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Commentary

Further Chaos and Dysfunction in the Brickyard and the Systems That Support It

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In 1963, Bernard Forscher wrote and published a commentary manuscript that detailed concern over the status of the pursuit of science. The manuscript was written based on a cynical metaphor of science viewed as building construction. This manuscript describes the impact that Forscher made on the education of the author during his early training, followed by a continuation of Forscher's metaphor from 1963 to current time. As will be revealed, concerns over the 'health' status of science have increased since 1963. There is clear evidence that the chaos and dysfunction have escalated within the brickyard (institutions where science is pursued) and spread to the multiple layers of systems that support it.

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Introduction

In 1963, Bernard Forscher defied convention by writing a cynical one-page letter to the editor of the journal *Science*, titled "*Chaos in the Brickyard*", which was then eventually published [1]. The letter was a talented effort at expressing perceptions of a deteriorating status of science, with such concerns expressed as a metaphor through terms derived from building construction.

A pertinent dictionary of Forscher's prose consisted of; scientific research = construction; scientists = brick makers and builders; junior scientists = brick makers; facts = bricks; buildings or construction = edifices, explanations, laws, theories, or paradigms.

It is interesting that, way back in 1963, Forscher detected a floundering and chaotic landscape of science. It is insightful to attempt to comprehend the world, or thinking, of Forscher as he wrote this letter. To him, only a subset of scientists possessed the skills necessary to challenge convention and build new edifices (paradigm shifts) [2] from which to advance science and humanity in our understanding of the

world around us. In addition, inherent in Forscher's perspective was the clear belief that the chaos he observed was in part due to challenges to the time "needs" of quality science. Good construction, with quality bricks and mortar, takes time.

Of course, one only needs to read Kuhn's [2] account of the extensive time delays (30 to 50 years, or longer) between paradigm shifts in the history of the physical sciences to the early 1960's to realize that Forscher's views were well-founded. Interestingly, the first edition of Kuhn's text was published one year before the publication of Forscher's letter!

It has now been 60 years since the publication of Forscher's letter, and I am sad to admit that I only first became aware of this letter on January 8, 2018. Nevertheless, I related intensely to Forscher's expressed content and perspective. In 2018, I shared this letter as an email attachment to all my university colleagues in our School. Thanks to a colleague of mine, who replied to this email with a view of a need for a more recent reference to express this problem, my mind started to go to work. Of course, part of the 2018 message of Forscher's 1963 letter is that it still had relevance more than fifty years later. But then I thought, what if I was to

extend this letter from 1963 to the current time? What would this extension read like?

It didn't take me long to complete the extension of Forscher's metaphor to the then current time of 2018. I submitted the manuscript to the same journal who published the original letter (*Science*), but they editorially triaged the manuscript stating that they no longer support manuscripts of this type (those that critically confront contemporary science). The sad reality of that decision was that the editors of *Science* didn't know enough about their flawed conduct to realize what their decision meant; a premier scientific journal didn't understand or value their roles in science, or research and commentary on the overall 'health' of science! I pursued submissions to numerous other journals, but for all, editorial triage prevailed. COVID19 came and passed, and then I recently (May 2023) re-read a core manuscript that I first read in 1986 (I was studying for my Master's degree at Wake Forest University, North Carolina, USA), which in hindsight changed my education and future career. Katch's ^[3] sincere concerns about the past and future quality of research within the Exercise Sciences was my introduction to scientific philosophy, which to that time (1986) my university education had never revealed to me. Katch mentioned the increasing need for "the development of method-oriented brick builders" within the exercise sciences (p. 594, right column, 1st paragraph) and that recent re-reading sparked a resurgence of my interest in Forscher's original manuscript, in addition to the courage and integrity he showed to express his concerns. It is because of Forscher's ^[1] and Katch's ^[3] leadership in caring for science by promoting the need for the correct pursuit of science that I decided to, once again, rejuvenate my efforts to publish my extension to Forscher's brilliance.

The content that follows is a revised version of my original 2018 efforts, with three meaningful changes that involve an extension of the metaphor to now include, 1) the questionable practice of editorial triage, 2) the deterioration of peer review, and 3) the unequal opportunity (nationally and globally) to participate in an increasing cost entry system of both the dissemination of science, and the access to published science.

If you have not read the 1963 letter by Bernard Forscher, read it now, and then progress to the content that follows. As such, I propose that the letter continues as presented below.

Background

There is a need to add to Forscher's metaphoric dictionary to clarify important aspects of science not covered in the original letter, but which have since become notable features of the developing post-1960's scientific method. To build bricks and mortar you need quality raw materials. In science, existing knowledge and research skills = raw materials. Quality raw materials strengthen the bricks and the mortar so they can eventually come together as a firm building structure (edifice or paradigm). Inferior quality raw materials = false knowledge, or constructs, or in more extended expression, information that is prematurely accepted as a fact. The crafting of poorly built bricks and mortar = pseudoscience. Despite good intent by scientists (builders and master builders) and junior scientists (brickmakers), if the raw materials are poor, even if the design and intent of the construction are sound, the building will not stand the test of time; it will not represent the truth and therefore be more adherent to the process of pseudoscience. Consequently, inferior quality raw materials (deficient and/or incorrect knowledge and skills) are a huge concern to the quality of building construction (science) as they "infect" all components of construction. If you combine poor intent by poorly trained builders and brickmakers with poor raw materials, poor brick design and poor construction, then there will be fewer buildings built, those that are built will be more likely to crumble, there will be longer periods between new building designs and functions (paradigm shifts) and, by definition, lost opportunities causing retarded progress and a consequent deterioration of society.

Continued Content Beyond 1963

Despite warnings from builders, and even some brick makers, of the increasing occurrence of inferior raw materials, poor brick design and construction, questionable building design, and delays in building construction, the pace of brickmaking forged ahead.

In years past, the quality of the bricks was regulated by the builders themselves. Each accepted the responsibility of an ethical, unbiased screening system (peer review). Yet as the pace of brickmaking increased, the training of brickmakers became more rapid, the quality of the brick makers became increasingly questionable, and the sheer number of bricks produced meant that brick inspection could no longer be left only to the builders. A conflict of interest that progressively developed was ignored. Now, poorly trained brickmakers with even less experience in building were becoming increasingly involved in brick screening. Less quality raw materials were tolerated, fashionable brick designs were promoted, and many brickmakers were now

involved in building even though they lacked the qualifications and experience for quality brick inspection. Of course, this reinforced the need for more brick makers, which in turn forced the need for more brickmakers to transition into building and allowed inferior bricks and mortar to be used in construction. And so, this problematic positive feedback cycle continued, leaving the true master builders to have less and less say in the pursuit of their craft. The conflict of interest developed because the institutions that paid the brick makers were financially rewarded by their benefactors, and the government, for making bricks and not quality buildings. Consequently, there were lucrative incentives to just make bricks without caring much at all about the broader, more important societal benefits of construction.

If these dire developments were not calamitous enough, a new practice emerged in the brick inspection. Bricks were now being judged on how favourable their design was to a society based on overseers of the inspection process (editors) and not the more qualified brick inspectors and a subset of qualified and experienced builders. Thus, many bricks were no longer thoroughly inspected at all and returned based on superficially conceived faulty development or simply with the label of not meeting expectations or storage requirements. The blind and non-transparent manner of this process was concerning because evidence grew of incidences where bricks resulting from revolutionary design and structure were blocked from inspection simply because they were different, and as such, evidence of their superior function was ignored. Perhaps there was too much money invested in all the prior bricks being sold to have them be relegated to insignificance by changes induced by superior products supporting revolutionary building designs (paradigm shifts). But once again, this only caused retardation of progress in brick making and building construction.

As the master builders aged, with many eventually succumbing to their life's clock, the true purpose of building construction gradually vanished from the education of brickmakers and their transition to builders. The method of construction itself also gradually turned towards a less righteous social role as a pawn to the finance-based drivers of this enterprise.

It soon became apparent to the politicians that this brick making enterprise was good for the economy. As is the case when the drive for the powerful dollar replaces respect for common sense, the purpose of making bricks soon further transitioned from quality to quantity; from purpose to profit. Support enterprises were formed, further escalating financial flow into this system. Such flow extended to the institutions that trained the brick makers and the builders. Governments invested more funds into churning out more

brick makers, so the institutions, in turn, changed their structures and processes. These institutions also developed business models of operation, and once again, income and profit became the primary drivers of purpose. As building construction took too long and there was no immediate gain to be made from such construction, this higher purpose gradually became obsolete.

The storage facilities (journal publishers) for these bricks were not blind to these changes. They too were tantalized by the cash flow they saw before them. Where once these storage facilities were relatively small, local, and only concerned with larger composites of brick collections (books), they soon realized that given the investment of institutions to brick making, supported by an investment of government, further supplemented with investment from corporate entities, they could not only acquire individual bricks at no expense, but also charge the institutions to store them. Then, with the dawn of the concept of "open access", these storage facilities once again added another layer of charge to the brick makers and their institutions for letting all people have access to the bricks so they could mostly recycle them into newer bricks of even more questionable quality. Increased storage sites within the storage facilities merged, and such conglomerates were soon spread across the world. The global scale of this enterprise and the enormous profit potential of the construction enterprise meant that more and more storage facilities formed, allowing more storage potential for more and more bricks, which were now easier to make due to the lowered standards of production and increasing numbers of brick makers resulting from increasingly streamlined (though deficient) education and training.

Despite the multiple cost cycles of this process to the institutions, they did not care. Government funds into the enterprise partially covered these costs. Nevertheless, there was a lack of quality leadership within the institutions and government, and as such nobody with power within the system questioned the logic of the imbalanced cash flow. These empowered players were also oblivious to the reality that available funds were inadequate, the financial input needed in this system was constraining the magnitude and quality of brick making and building construction, and that in the long-run the system was unsustainable. Regardless, as each institution towed the line, others followed without question, further clogging the construction enterprise.

The financial dependence of this ballooning system meant that only the financially wealthy brick builders of the wealthy countries could contribute to and benefit from the construction enterprise. This was unfortunate, as many current and future quality brick makers and builders, especially from less financially developed countries, were segregated from construction opportunity, where in turn the

world was also segregated from the enormity of their potential contributions. This reinforced and expanded the chasm that is the gap between those that had lucrative construction to those that did not. Clearly, participating in quality construction was not a right for all humanity, nor was all humanity equally deserving of benefitting from it. For some reason, such truths did not perturb the mainstream builders, their institutions, or the financially capable consumers of the construction on domestic and global scales.

The governments of the financially wealthy countries were delighted at these developments. For their interpretation was more cash flow, more companies being formed, and more people likely to be happy and agree to support political re-election. The unrealistic (and perhaps unsustainable) costs of all this were hidden in the mantra of more brickmakers in training, less of the populace out of work, and that continued investment into education and construction was essential for the futures of their citizens. Sadly, the public remained oblivious to the extent of the poor-quality brick making, in addition to the magnitude of how their tax dollars were being redirected to the bank accounts of the now multi-national (not local) storage

companies that were accumulating record profits. All was good because the money machines were happy.

Yet what of the master builders? Do any exist anymore? What of their purpose in the pursuit of ensuring quality brick making and building construction in all countries and societies of the world? What happened to the concept of quality and the pursuit of buildings that last? What does all this mean to the future of humanity that depends on the quality of the buildings and not their number, the size of the stockpiles of bricks, or which country they are from? Can building construction, across all roles, levels, and geography, once again return to the pursuit of the originally intended higher purpose?

References

1. [Forscher BK](#). 1963. Chaos in the brickyard. *Science*. 142(3590):339.
2. [Kuhn T](#). 2012. *Structure of scientific revolutions*. Chicago: University of Chicago Press.
3. [Katch V](#). 1986. The burden of disproof. *Med Sci Sports Exerc*. 19(5):593-595.

Declarations

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