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Editorial

Figureheads, ghost-writers and pseudonymous quant bloggers: The recent evolution of authorship in science publishing

Summary Traditionally, science has been published only under the proper names and postal addresses of the scientists who did the work. This is no longer the case, and over recent decades science authorship has fundamentally changed its character. At one extreme, prestigious scientists writing from high status institutions are used as mere figureheads to publish research that has been performed, analyzed and 'ghost-written' by commercial organizations. At the other extreme 'quant bloggers' are publishing real science with their personal identity shielded by pseudonyms and writing from internet addresses that give no indication of their location or professional affiliation. Yet the paradox is that while named high status scientists from famous institutions are operating with suspect integrity (e.g. covertly acting as figureheads) and minimal accountability (i.e. failing to respond to substantive criticism); pseudonymous bloggers — of mostly unknown identity, unknown education or training, and unknown address — are publishing interesting work and interacting with their critics on the internet. And at the same time as 'official' and professional science is increasingly timid careerist and dull; the self-organized, amateur realm of science blogs displays curiosity, scientific motivation, accountability, responsibility — and often considerable flair and skill. Quant bloggers and other internet scientists are, however, usually dependent on professional scientists to generate databases. But professional science has become highly constrained by non-scientific influences: increasingly sluggish, rigid, bureaucratic, managerial, and enmeshed with issues of pseudo-ethics, political correctness, public relations, politics and marketing. So it seems that professional science *needs* the quant bloggers. One possible scenario is that professional scientists may in future continue to be paid to do the plodding business of generating raw data (dull work that no one would do unless they *were* paid); but these same professional scientists (functioning essentially as either project managers or technicians) may be found to lack the boldness, flair, sheer 'smarts' or genuine interest in the subject to make sense of what they have discovered. Some branches of future science may then come to depend on a swarm of gifted 'amateurs' somewhat like the current quant bloggers; for analysis and integration of their data, for understanding its implications, and for speculating freely about the potential applications.

Traditionally, science has been published only under the proper names of the scientists who did the work. This is no longer the case, and — especially in the biomedical sciences — authorship has fundamentally changed its character. At one extreme, real names of prestigious scientists writing from high status institutions are used as figureheads to publish research that has been performed, analyzed and written by commercial organizations; while at the other extreme 'quant bloggers' are engaged in real science but with their personal identity shielded by pseudonyms and from web addresses that give no indication of their status, location, education or professional affiliation.

Personal status and accountability

Early science was mostly not published, but on the contrary kept secret and exploited for personal prestige and commercial gain [1]. It was an innovation of the Royal Society of London that science ought to be published — and the incentive to publish was gaining personal status among that elite

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Royal Society, and similar scientific societies. The earliest 'publications' were in the form of letters to other society members (which explains why the articles in the journal *Nature* are still called 'letters') and in the form of talks and lectures (records of which were preserved in volumes called 'proceedings' or 'annals' of these societies). The convention arose that status would be awarded to the *first* to publish new information — and these conventions served to overcome the incentive for secrecy and instead rapidly disseminate science which enabled the new recording and sharing of knowledge to lead to more rapid progress [1].

The tradition of publishing science only under real names served a variety of functions. One was self-interest, in that each scientist was usually motivated by competing for scientific prestige by striving to be the first to publish an idea, technique or new data. This required each publication to have an unique provenance. Scientific prestige was primarily allocated by logging and totalling each individual's accumulated contribution.

Scientific accountability was another important principle. Anonymous publication was generally forbidden because it was unaccountable — if nobody knew who was making an anonymous assertion the author could not be called-upon to provide clarification or defend their data or reasoning; whereas by contrast science published under a specific person's name was regarded as their personal responsibility. For accountability to be enforced also required that the work be published from a postal address, since most scientific communication that was not face to face, was done by postal correspondence. From this practice of named scientists publishing from specific (usually institutional) addresses, there emerged an informal convention that a scientist should respond to all reasonable written queries about their work, even up to the point of sharing raw data where substantive issues were involved.

For example, if a substantive critical letter was published in a professional venue referring to an scientific author's work, then the author was obliged to respond; and the research was considered suspect until such time as the author had responded adequately to deal with the criticism. If an author failed to respond to a critical letter, or responded irrelevantly or without answering the substantive criticisms, then it would usually be assumed that — by default — the criticism had been correct.

So, in science, by contrast with the law, a scientist accused of error in a rational communication from a competent critic was traditionally regarded as ''guilty until proven innocent'' — this being a consequence of regarding newly-published science as merely conjectural (or 'false') until it had been validated by further (preferably independent) research.

The unaccountability of high status scientists

Over the past few decades, these ideas of personal responsibility and accountability seem to have broken down — at least in medical science. Scientists' names no longer guarantee the provenance of the work published under that name, and a specific name and address no longer implies accountability. Especially has accountability broken down in relation to the highest status scientists.

From numerous informal observations over the past two decades, it seems clear that high status scientists are no longer required to respond to requests for clarification or to published criticism, but can ignore it with impunity. The traditional default that criticism was regarded as correct *unless* it was refuted, no longer seems to apply to high status scientists when a criticism comes from a lower-status scientist. This applies even when clarification is clearly necessary, when the criticism is potentially devastating, and even when critical communications are published as articles or correspondence in high impact journals. The fact is that, nowadays, high status scientists are seldom sanctioned in any way for ignoring criticism by the scientific community.

The current default assumption seems to be along the lines that high status scientists are always right unless and until *conclusively* demonstrated otherwise — in other words, high status scientists are now regarded as innocent until proved guilty. So that science published under the name of high status scientists from prestigious institutions is apparently regarded as intrinsically correct until such time as it is proven false.

And high status scientists are now placed under no obligation to co-operate with their critics in discovering the truth — in the first place high status scientists usually do not need to acknowledge or respond at all to criticism; if they respond they are not compelled to provide relevant refutation but are allowed to bluster, change the subject, and make *ad hominem* attacks on their critics; requests for extra methodological detail or raw data can be ignored. Sometimes, criticism is met with legal threats — for example accusations of libel.

This kind of blocking of critique happens precisely because the onus of proof in science has now reversed — at least in relation to high status scientists. I believe that it is precisely this lack of accountability of high status scientists for sloppi-

ness, error, incompleteness or bias in their published research which has made it possible for them to act as figureheads to publish other people's work under their own name.

Because of the prevailing lack of accountability, published scientific work is now seen as an undivided benefit for a scientist's career. The consequence is a system in which the more research that is published under an author's name, the better for that authors career: good quality published science accrues credit while poor quality published science does not attract sanctions and does not diminish the reputation of the scientist who published it — at worst bad science is merely ignored. And anyway, the 'badness' of science done by high status scientists must now be established using a new — and extraordinarily demanding — standard of proof.

The peer review cartel of high status scientists

The deep, underlying cause of the immunity to criticism of high status scientists is probably the greater role of peer review in science, and the domination of peer review by a minority ('cartel') of high status scientists. Peer review mechanisms are now used not only to evaluate completed science, but pre-emptively in allocating resources.

Modern science uses peer review mechanisms at many levels: defining overall research strategies, awarding research grants, granting ethical permission to do research, journal refereeing processes prior to publication, organizing conferences... indeed it is hard to find an area of science which is not dominated by peer review. This means that a low status scientist can have their career damaged (perhaps without knowing it) if s/he makes a powerful enemy of a high status scientist who is influential within the all-important peer review system. The problem is that peer review processes are systematically biased to give more weight to negative than positive evaluations (ie. a bad report has a greater impact on the review process than a good report [2]) — so having a high status enemy involved in the peer review system is likely to have a significantly damaging impact on a scientist's career.

The result is that high status scientists are feared to the extent that the mass of lower-ranked scientists will not call them to account for their errors and misdemeanours in case they provoke reprisals via the peer review systems.

Another very important result of the centrality of peer review is that while traditional science was mostly a marketplace of ideas, modern science is dominated by a 'cartel' of scientists who are powerful within peer review and have quasi-monopolistic power. (In economics a cartel usually refers to a group of persons or organizations who cooperate to act as if a monopoly; to control production and prices and to protect themselves against competition, for example by lobbying government to introduce favourable regulations.)

Many of the trends of modern science which de-emphasize actual science and increase the emphasis on the activities which *surround* science can be understood as ways in which the cartel of high status scientists protect their research organizations (hence their own reputations) against competition. I am thinking of the increasing requirements for planning and coordination, the vast expansion of procedural and financial regulations, or the shift away from judging science by its accomplishments towards judging science by its 'inputs' (e.g. grant income, expensive technologies, numbers employed) — i.e. the whole style of 'Big Science' [3].

It is noticeable that the most prestigious branches of biomedical science (i.e. 'prestigious' as defined by the peer review cartel) are high capitalization specialties. For example, over the past couple of decades the use of extremely expensive brain imaging technologies in neuroscience has served to restrict participation in this field to those few who could afford to buy, maintain and run the latest version of these machines. Or, in the recent era of the human genome project, the high status laboratories were those which could afford to employ armies of sequencers. To those outside these fields it sometimes seemed as if the published output of novel brain imaging and large scale sequencing projects did not need to *earn* its status as breakthrough major science but rather had been *pre-defined* as significant.

The cost of technologies such as brain scanners, or huge work forces such as gene sequencers, therefore constitutes the minimum 'capital' a scientist must have before s/he can enter the marketplace of science and compete with the 'incumbent' high status scientists. The 'market entry' costs for doing high status science have risen and risen, and are now extraordinarily high compared with a few decades ago. In sum, high market entry costs (enforced by peer review) function as barriers which protect the scientific incumbents from competition.

Furthermore, once in the market and competing, the 'overheads' of science are another formidable barrier. The resources required for grant applications (including increasingly detailed planning, costing, billing and financial estimates) and for recruiting (including the expansion of employ-

ment and safety regulations) mean that the resources required for running a research team may now be very great indeed. A small researcher needs to cover the same fixed costs, therefore their overheads are higher relative to the actual science; and the large scale scientist also has the advantage of economies of scale. In the not-so-distant past a scientist could start work on a shoe-string and build-up; now the combination of high capital barriers and increased fixed administration costs are so onerous and so time-consuming as to make it extremely difficult, or impossible, for aspiring individuals or small teams to compete with the incumbent high status scientists.

How did this situation arise? Simple: all that high status scientists needed to do to secure their protected cartel was to acquiesce to external (e.g. governmental) pressures to over-regulate science. Incumbent high status scientists, who had already built-up a large administrative infrastructure, found that over-regulation gifted them with enormous structural advantages in perpetuating their scientific 'empires' because of this new protection against rivals.

The benefits to incumbent high status scientists may explain why science has been so easily subjected to over-regulation with barely a squeak of protest, and no significant resistance from the cartel of high status scientists who also control the peer review systems.

The greatly increased power of this cartel of incumbent high status scientists who participate in the ever-more-important processes of peer review is probably the underlying reason why high status scientists have now become *de facto* unaccountable — and how they can get away with flagrant scientific abuses such as ghost-writing.

Science ghost-writing

It has long been the case that high status scientists function as team leaders; and that their role in much research published under their name is managerial. However, it has recently emerged that some high status scientists — associated with the most prestigious universities and research institutions — do not even manage the research which appears under their names; but are functioning as little more than a figurehead, their names merely tagged-onto ready-made scientific publications for which the research was planned, prosecuted and analyzed by pharmaceutical companies, and the writing was done by commercial agencies [4—7].

The bottom-line function of such ghost-written publications is marketing rather than scientific enquiry. Naturally, the aim is that the named 'authors' of ghost-written publications should be high status scientists from prestigious institutions. Such names are apparently forthcoming. Very high impact 'peer reviewed' journals often publish such papers, and such papers attract more than usual levels of citations [4]. After all, they are professionally-written, have famous authors from famous institutions — and publication may be followed by very large scale purchases of thousands of 'off-prints' (used by corporations for marketing purposes) which may yield extra income of many tens of thousands of dollars for journals.

This practice of figurehead authorship has been largely ignored, and the many individuals who have functioned as figureheads for ghost-written research have not yet been investigated or called to account — again it seems that immunity has been *de facto* accorded to high status scientists for practices which are dubious at best and corrupt at worst.

It seems apparent that although contemporary medical science still operates using the superficial forms of traditional science, such as crediting scientific publications to individuals identified by personal names and specific postal addresses, behind this apparent continuity the scientific practices have utterly transformed such that many of the most prestigious modern scientists now wield scientific power without scientific accountability.

The pseudonymous 'quant bloggers'

It is a bizarre paradox of modern science that while named high status scientists with postal addresses at prestigious institutions are operating with suspect integrity and minimal accountability; by contrast, science bloggers — of (mostly) pseudonymous and unknown identity, unknown education or training, and writing from unknown addresses — are nonetheless publishing interesting work and having exciting interactions, on the internet.

The recent emergence of (frequently pseudonymous) 'quant bloggers' and other internet scientists is a phenomenon at the opposite extreme from the high status scientists who seem to be operating as individuals but in fact function as 'front-men' (or women) for anonymous teams with inscrutable agendas.

In what follows I provide only a very selective picture of blog science, based on my personal interests and tastes, and noting only the blogs that I have been reading for months or years. Clearly there are many, many other examples — but the

blogosphere is now so vast that no individual can experience and evaluate more than a tiny fraction of the output.

The term 'quant blogger' (i.e. quantitative analysis blogger) was invented by Steve Sailer [8] who is the practicing 'blogfather' of an interconnected group of mostly pseudonymous bloggers that have been in some way inspired by Sailer's example and his (often distinctly 'non-PC') interests in issues such as IQ; immigration; evolution; education; politics and sports — often analyzed by sex, class and race. Sailer has blogged many interesting quantitative analyses, including an influential hypothesis of the relationship between 'affordable family formation' and politics in the USA.

The Sailer-influenced quant bloggers include the pseudonymous Razib who hosts GNXP (Gene Expression) which includes several other quant bloggers such as the pseudonymous Agnostic and (his real name) Jason Malloy [9]. Other pseudonymous quant bloggers in this Sailer-descended group include Inductivist [10], Half-Sigma [11] and the Audacious Epigone [12].

Unrelated, not-Sailer-connected, quant bloggers include Engram who posts almost daily quantitative analyses on mainly socio-political or policy topics [13]; and who discovered an inverse relationship between capital punishment and murder rates in four developed nations. La Griffe du Lion has focused on IQ [14] and developed many hypotheses including the 'smart fraction' theory of economic development. The Climate Audit blog has been influential in its field, and is associated with discrediting the 'hockey stick' graph that was supposed to illustrate climate change over the past millenium [15].

In most of the above examples, typically the blogger presents analysis, tabulations or graphs of already-published data sets — such as population surveys or questionnaires; or does a re-analysis of a published scientific paper; or synthesizes several studies; or draws out applied implications of published science which are neglected (or obfuscated) by the primary authors. (Of course, quant bloggers usually also post chatty 'opinion' pieces and responses to current news.)

Although often the blogger's true identify and location may be unknown, there is an accountability mechanism via the comments section of the blog which follows the primary blog posting, and potentially also by other blogs linking and critiquing the original blog. Most of the above named bloggers form a broadly-sympathetic network who comment-on and critique each others work. But the crucial point is that a quant blogger must behave such as to *earn* the trust of their readers — and this typically involves engaging with their critics, and refuting relevant criticisms to the satisfaction of their readership.

Presumably, the reason why most of these bloggers are pseudonymous is their subject matter: they are often dealing with population differences in relation to sex, class and race; focusing on controversial matters such as IQ, personality, educational achievement or crime. At present, in USA and Western Europe — and especially in universities — such issues are virtually taboo except when treated using elaborately euphemistic language and reaching politically correct conclusions [16]. This means that mainstream human sciences may err in ignoring robust, but politically-incorrect, interpretations for their data [e.g. 17].

Pseudonyms are used because scientists (and other media commentators) who work in these non-PC 'taboo' fields may be subject to the risk of denunciation by the media and to professional or institutional arbiters of coercive political correctness. The sanctions have ranged from the moderate unpleasantness of unpopularity among professional colleagues, up to deliberate misrepresentation and false ascription of opinions or motivations, mob-vilification, hate campaigns, persecution by employers (failure to get academic jobs, failure to get promotion or tenure, sacking etc.), legal sanctions, aggression and personal violence. Even the most distinguished scientists are vulnerable to onslaught: the hugely-influential psychologist Hans Eysenck was one of the earliest victims from the mid 1960s, the sociobiologist E.O Wilson was similarly attacked in the late 1970s, and more recently Harvard President Larry Summers and the great James D. Watson both lost their jobs after transgressing the bound of political correctness.

In such a context of endemic intimidation, a scientist's natural wish to get maximum personal credit for their research by using their real name and address is often overwhelmed by sheer survival instinct — and pseudonyms and web addresses are regarded as safer. For such reasons, some of the most exciting and potentially important current scientific discourse is forced to be pseudonymous; even though — in a more honest, tolerant and rational world — it would surely be better to have scientific discussion between people using their real identities.

The future of internet science

There is a sense in which quant bloggers and other internet scientists are secondary-to and dependent-on professional science — which, after all, typically generates the databases. Professional sci-

entists have the infrastructure, time and resources to do large and sustained projects; by contrast amateur or part-time internet scientists usually have only their brains, web-community, computers and spare time. On the other hand, a great deal of highly-prestigious mainstream quantitative science, published in the highest impact journals, also involves re-analysis and combination of already-collected data.

But professional science is significantly disadvantaged too, because modern science has become so highly constrained. Even compared with just a few decades ago, modern science is now over-planned, slow, rigid and bureaucratic. In fact, much modern science often has little to do with 'science' at all — but has become more like some kind of mega 'project management' task, analogous to building a new public hospital or major road bridge. Such large-scale and long-term activity makes modern scientists risk averse — and the leaders will avoid doing or saying things which may prevent them winning the next major research grant upon which depends their livelihood (and also the livelihoods of the large research teams which depend upon the leader's continued ability to raise funds). So the nimble quant bloggers, lacking such baggage, are able do and say things which the professional scientists cannot, or will not, do and say.

The pedestrian nature of modern science means that the activity will fail to attract and retain the kind of creative people it used to. Future professional scientists will probably tend to comprise a large majority of specialized technicians being co-ordinated by a small minority of high status project managers. Both technicians and managers will typically lack the genuine 'interest in the subject' of old-style scientists — they will also lack boldness, flair, and either the motivation or the ability to get the most from the information they have gathered. Then professional science will become dependent on people like the science bloggers to understand and analyze their data.

One possible future outcome is that professional scientists will continue to be essential for the routine, highly-organized business of collecting or generating raw data. Professional scientists might therefore get paid to plod through the mechanical work of accumulating information (work that people will only do when they *are* paid to do it). But since they are too dull and timid to understand what they have amassed, gifted amateur scientists will be needed for the clever work. And spontaneously creative people like the best quant bloggers actually enjoy this kind of activity.

'Serious' science must have space for the fun of discovery, the play of skill, and the joy of insight; and this seems to be an increasing role for the blogosphere.

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