

# Peer review in the sciences and the humanities

## Abstract

In ancient times, reading and writing was limited to the elite; most people did not know how to read and write. This changed much, in part, with the advent of the Judeo-Christian literature in the first century and much later with the printing press around 1440-1455 CE. The first scientific journal was published in 1665 CE and the first refereeing process in 1731 CE. The peer-review platform as we have it today emerged after the second World War (1945) in the 1960s. Peer-review processes are not perfect and have flaws, but they remain important to follow for academic research and interaction. The flaws in peer review are far more pronounced in the sciences than in the humanities.

During the past 10 years of academic research and interaction with more than a dozen of scholars and some scientists online, I have noticed how viewpoints on certain biblical interpretations, or certain scientific paradigms, can increase in popularity, remain stable, or fall into pieces. This is how science and scholarship work. The main reason this occurs at a faster rate today than decades ago, or hundreds of years ago, is the Internet. In another blog post, I will briefly overview how the Internet has positively affected Biblical Studies (and science in general) and how it has negatively affected those who don't practice any online academic research. At this stage, I will be surveying the history of written texts, education and peer review (and its importance). I will briefly overview some issues with the peer-reviewed process and how it differs between the sciences and the humanities. In the end, peer review (and academic conferences and other non-peer-reviewed scholarly literature) is crucial for any amateur or professional researcher. This is important because common people that are not aware of peer review, or its importance and its inner workings, might continue thinking that anything online that seems convincing must be correct simply because they have read it. It's worth noting, however, that simply because a resource is peer-reviewed does not make its claims or thesis correct. In simplest terms, it might only mean that it's acceptable for publishing in a recognized academic publication.

## Ancient reading and writing were reserved to the elites

As far as we have discovered until now in archaeology, thousands of years ago, in the 4th–3rd millennium BCE<sup>1</sup>, the first pieces of full writing appeared from Mesopotamia in the form of cuneiform. As writing developed in Mesopotamia and the rest of the ancient Near East, passing towards the west through ancient Assyria, Canaan and Egypt, it was clear that only the elite were able to read and write. (I am unfamiliar with the writing history and systems of ancient Mesoamerica, China and India, so it's out of scope). Perhaps, proto-writing existed before the 4th millennium BCE, and even into the 7th–9th millennium BCE<sup>2</sup> for keeping an account of records, but I'm not concerned with that side of the question. I'm presently concerned with the writing of full-fledged texts. Even in the first millennium, only the elite were able to read and write, although certain ancient schools might have already existed for the elites. Most people in communities were not be able to read and write. They were listeners. It was an oral era, sharing stories and information orally.

It all began to change mostly (but not solely) with the Greek philosophers at around 500 BCE. By this time, the writings of Babylon in Sumer (part of southern Mesopotamia), Egypt, and Israel had already flourished. By the first century CE, literary circulation exploded due to Judeo-Christian texts. Nevertheless, common people still did not know how to read and write, and this was so (more or less) until the 16th—17th centuries.

## History of the printing presses

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<sup>1</sup> The Oxford Classical Dictionary is “Substantive, peer-reviewed, and regularly updated...” <http://oxfordre.com/classics/view/10.1093/acrefore/9780199381135.001.0001/acrefore-9780199381135-e-1952?rskey=QYnwvL&result=1>; accessed 5 Mar. 2019.

<sup>2</sup> Whether the oldest writing is the 6th millennium BCE or the 7th-9th millennium BCE matters little. The point is that we've found older writing than the 4th millennium except, as I say, that it's not full-fledge texts. This recent news story from 1 Mar. 2018 reports a discovery of Bulgarian writing of “ritual calendar information”: <https://www.ancient-origins.net/news-history-archaeology/8000-year-old-slab-holds-oldest-writing-ever-discovered-or-does-it-009675>; accessed 5 Mar. 2019.

Japanese and Koreans began using woodblock for manual printing with ink in the 8th century CE<sup>3</sup>, and Chinese monks used similar woodblock boards in 868 CE to print the oldest discovered printed scroll (The Diamond Sutra, a translation from Sanskrit).<sup>4</sup> This scroll was a Buddhist text. Centuries later, the first movable type printer (while still using blocks) appeared in China in the 11th century. Other movable type printers continued to be used into the 12th–13th centuries, but it was not until the 14th century that metal movable type printers came to light in China in the 1300s.<sup>5</sup> These printing inventions were genius in Asia, but they did not become too widespread since the Asian-based languages have hundreds of different characters. This made the process tedious and inefficient. It was Johannes Gutenberg in Europe in the 15th century (1400s) that invented a new movable type printing press but, this time, evidently using the alphabetic characters, easing the process experienced in East Asia.

The invention of a printing press in Europe between 1440-1455 CE changed the world. It encouraged yet another explosion of literary production and circulation. Around 1440 CE, Johannes Gutenberg manufactured a new movable type printing press that became extremely famous, but there does not seem to be clear evidence that it became publicly operational until more than a decade later. Thus, in 1455 CE Gutenberg's full printing operations are traceable to the *Gutenberg Bible* or the *Forty-two-line Bible*.<sup>6</sup>

## History of referee and peer-review systems

Schools as we know them today, although in primitive form, began between the 17th—18th centuries.<sup>7</sup> This was also the period when a precursor to peer review began. It was during the Age of Enlightenment that the Royal Society created the first scientific journal (*Philosophical Transactions of the Royal Society of London*)

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<sup>3</sup> Live Science: <https://www.livescience.com/43639-who-invented-the-printing-press.html>; accessed 6 Mar. 2019.

<sup>4</sup> Smithsonian.com: <https://www.smithsonianmag.com/smart-news/Five-things-to-know-about-diamond-sutra-worlds-oldest-dated-printed-book-180959052>; accessed 6 Mar. 2019.

<sup>5</sup> Live Science: < <https://www.livescience.com/43639-who-invented-the-printing-press.html>>; accessed 6 Mar. 2019.

<sup>6</sup> Encyclopedia Britannica: <https://www.britannica.com/biography/Johannes-Gutenberg>; accessed 6 Mar. 2019.

<sup>7</sup> Psychology Today: <https://www.psychologytoday.com/us/blog/freedom-learn/200808/brief-history-education>; accessed 6 Mar. 2019.

in 1665<sup>8</sup> under Secretary Henry Oldenburg (1618-1677).<sup>9</sup> However, at the time, the editors of the Royal Academy of Sciences were the ones who made decisions about accepting or rejecting a scientific document for publication—peer review by external reviewers, per se, was not yet in place. In 1731, the Royal Society established a committee to review what to publish to ensure quality and scientific rigor. It was much later in 1831 that a more elaborated referee process was put into place (a referee is a reviewer or a critic) due to the influence of Cambridge professor and president of the Geological Society, William Whewell (1794–1866).<sup>10</sup> It was Whewell who invented the term "scientist."<sup>11</sup> It was not until after World War II (after 1945, in the 1960s) that the referee system became "peer review."<sup>12</sup>

The old referee system in the 19th century had a single-blind system of review, where the reviewers know the author's name, but the reviewer's names are hidden from the author. In other words, the author could not know the names of the reviewers. In the 20th century, in the mid-1900s, double-blind peer review became implemented where both the names of the reviewers and authors were hidden from each other. This was (and is today) supposed to help reviewer bias towards the authors. However, since the authors must provide citations and have a bibliography, the reviewers today in double-blind might still detect who the author is throughout the citations and references, especially if there are self-references from the author. In 2006, PLOS ONE launched their Open Access journal for "scientifically rigorous

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<sup>8</sup> Some online resources document the history of peer review, although with some minor differences in dates and other details: (1) <https://www.editage.com/insights/a-history-of-academic-peer-review/>; accessed 5 Mar. 2019, (2) <https://blogs.scientificamerican.com/information-culture/the-birth-of-modern-peer-review/>; accessed 5 Mar. 2019, (3) <https://www.nature.com/news/peer-review-troubled-from-the-start-1.19763>; accessed 5 Mar. 2019.

<sup>9</sup> Encyclopedia.com: <https://www.encyclopedia.com/people/history/british-and-irish-history-biographies/henry-oldenburg>; accessed 5 Mar. 2019.

<sup>10</sup> Encyclopedia.com: <https://www.encyclopedia.com/people/history/british-and-irish-history-biographies/william-whewell>; accessed 5 Mar. 2019.

<sup>11</sup> Stanford Encyclopedia of Philosophy: <https://plato.stanford.edu/entries/whewell/>; accessed 5 Mar. 2019.

<sup>12</sup> Scientific American: <https://blogs.scientificamerican.com/information-culture/the-birth-of-modern-peer-review/>; accessed 5 Mar. 2019.

research, regardless of novelty."<sup>13</sup> Open Access journals are there to provide a wider access to the public for peer-reviewed and non-peer reviewed theses, articles, monographs and conference papers. Open Access is free for people to browse and read, but it's not free for authors. Authors that submit papers to PLOS ONE must pay between \$1,595 USD - \$3,000 USD per article as publication fees.

Peer review is supposed to reduce bias and control the quality of scientific papers, but it's not flawless. There are many deficiencies with peer review, especially in the sciences. For instance:

- Reviewers might be biased towards the authors and unfairly over-criticize a paper published by someone they recognize, or they might unfairly reject the paper;
- The process is slow since there are thousands of scientists and scholars, and yet there are only a few hundred journals and a handful of reviewers. Editors and reviewers might be limited or pressed to review so many publications;
- The process might be flawed since there have already been fraudulent papers with fraudulent data published in some journals in the past that were somehow accepted and published, but they were later retracted;<sup>14</sup>
- Reviewers do not get paid extra for their work. Their peer-review efforts are part of their academic position.<sup>15</sup>

### **Peer review is more problematic in the sciences than the humanities**

There are some points to clarify at this point, and here comes the gist of this blog post: peer review is of utmost importance for scientific and scholarly rigor and quality, but it's far more problematic and inefficient in the sciences than it is in the humanities. Peer review is a quality assurance on submitted papers articulating

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<sup>13</sup> PLOS ONE's official website: <https://journals.plos.org/plosone/s/journal-information>; accessed 6 Mar. 2019.

Analysis of PubMed Articles from 2006 to 2010:

<https://journals.plos.org/plosone/article/figure?id=10.1371/journal.pone.0060925.t001>; accessed 6 Mar. 2019.

<sup>14</sup> Who's Afraid of Peer Review? (Science magazine): <http://science.sciencemag.org/content/342/6154/60.full.pdf>; accessed 5 Mar. 2019.

<sup>15</sup> SpotOn Report, What might peer review look like in 2030? (BioMed Central): <

[http://events.biomedcentral.com/wp-content/uploads/2017/04/SpotOn\\_Report\\_PeerReview-1.pdf](http://events.biomedcentral.com/wp-content/uploads/2017/04/SpotOn_Report_PeerReview-1.pdf)>; accessed 5 Mar. 2019.

specific views and technical details. But it's not without its flaws as I already explained. For the past 10 years, I have delved into both, especially in Biblical Studies and Languages (humanities) as well as Food and Nutrition Science (sciences). Why is it, then, that peer review is more problematic in the sciences than in the humanities? Allow me to refer to the blog posts by both Dr. Michael S. Heiser and Professor Emeritus Larry W. Hurtado, who both have already blogged about this.

First, Prof. Hurtado shared on July 15, 2013 a blog post entitled “**Expertise and How to Detect It**”.<sup>16</sup> I recommend that you read it. In short, he explains why peer review is a critical process in scholarship. A lot of professed researchers out there make wild claims about biblical texts, but they do not submit their claims through academic review, and some common people read those wild claims and run with them. In another blog post that I also recommend reading from October 21, 2013, Prof. Hurtado posted “**Peer Review and Biblical Studies Scholarship**”.<sup>17</sup> In it, Prof. Hurtado explains in more elaborated detail how peer review works in scholarship and why it's important. But he also contrasts the sciences versus the humanities:

“I understand that there is now a certain concern in at least some fields in the Sciences about falsification of data, and inadequate peer-reviewing, which has allowed articles to be published that have been shown later to rest on phantom data or rigged results. I suspect that part of the problem in peer-reviewing articles based on experimental data is that one would really need to try to replicate the experiment to test the claims, and that would be difficult to do in many cases. (Reviewers are themselves engaged in their own set of experiments on other questions, and couldn't easily gear up for some other one.) There are other factors, perhaps: e.g., peer-reviewing typically isn't remunerated, but is done as part of one's participation in the field. So, there may be a temptation to give a “light touch” and not spend the time required really to test things, e.g., re-running the statistics, etc. But in Humanities fields, typically, the data are there and available: A body of relevant texts, or images, or inscriptions, etc. So what is involved usually is assessing how adequately and cogently the data are addressed, and also how adequately the

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<sup>16</sup> Larry Hurtado's Blog: <https://larryhurtado.wordpress.com/2013/07/15/expertise-and-how-to-detect-it/>; accessed 5 Mar. 2019.

<sup>17</sup> Larry Hurtado's Blog: <https://larryhurtado.wordpress.com/2013/10/21/peer-review-and-biblical-studies-scholarship/>; accessed 5 Mar. 2019.

author has engaged prior scholarship (e.g., giving adequate reasons why previous views are likely faulty).”

Dr. Heiser has equally noted the same sort of matter between the sciences and the humanities. In one of his blog posts about this subject published on May 21, 2015, he posted “**Distinguished Editor of Lancet Medical Journal: Much of Peer-Reviewed Content is Bogus**”.<sup>18</sup> He makes similar remarks that scientific publication is tied to money, grants, medicine and drugs, military applications, technology, and big pharma contracts. The humanities are not tied to any such trappings. It’s not flawless as there are still some problems, but the peer-review process in the humanities is much less alarming than the sciences. In conclusion, Dr. Heiser finalized saying:

“I’m not saying that humanities journals never publish anything they shouldn’t. I’m saying that, if you think the above headline justifies snubbing what the peer-review process produces in humanities field, you just don’t understand the fields or the problem.”

On another note, research scientist and Astro/Geophysicist Stuart J. Robbins, Ph.D., a well-known astronomy blogger (Exposing PseudoAstronomy<sup>19</sup>), has also recently published a blog post about peer review on March 9, 2018.<sup>20</sup> In this post entitled “**Even Science Reporters Are Circumventing Scientific Process**,” Robbins tells us that some science reporters often rush to report new discoveries made by some researchers out there that may not have gone through peer review at all. In this particular case, a freelance reporter asked Robbins for his opinion on a paper published online at arxiv.org, but Robbins refused explaining that these sorts of documents must go through peer review first, but this one was not peer-reviewed and it looked suspicious.

In conclusion, peer review is not perfect. There are problems in the process in general, in single-blind, double-blind and open-access platforms, and in the sciences

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<sup>18</sup> Dr. Michael S. Heiser’s website: <http://drmsH.com/distinguished-editor-of-lancet-medical-journal-much-of-peer-reviewed-content-is-bogus>; accessed 5 Mar. 2019.

<sup>19</sup> Exposing PseudoAstronomy by Stuart J. Robbins, Ph.D.: <https://pseudoastro.wordpress.com>; accessed 5 Mar. 2019.

<sup>20</sup> Ibid. <https://pseudoastro.wordpress.com/2018/03/09/even-science-reporters-are-circumventing-scientific-process>; accessed 5 Mar. 2019.

and the humanities. But as briefly referenced, there are far more problems in the sciences than in the humanities since the sciences involve experiments that need funding, or that involve conflict of interests, or that are tied to “big money” and technological advancements—and perhaps greed and fraud. But not so much in the humanities, and in textual scholarship, specifically. Despite the issues, peer review (as well as academic conferences and academic online exchanges) are of utmost importance. Novel claims and technical details ought to be reviewed and critiqued by experts who are qualified in each field of study to be able to judge. Otherwise, almost any professed expert can go about claiming and spreading spurious interpretations and data.

As some scholars have said [in my own words]:

**Everyone can have their own opinion, but not everyone can have their own data.<sup>21</sup>**

Note: Some articles are not peer-reviewed. To better understand how to detect actual peer-reviewed articles in science and scholarship, see these links (although they discuss peer review in science not scholarship—but it applies almost the same to both disciplines):

**Peer-Reviewed Journals versus Scholarly Journals**

<https://libguides.olympic.edu/c.php?g=231968&p=1540816>

**A Guide To Peer-Reviewed Journals in Canadian History**

<https://www.unwrittenhistories.com/a-guide-to-peer-reviewed-journals-in-canadian-history/>

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<sup>21</sup> Actually, Prof. Hurtado said himself: “everyone is entitled to an opinion, but not entitled to his/her own truth.” In <https://larryhurtado.wordpress.com/2019/02/27/knowledge-based-opinion-and-honest-questions>; accessed 5 Mar. 2019.