JURASSIC PARK BOO BOOS By Gregory Paul

A third of a century ago, I could not convince my childhood friend that the star of the movie and TV series Voyage to the Bottom of the Sea, that underwater Cadillac, the Seaview, was not a real submarine. What Hollywood makes up can seem so convincing. These days most people learn about dinosaurs via the two Jurassic Park movies. They should remember that these motion pictures are not science documentaries meant to be accurate and educational. They are just movies meant to entertain.

Growing up fast - One, err, big problem in JP is posed near the beginning of the first movie. Drs Grant and Sattler are amazed to see 50 ton brachiosaurs moving across the landscape, and equally enormous diplodocid sauropods stride across the big screen in The Lost World. This is a problem because it takes decades for elephants to grow to 5, or in rare cases, 10 tons. Whales grow much faster, but that is because the young are fed vast quantities of nutrient dense milk. Even with genetic engineering to boost growth rates to artificial levels, none of the juvenile dinosaurs could have grown to larger than a few tons in the few years that the JP series covers.

Too many giants, too little space - In monster movies, wee islands have really big animals on them. In the masterpiece King Kong, mysterious Skull Island was home to a host of great predatory and predaceous dinosaurs, as well as a family of super apes. We know there was a family because of the disappointing sequel Son of Kong. Likewise, Isla Sorna is chock full of sauropods, stegosaurs, ceratopsians, hadrosaurs, and tyrannosaurs each weighing many tons. Real island giants are much more modest. Giant Galapagos tortoises weigh as much as 500 pounds, and the Indonesian Komodo monitor weighs a couple hundred pounds. Until people killed them off in the last thousand years, New Zealand and Madagascar hosted ostrich-like birds weighing over a third of a ton. It takes most of a continent to produce the vast guantities of food needed to support breeding populations of animals the size of rhinos, elephants and whales. Isla Sorna would have been quickly stripped bare of its vegetation by all the enormous dinosaurs crowded onto its humble shores. Therefore the island could have been populated by plenty of compsognathids, small ornithopods, and perhaps some ostrich-mimic dinosaurs. But even the raptors, at the top of the too small food pyramid, would not have found enough food to make a go of it.

Sauropods were not placid cattle - One of the easy clichés Hollywood slips into is the wise scientist who somehow knows something he cannot know. In the first JP, Dr Grant reassures the kids he is sharing a tree with, that the giant brachiosaurs are as harmless as cows. Now wait a minute. At game parks visitors are warned to stay away from the moose, buffalo, and elephants because big herbivores can be dangerous. Contrary to the image of sauropods as absurdly small headed, the movie had the size of the brachiosaurs' big heads correct. They were large enough to swallow a child whole. And why not? Sauropods may well have been in the habit of picking up small animals for the valuable proteins, calcium, salts and other nutrients they contained. Personally, I think the flick would have improved had the sauropod gobbled up the children.

The 'big plant eating dinosaurs were gentle giants motif' was also seen in the scene in which Dr Sattler places her hand in the mouth of the sick Triceratops. I shy away from parrots because they can deliver a nasty bite. Would you stick your hand inside an oversized parrot-like beak that could bite through your arms bones like they were mere toothpicks?

Tyrannosaurs only see what moves - Another thing the wise



Dr Grant knows about a predatory dinosaur that has been extinct 65 million years is that it can only see what moves. Be still and be safe. This is not a bad idea, like many carnivores your cat's optic lobes are tuned to detect moving objects. But this is no guarantee the same was true of Tyrannosaurus. And what if it detected prey by smell?

Gumby brachiosaurs - The dinosaurs of JP are vastly superior to those that have previously graced the silver screen. However, contrary to the impression many have, the JP dinosaurs are not strictly accurate. Stan Winston and Speilberg frequently altered them to better fit the needs of the scripts. So the dilophosaurs were too small and spit venom, the stegosaurs were too large, and even the head and body shape of Tyrannosaurus were subtly but significantly changed from reality. A mistake in my view. But to me the most annoying error concerned the legs of the brachiosaurs. One can be excused for assuming such colossi must have had fat legs to bear their great mass. However, their limb bones are very long and rather slender, especially those of the forelimbs. Fossil footprints show that the feet were not oversized, the hand was not even padded. It is clear that brachiosaur legs were well proportioned, elegant structures, not the overbloated Gumby-like appendages seen in Jurassic Park.

JP may well be correct in showing the giant dinosaur rearing up on two legs, although the long armed brachiosaurs were among the least likely sauropods to do so.

Seismic dinosaurs - Determining that tyrannosaurs are approaching is easy on the Jurassic Park islands. Just find a puddle or a glass of water, and if the surface starts to quiver kiss your you - know- what good-bye. The notion that dinosaurs were so big that the ground shook under their mighty feet goes all the way back to the 1800's, and has been perpetuated by names such as Seismosaurus. Of course it's all silly. Last time you were at the zoo, did the ground shake as the elephants - which weigh about as much as a T. rex - walked about? Of course not. And the last thing tyrannosaurs wanted to do as they hunted was to alert their prey by jumping up and down as hard as they could.

Nor do herbivores want to tell the predators where they are via ground tremors. Most of the time they all stepped gently. When a herd of Triceratops stampeded as the tyrannosaurs attacked, then the ground shook.

The walk, don't run, T. rex - A walking gait is one in which at least one foot is on the ground at all times, so speed is always low. Although animals the size of elephants have long legs and great strides, basic limitations of stride frequency mean they cannot walk faster than about 12 mph. In order to move faster an animal must use a running gait in which all the feet lose contact with the ground, thereby allowing a ballistic suspended phase that greatly increases speed. Because elephant legs are not designed to run, they are slow beasts. Tyrannosaur legs were bird-like, and may have been able to propel even T. rex as fast as a large antelope, although some disagree. When the T. rex chases the jeep it is certainly moving very fast, much faster than any animal can walk. Yet if you carefully watch the **Tyrannosaurus**, you will notice that it uses a peculiar shuffling gait in which one foot is always touching the ground. Simply not possible. The good special effects folks at Jurassic Park missed an opportunity to show T. rex in the full glory of a true run.

Tyrannosaurus feet weren't THAT big - In TLW, a human body sticks to the foot of the fast walking T. rex, like so much toilet paper. The problem is that the human seems to be shorter than the foot of the dinosaur, but a big T. rex foot was only some three feet long.

So what if the power goes out? - Many critics of JP scoff at the notion that designers of a paleozoological theme park would be so dumb as too cage the T. rex with nothing more than an electrical fence subject to power failure. Not so fast. At the National Zoo in Washington DC, it is quite possible for the big cats to leap up onto walls and walk out to greet their human admirers. All that is stopping them is a rather skimpy electrical wire. Why are the park personnel not worried about the electricity going out? (After all, a little girl literally lost her head to a lion at the old cat house some forty years ago.) Because the cats long ago found out that the wires hurt, and they have no way of knowing if they no longer do. It is just as improbable that the shock-shy tyrannosaur would think "huzzah, the infernal fence is dead! Now I can finally smash through it and wreak havoc with those sports utility vehicles I so despise!"

Raptor intelligence - The raptors, or more correctly dromaeosaurs - are portrayed as being smarter than apes. They can outwit a skilled and heavily armed bush hunter. They can open door handles they have never dealt with before. Even a high IQ chimp would be hard pressed to do that. Were dromaeosaurs so devishly intelligent? Of course not! Dromaeosaurs, and the other advanced, bird-like theropod dinosaurs as well, had brains about as big as ostriches. That's impressive by dinosaur standards, but nothing to write home about. Your cat or dog is a big brained genius compared to a raptor.

Family values - One might think that the TLW was sponsored by one of those right wing family value groups. Dinosaurs were portrayed as good, loving parents that would mind their own business only if those greedy humans would leave them alone! Excuse me

while I wipe away a tear.

The issue of parental care in dinosaurs is controversial. In recent years some, moi included, have shown caring for their young almost as well as nursing mammals and nesting birds. In a sort of reptilian backlash, other researchers assert that they were no better parents than reptiles, some of which do give a limited amount of care to their young. The truth may lie somewhere in between.

Many birds and mammals can give their young charges lots of TLC because they do not have many young, maybe one or two chicks or calves. In such cases, it is genetically vital for the parents to do whatever they can to raise their few young to adulthood, so juvenile mortality tends to be low. Other creatures, including many reptiles but also the big ground birds, produce lots of eggs each year. There is no way that each of the young can receive a high level of care. Nor is there a need to. If you produce a dozen off spring each year, so what if ten or eleven of them bite the dust? You're going to lay another dozen eggs next year anyway, so juvenile mortality is usually high.

It is therefore most unlikely that dinosaurs gave their young the loving one-on-one care seen in TLW. There is reason to believe at least some dinosaurs, such as the duckbilled hadrosaurs, were like ostriches, who guard and guide dozens of chicks but give them no other care once they leave the nest. It is particularly notable that young tyrannosaurs have longer snouts than their parents. This is contrary to the usually short, "cute" snouts that help inspire parental care, and that characterized the baby T. rex in TLW. It is possible that baby tyrannosaurs were really vicious little independent hunters that received no care at all, and would make a nice meal of you if they had the chance.

Getting steamed - The thing in JP that seems to most rile those involved in the reptilian backlash against "warm-blooded" dinosaurs is when the raptors steam up the door window with their warm moist breath. This is rather ironic, because paleophysiologist Guy Leahy notes that alligators have been seen to have steamy breath on chilly mornings. Even reptile bodies, if they are big enough, can retain enough body heat to exhale warm moist air into a humid, cool morning, and make a nasal puff or two. Not that dinosaurs were good candidates for having reptilian metabolisms. Gregory Paul

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