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Ramsay's and some other sealed packets

Rayleigh and Ramsay's discovery of argon; the French Academy system

Alwyn Davies [1] provides the full French text (and English translation) of William Ramsay's sealed packet ("pacquet scellé" or "pli cacheté") recorded by the French Académie des Sciences on 13 August 1894 under serial number 5038. The packet (first opened in 2004) contained an account dated July 1894 in which Ramsay stated that he and Lord Rayleigh were co-discoverers of a new gas present in the atmosphere which was either a "modification" of nitrogen (we would say "allotrope") or else a new element. At that stage (in particular, not having decided which of the two things the new gas was), Rayleigh and Ramsay were not ready to publish. Fearing that they might be beaten to publication by others, Ramsay deposited the sealed packet with the French Academy to ensure that, if they *were* so overtaken by others, then they would have impeccable evidence of their own priority. In fact, the work progressed so rapidly that the "insurance" afforded by the sealed packet was needed for less than six months, and indeed proved to be insurance against an event that did not occur. On 4 August (even before the sealed packet had made its way to France and been recorded) Ramsay informed Rayleigh that the new gas indeed comprised a new element. On 31 January 1895 [2], an experimentally thorough and compellingly argued paper was received for publication by the Royal Society.

The January 1895 paper reported isolation of a new gas from the air. William Crookes had measured the spectrum of the gas and identified numerous characteristic lines. The high ratio of specific heats C_p/C_v of the gas was close the theoretical value of 5/3 for a monatomic gas. (The only gas in which such a ratio had been previously observed was mercury gas at high temperature.) The density of the gas indicated a new element "argon" with a molecular weight of around 40. Accordingly, the atomic weight of argon was also around 40, suggesting (correctly) a location after chlorine in the periodic table in a new group (now called group 18, the noble gas group [3]). This was indeed a great discovery, not only affording a new element but also supporting the hypothesis of an entire new group of elements; so, even if in July 1894 Ramsay had expected progress to be as rapid as it turned out to be, his filing of the sealed packet so as to save something from the disaster of being beaten to publication by others was arguably not a disproportionate precaution.

Davies notes that the French Academy had instituted this system of preserving evidence of priority for scientific ideas and discoveries in 1735, and that a total of 18 000 sealed packets had been deposited by 2012.

This article now draws readers' attention, firstly, to a sealed packet of Michael Faraday's in which he explicitly sets out the *reputational* benefit he hoped to get from the sealed packet, and secondly to the special *commercial* value given to sealed packets in French patent law.

Faraday's sealed package in the Royal Society safe

In Faraday's *case*, it was a theoretical idea for which he wished to secure priority [4] [5]. He composed a paper dated 12 March 1832 which was deposited, sealed, in the in the Society's safe. In this paper (like Ramsay's, now available to the public), he presciently postulated that electrical and magnetic action was not instantaneous and required time for its transmission, and furthermore that a vibratory theory would apply to these phenomena. Faraday ends his paper by explaining his fears of others claiming credit before he is ready to publish:

"These views I wish to work out experimentally: but as much of my time is engaged with the duties of my office, and as the experiments will therefore be prolonged, and may in their course be subject to the observation of others; I wish, by depositing this paper in the care of the Royal Society, to take possession as it were of a certain date, and a lone right, if they are confirmed by experiments, to claim credit for the views at that date: at which time as far as I know no one is conscious of or can claim them but myself."

Sealed packets under French patent law; the INPI system

Patent law in France is by international standards anomalous in according value, in this case *commercial rather than merely reputational*, to sealed packets. In the French Intellectual Property Code [6], the first paragraph of Article L613-7 reads, translated, as follows:

"Any person who in good faith at the date of filing or priority of a patent was ... in possession of the invention which is the subject of the patent has the personal right to exploit the invention despite the existence of the patent."

To take advantage of this exception to infringement in French law, the practice of depositing sealed packets with parties whom a court would regard as trustworthy is very widespread. A packet deposited with the French Academy would be effective; but a far larger number of packets are deposited with INPI, the French national intellectual property office (with which patent applications may also be filed). INPI receives more packets *in each year* than the French Academy has received over the entire lifetime of its system. INPI receives annually over 40 000 sealed packets (under the name enveloppes Soleau) [7], charging as of 2 November 2016 €15 for each 5 years the packet is kept [8].

So if A deposits an enveloppe Soleau describing an invention, and later B files a French patent application and sues A for patent infringement, then A can have the enveloppe opened and can plead the exception to infringement provided by Article L613-7. (The significance of the word "personal" in the Article is that the French patent is still enforceable by B against others who have no exception to rely on. The words "in good faith" exclude the case where A got details of the invention from B in confidence and then abused the confidence by filing the enveloppe Soleau.)

In giving such commercial protection to a secret idea, even a paper proposal or a pure laboratory result, France is out of line with other countries. *In the UK*, for instance, if B were to sue A under an equivalent UK patent, the production of the enveloppe (or of any other evidence showing A had prior independent secret

knowledge of the invention) would not alone be sufficient to avoid the Court's finding infringement: there is an exception only for prior secret *commercialisation* (or serious and effective preparation therefor) undertaken in good faith [9].

If in the UK one does not presently want to invest in commercialisation of an invention, while wishing to preserve one's option later to do so without the risk of being blocked by subsequent third-party patent applications, then the only possibilities are –

(i) to file one's own patent application – which is expensive and means that the invention will be published 18 months later – or

(ii) simply to publish (in which case the invention goes into the public domain).

As a matter of public policy, the UK patent law gives only minor benefit to those who keep their inventions secret.

This difference reflects a more general issue of patent law in Europe. In 38 states (geographically spread from Turkey to Iceland as of 2 November 2016 and including all EU states) [10], the written law on the *granting, validity, and interpretation* of patents has been harmonised to a remarkable degree, in a process that began in the 1970s; any residual variation arises mostly from the inevitable variation between the approach taken by different courts, which can arise within a jurisdiction as well as between jurisdictions. In contrast, the written law on *infringement* has not been harmonised to the same degree, which allows (*inter alia*) the variation between the French code and the UK statute just discussed. The recent Agreement on the Unified Patent Court [11] will, if it comes into force, effect significant harmonisation of infringement law within the EU subset of the 38 states. However, even in that Agreement, the French anomaly, while implicitly acknowledged to exist, is not eliminated. Article 28 reads (author's italics):

"Any person, who, if a national patent had been granted in respect of an invention, would have had, in a Contracting Member State, a right based on prior use of that invention *or a right of personal possession of that invention*, shall enjoy, in that Contracting Member State, the same rights in respect of a patent for the same invention [when under consideration by the EU Unified Patent Court]."

The French sealed packet systems seem destined to flourish for many more years.

1. Alwyn Davies, *RSCHG Newsletter*, 2016, **70** (Summer), 33-37.

2. Lord Rayleigh and William Ramsay, *Proc R Soc London*, 1895, **57**, 265-287.

3. Group 18 has been the IUPAC recommendation since 1988 (https://iupac.org/what-we-do/periodic-table-of-elements/), though previously the group was known as Group 0. The term "inert gases" – "argon" itself was derived from the Greek for "inactive" – was used until the discovery of $XePtF_6$ (Bartlett,

N., *Proc. Chem. Soc.*, 1962, 115-116); after this, the group was renamed by analogy with the term “noble metal”).

4. L. Pearce Williams, *Michael Faraday – a biography* (Chapman & Hall, London, 1965; Da Capo paperback reprint, New York, 1987), page 181 (Da Capo edition).

5. James Hamilton, *Faraday – the life* (Harper Collins, London, 2002), pages 257-258.

6. *Code de la propriété intellectuelle* (consolidated version 25 April 2016) available as http://www.wipo.int/edocs/lexdocs/laws/fr/fr/fr500fr.pdf

7. *2014 en chiffres* (INPI, Courbevois, France, 2015), available as https://www.inpi.fr/sites/default/files/inpi_rapport_data.pdf, and previous annual versions of essentially the same publication.

8. *L’enveloppe Soleau* (INPI, Courbevois, France), https://www.inpi.fr/sites/default/files/brochure_enveloppe_soleau.pdf.

9. UK Patents Act 1977 (as amended), Section 64, available, like all UK statutes, under http://www.legislation.gov.uk/. To understand how the wording of this leads to the conclusion above, see standard patent law texts such as the current edition of the *CIPA Guide to the Patents Acts* (Sweet and Maxwell, London).

10. For a map showing the 38 states (members of the European Patent Organisation), see http://documents.epo.org/projects/babylon/eponet.nsf/0/8C003885190F73D2C1257EEE002E4EBB/$File/European_patents_coverage_en.png. When the system in question commenced with the opening of the European Patent Office on 1 June 1978, only the following states participated: three large states UK, France, and Germany; the three “Benelux” states; Sweden (not then a member of the predecessor of the EU); and Switzerland (not a member of the EU even today), see http://www.epo.org/about-us/organisation/member-states/date.html.

11. *Agreement on a unified patent court*, https://www.unified-patent-court.org/sites/default/files/upc-agreement.pdf. The agreement has been signed (as of 2 November 2016) by all EU member states other than Spain and Poland. The non-signature of Spain and Poland is not fatal: if of the states which *have* signed, the UK, France, Germany, and ≥10 others proceed to the next step of “ratification”, then the Agreement will come into force with respect to those ≥13 states. The referendum in favour of Brexit has cast doubt on the timing and likelihood of UK ratification, with the result that future of the Agreement is in peril.