

Chemistry Papers Are Retracted Mostly Due to Plagiarism, Data Manipulation



By Alex Berezow, PhD — May 28, 2019



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"To the wild ground
Of Nature trust the mind which built for use."—WILLIAMSON

THURSDAY, NOVEMBER 4, 1884

NATURE: APHORISMS BY GOETHE

NATURE: We are surrounded and embraced by her: powerless to separate ourselves from and powerless to penetrate beyond her. Without asking, or warning, she snatches us up into circling dance, and whisks us on until we are L and drop from her arms.

She is ever shaping new forms: what is, has never been; what has been, comes not again. Everything is new, and yet taught but the old. She is live in her midst and know her not. She is mostly speaking to us, but betrays not her secret, constantly set upon her, and yet have no power to see.

All comprehending idea, which no teaching had out.

Manifold dwell in her and she in them. With men she plays a game for love, and rejoices that as they win. With many, her moves are so hidden, the game is over before they know it.

That which is most unlearned is still Nature; stupidest philistinism has a touch of her get. Whoso cannot see her everywhere, sees her where rightly.

She loves herself, and her innumerable eyes affections are fixed upon herself. She has delirium herself that she may be her own delight, causes an endless succession of new capacities enjoyment to spring up, that her insatiable spirit may be assuaged.

Credit: Public Domain/Wikipedia [1]

Retractions in science are a fact of life. Sometimes, the published literature is wrong, and when it is discovered, the paper is often stricken from the scientific record.

We would like to believe that most retractions are due to honest errors, for example, accidentally mixing up control and experimental groups. We don't want to believe that most retractions are for nefarious reasons, like fraud.

Unfortunately, new research by François-Xavier Coudert published in the journal *Chemistry of Materials* does not reveal happy data. Dr. Coudert found 331 papers in the fields of chemistry, materials science, and chemical engineering that were retracted in 2017 and 2018. The overall retraction rate (about 3 per 10,000) is low, which is good news, but the reasons for the retractions were disheartening.



Dr. Coudert learned that 229 of the 331 papers (69%) were retracted for plagiarism and "data manipulation," which, more often than not, is a nice way of saying "fraud." (See chart.) Only 54 of the papers (16%) were retracted due to "honest errors."

Cheater, Cheater, Pumpkin Eater

Obviously, this is not good news, but there could be another explanation for the data: Systematic bias in which papers are retracted.

Plagiarism is relatively easy to catch. If somebody copies and pastes entire tracts of text, often somebody will notice. (Besides, we now have software that screens for plagiarism.) Fabricated data is much harder to catch, but an eagle-eyed scientist might notice irregularities with digital images that may indicate manipulation or data that looks "too good to be true." If detected, plagiarism and data manipulation are slam-dunk reasons to retract a paper.

That isn't necessarily the case for "honest errors" for two reasons. First, honest errors are exceedingly difficult to catch. Second, if scientists believe that the authors of another paper committed an error, they often address it by performing a better experiment and/or publishing a response. In this way, the scientific record is self-correcting, and there isn't as compelling a reason to retract a paper just because something in it is wrong. In this way, a systematic bias in retractions may be responsible for Dr. Coudert's findings.

If this analysis is correct, the good news is that fraud is still likely a minor problem. The bad news, however, is that there are a lot of honest errors out there in the published record which have yet to be detected.

Source [2]: François-Xavier Coudert. "Correcting the Scientific Record: Retraction Practices in Chemistry and Materials." *Chem. Mater.* 31(10): 3593-3598. Publication Date: May 28, 2019 DOI: 10.1021/acs.chemmater.9b00897

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[1] https://en.wikipedia.org/wiki/Scientific_journal#/media/File:Nature_cover,_November_4,_1869.jpg

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