it bears thinking about. Maybe six isn't an unusual number of sauropods in an ecosystem, it just takes a quarry with 4000+ bones to capture them all.

Third, a little push from our editor at the Anatomical Record got us thinking about why *Haplocanthosaurus* dorsal vertebrae are so distinctive. More on that in ~~the next~~ a future post.

For more posts on *Haplocanthosaurus*, see the running list on this page (link).

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