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# The Patent and the Paper:
## A Few Thoughts on Late Modern Science and Intellectual Property

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## Abstract

Marie and Pierre Curie's decision not to patent the discovery (1898) and later isolation (1902) of radium is perhaps the most famous of all disinterested decisions in the history of science. To choose publishing instead of patenting and openness instead of enclosure was hardly a radical choice at the time. Traditionally, we associate academic publishing with "pure science" and Mertonian ideals of openness, sharing and transparency. Patenting on the other hand, as a byproduct of "applied science" is intimately linked to an increased emphasis and dependency on commercialization and technology transfer within academia. Starting from the Curies' mythological decision I delineate the contours of an increasing convergence of the patent and the paper (article) from the end of the nineteenth-century until today. Ultimately, my goal is to suggest a few possible ways of addressing the hybrid space that today constitute the terrain of late modern science and intellectual property.

**Keywords:** academic publishing, patenting, intellectual property, Marie Curie

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# I

In 1898, Marie and Pierre Curie discovered that *pechblende*, a byproduct of the radioactive disintegration of uranium, traditionally used for the decoration of Bohemian glassware and viewed as nothing more than waste following this production, proved to contain two new elements, polonium and radium. We now know that this was the birth of a new science, one Marie Curie later baptized *radioactivity*—a science that would turn out as much foe as friend. The Curies announced their discovery in three *notes* published in the *Comptes Rendus*, the journal of the French Academy of Sciences. As the nineteenth century drew to a close and the twentieth dawned, it was clear to them as well as the international scientific community at large that the *journal* was the obvious choice when it came to announce discoveries and claim scientific authority. Indeed, during the twentieth-century the scientific journal would dominate research to the point of exclusivity and the scientific peer-reviewed article become the common denominator by which the measurement and evaluation of scientific output and excellence took place; establishing a "virtual monopoly on expert scientific authorship" (Csiszar 2010: 403). However, modern information is made up of a cornucopia of documents, which to some extent seem to have broken this monopoly in favor of "a mixed economy of genres that include preprint archives, working papers, and patent documents" (Csiszar 2010: 428, n.14).

In this exploratory paper, I rely on the Curies famous decision not to patent radium or the process of its extraction in order to query the relationship between the paper (i.e. the scientific article) and the patent, two types of documents that traditionally have been considered antithetical, on either side of sciences "pure" and "applied." In the current debate on enclosure/openness there is little doubt that intellectual property, and especially perhaps patents, symbolizes the truly dark underbelly of an ongoing commodification of research and higher education (Greenberg 2007; Rader 2010; McSherry 2001). Rent-collecting demons known as patent "trolls" and the impenetrable layers of counter-productive patent "thickets" (Lemley 2013) that hinder, rather than encourage innovation, have come to illustrate everything that has gone haywire in the intellectual property system. And rightly so. But there is another, and perhaps complementary way of looking at patents that has all but been forgotten in the consensus around their general badness: historically, patents were part of public knowledge. They still are. And yet, somehow they are not. I am acutely aware of the fact that very few—including myself—primarily associate patents with this original ideology of openness. Perhaps this is why Judge Newman's declaration that the "study of patented information is essential to the creation of new knowledge, thereby achieving further scientific and technological progress" (cited in Rimmer 2008: 176) is such an important reminder to reclaim this earlier history. The purpose of this essay, then, is not to offer an apologia for patents, but rather to suggest a modest re-thinking of

the dichotomy between paper/patent and enclosure/openness in order to contribute to a more nuanced understanding of what public knowledge might be and how we best might continue to defend it.

## II

The work that resulted in those three *Comptes Rendus* articles took place in a small, glassed-in space used as a storage room for machines, a cold and drafty makeshift laboratory located on the premises of the *École Municipale de physique et de chimie industrielles* (EPCI), Pierre Curie's academic home for more than twenty-three years. Later, this insufficient shed would become part of the Curie myth, as if driving home the point that the Curies' discoveries were all the more impressive because they were denied proper facilities and worked outside the establishment rules.

Marie and Pierre Curie's collaboration was consolidated during roughly a six-year period beginning in 1897 and ending with the 1903 Nobel Prize in Physics, which the husband-and-wife team shared with Henri Becquerel. Theirs was depicted as a unique marriage, and the couple became the target for innumerable at-home articles in the French and international press. Journalists found them endlessly fascinating. He was something of an outsider. The son of a 1871 communard, Pierre Curie was home-schooled and never attended any of the *Grand Ecoles*. Marie Sklodowska, his wife and mother of their two daughters Irène and Eve, had arrived in Paris from Poland and was working on her thesis at the Sorbonne. They were certainly illustrious, but more than anything, they were *modern*.

This most famous of all scientific partnerships came to an abrupt end on April 19, 1906, when Pierre Curie slipped and was run over by a horse-drawn carriage while crossing the rue Dauphine. Newspapers spared no detail of how the scientist's head was crushed under the wheel and held nothing back when recapitulating the dramatic moment when the identity of the victim was revealed. A heavy *camion*, a slick pavement, and at age thirty-nine, Marie Curie was a widow with two young daughters to support. Almost immediately succeeding her husband as Professor at the Sorbonne, Marie Curie now embarked on the path to becoming the world's most famous female scientist.

Fast-forward to 1923, almost twenty years after her husband's death, when Marie Curie would tell the story of the discovery of radium and the birth of the science of radioactivity to the world. If she was famous already at the time of the first Nobel in 1903, this was nothing to her status in the beginning of the 1920s, when she had morphed into an international celebrity of the highest order. She had achieved an unparalleled accomplishment by receiving a second Nobel in 1911, this time in Chemistry and without having to share the honor with anyone. She had toured the U.S. to enormous fanfare and had joined the League of Nations' recently formed *Commission Internationale de Coopération Intellectuelle* (CICI)

in order to work for international cooperation in science and research following the First World War.

And in 1920, she had also been offered the opportunity to write a biography of her late husband Pierre for the book series "Les Grands Hommes de France." Managing their public personas in print was something scientists were increasingly willing to do, and readers had a huge appetite to take it all in, and (like today) the biography was a popular genre in which to do so. Curie now found herself in the position to ensure Pierre Curie a well-deserved place in the company of immortal "Great Men," like Descartes, Talleyrand and Racine. And yet, because his work and life was so tightly bound to hers, she was also offered—under the most acceptable of forms—the possibility of overseeing her own legacy. The story was hers to write and leave to posterity. Nobody could contradict her.

One of the most important passages from *Pierre Curie* articulates what we could call the Curie's scientific ethos, setting the benchmark standard for a particular kind of scientific disinterestedness.

> Our investigations had started a general scientific movement, and similar work was being undertaken in other countries. Toward these efforts Pierre Curie maintained a most disinterested and liberal attitude. With my agreement he refused to draw any material profit from our discovery. We took no copyright, and published without reserve all the results of our research, as well as the exact processes of the preparation of radium. In addition, we gave to those interested whatever information they asked of us. This was of great benefit to the radium industry, which could thus develop in full freedom, first in France, then in foreign countries, and furnish to scientists and to physicians the products which they needed. This industry still employs today, with scarcely any modifications, the processes indicated by us (Curie 1923: 111).

As she enumerated the dos and the don'ts, Curie situated scientific practice within a gift/market dichotomy upholding two distinct systems of credit and reward. Intellectual property represented an "interested" perspective where you "reserve advantage." Choosing to "publish without reserve" and keeping "no detail secret," instead epitomized the values of disinterestedness. Abstaining from proprietary shackles on radium spurned more innovative activity in both science and industry. The industry could then develop "in full freedom, first in France, then in foreign countries." This is not the time nor the place to go into details on how this text ended up the way it did in *Pierre Curie*, what importance the "I" and the "me," and the "we," and the "our" had to the consolidation of scientific authority and autonomy. Suffice to say that a lot of interest went into the production of disinterestedness. Twenty years after the fact, Marie Curie made it very clear that choosing to publish without reserve was a deliberate rejection of keeping advantage through intellectual property.

## III

Of course, this separation of publishing and patenting in *Pierre Curie* was a bit more complicated than Marie Curie made it out to be. Pierre Curie had in fact patented several instruments that brought him an extra income that was far from negligible (Hemmungs Wirtén 2015: 20) and while the ethos of the scientific community of the time was openness, patenting was becoming increasingly important. Paul Lucier describes the double bind of nineteenth-century scientists: "any scientist who patented research put at risk his professional integrity. Still, if a scientist wanted to protect his rights as a discoverer, he would have to patent" (Lucier 1996: 154). As so often was is the case, things tend to come in shades of grey rather than just black and white.

The relinquishment made by the Curies in their negation of patenting is disinterestedness in action: a principle which, together with communism, universalism and organized skepticism, echoes Robert Merton's (1968) famous four pillars of the scientific ethos. But not everybody was as convinced as Curie that gifting radium had been a sensible thing to do. In 1941, T Swann Harding saw Curie's actions not so much giving away as abandoning, letting a dangerous element loose rather than controlling it by expertise. He wrote:

> A false sense of ethics induced Mme. Curie not to patent her discovery and thereafter to see that it was used beneficially for mankind. This meant giving her discovery over to every quack and commercial faker who chose to exploit the public by means of it. […] Her inverted and distorted sense of probity turned radium over to rascals (Swann Harding 1941: 386).

Regardless of how you view the Curies' choice of non-patenting, when I began working on Curie from the perspective of intellectual property a few years ago, the decision not to patent radium was foremost in my mind. While I have worked on intellectual property my whole academic career, I have mainly done so on copyright and remained in the sphere of media and the cultural industries. For the past few years, however, I have increasingly wanted to move into slightly different intellectual properties (patents and trademarks) and into a slightly different arena, one John Willinsky (2006: 17) terms "the know-biz" industries.

So, Curie became a vehicle for me to think about what is happening in academia around these issues today, where the action of non-action seemed refreshingly out of sync with the present situation. One where "publish or perish" has been supplanted with "patent or perish." With Steven Shapin's eloquent description of the relationship between the past and the present in mind, I too felt that

> it is inevitable that we write about the past as an expression of present concerns, and "we *can* write about the past to find out about how it came to be that we live as we now do, and indeed, for giving better descriptions of the way we live now (Shapin 2008: xiii).

So, exactly how *do* will live now? Let me attempt an answer to that question by returning once more to the Curies and what I think is a telling snapshot example

of our life right now in this intersection of publishing and patenting. The shed within the *École Municipale de physique et de chimie industrielles*, the one where the discovery of radium took place, is long gone. The school on these premises where Marie and Pierre Curie discovered and later isolated (1902) radium, still stands, but today under the name *École Supérieure de Physique et de Chimie Industrielles de la Ville de Paris* [ESPCI Paris Tech]. With the addition of the penultimate Americanized label of excellence attached to it [Paris Tech], the school markets itself on its website by connecting publications with patents. "The researchers of the school construct the knowledge of tomorrow and publish *1 article daily* in the best international scientific journals, they invent the industry of the future and *deposit 1 patent a week*" (ESPCI 2015). Assigned different roles, "constructing the knowledge of tomorrow" by publishing, versus "inventing tomorrow's industry" by depositing patents, the balance between the two is seven articles to one patent per week. The contrast and the quantification is perhaps eye-catching but hardly unique for ESPCI Paris Tech in the "the late age of information" (to paraphrase David Jay Bolter's (2001) expression "late age of print").

Not only is that quantification in itself quite remarkable, but it is also ironic that it is articulated by the very school (granted, one that belonged in the "applied" category) where that famous decision of non-patenting occurred, a story that the school uses to good effect in its own narrative on its illustrious heritage.

ESPCI's identity relies on patents and articles as complementary, not antithetical and the school quite seamlessly brings together the two practices—publishing and patenting—that Curie wanted to separate so badly in *Pierre Curie*. And still, the process is one where the paper "comes first" and the patent "follows." This is a trajectory that no longer follows. In the late modern university, scientists may well find themselves working under the premises of flows going in just the opposite direction: signing non-disclosure agreements because patents, not publications, are the expected outcome of their research funding. So, while the distinction between publishing and patenting was never absolute, incompatibility now seems to have turned into compatibility and divergence into convergence. Thus, the ESPCI just seem to be doing more or less what all universities do today: compare, number and measure both types of documents within the framework of an overarching metrics culture.

## IV

As I was preparing this paper for *Publishing for public knowledge* it struck me that the theme of this workshop expressed a kind of implicit agreement on what public knowledge is. Few of the speakers or members of the audience would oppose or argue *against* the values of openness and academic freedom outlined in the workshop invitation. We have little difficulty thinking of publishing as (at least ideally) a vehicle for the promotion and wider dissemination of knowledge

and science—despite the deeply flawed current economics of publishing and its abundance of legal snafu. But arguing that *Patenting for public knowledge* is important or even possible is almost inconceivable. Thirty years of intellectual property expansionism has certainly made most of us who work in this field both weary and skeptical that there is any good to be had from the patent system, or entertain the notion that we could actually learn more about the evolution of the idea of public knowledge by looking at it from the perspective of patenting.

T Swann Harding felt that Curie would have shown more interest in the well-being of the general public if she had decided to control radium by one or several patents rather than letting it roam "free." What he suggested was patenting as a form of "defense," and one early example of such a strategy is the 1923 University of Toronto patent on insulin (Cassier 2008; Weiner 1987). The university patented because the university and the scientists in questions were the best stewards of the knowledge, or so the argument went. We generally think of university patenting as quite a recent affair, with the controversial Bayh-Dole Act from 1980 as a watershed moment in this history. Bayh-Dole opened the door for federally funded U.S. universities to patent their research and has come to epitomize the collision between an earlier "gift-economy" and an incoming culture of propertization (Rai & Eisenberg 2003; Rooksby 2013; Etzkowitz 1994; Metlay 2006; Popp Berman 2008).

So we really start out thinking that patents have nothing to do with public knowledge, in fact, that they might undo it altogether. But bear with me just for a little while longer while I point out a few crucial aspects that we associate with publishing that are actually present also in patenting. Not a revolutionary suggestion by any means, but one that might offer us the keys to a complementary space that seems particularly rewarding in its potential to query the notion of what "public knowledge" is and how it comes about.

We might consider that both patents and articles are claim-making texts: whether or not we consider the journal article and the patent application complementary or ideologically incompatible, both make claims. Just as a scientific publication needs to conform to a narrative logic and generic conventions (the order in which the argument is made, the length of the text) does a patent application preclude certain rhetorical stances and highlight others (Myers 1995). Such claims are authored: writing an article or a patent application, is in both cases mediated via authorship. Such a category includes individuals as well as groups, and in the case of patents, lawyers and patent examiners who act as both readers and authors and whose role in the proliferation of scientific authorship still remains underexplored. But authors or inventors cannot make claims in secret. Disclosure is the backbone of the journal article and the patent application alike, where the "limited monopoly" or exclusive right to control the exploitation of the patented invention for a twenty-year period rests on "the disclosure of technical information." Disclosure implies the presence of readers, readers who can judge and evaluate the

claims within certain practices of reading and evaluation. In academia these include well-known processes of peer-review and in terms of patents the examination and evaluation of an application *before* awarding a patent. Patent agents formed a new profession as did patent examiners (Swanson 2009). What sort of expertise did they engender? Why and when did it appear? Such knowledge links to storing and archiving, as patents passed through patent offices that competed and collaborated with bibliographic institutions, they too became bibliographical institutions that collected the growing pool of information needed to establish what in patent-speak is known as "prior art," because failure to do so might invalidate the patent. Equally, failure to "know the field" is just as dangerous in scientific publishing, and can only be avoided by careful and methodical database searches that have much in common with the preparations undertaken when writing a patent application. These are just a few overlaps, a few points of comparison suggesting that to follow the paper trail of patents historically means rethinking, not only one of the most contentious intellectual property rights today, but also our perception of openness and public knowledge, and, in extension also the role played by secrets and secrecy.

## V

If the paper and the patent are both part of the infrastructure of research and both have something to do with the construction of public knowledge, should we then just learn to love the patent and stop worrying? Not quite. It is undeniable that the acceleration in university patenting, the metrics culture in general and the corporatization of higher education is deeply problematic. Patenting is one part of the problem, no doubt. But there are other, perhaps even more worrying tendencies. Silence, for instance. Because if both the patent and the paper was about making knowledge available, the presence of trade secrets and confidentiality agreements has increasingly turned laboratories into walled and privatized spaces within universities. The old chronology—where the paper took precedence—no longer automatically holds. The conditions for what we think of as "public," in the dissemination of knowledge is one of the most pertinent and controversial questions facing research and higher education today. It is one that scholars and scientists encounter on a daily basis, but that also reverberate into the ideological cornerstones of basic science and research. A further understanding of the complexities involved in the shared history of publishing and patenting can provide new insight into current processes of enclosure/openness within knowledge intensive milieus. These developments require further study in order to assess the impact on future knowledge production, but I believe it is essential that we revisit and rethink some of our own assumptions on what public knowledge is when we do so.

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