

THE *BRONTOSAURUS* BROUHAHA

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Arguably, one of the best-known and most popular dinosaurs in the world is the *Brontosaurus*. However, over the past several years, various articles have appeared in both the scientific and non-scientific literature, suggesting that the name *Brontosaurus* is incorrect and that the name *Apatosaurus* should be used instead. What is the truth on this matter?

There are few animals that capture the attention of young and old alike better than dinosaurs. Those “young in years,” as well as those “young at heart,” are enamored of these giant beasts from the past. Little wonder! From kindergarten to graduate school, we constantly are besieged with dinosaur toys, dinosaur exploits, dinosaur movies, and dinosaur theories.

Yet some of these mysterious creatures are more familiar to us than others. Perhaps this is because we are impressed by their size (like *Brachiosaurus*), their unusual construction (like *Stegosaurus*), or their imagined personalities (like *Tyrannosaurus*). Perhaps it is because we have seen them in the movies (like *Velociraptor*). Or, perhaps it simply is because we have “grown up” with them almost our entire lives. Is there any child or adult in America who, when asked, could not tell you what kind of steaks Wilma Flintstone routinely served her husband Fred for supper? (*Brontosaurus*, of course!)

Regardless of the reasons, the simple fact remains that we love to love dinosaurs. From cradle to grave, our interest in, astonishment at, and obsession with these “terribly great lizards” never seems to cease. And likely it would be safe to say that through the years one of the best-known and most beloved of all the dinosaurs has been the *Brontosaurus*. The sheer size of this creature was enough to command attention. At almost 70 feet long, it was longer than two buses parked end-to-end, and by conservative estimates could eat more than 1,100 pounds of food every twenty-four hours (Norman, 1993, p. 168). Perhaps its size alone catapulted it into fame. But famous it has become. For example, in Willis O’Brien’s 1925 silent movie, *Lost World*, a *Brontosaurus* and a carnivorous *Allosaurus* engage in an epic battle-to-the-death. Later, *Brontosaurus* was seen devouring a man in the 1933 cinematic version of O’Brien’s *King Kong*.

Murals in museums around the world depicted the *Brontosaurus* gazing contentedly at its surroundings as it feasted on nearby, lush vegetation. And last, but certainly not least, we can thank Fred, Wilma, Barney, Betty, Pebbles, and Bam Bam for bringing the *Brontosaurus* right into our living rooms via their madcap Saturday morning escapades.

THE ANIMAL THAT NEVER EXISTED

Enter the current “*Brontosaurus* brouhaha,” which can be explained best by the lament of one renowned dinosaur expert: “Although everyone has heard of *Brontosaurus*, it never actually existed!” (Norman, 1993, p. 168).

What?! Our beloved *Brontosaurus* “never actually existed”? How can this be true? After all, we have seen the creature on television, at museums, and in the movies? How can it never have existed? What is going on here?

The present problem has its origins in two events that occurred in 1913 and 1989. An explanation is in order. The International Union of Biological Sciences periodically publishes a book known as the *International Code of Zoological Nomenclature*, which establishes the rules and regulations for identification and naming of animal taxa (there is a separate code for regulating the taxonomy of plants). In 1913, at a meeting held in the principality of Monaco, the International Zoological Congress adopted “Article 79,” more commonly known as the “plenary powers decision.” This article states: “When stability of nomenclature is threatened in an individual case, the strict application of the Code may under specified conditions be suspended by the International Commission on Zoological Nomenclature.”

In plain English, here is what the article is saying. There may be occasions when an individual species has been given two names (e.g., two scientists, completely unaware of each other’s work, may discover the same animal, yet give it a different name). Under normal circumstances, the rules of taxonomy set forth in the *International Code* declare that the **oldest** name (i.e.,

the one given first) has priority, and should prevail. But, under Article 79, if it is the case that the later designation has achieved such widespread use and popularity that use of the “correct” name would threaten the “stability of nomenclature” (e.g., if it were unrecognizable to the majority of people, or would cause disarray in the literature on the subject), then the later designation may be allowed. As Stephen J. Gould has observed, the plenary powers rule provided “that the first designation shall prevail, unless a later name has been so widely accepted that its suppression in favor of a forgotten predecessor would sow confusion and instability” (1991, p. 83).

Now, fast-forward to 1989. In that year, the United States Postal Service declared the month of October as “national stamp collecting month.” On October 1, at a gala presentation at Disney World in Orlando, Florida, the Postal Service officially launched four stamps, each of which bore the picture of a different dinosaur (*Tyrannosaurus*, *Stegosaurus*, *Pteranodon*, and *Brontosaurus*). The Postal Service, of course, had hoped to stir interest, but instead engendered a scientific controversy that soon was to be the topic of discussion in major publications within both the scientific and popular media. The editor of the *Wall Street Journal*, for example, supplied a nice summary of what had happened when he wrote:

The Postal Service has taken heavy flak for mislabeling its new 25-cent dinosaur stamp, a drawing of a pair of dinosaurs captioned “*Brontosaurus*.” Furious purists point out that the “*brontosaurus*” is now properly called “*apatosaurus*.” They accuse the stamp’s authors of fostering scientific illiteracy, and want the stamps recalled (as quoted in Gould, p. 86).

What did the editor mean when he said that *Brontosaurus* now should be called *Apatosaurus*? What has happened here? And how does Article 79 fit into this brouhaha? Again, a word of explanation is in order.

During the late 1870s, two men became famous for their finds of fossilized dinosaur remains—Othniel C. Marsh and Edward D. Cope. In what later became known as the “Bone Wars,” these two scientists became bitter rivals, each struggling to gain more notoriety than the other. In 1877, Marsh described one of his finds as a creature he labeled *Apatosaurus*, and observed that it was about 50 feet in length. Two years afterwards, in 1879, he introduced another find labeled as *Brontosaurus*, and noted that it was approximately 70 feet long. In commenting on this, Gould remarked:

Marsh considered *Apatosaurus* and *Brontosaurus* as distinct but closely related genera within the larger family of sauropod dinosaurs. *Brontosaurus* soon became everyone’s typical sauropod—indeed the canonical herbivorous dinosaur of popular consciousness, from the Sinclair logo to Walt Disney’s *Fantasia*... (pp. 87-88).

Marsh mounted and displayed his almost-complete *Brontosaurus* skeleton at Yale’s Peabody Museum, and photographs of the reconstruction were distributed widely around the world. However, in 1903 Elmer Riggs of the Field Museum of Natural History in Chicago restudied Marsh’s finds, and discovered that, in fact, *Apatosaurus* and *Brontosaurus* were two versions of the same creature, with *Apatosaurus* being the younger, smaller, more juvenile specimen. Remember that this was ten years before Article 79 was adopted; thus, no exceptions were allowed in the naming hierarchy. The older name was to prevail; the younger was to give way, and sink into oblivion. At least that is what **should** have happened. However, that is not what **did** happen. And therein lies the present controversy.

Riggs’ conclusions were published in Publication 82 of the *Geological Series of the Field Columbian Museum*—a little-known work that afforded his research scant public exposure. Thus, as Gould has suggested:

The name *Brontosaurus*, still affixed to skeletons in museums throughout the world, still perpetuated in countless popular and semi-technical books about nature, never lost its luster, despite its technical limbo.... No argument of fact arises at all, just a question of names, settled in 1903, but never transferred to a general culture that continues to learn and favor the **technically invalid** name *Brontosaurus* (pp. 90-91, emp. added).

The key phrase here is “technically invalid.” In short, the name of *Brontosaurus* “stuck” in a way that *Apatosaurus* never did. The latter is “technically” correct; the former is more popularly employed. Thus, in its defense, the Postal Service could write (accurately) in Postal Bulletin 21744: “Although now recognized by the scientific community as *Apatosaurus*, the name *Brontosaurus* was used for the stamp because it is more familiar to the general population.”

Today, it is not unusual to hear the term *Brontosaurus* still being applied to dinosaurs, even though, according to the *Encyclopaedia Britannica*, “in 1974 the name *Brontosaurus* was formally discarded” (1997, 2:547). But “formally” discarded is not the same as “popularly” discarded.

Further complicating the problem is the fact that many scientists today use the terms “brontosaurus” or “brontosaurus” (no capital B, no italics) to refer to a **group** of the sauropod dinosaurs (known in taxonomic circles as an “infraorder”). [NOTE: The sauropod dinosaurs were the largest dinosaurs ever to have lived.] American dinosaur expert, Robert Bakker, in commenting on this subject, wrote:

When I say “brontosaurus” I’m referring to brontosaurians in general, a huge order of dinosaurs which consists of scores of genera such as *Brachiosaurus*, *Camarasaurus*, *Diplodocus*, *Supersaurus* and *Brontosaurus*. The name *Brontosaurus*, then, is much more specific than “brontosaurus.” *Brontosaurus* is one close-knit genus, a tiny subset of all brontosaurians (1994, p. 28).

So, while it is incorrect technically to speak of a *Brontosaurus* (since the animal should be known by its designation, *Apatosaurus*), it is correct to speak of “brontosaurus” or “brontosaurians,” since such a moniker refers to a group within the sauropods. All that aside, however, it is likely that people will continue to speak of *Brontosaurus* for a long time to come, simply because the word has become so much a part of our vernacular.

A TALE OF A HEAD

In one of the above paragraphs, the statement was made that Othniel Marsh mounted and displayed his “almost-complete” *Brontosaurus* skeleton at Yale’s Peabody Museum for the world to view. The two words, “almost-complete,” represent another interesting, but unrelated, part of the story about the *Brontosaurus*. When Marsh found the *Apatosaurus* and *Brontosaurus* skeletons, neither of them possessed a head. But Marsh wanted the mounted skeletons to have heads. Robert Bakker speculated about how he got them:

Marsh left no notes about how he handled the head-body problem. His thinking might’ve gone like this: “*Brontosaurus* has the biggest, most massive body, so it should have the biggest, most massive head.” Makes sense. So Marsh rejected a *Diplodocus*-type head for *Brontosaurus* because diplos had delicate heads with elegantly tapered snouts. And diplo teeth were incredibly thin and pencil-shaped, hardly the biting apparatus fit for a Thunder Lizard. Instead, he chose the biggest, thickest, strongest skull bones, lower jaws and tooth crowns from three different quarries, concocting what he thought was a *Brontosaurus* cranium complete with *Brontosaurus* teeth. The theory seemed so logical that for nearly a century most *Brontosaurus* reconstructions followed Marsh’s lead (1994, p. 29).

Dr. Bakker interrupted his story about Marsh’s headless skeletons to discuss two different types of brontosaurians—what he termed “Tall Shoulders” and “Whip Tails.” The descriptive terms are fairly self-explanatory. Those in the Tall Shoulder group possessed torsos that were more massive, with much higher shoulders and generally shorter tails. Those in the Whip Tail group possessed much shorter shoulders and much longer tails. These two groups, Bakker suggested, would have “walked differently, fed differently, fought differently.... If you dug up a single piece of backbone, you usually could tell with one glance which of the two tribes the bone belonged to” (p. 30). Furthermore, Bakker declared, “...since Whip Tails and Tall Shoulders used unique blueprints for building body parts, then they must’ve had unique cranial trademarks. One should be able to tell the heads apart with ease” (p. 30).

Unfortunately Marsh either did not see, or ignored, these differences, and instead used the “massive body/massive head” theory in ordering museum technicians to construct a head for his *Brontosaurus*. As Bakker wrote:

To manufacture a head for the Yale Bronto, Marsh had chosen heads and teeth from three Tall Shoulder Clan species. He’d used bits and pieces from *Morosaurus*, *Camarasaurus* and *Haplocanthosaurus*. New York and Pittsburgh had done the same, using most *Camarasaurus* spare parts for their *Brontosaurus* heads. All this would have been fine if *Brontosaurus* itself were a bona fide Tall Shoulder, because most clan members had big teeth and jaws. But bronto wasn’t a Tall Shoulder at all. It was a Whip Tail, a close cousin of *Diplodocus* (p. 30).

The problem almost was solved in 1909. Almost. Financier Andrew Carnegie was disappointed that the museums in other cities had better exhibits than those in the museum of his favorite city, Pittsburgh. He thus provided the equivalent of \$10 million to the museum for the sole purpose of finding a *Brontosaurus*.

In 1909, Carnegie’s crew found just the right one near Jensen, Utah. It was the largest, heaviest brontosaurus ever discovered up to that time, and became known as *Apatosaurus louisae* (yes, Carnegie’s wife was named Lou-

ise!). In addition, workmen at the site had discovered a single head a short distance from where the skeleton had been found. The head’s ball joint fit perfectly with the neck’s socket, leading the foreman to believe that they finally had found the head and body of a brontosaurus together.

But, as Bakker has lamented, when the museum technicians began to assemble the brontosaurus for public viewing, they rejected the head as being far too small for the body.

Unfortunately, when the specimen was shipped back to Pittsburgh, the savants poured cold water on the foreman’s ideas. “No, no, no,” they said emphatically. “It can’t be a *Brontosaurus* head. It looks too much like a *Diplodocus* head!” That’s right. The head found with Louise’s bronto was a perfectly good head from the diplo family, just slightly bigger than that of the average *Diplodocus carnegiei*. That’s why the Pittsburgh professors refused to believe it was a *Brontosaurus* head: The tradition of using big, boxy cam or haplo heads was too strong. So the head sat forgotten on a basement shelf for forty years until [Jack] McIntosh got it out, dusted it off and reunited it with its rightful *Brontosaurus* body at last (p. 33).

In 1975, Jack McIntosh of Yale published his research, showing that the heads on the *Brontosaurus* exhibits in museums around the world were completely wrong. Marsh had erred in his assumptions, and, following his lead, so had his colleagues for the next hundred years. As Bakker noted:

Not only did *Brontosaurus* have the head of the wrong species, it had the head of the wrong genus, and not only the wrong genus but the wrong family. And not only the wrong family, but the wrong family of families. In fact, the head given to *Brontosaurus* for a hundred years was just about as wrong as you could get and still be within the grand order of brontosaurians. To make a mistake of the same magnitude today, you’d have to put the head of a giraffe on the body of a goat (p. 29).

Marsh no doubt meant well. And his logic seemed sound. But the bottom line is that from 1879 until 1975, museums had the wrong dinosaur head on the wrong dinosaur body, because their assumptions were invalid and their logic wasn’t sound. Kind of makes you think, doesn’t it?

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