

**Who owns what we know, and why it matters?
The history of privatization of scholarship**

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Abstract: We live in a knowledge age in which various forms of knowledge and culture enter into the building of our living together on the planet and are the main source of economic growth. Scientific knowledge, technological innovation, cultural creativity and academic advance are certainly involved with it and play a key role in contemporary times as humanity faces unprecedented challenges. Ownership and access to scientific knowledge are contested. There is a clear tension between calls for openness and sharing of scientific knowledge and, more broadly, for the recognition of knowledge commons and the involvement of commercial interested in the production and dissemination of scientific knowledge. In this paper, I explore the historical roots of this tension going back to the emergence of scientific publications and looking at the key developments in the evolution of the relationship between commercial interest and the production of scientific knowledge. This analysis reveals that cultural repertoires that are deployed by advocates, scholars, and commentators in today's debates over scientific commons run deep into the history of scholarship production and largely reproduce an inherent tension between openness and commercialization that has always contributed to the development of science since the 1600s.

Key words: scientific commons, commercialization, culture, history of science, intellectual property law, open access

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Knowledge ownership and access

I believe that scientific knowledge is a public good. I suspect that the great majority, if not all, of the attendees of this conference agree with me. Agreement on this premise however does not solve the any problem; it creates more problems. If scientific knowledge is a public good, what is the appropriate regulatory framework to allocate ownership and access rights to this public good? What rules of ownership and access should govern the production and dissemination of scientific knowledge? Is the current framework and are the legal tools currently available to scholars facilitating the sharing of scientific knowledge? I became aware of the tension between commercial interests and making science widely accessible, between the interests of authors and publishing houses, between author's prestige and quality of their research, between readers in wealthier institutions and poorer institutions, of a possible divide between the Global North and the Global South. While we live in an age of instant global communication, a time when collaborations between countries and continents have never been easier, market concentration in the academic publishing industry threatens the free exchange of ideas and data. As the venues for publication have increased, *visibility* of publications has decreased dramatically. Access to top publishers, journals, and other outlets has become not only increasingly competitive but also important for the publication to be noticed, read, and become influential. Commercial publishing and commercial interests in the production of knowledge in particular are problematic to the extent to which commercial interests are not aligned with the pursuit of knowledge. For instance, in 2007, it became known that Elsevier, Wiley and the Association of American Publishers had hired a public relation firm to contrast the growing movement towards open access. This lead me to being a line of research focusing on questions of patterns of inclusion in and exclusion from (scientific) knowledge, formation of knowledge elites, and the divide between the "haves" and the "have-nots."

This paper is part of a larger project aimed at further exploring the tension between knowledge commons and privatization and looking at some of its consequences. In this paper, which is the first of a series, I look at the issue from an historical perspective in an effort to explore the roots of this tension. My expectation when I began working on this issue was that, in the early days of scholarship production, support for knowledge commons was stronger, or at least not challenged and affected by the interference of commercial publishers. Further, the open access movement often claims that a culture of knowledge commons were present in the old days. While the clothes may be new (open access), the idea is an old one (knowledge commons), some argue. However, have commercial and academic interested always been untangled? Has knowledge been increasingly privatized? Is the movement towards open access and the idea of scientific knowledge as common resource a recent and new phenomenon or the development of cultural demands already present in earlier times?

In this paper, my primary objective is to explore these questions for the viewpoint of cultural history. To do so, I look at the birth of scholarship, its relationship to the publishing industry, and early practices. I am particularly interested in the cultural frames and repertoires that were developed and deployed in the early days of scholarship and to reason about their persistence, perhaps in mutated form, in contemporary debates about knowledge commons.

The paper is divided in various sections. First, I look at the tension between knowledge commons and privatization in contemporary debates and practice surrounding scientific

knowledge. I then turn to discussing the emergence of the practice of scientific book and journal publishing. I look at practices and events that are representative of cultural underpinnings that are connected with the current tension between knowledge commons and privatization. In a *long-durée* perspective, I briefly discuss key developments of the past two centuries that have transformed production, ownership, and access to scientific knowledge—in particular those that have enhanced the presence of commercial interests in scholarship production. In the last section, I highlight key insights of this historical analysis for current debates on ownership and access to scientific knowledge.

The tension between knowledge commons and privatization

Publishing scientific information in scientific publications had been the gold standard for centuries. Personally, as a rather young scholar, I have always thrived to combine the “publish or perish” mantra with the desire, aspiration, or idea to share my research, my findings, and my ideas to a wide audience. Scholarly publications have been the primary, but exclusive, vehicle of such ambition. My career as a scholar has been so far rather short. I published my first paper in 2000 as a graduate student but the first proper peer-reviewed publication came in 2005. As shown in Table 1, I published a dozen papers; some of which have appeared in better journals than others, some have been more widely read and cited than others; some, and this is the important point, are available to the readers for free either because they were published in an open-access journal or because they became freely downloadable sometimes after publication. Not surprisingly, my mostly cited paper is one that is freely accessible and that appears in the journal with the highest Impact factor (ironically, however, this paper discusses a certain legal framework that has been profoundly reformed by subsequent legal interventions and that, for many purposes, made my paper useless as a reference to the current legislative framework). Why isn't scientific knowledge then more freely accessible? Why aren't all highly respected publication venues committed to expanding access to knowledge?

Calls for shared ownership and free access of scientific knowledge can certainly be easily found. Paragraph 30 of the World Medical Association's Declaration of Helsinki, as amended in 2008, recited that

Authors, editors and publishers all have ethical obligations with regard to the publication of the results of research. Authors have a duty to make publicly available the results of their research on human subjects and are accountable for the completeness and accuracy of their reports.

Table 1 – Access to my peer-review scholarship

Publication	Year	Publisher	Price	Free online version?
Colum.-VLA JL & Arts	2000	Columbia University	24 hours (\$29.95) access through HeinOnline	No
Genomics, Society and Policy	2005	Springer	Open Access	Open Access
Human reproduction	2005	Oxford University Press	Free (after embargo)	Yes
Medical Law International	2005	SAGE	\$25	No
The International Journal of Human Rights	2006	Routledge	\$37	Yes
Health and human rights	2008	Harvard School of Public Health	Open Access	Open Access
Human Fertility	2009	Informa UK Ltd.	\$50.00 (24-hour electronic access)	No
Kennedy Institute of Ethics Journal	2009	The Johns Hopkins University Press	\$20	No
Critical Public Health	2010	Routledge	\$37	No
Social & Legal Studies	2013	SAGE	\$25	No

In 1996, leaders of the scientific community agreed on a groundbreaking set of principles, known as the Bermuda Principles, requiring that all DNA sequence data be released in publicly accessible databases within twenty-four hours after generation.² Article 1 of the Universal Declaration on the Human Genome and Human Rights, which emerged from UNESCO’s general conference in 1997, adopted the view that the genome sequence as the heritage of humanity. In 2002, the Budapest Open Access Initiative stressed the importance of free and unrestricted online availability and identified strategies to achieve this objective: expanding the number of authors who publish in open access journals, giving them control over the integrity of their work and the right to be properly acknowledged and cited; identifying new cost recovery models and financing mechanisms; deposit refereed journal articles in open electronic archives (self-archiving); and launching a new generation of journals committed to open access and helping existing journals that elect to make the transition to open access.³ The signatories of the 2003 Bethesda Statement on Open Access Publishing agreed on the need to identify and promote “significant, concrete steps that all relevant parties can take to promote the rapid and efficient transition to open access publishing” and encouraged “faculty/grant recipients to publish their work according to the

² Policies on Release of Human Genomic Sequence Data. Washington: US: Department of Energy. Human Genome Project; [30 October 2008]. http://www.ornl.gov/sci/techresources/Human_Genome/research/bermuda.shtml.

³ <http://www.opensocietyfoundations.org/openaccess/read>

principles of the open access model.”⁴ In 2012, in an effort to reinforce the idea that University’s goal is the “creation, dissemination, and preservation of knowledge,” Harvard University imposed an automatic open access license—granting the university a nonexclusive, irrevocable right to distribute their scholarly articles for any non-commercial purpose—on faculty authors in participating schools.⁵

The literature is also filled populated by scholars proposing, arguing, and defending the conception of knowledge as a public good, a shared resource. It is often argued “open” science is good science, that is that the results of scientific research should be published and otherwise laid open for all to use and evaluate. In 1973, Merton argued that the spirit of science is a “communitarian” one when it comes to access to the knowledge and identified in openness, universalism and communalism and the importance of scientific priority and reputation the fundamental norms of the scientific community. Nelson (2004, 462) stressed that knowledge is a canonical case of something that is non-rivalrous in use in this sense,” and that there is “no ‘tragedy of the commons’ for a pure public good like knowledge.” The 2007 volume *A Framework for Analyzing the Knowledge Commons*, edited by Ostrom and Hess, constituted a seminal contribution collecting contributions discussing the value of conceptualizing knowledge as a shared resource. Recently, Frischmann’s *Infrastructure* argues for scientific knowledge to be considered part of our infrastructure, a shared resource with social values, and for commons as a mode of management of knowledge infrastructure. Taken together, these are all efforts that acknowledge, support, and reinforce the notion that scientific knowledge is a public good—the open-access movement being an important but not exhaustive component of the field.

The movement towards the creation of knowledge commons and open access is however challenged privatization of scientific knowledge. Patenting and commercialization activities come to mind first. Privatization came in the form of legislative and judicial expansion of private ownership over scientific data. In the United States, Nelson points out, courts “have ruled that at least some of the results of basic research can be patented.”⁶ Also the Bayh-Dole act of 1980 strongly encourages universities to take out patents on their research results where they could and has brought about profound changes in the way universities give access to their research results.”⁷ As a result, “important areas of science are now much more under the sway of market mechanisms than used to be the case. And in particular, in some important fields of science important bodies of scientific understanding and technique now are private property rather than part of the commons.”⁸

Changes increased costs of access to scientific literature run counter the idea of knowledge commons. The cost of journal subscriptions has been on the rise for decades. The Association of Research Libraries calculated that, in the period 1986-2003, the price per subscription of serials rose by 215% and libraries that were member of the Association of Research Libraries paid 260 percent more for their serial subscriptions in 2003 than in 1986 despite having increased the

⁴ 2003 Bethesda Statement on Open Access Publishing, <http://www.earlham.edu/~peters/fos/bethesda.htm>.

⁵ <http://osc.harvard.edu/policies>.

⁶ Richard R. Nelson, "The market economy, and the scientific commons," *Research Policy* 33, no. 3 (2004).

⁷ Ibid.

⁸ Ibid.

number of subscriptions by only 14 percent.⁹ The merits of this rise, also known as “serials crisis” are controversial since the industry is not very transparent about its costs and profits for the industry seem to be rising as well. In 2013, Van Noorden reported from the columns of *Nature* that

Data from the consulting firm Outsell in Burlingame, California, suggest that the science-publishing industry generated \$9.4 billion in revenue in 2011 and published around 1.8 million English-language articles — an average revenue per article of roughly \$5,000. Analysts estimate profit margins at 20–30% for the industry, so the average cost to the publisher of producing an article is likely to be around \$3,500–4,000.¹⁰

Also the profits of commercial publishers seem to be higher than the profits of academic publishers. A study of the London-based Cambridge Economic Policy Associates “estimated margins at 20% for society publishers, 25% for university publishers and 35% for commercial publisher.”¹¹ Further, the publishing industry has restricted libraries and readers’ freedom of choice. Libraries are often forced to purchase bundles of journals. Bundles offered by large commercial publishers are attractive as they allow libraries to subscribe to large numbers of journals in order to avoid paying the exorbitant list prices for the ones they need. However, they divert funds that could be allocated to other purchases. Even when libraries maintain a journal subscription, many publishers limit access by imposing restrictive terms. “Because most electronic resources are leased, rather than purchased outright, libraries experience consequences beyond rising subscription costs. License terms that limit the number of users for electronic resources, disallow off-campus use by university affiliates, or restrict the sharing of resources by interlibrary loan are common and mean that the University does not always get the full value of what it pays for.”¹² This has led thousands researchers to join a boycott of Elsevier, a prominent publisher of science journals in 2012.¹³ The number of researchers that have joined the initiative is 13424 as of April 2013.¹⁴ The serials crisis has had ramifications also outside the Global North. Many researchers and institutions in less developed countries have had difficulty in accessing journals.¹⁵ The problem is further compounded that the high degree of concentration of ownership in the publishing industry that followed the corporate mergers and acquisition frenzy of the 1990s and 2000s.¹⁶

A brief history of early book production

⁹ Judith M. Panitch and Sarah Michalak, “The Serials Crisis. A White Paper for the UNC-Chapel Hill Scholarly Communications Convocation,” <http://www.unc.edu/scholcomdig/whitepapers/panitch-michalak.html>.

¹⁰ Richard Van Noorden, “Open access: The true cost of science publishing,” *Nature* 495, no. 7442 (2013).

¹¹ *Ibid.*

¹² Panitch and Michalak, “The Serials Crisis. A White Paper for the UNC-Chapel Hill Scholarly Communications Convocation”.

¹³ Thomas Lin, “Researchers Organize Boycott of a Publisher,” *The New York Times*, February 13 2012.

¹⁴ <http://thecostofknowledge.com/>.

¹⁵ K. N. Igwe, R. O. Oyewo, and S. M. Yusuf, “The Importance of Open Access Initiatives to the Serials Crisis in Nigerian Academic and Research Libraries,” *PNLA Quarterly* 77, no. 3 (2013).

¹⁶ Dan Tonkery, “Mergers and acquisitions in the library marketplace: opportunity or threat?,” *Serials Review* 27, no. 1 (2001).

My historical inquiry begins with the birth of modern scholarship, which I trace back to the publication of the first scientific book (1623) and first scientific journal (1665). The first two books that can be properly classified as “scholarly production” were Galileo’s *Letter on Sunspots* and *Il Saggiatore*, which were published respectively in 1613 and 1623. They can be said to be scholarly publications in a full sense because they were the first works published by an academy (Rome-based *Accademia dei Lincei*).¹⁷

The birth of modern scholarship was very much structured around ideas and beliefs that had influenced the publishing world for centuries. Before the invention of the printing press in 1440, knowledge production and access was elitist—only a tiny fraction of the population had the educational and financial means to access knowledge—and highly controlled by institutions, primarily the Church and the King. It was never free. Certainly these restrictions were in part dictated by technological means that were available before 1440. Until then, written words circulated thanks for the dedication of multi-talented scribes and manuscript illuminators copying manuscripts with bird’s feather quill pens on parchment, a technology which had supplanted papyrus beginning from the first century A.D. Parchment were initially put together giving light to scrolls or *volumen*. Between the second and the fourth centuries A.D., the codex, with its individual pages and left hand binding, became increasingly preferred to the scroll. The seeds of the modern book were planted. This technology became the paradigm in the late Middle Ages bureaucracy’s efforts to record legal and administrative decisions.

The fifteenth century brought an entire new technology, filled with potential for transformation: the printing press. The mechanical movable type printing was invented in 1440 by Johannes Gensfleisch, usually known as Gutenberg, a German blacksmith, goldsmith, printer, and publisher. His officine began its activities by printing religious texts: a papal letter, two indulgences, and the famous 1455 Bible. Gutenberg’s invention quickly spread around Europe and beyond (it was first used in Japan in 1590).

Hailed by many scholars as a revolution, its major contribution in the short term was to undermine religious institutions’ monopoly in written knowledge circulation.¹⁸ It became a force towards openness and access to knowledge as it subtracted the exclusivity of written words to the church and the monarchs. Yet, its social impact should not be overstated. Existing structural arrangements and cultural frames limited the democratic force of the printing press for many decades. “For a long time, the ‘printing revolution’ only affected a narrow scholarly elite.”¹⁹ Books were printed in very few copies and expensive. Only few could afford purchasing a written book and were able to enjoy reading it. Further, intellectual elites resisted the allure of the new technology and remained devoted consumers of manuscripts as a symbol of resistance of elitism to knowledge vulgarization. In addition, the great majority of printed books were

¹⁷ Alan Cook, "Academic Publications before 1940," in *A century of science publishing: a collection of essays*, ed. Einar H. Fredriksson (Amsterdam; Washington, DC: IOS Press, 2001), 16.

¹⁸ Elizabeth L. Eisenstein, *The printing press as an agent of change: communications and cultural transformations in early modern Europe*, 2 vols. (Cambridge, UK; New York: Cambridge University Press, 1979).

¹⁹ Martyn Lyons, *A history of reading and writing: in the western world* (Houndmills, Basingstoke, Hampshire; New York: Palgrave Macmillan, 2010). 35.

religious, works of reference, and compilations of laws. Thus, with some notable exceptions (Galileo's body of work being the most prominent), they were not carriers of revolutionary ideas.

The printing press also brought commercial interests into the picture from the beginning. The seminal Descartes's treatise *Discourse on the Method* was published in 1637. The book was originally published by the Elsevier brothers in Leiden, Netherlands. Later, it was translated into Latin and published in 1656 in Amsterdam. However, the 1637 edition of Descartes's *Discourse* was published without Descartes's name appearing on it. The philosopher judged the financial conditions imposed by the Elsevier brothers to be unacceptable and he looked for another publisher. He wanted "the whole text to be printed with very fine characters and on very fine paper" and that at least two hundred copies should be kept for his personal use for he "desired to distribute (sic) some of them to a quantity of people."²⁰ The Elzevier brothers who published the 1637 editions did business since 158 as House of Elzevir, a family-owned publishing house (Elsevier, the publishing giant that is now a part of the Reed Elsevier group and that publishes about 250,000 articles a year in 2,000 journals including the top-ranked *The Lancet* and *Cell*, took its name from the small pioneering publishing house of the Elzevier brothers.)

Interestingly, piracy seems to be a companion of knowledge. Since the early days of academic publishing, plagiarists and impostors, who abounded, contributed to knowledge spreading. Galileo's ideas became accessible around Europe not because of the editions published in Venice by the *Accademia* but because his works were "frequently pirated in unauthorised editions, illegal imitations or abbreviated versions."²¹ Galileo's images of the lunar surface, Lyons reminds us, were reprinted without permission in Frankfurt and London editions, from woodcuts which were recycled and did not reproduce identical images each time there were used."²²

Overall the "printed book revolution," while transformative in the long run, did not transform the ways in which scholars and intellectuals had communicated since then. The early days of academic book publishing show that the interest of authors and publishers were not always aligned, and that the presence of books itself was not guarantee of sales and consequently that new knowledge was widely accessible by virtue of being published.

A brief history of early development of scientific journals

Scientific journals appeared at a later time, in part as a reaction to books being inadequate vehicles of knowledge distribution. The first scientific journal is commonly believed to be *Philosophical Transactions*, a periodical published by the Royal Society of London since 1665. Henry Oldenburg, the Society's first secretary, paid for its publication with the expectation, formalized in an agreement with the Council of the Royal Society, of reap any profits. Unfortunately for Oldenburg, the journal did not generate profits. Scientific journals would become a source of revenues for publishers only after WWII. Until then, were primarily published by academic societies and distributed to each society's members (as part of the annual

²⁰ Jean Galard, "The Birth of Scientific Publishing - Descartes in the Netherlands," in *A century of science publishing: a collection of essays*, ed. Einar H. Fredriksson (Amsterdam; Washington, DC: IOS Press, 2001), 9.

²¹ Lyons, *A history of reading and writing: in the western world*. 38.

²² Ibid.

membership dues) and to other societies. As a result, journals made little or no sales for profit for almost three centuries.

The lack of financial profitability is somehow in line with their cultural roots, which are to be found in a practice called “the republic of letters”. These epistolary exchanges among intellectuals and savants began during the Renaissance and have possibly survived in contemporary forms of international collaboration among thinkers (blogs come to my mind). McNeely and Wolverton define it as “an international community of learning stitched together initially by handwritten letters in the mail and later by printed books and journals.”²³ The “republic of letters” was a means to engage intellectual exchange among elites avoiding censorship and other forms of restrictions that for decades limited scientific publishing. In fact, academies were given permission by the state to publish. They were not free to do so. They were able to publish periodicals because they have been given printing and licensing privileges by the French and English kings. In the eye of the kings and their censorship officials, Biagioli speculates, these publications were of “a marginal kind...hard to print, sell, and review anyway.”²⁴ The rapid increase of nonscientific printed books kept them sufficiently busy. “They may have been little at stake in the texts whose publication there were to control...typically scientific texts had little political relevance, provided marginal business opportunities, and posted little risk from the censors’ point of view.”²⁵

Academies produced also a key feature of current scholarship production: peer review. In order to guard these exceptional prerogatives, the academies developed a system to manage and control the risk of losing royal support, which was hard to obtain. The practice of peer review was deployed to separate ideas deemed worth of publication and those that did not meet the academies’ standard. It acted both as a mechanism of self-protection of the academies by which could select those ideas that deserved the academies’ imprimatur and as a barrier for potential authors to access to the means production of knowledge (and thus as a de facto barrier to the free flow of ideas). In Mario Biagioli’s words,

Both of the first two state-sponsored or state-chartered academies, the Royal Society of London (1662) and the Académie Royale des Sciences of Paris (1699), were granted the privilege to publish their own works. This was an extraordinary exception from the licensing and censorship systems that since the 16th century had been established by political and religious authorities throughout Europe in response to the perceived political and religious threats posed by the printing press. All texts, scientific or not, had to be reviewed and licensed in order to be printed and sold legally. The first scientific academies were not exempted from these requirements, but were allowed to administer them on their own. Peer review was introduced to select manuscripts to be published according to the new academies’ printing prerogatives.²⁶

²³ Ian F. McNeely and Lisa Wolverton, *Reinventing knowledge: from Alexandria to the Internet*, 1st ed.(New York: W. W. Norton, 2008). 122.

²⁴ Mario Biagioli, "From Book Censorship to Academic Peer Review," *Emergences: Journal for the Study of Media & Composite Cultures* 12, no. 1 (2002): 14.

²⁵ *Ibid.*, 15.

²⁶ *Ibid.*, 14.

The *long-durée* perspective

Scholarship production, ownership, and access have been radically changed since the times Descartes and Galileo were looking for publishers. Thousands of scholarly books and journals are published every year. Some are only available on digital platforms. The publishing industry is populated by corporate conglomerates that own dozens of publishing brands and deliver scholarly products to institutional and individual customers throughout the world. Readers consume eBooks on various reading devices. The spread of knowledge is undermined by raising cost of access to scholarship. Journal subscriptions have become significantly more expensive to the point that their cost is prohibitive to some institutions. Academic publishers publish smaller number of printed book for first editions (300 to 500 with sales over 1,000 copies to be considered a success). Journal submission acceptance rates are declining and publishing work in widely read publication is harder especially for yours scholars, scholars who pursue noon-mainstream research, scholars coming from less prestigious academic background. How did we get here? Is there any continuity with the early days of scholarship publishing?

The academic publishing world has experience drastic change as a consequence of the change both at the macro- and micro-level. The “reading fever” that hit Europe between 1750 and 1830 significantly contributed to the opening of knowledge to new audiences and the creation of a public sphere in which knowledge would be distributed, accessed, and consumed by new readers. Habermas argues that printed consumption activated formation of a public space for knowledge.²⁷ The “reading fever” was produced by the technological developments in the printing industry, which led increased consumption of printed publications. Books thus became a much more accessible commodity, an artifact that would become a permanent fixture in many households. Yet, this wave of openness and democratization was incomplete because, as Habermas notes, the public space of knowledge was a space that was not made accessible to the massed but only to bourgeois elites.

The “reading fever” also increased science’s vulnerability to commercial interests. The growth of a free market and the spread of commercial capitalism being the driving forces behind the reading fever, commercial interests became more prominent ingredients of academic publishing.²⁸ Business considerations became part of the decision making process at the level of publishers, and authors’ ability to secure a publishing contract became increasingly linked to the projected commercial success of the book. Journal publishing, by contrast, remained immune to commercial interests. While scientific journals grew exponentially in numbers (by 1800, 750 scientific journals were published with some regularity. In the nineteenth century, the number grew to several thousands) and multiplied, they became assets only after World War II. The growth of journals in the eighteenth and nineteenth centuries were primarily driven by the professionalization of science, the growth of regional and international academies and scholarly societies, and the emergence of new areas of scientific inquiry.

²⁷ Jürgen Habermas, *The structural transformation of the public sphere: an inquiry into a category of bourgeois society* (Cambridge, MA: MIT Press, 1989).

²⁸ Ibid.

Journals became profitable assets for publishers after World War. Publishers transformed the scholarly journal industry by addressing various gaps left open by traditional scientific publishing failed. Publishers cleverly founded new journals in emerging areas of sciences that were not represented by existing academies and societies. They invested in sectors that had scientific potential, sectors often driven by charismatic scholarly figures who gave assurance of potential for readership. As a result, new journals started popping on a daily basis to the point that journal count conducted in December of 2011 based on the Ulrich's Serials Analysis System revealed that the number of active, academic/scholarly, peer reviewed journals to be 26,746—an astonishing number in an age of publish or perish!²⁹ The explosion of publication is certainly testament of the validity and durability of Royal Society of London's vision.

Journals' content also evolved. Overtime, papers adopted the Introduction-Methods-Results-Discussion format as the golden standard in the life sciences. This is the result of increased professionalization and science and specialization of publications. The flip side was increased homogeneity among scholarly products and growing difficulties for unconventional research to find suitable publication outlets. Papers also become progressively longer and with more citations, acceptance rates declined, and the delay between submission and publication increased. In 2000, Ellison reported that in the 1970s, the average delay between submission to the *Quarterly Journal of Economics* and acceptance of the paper was nine months. In 2000, it was 20 to 30 months.³⁰

Peer review acquired the characteristics that identify it as the paradigm of publishability of contemporary science. Peer review acted not only as an engine of democratization of science, by upholding academies' and scientific communities' ability to produce and spread science, but also as a force against openness and democratization in science, by partly reproducing biases and elitism that characterize academia and by acting as structural bottleneck suppressing innovation.³¹ Peer review a gatekeeper also became an engine to build a journal's reputation in entirely new ways.³² A 2008 study of journals in economics and finance found that lower acceptance rates are associated with higher citation count, citation impact factors, and survey-based rankings of journals.³³ The same study further proved that lower acceptance rates are significantly associated with type of readership, higher circulation, lower rates of invited papers, and availability of reviewers' comments.³⁴

Although radically different in spirit and implementation, this academies' practice to set standard of publishability developed into the current practice of screening meritorious journal submission and grant applications by scientific experts to evaluate them in a manner free from inappropriate

²⁹ Calculations of Heather Morrison. Appendix C: how many active, scholarly peer reviewed journals? <http://pages.cmns.sfu.ca/heather-morrison/appendix-c-how-many-active-scholarly-peer-reviewed-journals/>

³⁰ Glenn Ellison, "The slowdown of the economics publishing process," *Journal of Political Economy* 110 (2002).

³¹ Ibid; David F. Horrobin, "The philosophical basis of peer review and the suppression of innovation," *JAMA* 263, no. 10 (1990).

³² Tom Jefferson et al., "Editorial peer review for improving the quality of reports of biomedical studies," *Cochrane Database of Systematic Reviews* 2 (2007).

³³ Paul J. Haensly, Paul E. Hodges, and Shirley A. Davenport, "Acceptance Rates and Journal Quality: An Analysis of Journals in Economics and Finance," *Journal of Business & Finance Librarianship* 14, no. 1 (2008): 2.

³⁴ Ibid., 7.

influences. From a defensive practice geared towards protecting the academies from criticism, peer review became internalized professional discipline in the nineteenth century when “peer” became synonymous of academic researcher rather than royal subject and “review” a highly structured, blind process involving a plurality of anonymous reviewers and precise professional norms.

Other features of the current field of scientific journals (impact factor, rankings, h-index) are very much recent developments in the field. For instance, the idea of an impact factor was first mentioned in 1955. These features, collectively known as “scientometrics,” produce the belief that some journals are more prestigious and high quality than others. Its findings are routinely used by libraries in naming purchase decisions, by authors in making submission decision, and by university in making tenure and promotion decisions. “Some would equate prestige with high impact,” Garfield, one of the founding fathers of the field, notes.³⁵

Lessons

Where does this historical analysis leave us? What lessons can be learned that can shed a light on today’s debates on science’s openness, scientific commons, and the role of commercial publishers in the production and dissemination of knowledge? This rather quick (and possibly superficial) historical overview of how scholarship has developed provides interesting insights on the historical roots of cultural repertoires that are currently deployed both in shaping and reshaping the structural framework of scholarship ownership and access as well as in debating the merits of the dominant framework and its alternatives.

Production and access to knowledge have never been a matter of free exchange, immune from outside interference. When scholarly books first appeared, the Church and the King acted as gatekeeper of new publications. Book publishers and scientific academies were given permission to publish that was narrowly tailored and subject to revocation. With regard to books, commercial publishing has been intertwined with scholarship dissemination since the birth of modern science. The Elzevier brothers proposed a publication contract that was unacceptable to Descartes who wanted to keep at least two hundred copies for personal use. For many decades, however, commercial publishing did not flourish in part because books’ penetration was limited. They were expensive and only attractive to a small fraction of the population. Reference works, and primarily encyclopedias, compilations of laws, and catalogues, were the product of choice of commercial publishers for many decades. Nonetheless, the presence of commercial interests in scholarly book publishing created tensions between authors and publishers that is still alive today.

Journals, on the other hand, emerged exclusively as tools to promote the dissemination of knowledge not as commercial products.³⁶ They were born as a development of the practice known as “republic of letters,” which was inspired by the ideal of free exchange of ideas and knowledge sharing. Egalitarian principles of reciprocity and exchange guided its development—ideals that are very much at the roots of the current movement towards open access. Commercial

³⁵ Eugene Garfield, "The history and meaning of the journal impact factor," *JAMA* 295, no. 1 (2006): 92.

³⁶ Cook, "Academic Publications before 1940," 20.

publishers' initial involvement with journals was merely upon commission of academic societies, which were assumed the role of paying customers. Journals became vehicles of profits much later when the professionalization, segmentation, and specialization in of sciences opened up new fields and created new readership. Journals however still preserve their original spirit of tools for the dissemination of knowledge. In 2013, Martin Frank noted in the columns of the *New England Journal of Medicine* that,

A scholarly journal serves several functions for authors and readers. It serves to register the ideas of the authors, date-stamping them to provide appropriate credit for discoveries. It disseminates the authors' ideas and results to an interested community of scholars. It certifies the validity of articles through peer review. Finally, it archives articles, preserving them for future reference and citation.³⁷

Regardless of the spirit of egalitarianism and openness that shaped the birth and growth of academic journals, scientific knowledge remained for centuries a matter of elites. Whether religious, bureaucratic or intellectual, elites were the primary producers and consumers of scholarship. Women were excluded from the "republic of letters." The "reading fever" brought books only to the houses the *bourgeoisie*. As subscription costs continue to go up, the question elitism in knowledge dissemination is still an issue, one that has been a constant companion of knowledge production and access since the dawn of science. One of the current forms of resistance to expensive journal subscriptions and book cover price is piracy. A contested practice, piracy has become easy to implement as a consequence of the appearance of the internet and the digitalization of scholarship. Interestingly, piracy emerged almost contextually with the appearance of scholarly books. It seems to be a practice that is both intertwined the presence of commercial publishing (and to resulting financial barrier to accessing knowledge) and acting as a means of dissemination of scientific knowledge.

With the paper, I intended to show that historical analysis can inform contemporary debates and reflections on the tension between the call for knowledge commons and increasing privatization of knowledge. Many of the nodes that are problematic in today's thinking about these issues are the product of long term patterns of conduct that are informed by cultural schemas that emerged at the time scholarly publishing was born and that, since then, have become deeply embedded in our everyday experience and understanding of scientific knowledge. Awareness of the persistence of social practices and cultural beliefs contributes not only to better informing current debates but also to our understanding that these trajectories have a long history and that change of cultural schema and social arrangement is possible but needs to address some of the fundamental mechanism that have contributed to the birth and growth of science as we know it.

³⁷ Martin Frank, "Open but Not Free — Publishing in the 21st Century," *New England Journal of Medicine* 368, no. 9 (2013): 787.

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