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PEER-REVIEW – LESS THAN YOU SUPPOSE*

A REASONABLE VIEW OF “PEER REVIEW”

-by Bernie Hutchins

The original title here was “Peer Review is (Usually) Crap”. By “usually” we have in mind the majority of the time – not necessarily an overwhelming majority. Perhaps 67%.

In short: Peer review does not work because:

(1) Often (not always) the folks doing it are either too lazy, or too overworked, or too lacking in background and in resources, to do a credible job, in light of an ever-increasing load of submissions (the sheer volume of which would suggest that the average quality of manuscripts is likely decreasing). You can’t know. No one officially reviews the reviewers, etc. etc. Only time tells if work is good or bad – as it would have anyway. The situation is out of balance and is not getting any better!

(2) The highest quality reported work available to the scientific world is actually (obviously?) the result of a conscientious, concerted effort on the part of the authors. Peer review suffers from being a version of “Argumentum ad Verecundiam” better known as “argument from authority” and which is often considered to be at least potentially a logical fallacy. It need not always be a fallacy, but it can be and often is, especially as support for a publication is related to a non-science agenda. Peer review is asking others to consider themselves to be experts and to then vouch (anonymously!) for another’s work. Much more effective is a department group meeting - everyone standing around the blackboard; that sort of thing.

(3) As much as authors were formerly almost totally responsible (in all general aspects) for material in their finally galley proofs, down to the crossing of t's, we now look to others and/or to technology. If a paper is questionable to the author, the impulse to “work on it a while” is replaced with “why not just put it out for review.” Let the peer-reviewer take some of the responsibility! Much as we take comfort from a spell-check (often to our regret), it IS comforting to have someone or something to blame, even if no actual charges are made. The question should not be: “How it got past peer review?” The question should be: “Why did the authors submit the junk in the first place?”

(4) Peer reviewers are supposed to perform conscientiously and without ulterior motive. Often this is probably true. But – sometimes it is political, agenda-promoting, or just vindictive. As such it may move from nonfeasance to malfeasance

We spoke briefly to this issue previously: <http://electronotes.netfirms.com/ENWN11.pdf>

Let's start now with the idea of what “Peer Review” means to the average person, and then look at what it means to someone who is at least an occasional provider and consumer of peer review.

Peer Review – to the Ordinary Person

The ordinary person hearing that a “paper” (a publication, a “study” or “article”) is “Peer Reviewed” supposes that that **MUST means something special**. They may tell you that it is some sort of guarantee that the paper is correct. Doesn't it mean that experts in the field have looked at it and decided it is correct? As such, it seems quite a bit like the familiar case of a teacher grading an exam. (This supposition would be at least partly silly. If there were in fact a group of people who could determine that a paper was “correct” in all respects, part of the “body of knowledge”, than this group could or should have written it up themselves.)

Observers with more reserve may say rather that it merely means that a few persons with enough specific knowledge of the particular field (the subject of the paper) have read it and determined that it has no obvious flaws and that it should be published so that a more general readership can consider if it will subsequently be found to be right (likely) or wrong (possibly). This second view is closer to the truth.

However, much more common than a claim of approval (that a certain paper is peer reviewed – with associated positive connotation), is the denigration of a paper by the negative: the paper was NOT peer reviewed. The implication is usually used in a pejorative sense, that the paper is quite possibly wrong – indeed the paper may have been “pure invention” for all we know. This ignores the possibility that the work was

thoroughly and meticulously vetted by the author and colleagues, most of whom have a lot more at stake (in the event of letting errors through) than the anonymous peer reviewer. Typically such a paper may also be published on an Internet site or on a blog, often in response to an immediate issue.

Not untypically, an attached “Not Peer Reviewed” label is associated with a controversial topic. In such cases, not unusually, the person making the disparagement does not even know what peer review involves – and has not likely even seen, let alone understood the paper – it’s just a convenient “dig” that sounds impressive.

Of course, everyone really should understand that quite a few papers really do pass peer review and subsequent scrutiny and are substantially, if not exactly, as they were originally submitted. The papers are the same before and after peer review. So obviously, having or not having peer review often means absolutely nothing as far as content is concerned.

Another point is that many publications do not have peer review because it is almost never done in these cases. Of course, daily, weekly, and monthly “news magazines” are not peer reviewed. Articles in popular (newsstand) science magazines are not peer reviewed. Little appreciated is the fact that most books are not peer reviewed, although they are usually conscientiously edited by professional editors, read critically by helpful friends of the authors, and some chapters may get a review by persons who are paid.

But the standard application of peer review is for new research in academic journals. Accordingly, these are exactly the papers that the “Average Joe” does not even see. Likely such readers could not even begin to read them. In fact, it is probably not widely recognized that professional researchers will often find these newly published papers, in their own field, difficult to “get into”. The average reader is understandably left out, except as an opinion may be derived from the context of presentation. If a news report relates the findings of a paper as published in a “prestigious journal” there is a tendency to assume that this really is some sort of “gold standard” of reliability. Thus the associated binary label: peer reviewed or not, is all that seems to be in play. (Yet the same news consumer is never surprised that coffee is good for him according to one prestigious journal today, and tomorrow a different prestigious journal will say it is bad!)

The message here is that peer review may mean, and often does mean, very little. And the characterization “Not Peer Reviewed” used as an invective, more than anything else just shows ignorance. (The “issue” is of course whether the material is verifiably correct or not.) But it’s the negative that is too often in play - a tool at the reserve if someone disagrees with the findings of a publication.

Peer Review – to the Writer or Peer Reviewer

Most peer reviewers are themselves writers and many writers also serve as peer reviewers. That's kind of what the word "peer" suggests. This fact also suggests the sometimes aptness of the pejorative sobriquet "pal review".

Here we are talking about professional, academic journals. If you are an academic, you likely specialize in a few fields of research, and have a few standard journals which you "read" and possibly contribute to. Here by "read" we mean that you peruse the new issues and possibly study a few articles in detail. Reading an academic paper is very seldom a leisure activity. It can be very hard, or indeed nearly impossible, (outside your field). Even in a general field (say Electrical Engineering) there are many sub-specialties. Even in your own sub-specialty it is generally not easy to jump right into a new paper. To do this with enthusiasm, you really have to want to know what someone has done – for some good reason of your own. And you have to commit to at least a few hours, and possibly a few days to go through something in detail.

Accordingly, the arrival of a manuscript in your inbox with a request to review it is not entirely welcome, to say the least. Note that in general there is no compensation, or recognition. It's just your duty – although you can usually refuse and make an excuse. Aside from the requirements of putting your brain in gear, and the time, there can be other problems.

In theory, the peer reviewers are anonymous. In practice, they are often known or guessed. (If you cite in your paper that Smith has been working in this area, and your work builds on his, Smith may well get a call from the editor to peer-review duly.) Likewise the peer reviewer generally (always?) does know who the authors are (it's right on the paper), knows their reputations (unless they are very new), and often knows them personally. They may in fact even be his/her best friends, or his/her worst enemies. The authors may be renown (must be right) and the reviewer - not so much. Or the authors may be newcomers – in which case their names are not a shortcut to suppose if they are any good. You may really have to start fresh and read in detail if you can't rely on reputation! What if the paper gives you a useful lead for your own research – an ethical problem?

So let's assume the reviewer agrees to do the review – finding the time and motivation. You soon come to something you don't understand. If it's your own colleague, you would just run down the hall or fire off an email. But you are anonymous, and anyway, the general reader won't necessarily be able to ask and expect a response. [In some cases, an official request to contact the authors during review is granted and seems very reasonable.] But you are likely to be stuck with the fact that you can't understand one or many things in the paper. Perhaps – you are just

too stupid! If you reject the paper for lack of clarity – perhaps you are the only person in the field who will fail to “get it”. You have to be really comfortable with your own abilities and accomplishments to associate something you don’t understand with someone else’s failure to communicate. You are probably right – the work may well be at least unclear, or even wrong. So you try again. Tic-toc. Headaches.

So here is the point. A paper that is “easy” to peer review probably will gain little from peer reviewing – a good editor will do the proper job. If the editor can’t handle it, and indeed with increasing specialization, difficulties are more or less expected, there is far too great a chance that (in turn) peer review also fails, or is counter-productive. A good paper passed by an editor could have been out there very quickly. With peer review, it is held up – usually the better part of a year. Well, perhaps not really – “preprint” copies are likely to be all over for what will become the more significant papers.

Sometimes It Works

Certainly peer review works some of the time. In many cases a peer reviewer does a good job, and can greatly improve a paper that might have already been good enough. For example, if the reviewer found it difficult, but not impossible, to understand something, a suggestion for improving the text should be welcomed by all. Or papers that are not “wrong” may be rejected as not original or as not adding anything significant.

And Sometimes It Doesn’t

We often hear the term “replicability” used to suggest that something is correct. Indeed, the fact that another independent researcher has done the same study with the same or very similar results is very significant. However, non-replicability is even more powerful. Not that a failure to repeat is in itself proof of error, but it likely suggests, at least, that something more subtle is going on. So why don’t peer reviewers just repeat the experiment? Of course, the general answer to this is that they lack the resources, at least time and money, to do this. (You will wait a long time for someone to build a second Large Hadron Collider to verify a Higgs particle finding.) Sometimes you can. Perhaps the submission includes at least access to archived data and computer code. [When code is included, even if a reviewer or reader does not care to run it, it is often a means of understanding something that is not clear in the text. Computer code, even in a relatively unfamiliar language, can be wonderfully useful. By definition almost, it is unambiguous – computers can’t tolerate ambiguity!] So analysis and interpretations can perhaps be reviewed in their details of the data and the code.

Peer Review as a Hammer

Despite the fact that so few people understand what peer-review does mean or does not mean, it is all too common for people making an argument to use it as a “buzz-word” or to regard it as a “hammer” of convenience. As such, it matter not if a particular paper is peer-reviewed or not – you can be flexible in how you use this fact. There are four cases: the paper may support your preferred view, or not, and it may (or may not) be peer reviewed. If we assume you are using the paper to support your preferred view, the four possible cases are in the grid below:

	Supports My Point	Disagrees With Me
Peer-Reviewed	I'm Right !	Corrupted by Special Interest
Not Peer-Reviewed	Authors of High-Regard	Obvious Garbage

The two cases in pink are based in prima facie acceptance of the assumed merits (and perhaps infallibility) of peer review. The two cases in green involve more inventive pleadings. If it is peer reviewed but disagreeable to you (upper right green), you can complain of corruption, such as support by a nefarious special interest. If it is not peer reviewed, but supports your preferred position (lower green), you can always praise the authors as high-standing individuals such as perhaps, “Harvard professors” or Nobel Prize winners (or “as seen on TV!”).

MISCELLANEOUS COMMENTS

Too Few Reviewers

There are too few folks to meet the needs for peer reviewers. Editors often have to beg and settle for less than their first choices. Not that it is ever excessively clear who would be a good first choice. There are just too many journals and too many papers – so it would not work well even if it were a good system. It's not.

Not Needed in the Checkout Line!

Is it essential that an academic paper be cutting-edge-original in order to go to peer review and publication? Not at all. Clearly there are people who would have difficulty reading just about anything – perhaps even the tabloid at the grocery checkout. This sort of person is not going to be able to read a paper in a recent physics journal. Now, magically upgrade our checkout line illiterate to a professional – say an engineer. It is perhaps a surprise to many that this engineer is not going to be that far ahead of the checkout line person in encountering a new academic offering. The basic intelligence and training may be there, but not the previous involvement needed. So outside of a few (perhaps a very few, some estimates suggest 0-5 readers!) and a few exceptional papers, no one actually reads the papers.

The Internet

The Internet changes everything. It is easy to criticize the Internet, but it also pays to be specific about shortcomings. What is certainly true is that it makes possible quick access to a wide range of materials previously available only to academic libraries and professionals. It is also true that materials can be posted by individuals, very quickly, inexpensively, and very attractively. Accordingly someone otherwise unknown may be making a useful contribution. Much first-rate material, otherwise at best “obscure”, is available. REJOICE AT THAT. And no peer-review required.

But much more has changed because of the Internet. For one thing, we now routinely expect to have articles available almost instantaneously. Indeed, we also tend to expect them to be free. At worst, a “magazine” should cost only perhaps \$5 on the newsstand, so why should just a single article delivered electronically not be too cheap to meter? Well, many folks apparently really ARE willing to accept that some academic material just costs more and are intended for a higher class of consumer!

This brings up the question as to why there is so little middle ground. There's entertainment stuff for the general public and, somewhere there is higher-class academic stuff (just briefed on the evening news). Two magazines (these are not "Journals") are **Science** (US) and **Nature** (UK). These are considered "high prestige" but far from universally so. There is an amusing joke in currency, to be offered in a highly pseudo-defensive tone; "Just because it's published in **Nature** does not automatically mean it is wrong!" These are not checkout-line items, and are rarely even in bookstores that carry periodical items. If you want to see an article, Google may lead you to find that they seem to want to charge something like \$30 ("paywall") for a single electronic download of an individual article to an individual person. That's way out of line. So along with the prestige seems to be an effective embargo of these papers from the unwashed, further insulating the papers from scrutiny from those not properly credentialed. Shell out the \$30 or rely on a popular press-release interpretation. Many times you can find it posted by the author for free, but not always of course. Too often if you pay the \$30 for four pages, you will be in the position of saying you suspected it was garbage (or incomprehensible) but had to pay \$30 for the right to say so.

By coincidence, Henry Petroski has just commented in this*, and on related issues relating to preprints, reprints, etc. over his 40 years of experience [Petroski, H., "In Memory of the Offprint", **American Scientist**, Vol. 102, No. 1, Jan/Feb 2014, pp 14-17]. Henry's delightful article, interestingly enough, seems to be paywalled (!) although I don't know the cost because I am a subscriber and get it free online! **American Scientist** (not to be confused with **Scientific American**, worthless for over a decade) remains excellent and then some.

Occasionally there are e-books and e-pamphlets for a couple of bucks which are usually well worth it.

At the same time, more restraint in posting is probably advisable. There is far far too much to weed through. But this is not just the Internet – "Journal Inflation" has been a problem for years, both as paper, and now as electronic texts.

Science Journalists and Review Papers

Many of us "grew up" with science magazines. I remember having subscriptions to **Scientific American** and **Popular Electronics**. (Indeed, **Electronotes** was launched from a letter to **Popular Electronics**.) As a child, on rare trips to "the city" (Rochester NY) I was allowed perhaps 50 cents to spend on back issues of **Scientific American**, and I think they were 10 cents in the used magazine store. This was the **Scientific American** with columns by Martin Gardner and C.L. Stong packed among other treasures and wonders.

Presumption of Correctness

But an Obligation to Find Something Wrong for Peer Review

In a court of criminal law, one has a well-respected presumption of innocence. The reviewer receiving a paper to adjudicate likely gives it the presumption of correctness. It is probably right, although perhaps not highly likely to be so. At least, it may not be demonstrably wrong in the sense that a review can be held responsible for not reporting errors. After all, how would anyone know? Don't we have to trust the professionals to do a reliable and honest job?

So no matter what, the reviewer can usually escape blame. The question of correctness can be ducked. And after all, the reviewer's second responsibility, the question of whether or not a paper is a valuable enough contribution is at least a matter of opinion. Different reviewers might well have honest differences on this issue.

So what does the reviewer absolutely have to put on the checklist before approving publication? What is the minimum required?

(1) Make sure there is nothing truly silly.

(2) Make sure there is something that at least the author's claim is new.

(3) Then - find a couple of things that are arguably wrong (if possible) or just that arguably need to be improved, just to prove that you really did look at the paper. That's about it though.

* This text was scheduled as ENWN-17 for January 5, 2014, and apparently much of it was written before that. I don't remember. Any passive inferences of a time reference are to 2013-2014. It was not finished or posted, although a much abridged version was ENWN-11 for February 22 of 2013, as noted above, which promised a full version later. Never happened – until now. I found this text by accident when I got a duplicated file name message. It was evident that I had struggled with this, and that there was much still messy with it. I decided (since there was some current, 2017, interest in peer review) to just fix a few typos, apologize, and post – for the record.