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Scientific or Sciencey?

Yeti, Nessie, et al.

Confession time: I've watched my fair share of shows such as Finding Bigfoot and Bigfoot: The New Evidence. (This dates me, but I was in my small town's movie theater for opening night of The Legend of Boggy Creek. Two days later I returned to see it again.) These programs typically have a similar trajectory. You're teased with tantalizing "new evidence," which gets introduced within the first third of the program. The tantalizing evidence often is some kind of hair or feces that the finder swears is unlike anything they've ever seen (and they're supposedly familiar with black bear, brown bear, wolf, deer and other animal hair and feces, so it couldn't be any of those). By the end of the program, analysis reveals that the "new evidence" is from a bear, bison, human, or domestic animal. But the intrepid believers in Bigfoot, though disappointed, go on undaunted because, well, the truth is out there!

Bigfoot, among other mysterious beasts, is the subject of Abominable Science! Origins of the Yeti, Nessie, and Other Famous Cryptids. This is an immaculately produced book rivaling the production values of the finest coffee table volumes. (Try it at home—it's a guaranteed conversation starter for guests.) Daniel Loxton and Donald R. Prothero (yes, the Prothero of creationism and ID debates) delve into some of the most well-known cryptids (mystery creatures whose existence hasn't been demonstrated): Bigfoot, the Yeti, the Loch Ness Monster, sea serpents, and Mokele Mbembe (the Congo dinosaur). Each cryptid gets its own heavily documented chapter (there are over 1,100 footnotes altogether); these accounts are bracketed by an introductory chapter on cryptozoology (the study of cryptids) and a concluding chapter on why people believe in monsters.

Abominable Science! is entertaining, informative, and readable. The Bigfoot legends, we learn, originated with Native Americans, although their tales bore little resemblance to later Bigfoot lore. The Bigfoot that we would recognize today can be traced to William Roe's dramatic report of a sighting in British Columbia in 1955. Roe sent his detailed written narrative to pioneer Bigfoot "researcher" John Green, who subsequently published it; or maybe Green

interviewed him (it's not exactly clear how the report originated). This is the account all subsequent "encounters" are patterned after, including the infamous and controversial 1967 Roger Patterson and Bob Gimlin Bigfoot film.

Although the immediate reaction to Roe's report was largely limited to Canada, Bigfoot became an American sensation in 1958 through Raymond Wallace's faked tracks (this incident led to the Bigfoot branding; previously the mythical creature had been known by its native name, Sasquatch). These fake tracks formed the foundational evidence for the whole Bigfoot investigation, according to Green. Alas, problems with hoaxers have vexed Bigfoot research over the decades. One of the early hoaxers, bricklayer Ray Pickens, seems to have been partly motivated by revenge. In 1971, he laid down fake footprints on several occasions—and in each case they were subsequently identified as "authentic." The initial escapades were a response to a Bigfoot researcher calling Pickens and his friends "hicks." Pickens continued to create fake footprints that fooled Bigfoot researchers because "I just wanted to show that anybody could fake them." In addition to deliberate trickery, of course, misidentification often leads credulous seekers astray. The range of Bigfoot "sightings" in North America is almost identical to black bear population distributions.

Loch Ness Monster lore has a similarly dodgy origin. Prior to Alex Campbell's famous 1933 newspaper report that started the whole Loch Ness monster mania, there had been no folklore of mysterious creatures specific to Loch Ness. Any previous tales or "sightings" fit the generic forms for mysterious water creatures that exist worldwide, and none of those resemble Nessie of legend. It was Campbell's article that popularized the application of the term "monster" to the supposed creature of Loch Ness. Moreover, he falsely claimed there had been a long history of sightings over generations.

But Campbell's article, however sensational its claims, wasn't the only factor. Following others, Loxton and Prothero suggest that the Hollywood blockbuster movie King Kong and the sequel Son of Kong had set the stage in 1933 for the Loch Ness monster: Both films involved gigantic long-necked water monsters that potentially could fit the bill for Campbell's report. Moreover, these movies had started something of a "monster fever" in the Western world, particularly for prehistoric creatures.

King Kong was released in London on April 10, 1933, and Aldie Mackay's "sighting" of a water disturbance that perhaps involved a creature with "humps" (forming the basis for Campbell's article) took place shortly thereafter.

The full birth of the legend of Nessie can be dated to an August 4, 1933, letter published in the Inverness Courier, where George Spicer reported that he and his wife saw something resembling a "dragon" or "pre-historic creature" crossing the road about 50 yards ahead of them as they were driving along the loch's north shore. Loxton and Prothero give a detailed comparison of the many parallels between Spicer's account and the dramatic scene in the movie where the prehistoric water creature—a Diplodocus-like sauropod—comes on land, chasing the crew of the Venture.

Whether this all amounts to a satisfying explanation for the birth of Nessie, 1933 is the generally agreed upon year for the beginning of the legend. Prior to the publication of Spicer's letter, there had been no reported sightings of any long-necked water creatures. Afterward, this was practically the only kind of water monster reported in Nessie "sightings." Less than a year after Spicer's letter saw print, the feature film *The Secret of the Loch* debuted with the lead character declaring the Loch Ness monster to be ... wait for it ... a Diplodocus! As with Bigfoot, news and entertainment media combined with popular culture to create a legendary creature and a signature "script" that subsequent "sightings" conformed to. By the end of 1933, Nessie was being used to market consumer products from floor polish to breakfast cereal.

The most famous photo purported to be of Nessie, the iconic Surgeon's Photograph, was faked by big-game hunter and showman Marmaduke Wetherell and his son Ian. Ian and his step-brother, Christian Spurling, built the model monster around a toy submarine. Marmaduke and Ian found an inlet where they floated the monster and Ian "took about five shots with the Leica." I've always been struck by how this photograph seemed to have a ring of waves outgoing from Nessie that look to be no more than five or six feet in diameter, so that the model monster could be no more than about three or four feet in height (the best estimates put it at a maximum of four feet). The power of the Surgeon's Photograph in the light of the desire to believe, however, overcomes the obvious shortcomings of the picture (and apparently the family hoax admissions are not well known or have been discounted). It was fascinating to read the back story behind this photograph. (Marmaduke had previously faked footprints of Nessie using a mounted hippopotamus foot.)

You might be asking, "What kind of people believe in this nonsense?" People very much like you and your friends and neighbors. As Loxton and Prothero emphasize, "It is important to understand that essentially everybody believes in things that scientists consider to be either unproven, implausible, or

demonstrably false." The sheer number of cryptid programs on channels such as Animal Planet, Discovery,[1] History, and National Geographic suggest that the audience for such programming is quite mainstream. Interestingly, people who belong to Bigfoot hunting groups tend to be almost "hyperconventional" given how conventional they are on measures such as education, income, marriage, and mainstream religiosity. For example, at the 2009 annual Texas Bigfoot Research Conference, attendees "were better educated than average Americans, better paid, and more likely to be married." Cryptid belief thrives about as much among élites as in any other population segment in America. And in case you were wondering, people who score higher on measures of religiosity tend to believe in fewer cryptids than those who score lower.

Some anthropologists, psychologists, and sociologists have been studying the phenomenon of cryptid belief in American and Canadian societies (and belief in the paranormal more generally in North America). Loxton and Prothero summarize this research and its conclusions well: Nobody really has any explanation for why so many people believe in cryptids or why there is virtually no correlation between increased education and decreased belief in cryptids. Maybe people long for some remaining wildness in an otherwise controlled world. Perhaps people want to maintain some form of mystery despite Enlightenment thought's crusade against the mysterious. Or cryptid belief is one of the few ways people can practice deviancy that doesn't cost them anything in a conformist, consumer-oriented society. In any case, Loxton and Prothero wisely urge caution in the interpretation of this body of research.

After all, despite the pervasiveness of scientism in Western culture, there is still a fascination with the fantastic. The 19th century, which gave birth to scientism, was filled with examples of people who swore both by science and by spiritualism. Contemporary American society is no different.

Abominable Science! seeks to debunk cryptozoology while encouraging better scientific thinking. The authors are more successful at the former goal than the latter. Loxton and Prothero tend to write as if there is one scientific method rather than many scientific methods. This is a very common shorthand for referring to the complex and creative yet systematic processes of investigation used in the sciences. Unfortunately, speaking of "the scientific method" and throwing in the phrase "hypothesis testing" tend to reinforce what I call the 5th-grade view of science: a four-step procedure of observation, hypothesis, experiment, and conclusion. Scientific methodology is much richer and more creative than this overused, misleading caricature.[2]

One possibility for why belief in cryptids is so high in America is that few Americans—even the highly educated—actually understand much about the processes and principles of scientific inquiry. Cryptozoology superficially appears to be scientific, and a number of people mistake it for scientific activity. It sounds and looks "sciencey," to use Sharon Hill's lovely term, but that's it. Cryptozoologists typically don't begin with a theory to generate a viable hypothesis, deduce consequences from that hypothesis (predictions), test those consequences, analyze the data, check for errors, critically sift assumptions, and so forth. Rather, they begin with a bias (belief in the existence of a mystery creature such as Bigfoot) and then hunt for evidence to substantiate their belief. This leads cryptozoologists to force what they find to fit into their pre-established expectations. Moreover, they accept any evidence that remotely supports their belief no matter how weak or questionable, and discount any contrary evidence no matter how strong.

Good scientists, by contrast, practice healthy skepticism toward their hypotheses, evidence, and assumptions, even though they have some reasons for confidence in the theory that they are working with. They throw out weak or questionable evidence and take contrary evidence very seriously. Sure, scientists also have their expectations, but they critically assess the evidence for whether it genuinely supports the hypothesis or not. Cryptozoologists largely are unwilling to give up their beliefs no matter what the state of evidence is. Scientists accept the failure of their hypotheses (such failures happen fairly often) and usually get excited by what they learn from such failures. Cryptozoologists make a number of unfounded assumptions which they never challenge; scientists hold their assumptions as only provisionally true and return to critically examining their assumptions on occasion and sometimes frequently.

In the work of cryptozoologists, as Loxton and Prothero make clear, we find the same patterns of error again and again. Bigfoot searchers, for instance, are routinely guilty of confirmation bias:

Bigfoot enthusiasts look back over Native lore with an expectation of finding Bigfoot. They seize on any tales about a fabulous creature that resembles the Bigfoot they expected to find, while ignoring or reinterpreting the stories that do not. Then, having projected a modern Bigfoot into disparate Native legends, enthusiasts make the circular argument that Native American traditions confirm the existence of Bigfoot.

Likewise, they succumb to the unobtainable perfection fallacy. When confronted with the number of hoaxes in Bigfoot data, so prevalent as to taint virtually all of the supposed positive evidence, Green responded, "It doesn't matter if 10 per cent of these reports are mistaken, or 50 per cent of them, or 90 per cent of them ... . If Sasquatches are to be wished back into the books on mythology, every last one of these reports has to be wrong" [emphasis added]. Of course, it stretches human capabilities to investigate and definitively establish that all reported evidence for Bigfoot is false, so the true believer can shield his belief in Bigfoot from the rather large number of hoaxes and cases of misidentification. No scientific conclusions can survive under such demands for perfection.

I could go on, but the point should be clear. Cryptozoology has the veneer of science—it's sciencey—but not the substance. And Americans' inability to distinguish the sciences from that which is sciencey contributes to the stubborn and widespread belief in cryptids in American society.[3] This goes to the heart of Americans' dismal performance in science education over the past few decades, a trend that Loxton and Prothero discuss in their concluding chapter. The Next Generation Science Standards possibly can make a dent in this troubling situation because they actually focus on the processes and principles of scientific investigation. The better the grasp on these processes and principles, the less likely one is to be lured off-track by the sheen of the sciencey. Unfortunately, far too many Christians are misinformed and oppose the NGSS. We need to ask ourselves what is genuinely more dangerous to our pursuit of truth.

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1. The Discovery Channel has recently pushed this business to new heights, creating a megalodon myth with docudramas complete with fake incidents, fake evidence, actors playing fake experts, and some obvious computer animation trickery.

2. It was in 5th grade that I was first introduced to this description of scientific investigation.

3. If you're thinking that the misunderstandings and fallacies popping up in cryptozoology resemble strategies found in climate change denial, scientific creationist, and ID literatures, you'd be right. For instance, Michael Behe, among other ID supporters, often engages in the unobtainable perfection fallacy,

demanding that evolutionists supply every step in the historical development of complex biomolecules.