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The science of plagiarism



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When I returned to India after an academic career in Cambridge, England, spanning 15 years, I was entrusted with an enquiry into a case of accusation of scientific plagiarism. The circumstances, briefly, were as follows. A scientist, whom we shall refer to here as Dr X, had published a paper on the general theory of relativity in a reputed journal abroad. On the strength of that work he had secured a research scientist's position in one of our leading national research institutes. However, in a couple of years, the editor of the journal announced that it had been brought to his notice that the above paper was manifestly a copy of another paper by a German scientist published in another journal a few months earlier. The editor, therefore, announced that the paper in question would be treated as retracted and should not be referred to in any future scientific work.

Such a circumstance of scientific plagiarism invites serious retribution, to say nothing of boycotting of the perpetrator of the offence. The institution, not surprisingly, fired Dr X from the position he was appointed to. However, Dr X had strong political connections and he asked for a review of his case. In particular, he claimed that his work in that paper had been in circulation in preprint form long before he sent it for publication to the journal and it was the German scientist who had copied this work. Since the same scientific idea can occur to two scientists independently, the possibility of Dr X writing that paper entirely under his own inspiration could not be ruled out, *prima facie*.

The chairman of the governing board of the institution accordingly constituted a review committee with outside experts, including me as the chairman. The committee's brief was to find out if Dr X had written his paper independently of the German author whose paper was also made available to us for comparison. The committee was also supplied with the other main papers written by Dr X.

It was immediately clear to the committee that these other papers by Dr X were very ordinary and published in journals that did not have a rigorous refereeing process. Which is why we spotted some serious technical errors in those papers. These errors vitiated the main conclusions. At this stage the committee felt that it should interview Dr X to find out his reaction. It began to emerge in the course of the interview that Dr X seriously lacked competence in applied mathematics and this had led to those errors. In fact, it took some effort on the part of the committee to explain to him why some of his reasoning was erroneous. And with regard to the paper accused of plagiarism, Dr X was unable to explain the reasoning used in some places. With these facts it was evident that he could not have written the paper independently on his own. In short, the retraction of the paper by the editor was fully justified.

In a scientific enterprise retractions can happen... It's the retraction of a dishonest piece of work that leaves a bad taste.

Apart from plagiarism, another form of dishonest publication involves falsification of data. When a certain paradigm is being tested, the data collected for the test are crucial to the outcome. If the data do not support the paradigm, the temptation is to doctor it so that in its "new version" it is favourable. Such frauds are detected when other scientists cannot get the same data by performing similar experiments.

Such events are, fortunately, rare in today's scientific publishing. But, at the same time, a study over several years shows that their numbers are increasing. In an article in the distinguished research journal *Nature*, Richard van Noorden reminds us that in the early 2000s about 30 retraction notices appeared annually, whereas in the current year, 2011, the number may well exceed 400. The number of papers published has not risen that fast in this decade — it has gone up by only 44 per cent.

The rise in the number of retracted papers does not necessarily mean that the moral code of scientists is on the decline. Partly, the rise is because of the more efficient techniques available today of detecting malpractice. Partly the retractions are because of errors detected in the original publication. In today's highly competitive age, the incentive to rush to the press is strong and may dominate the need to recheck the paper. Errors in scientific papers may be committed by the best and the most experienced of authors.

A graphic account of one such episode is given by Leopold Infeld in his very readable autobiography called *Quest: The Evolution of a Scientist*. It relates to a result obtained by Einstein that gravitational force does not propagate like a wave. This was a remarkable conclusion and Einstein had arranged to give a seminar on it. Infeld had come to Princeton to work with Einstein and noted that the name of the seminar speaker was not given in the notice, because if it became known that Einstein was going to speak on such a fundamental subject, there would be crowds of reporters rushing in from New York. As a colleague, Infeld got to see the proof found by Einstein for this remarkable result. As he worked on that solution, Infeld found a simpler method to arrive at the same conclusion. Before showing it to Einstein, he had it whetted by Robertson, another distinguished scientist. Robertson discovered an error in Infeld's calculation, which rendered his conclusion invalid. Did a similar error exist in Einstein's calculation? Infeld was going to alert Einstein to this possibility, when he had a message from Einstein announcing that he had found an error too.

The upshot was, Einstein's conclusion that gravitational waves do not exist was vitiated. Nevertheless, he gave his talk as planned: only at the end he showed where he made a mistake in his calculation.

This is an example of retraction for honest reason. In a scientific enterprise such retractions can happen from time to time. Although they bring embarrassment to their authors, they do not have any disturbing effect on the peer community. It is the retraction of a dishonest piece of work that leaves a bad taste in the mouth.

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