



Monsters & Marvels

Author: Allchin, Douglas

Source: The American Biology Teacher, 69(9) : 565-568

Published By: National Association of Biology Teachers

URL: [https://doi.org/10.1662/0002-7685\(2007\)69\[565:MM\]2.0.CO;2](https://doi.org/10.1662/0002-7685(2007)69[565:MM]2.0.CO;2)

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

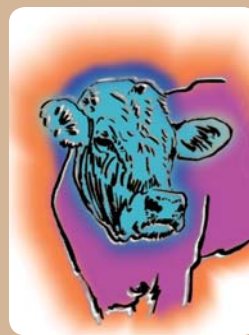
Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

Monsters & Marvels

How do we interpret the “preternatural”?



DOUGLAS ALLCHIN, DEPARTMENT EDITOR

Four-leafed clovers are traditional emblems of good luck. Two-headed sheep, five-legged frogs, or persons with six-fingered hands, by contrast, are more likely to be considered repugnant monsters, or “freaks of nature.” Such alienation was not always the case. In sixteenth century Europe, such “monsters,” like the four-leafed clover today, mostly elicited wonder and respect. People were fascinated with natural phenomena just beyond the edge of the familiar. Indeed, their *emotional* response – at that juncture in history – helped foster the emergence of modern science. Understanding that perspective, one might well probe another sacred bovine: That emotions can only contaminate science with values. Indeed, the potential of “monsters” to evoke wonder may, even today, help us motivate students.

Wonder

Consider the case of Petrus Gonsalus, born in 1556 (Figure 1)(Hertel, 2001). As one might guess from his portrait, Gonsalus (or Gonzales, or Gonsalvus) became renowned for his exceptional hairiness. He was a “monster”: someone – like dwarves, giants, or conjoined twins – with a body form conspicuously outside the ordinary. But, as his courtly robe might equally indicate, Gonsalus was also *special*.

DOUGLAS ALLCHIN has taught both high school and college biology and now teaches History of Science at the University of Minnesota, Minneapolis, MN 55455; e-mail: sacred.bovines@nabt.org. He is a Fellow at the Minnesota Center for the Philosophy of Science and edits the SHiPS Resource Center (ships.umn.edu). He hikes, photographs lichen, and enjoys tea.



Figure 1. Petrus Gonsalus. Image courtesy of Kunsthistorisches Museum, Vienna.

Gonsalus was born on Tenerife, a small island off the west coast of Africa. But he found a home in the court of King Henry II. Once there, he became educated. “Like a second mother France nourished me from boyhood to manhood,” he recollected, “and taught me to give up my wild manners, and the liberal arts, and to speak Latin” (Hertel, 2001, p. 9). Gonsalus’s journey from the periphery of civilization to a center of power occurred because he could evoke a sense of wonder. Eventually, he moved to other courts across Europe. Wonder was widely esteemed.

For us, Gonsalus may be emblematic of an era when wonder flourished. In earlier centuries monsters were typically viewed as divine portents, or *prodigies*. Not that they were miracles. The course of nature seemed wide enough to include them. Still, why had the customs of nature been suspended at that particular time and place? What purpose or intent did monsters signify? Why would this child, here, now, have such an inflated (hydrocephalic) head? Monsters thus once evoked fear or awe. The emotion reflected their uncertain meaning more than their strangeness of form.

By the 1500s, however, nature (still viewed as God’s realm) seemed less capricious. Confidence in nature’s consistency developed, although nature did not yet seem quite lawlike. The supernatural certainly still seemed possible: A divine power could suspend the natural order at any time. Monsters like Gonsalus were rare, and surely anomalous. Yet they seemed products of natural causes. That belief opened a new zone between the known and the unknowable. Historians Lorraine Daston and Katherine Park (2001) have dubbed such phenomena the *preternatural*,

or “beyond the natural.” The preternatural world, “suspended between the mundane and the miraculous” (p. 14), was emotionally charged. It was a domain of wonder and marvel.

What did Europeans in the 1500s and 1600s marvel at? Magnetic attraction: How did it reach across empty space? The reputed power of the amethyst to repel hail and locusts. Invisible writing that magically reappeared when heated. Liquid phosphor in the sea near Cadiz. Gems emitting light. “Fool’s paradises” of glass creating many colors from sunlight. Colored lights flickering in the northern sky. Healing a wound by bandaging the weapon (if one should believe that). Changing metals from one to another. An armor-plated cow-like beast with a huge horn on its nose. A sea-boar, with tusks. A brainless child born in Montpellier. A child with a tail of a mammal. A woman with four breasts. Here was wonder indeed (Della Porta, 1658; Daston & Park, 2001; Smith & Findlen, 2002). Monsters, in particular, reflected the intriguing tension at the edge of the natural: So close to human form, yet not. That is why Gonsalus — otherwise a wild native — found a home amidst the pinnacle of society.

Collecting & Exchanging

Objects that evoked wonder were worth saving and keeping. Such specimens were called *curiosities*. They included ostrich eggs, nautilus shells, whale vertebrae, a griffin claw (well, an inverted animal horn), armadillo shells, prickly blowfish and tropical corals, dragons’ teeth (probably from sharks), as well as carved ivory and fossils. Add, too, exotic minerals and gemstones, oddly shaped bones, large turtle carapaces and stuffed crocodiles. Curiosities, the physical artifacts, reflected the significance of curiosity, the emotion (as we would call it now).

The well-to-do, at least, began collecting curiosities. —And they enshrined their treasures in special *curiosity cabinets* (Purcell & Gould 1986, 1992; Rumpf & Beekman, 1999; Musch & Willmann, 2001). These cabinets allowed them to exhibit, take pride in, and perhaps share their unique specimens. In some cases, the collections expanded to fill whole rooms dedicated to the purpose. All due to wonder.

Gonsalus fit into this cultural practice of collecting unique specimens. He was, perhaps, a living curiosity. In a sense, he was “collected” from his native Tenerife. He and other monsters that became members of court culture were unique “specimens” whose role was to elicit wonder. Gonsalus’s uniqueness was ultimately documented and preserved in a full length portrait. After 1583 it became a prominent fixture in the multi-roomed curiosity “cabinet” of Archduke Ferdinand II of Tyrol (near Innsbruck, Austria). Ferdinand’s castle, Ambras, has since given the name to Gonsalus’s condition: hypertrichosis universalis congenita, Ambras type (McCusick, 2004).

Ironically, perhaps, Gonsalus never owned his own portrait. While his uniqueness was valued, he was also essentially the King’s *property*. We know that in 1595 Gonsalus’s son Arrigo, who shared his striking hairiness, was given *as a gift* from Ranuccio Farnese of Parma, Italy, to his brother, Cardinal Edoardo Farnese (see painting by Agostino Carracci, “Hairy Arrigo, Fool Pietro and Dwarf Amon,” another tribute to monsters) (Hertel, 2001, p. 17). (While we do not share the ethical perspectives of the late Renaissance, we can clearly see how deeply the culture valued the sense of wonder.)

Curiosities also contributed to Western European politics. Extraordinary specimens were exchanged as gifts among the

rich and powerful, from one court to another. No mere gestures, these gifts were currency in establishing political alliances and seeking courtly favors. The more striking or rarer the specimen, the more valuable. As Arrigo’s fate indicates, exchanges included living specimens. For example, an Indian rhinoceros, made famous by a 1515 Albrecht Dürer drawing, had been a gift from a sultan in India to the Portuguese governor there, who then gave it to the king in Portugal. It was on its way next to Pope Leo X in Italy when the ship carrying it sank. An elephant named Hanno had made a similar intercontinental journey, more successfully, the year before (Smith & Findlen, 2002, p. 1).

The demand for new marvels among the elite fueled a healthy trade. Merchants did not miss the opportunity to profit from venturing around the world. Curiosities, then, also became good business. Wonder supported commerce. Indeed, the commerce in exotica, combined with a spirit of dominion, helped finance further voyaging and discovery farther from Europe. More and more specimens arrived as Europeans extended their political and economic domain. Collections expanded.

Wonder easily extended to the influx of strange new plants, new animals, new minerals and new cultural artifacts. The diversity was exhilarating. The greater the diversity, the deeper the fascination. Many collectors now aimed for impressive scope as well. Collections expanded again, from select curiosities to comprehensive assemblages of thousands of specimens. One may readily appreciate how such collections and exhibit spaces evolved into natural history museums. The extraordinary collection of plants assembled by John Tradescant and his son, first catalogued in 1656, became the first public museum (Oxford University’s Asmolean Museum) in 1683. The collection of Hans Sloane, developed in the late 1680s, formed the core of the British Museum. In 1715 Albertus Seba, from Amsterdam, sold his collection of curiosities — one of the most extensive in Europe — to Peter the Great, who then created Russia’s first natural history museum (Musch & Willmann, 2001). Wonder, an emotion, fostered the creation of vast collections that ultimately served more systematic study.

The Spirit of Investigation

Wonder was also important in spurring inquiry. One can easily imagine an emotional response to curiosities that is purely aesthetic and passive. Wonder, however, was not idle appreciation or, with monsters, a debilitating horror or awe. Rather, wonder was provocative. Strange specimens evoked questions about the natural order: What caused these forms to vary from nature’s customs?

Wonder was also not curiosity, at least not at that time. In the 1500-1600s, curiosity implied a desire, even obsession, for knowledge that was inappropriate or unattainable. Curiosity was considered vain, self-absorbing and indulgent. (Accordingly, dramatist Thomas Shadwell satirized Robert Boyle and the Royal Society as overzealous fools in his 1672 comedy, *The Virtuoso*.) Wonder, on the other hand, led to fruitful investigation and to deeper knowledge about how nature worked (and often, too, to interpreting God’s intentions). That motivation was central to the emergence of modern science.

The spirit of investigation typically manifested itself first in an effort to collect all that was known (or ever known) about a particular topic. Thus French surgeon Ambroise Paré expressed his interest in monsters by collecting information

about as many cases as he could document and by reporting them all (1573/1982). He categorized the various forms, combining explanations of natural means and divine intent: too much seed here, too little there, images impressed upon the mother's mind, maternal injury, hereditary illness, God's wrath (or his glory), etc. Paré's approach was encyclopedic although, by modern standards, somewhat credulous. Human-animal hybrids appeared alongside conjoined twins and hermaphrodites. Wonder – at first – does not bring discernment. But Paré's work exemplifies well how such studies began, with few prior benchmarks. Eventually, the vast catalogs and natural history collections introduced two major challenges, each illustrated in Paré's experience and later addressed historically. First, how does one bring order to, or organize, everything, including all the unusual cases? Second, how does one distinguish credible from incredible claims? Both endeavors – the search for patterns and development of standards for evidence – were important in establishing modern science.

The spirit of wonder and investigation was also nicely exemplified in the work of Ulisse Aldrovandi, of Bologna, Italy. Aldrovandi gained renown as one of the finest naturalists of the late 1500s. Like others, he collected specimens from the New World and around the globe. His collection, however, was among the largest and most amazing. By 1595 he could write: "Today in my microcosm, you can see more than 18,000 different things, among which 7000 in fifteen volumes, dried and pasted, 3000 of which I had painted as if alive" (Daston & Park, 2001, p. 154). Further, he set about recreating it all in a "paper museum" of illustrated books. He planned volumes on birds, fish, insects, trees and – quite notably as an equivalent category – monsters.

The monstrous forms challenged Aldrovandi's organization. For example, he had collected many deformed lemons. Each was unique. Were they fundamentally different, or were they all "just" lemons? Aldrovandi gave each a separate category (Daston & Park, 2001, p. 285). For him, the differences clearly mattered. Monsters were not just unusual regular specimens. They had a special meaning. Monsters were not easily classified, hence their continuing power to amaze.

Aldrovandi was also concerned about credibility, perhaps a bit more than Paré. He repeatedly referred to illustrations drawn from life, rather than copied or based on some uncertain testimony. His books – his paper museum – drew on his actual specimens. He felt well informed enough to declare one unicorn horn a fake, as well as a hydra. He also showed others how, based on one specimen he obtained, a stingray could be reshaped to imitate a dragon (although he still maintained that genuine dragons existed in nature) (Findlen, 2002, pp. 306-310).

What about monsters? Were the reports and images of them credible? Could one really believe that somebody could be hairy all over or, as Paré described one girl, "as furry as a bear" (1573/1982, p. 38)? Petrus Gonzalus and his hirsute children, at least, would seem living proof. Aldrovandi surely appreciated the nature of material evidence. He found an opportunity to examine Gonzalus and his son in 1584 (one of only two physicians known to have done so). At one level, Aldrovandi sought perhaps to document Gonzalus as another anomaly for his collection. Yet he also tried to understand his unique condition. Elsewhere, Aldrovandi studied deformities in chick development and attributed them to chemical and physical changes in the egg yolk. Monsters shed light on nature. Here, wonder not

only fostered the cultural practice of collection, but also helped transform it into a deeper investigation of nature – what we now call science.

Wonder in the Classroom

For teachers today, the haunting image of Petrus Gonzalus as both monster and courtier reflects the central role of wonder in early science. A basic motivation for inquiry was, and perhaps still is, rooted in an *emotional* response. Good teachers already understand, I think (even if only implicitly), the pivotal role of motivation and engagement. The history, here, affirms the role of these emotions as a foundation of scientific practice. Fostering a sense of wonder and its investigative consequences might well be an explicit goal in teaching science.

The history also helps inform us of the critical boundaries of the emotion. Too much astonishment, perhaps, and one risks generating an unproductive "gawking wonder," not inquiry (Daston & Park, 2001, p. 316). I fret, in particular, about the "ooh-aah" syndrome typified by many television "discovery" programs. They tend to portray science more as circus sideshow than research endeavor. They teach authoritative answers and dumbstruck awe, not questions. Teachers may thus have a significant role in modeling appropriate perspectives and the art of posing questions.

Accordingly, care is advisable in selecting wonders for the classroom. One can easily find cases of "monsters," like Gonzalus (Bondison, 1997, 2004; Purcell, 1997; Leroi, 2003; and numerous Web sites). But our modern responses to these cases often differ substantially from those in the sixteenth and seventeenth centuries. Monsters have mostly become freakish, evoking disgust, not wonder. (That puzzling change also has roots in the history of science and will be addressed in the next *Sacred Bovines*.) Wonder emerges by challenging commonplaces. For example, the hermaphrodites (and other intersexes) that fascinated Paré and his peers can still potently problematize our notions of male and female (*Sacred Bovines*, Aug., 2006). As a modern example, *situs inversus*, the lateral reversal of internal organs (McManus, 2002), might also disturb our sense of the natural order. Non-human examples, such as albino gorillas or tigers, bald lemurs, or other anomalies occasionally found at local zoos, may likewise prompt queries about genetics and development. Wonders engage us and keep us off balance.

In modern culture, science typically serves as an icon of objectivity, purged of emotion. Science teachers might thereby imagine that their classes should focus on content alone, however sterile, lest subjectivity intrude and poison the science. Understanding the historical era that made hairy Gonzalus special, however, indicates that the emotion of wonder may well be constitutive of science. Will wonders never cease? Let us hope not.

Web Excursions

A portrait of Gonzalus: www.khm.at/staticE/page381.html.

Images from Aldrovandi's *Historia Monstrorum*:
www.bium.univ-paris5.fr/monstres/biblio/bib000881img.htm.

Many sixteenth-seventeenth-century images (text in French):
www.bium.univ-paris5.fr/monstres/debut2.htm.

Della Porta's *Natural Magick*:
members.tscnet.com/pages/omard1/jportat5.html.

Envisioned by Teachers...

Swift Optical: The Focus is on Learning!

Swift M3500DF Ultra Lite® Series

- Ultimate "Student Proof" Compound Microscope
- Ultra Lite® Illumination: The original and brightest cool fluorescent system
- Patented Pointmaster and unique C-wrench tool



Swift SM90HF Series

- Flagship of the Swift Stereo Microscope Line
- Maximum versatility for classroom use
- In-base Patented Ultra Lite® or LED Illumination Base Options

Swift M7000 Series

- Advanced Compound Microscopes
- Rugged Design for High Performance
- Cordless LED or Corded Halogen Illumination



Swift Optical is proud to sponsor the workshop:

Microscopes 101: Organelle of Day

NABT Conference, Thursday, November 29, 10:45 am to 12 noon, Baker Room

... Delivered by Swift!

For more information or
a demonstration, please call
(800) 523-4544



www.swiftoptical.com

References

- Allchin, D. (2006). Male, female and/or —? *The American Biology Teacher*, 68(6), 372-375.
- Bondison, J. (1997). *A Cabinet of Medical Curiosities*. Ithaca, NY: Cornell University Press.
- Bondison, J. (2004). *The Two-Headed Boy, and Other Medical Marvels*. Ithaca, NY: Cornell University Press.
- Daston, L. & Park, K. (2001). *Wonders and the Order of Nature*. New York, NY: Zone Books.
- Della Porta, J.B. (1658). *Natural Magick*. Available online at: members.tscnet.com/pages/omard1/jportat5.html.
- Findlen, P. (2002). Inventing nature. In Smith and Findlen (2002, pp. 297-323).
- Hertel, C. (2001). Hairy issues: Portraits of Petrus Gonsalus and his family in Archduke Ferdinand II's Kunstkammer and their contexts. *Journal of the History of Collections*, 13, 1-22.
- Leroi, A.M. (2003). *Mutants: On Genetic Variety and the Human Body*. New York, NY: Viking Adult.
- McCusick, J. (2004). Hypertrichosis universalis congenita, Ambras type; HTC1. *Mendelian Inheritance in Man*. Washington, DC: National Institutes of Health. URL: www.ncbi.nlm.nih.gov.
- McManus, C. (2002). *Right Hand, Left Hand*. Cambridge, MA: Harvard University Press.
- Musch, I. & Willmann, R. (2001). *Albertus Seba's Cabinet of Natural Curiosities*. Koln, Germany: Taschen.
- Paré, A. (1573/1982). *Of Monsters and Marvels*. Translated by J. Pallister. Chicago, IL: University of Chicago Press.
- Purcell, R. (1997). *Special Cases: Natural Anomalies and Historical Monsters*. San Francisco, CA: Chronicle Books.
- Purcell, R.W. & Gould, S.J. (1986). *Illuminations*. New York, NY: W.W. Norton.
- Purcell, R.W. & Gould, S.J. (1992). *Finders, Keepers: Eight Collectors*. New York, NY: W.W. Norton.
- Rumpf, G.E. & Beekman, E.M. (1999). *The Ambonese Curiosity Cabinet of Georgius Everhardus*. New Haven, CT: Yale University Press.
- Smith, P.H. & Findlen, P.(Eds.) (2002). *Merchants and Marvels*. New York, NY: Routledge.